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EXECUTIVE SUMMARY

INTRODUCTION

New Yorkers want access to energy supplies that are competitively priced and reliable. To help ensure this, the New York State Energy Planning Board, through adoption of this State Energy Plan, positions the State to maximize the use of clean and efficient energy and transportation technologies that can meet the State's growing demand for energy, provides for the safe and secure operation of the State's energy and transportation systems, and supports the continued development of competitive energy markets. The energy policies and strategies contained in this State Energy Plan (Energy Plan) are designed to keep New York at the forefront among states in providing its citizens with abundant, competitively priced, clean, and efficient energy resources.

New York is leading the nation in energy research and development and is poised to take advantage of technological developments among the most advanced uses of energy and to attract energy technology and component manufacturing industries to the Empire State. The State is also leading the nation in adopting flexible, yet stringent, environmental policies that balance the need for more energy with the need for improved public health and safety. The Energy Plan supports increased energy diversity, with greater emphasis on renewable energy development and improved energy efficiency, and innovations in regulatory policies that encourage and support development of competitive energy markets. Through the integration of energy, environmental, and transportation planning, the Energy Plan promotes transportation systems that are energy-efficient and environmentally sensitive.

Providing a secure and well-maintained energy infrastructure while ensuring adequate energy supplies is critical to the State's economy. New Yorkers spent $38 billion on energy in 2000 to support the State's economy and residents, including its industrial processes, commerce, services, transportation, lighting, heating, and cooling. The State's economic resurgence and expanding employment since 1998 resulted in larger than anticipated increases in energy demand, particularly for electricity. In turn, this growth has hastened the State's need for new energy resources and enhanced delivery capability. Further, in light of the recent terrorist attacks in New York and Washington, D.C., and continuing threats of attack, the State is working closely with the Federal government to protect the State's energy and transportation infrastructures against future terrorist attacks or acts of war.

The Energy Planning Board's vision for New York's future is one in which possibilities are realized for developing a world-class and sustainable renewable-based energy economy. New York will continue to lead by example, demonstrating new energy and transportation technologies, supporting infrastructure maintenance and enhanced capability, and promoting smart economic growth.

SUMMARY OF MAJOR RECOMMENDATIONS

The Energy Plan presents a balanced approach to meeting the State's energy needs, considering the role of new energy resources, an enhanced energy distribution infrastructure, and improved environmental protection. As a result, the Energy Plan reduces the economic and social risks associated with energy supply disruptions and price volatility. Moreover, the balanced portfolio of energy resources envisioned in the Energy Plan provides greater economic development opportunities within the State, particularly in the development of indigenous renewable energy resources and greater energy service reliability. Applying this same concept to the transportation sector, the Energy Plan's balanced approach incorporates environmentally-sound and energy-efficient strategies for new and innovative transportation applications and services, improving transportation efficiency and demand management, and enhanced transportation diversity (*i.e.*, different modes of transportation).

The Energy Plan provides broad statewide energy policy direction to guide State agencies, Boards, Commissions, and Authorities in their decision making. As energy markets continue to develop and new energy resources and services become available, new policies might be warranted. Nonetheless, given the State's current energy situation and vision for the future, the Energy Planning Board adopts the following public policy objectives:

1. Supporting the continued safe, secure, and reliable operation of the State's energy and transportation systems infrastructures;

2. Stimulating sustainable economic growth, technological innovation, and job growth in the State's energy and transportation sectors, through competitive market development and government support;

3. Increasing energy diversity in all sectors of the State's economy through greater use of energy efficiency technologies, and alternative energy resources, including renewable-based energy;

4. Promoting and achieving a cleaner and healthier environment; and,

5. Ensuring fairness, equity, and consumer protections in an increasingly competitive market economy.

To meet these public policy objectives, State policies must be balanced and based on long-term strategies that encourage and support development and use of new, cleaner technologies, more efficient energy-using practices, and improved transportation, energy production, and delivery systems. The energy policies and long-range planning strategies contained in the Energy Plan are designed to ensure that New York's energy needs are met by encouraging competition while ensuring fairness and equity, ensuring mobility, ensuring system reliability, and improving the State's environment.

As energy demand increases, the effects of energy production and use on natural resources require that the State consider the implications of energy decisions on the State's environment and health and safety of its residents. The Energy Plan balances the need for new energy supplies and investments in critical energy infrastructures with the need to protect the State's environment and public health. It also takes into consideration the significant changes that are transforming New York's energy markets to some of the most competitive and innovative in the nation. Finally, the Energy Plan provides strategic direction and policy guidance to foster further collaboration on the State's energy, environmental, transportation, and economic development activities.

A summary of major policy strategies and recommendations follow.

1. The State adopts the goal of reducing primary energy use per unit of Gross State Product (GSP) 25% below the 1990 level of energy use, by 2010.

2. The State adopts the goal of increasing renewable energy use as a percentage of primary energy use 50%, from 10% of primary energy use currently, to 15% by 2020.

3. The State adopts the goal of reducing greenhouse gas emissions 5% below 1990 levels by 2010, and 10% below 1990 levels by 2020.

4. The State will continue its study of the security of New York's energy infrastructure used for production, storage, and delivery. The study will include a risk and vulnerabilities assessment and recommendations for appropriate actions and will be conducted cooperatively by the Office of Public Security, the appropriate Energy Planning Board agencies, and major energy market participants, in cooperation with appropriate federal agencies.

5. The State supports significantly increasing energy resource diversity in electricity generation and transportation through increased reliance on indigenous, renewable, energy efficiency, and demand management resources. The State will support greater energy diversity through investments in technology and infrastructure development for indigenous and renewable fuels, demand reduction techniques, and energy efficiency. In addition, the State supports the continued safe operation of nuclear, coal, natural gas, oil, and hydroelectric generation as part of a diverse portfolio of electricity generation resources.

6. The State supports the development of additional energy supplies and demand reductions, and infrastructure to meet the State's energy needs.

7. The State will continue its efforts to reduce traffic congestion and delays and increase energy efficiency in transportation through a complement of actions that include supporting public transit, transportation management, intelligent transportation systems, and capital construction.

8. The State should reauthorize Public Service Law (PSL) Article X, scheduled to expire on January 1, 2003, relating to the siting of new major electric generating facilities.

9. The State should reauthorize Article 6 of the Energy Law, for statewide energy planning, scheduled to expire on January 1, 2003.

10. The State will continue to work expeditiously toward establishing a regional common market for electricity.

11. The State supports expanding bio-fuels research and development activities, with the goal of creating a self-sustaining private sector bio-fuels industry in the State within 5 to 10 years.

12. The State supports the development and use of distributed generation (DG) and combined heat and power (CHP) technologies at customer sites, with the goal of becoming a national leader in the deployment of clean, distributed generation technology.

13. The State encourages the Federal government to adopt new corporate average fuel economy standards for vehicles to address vehicle energy efficiency in a way that protects driver and passenger safety.

14. The State will review forthcoming recommendations from the Department of Environmental Conservation's Environmental Justice Advisory Group and implement appropriate recommendations in a timely manner.

15. The State will continue to strive to reduce energy costs for all New Yorkers with the expectation of narrowing the disparities between New York's costs and costs in other States and regions of the country.

ORGANIZATION

The Energy Plan is organized as follows:

Section 1 Executive Summary, Preface, Energy Plan Findings and Conclusions, and Energy Policy Objectives and Recommendations.

Section 2 Analyses of the energy related issues that the Planning Board identified for inclusion in the Energy Plan.

Section 3 Assessments of the State's energy markets and infrastructures, including forecasts of energy demand, prices, and supplies, and assessments of energy efficiency and renewable energy resources.

Section 4 Compliance with the State Environmental Quality Review Act (SEQRA).

Response to Comments (under separate cover) received in public hearings and written comments on the Draft Energy Plan.

PREFACE

INTRODUCTION

The United States (U.S.), by and large, has access to abundant supplies of energy. These energy resources enable our country to be the world's largest producer of goods and services and the leader in the world economy. Events in recent years, however, have served to remind Americans just how critical energy is to our society and way of life. After having access to plentiful and inexpensive energy supplies through much of the 1980s and 1990s, the nation has experienced intermittent price increases for natural gas and petroleum products, particularly over the past several years. In the winters of 1996-1997 and 2000-2001, natural gas prices spiked, as increasing demand for this fuel threatened to outstrip available supply, and starting in 1999, heating oil and gasoline prices also increased. During this same period, after a natural gas pipeline explosion in New Mexico, and power outages in the West and Midwest, concerns began to grow over the safety and reliability of the nation's energy systems infrastructure. In 2000, events in the State of California focused the country's attention on the adequacy and reliability of electricity markets, when its plan to restructure the electricity industry was undermined by supply shortages and extreme price volatility. Most recently, following the terrorist attacks of September 11, 2001, energy markets throughout the world are being tested for their resiliency as prices, particularly petroleum, become more volatile and uncertain, threatening global economic recovery.

The New York State Energy Planning Board (Planning Board) recognizes the inextricable link between the availability and price of energy and economic activity and well being. The U.S.'s position in the world economy and the standard of living of its residents is dependent, to some extent, on having ready access to reasonably priced sources of energy. The primary sources of energy are, to a large degree, imported from abroad, have significant and long-term effects on the environment, and ultimately face depletion. Until new and sustainable sources of energy are developed, the U.S. and New York will continue to experience the economic and social challenges of fossil fuel dependency.

A global challenge – such as ensuring adequate and reasonably priced energy in the face of climate change – requires a global solution. There is, nonetheless, a vital role for the states in addressing future energy needs. Although there is considerable

uncertainty in the energy markets and technology developments, states can position themselves for the future. States can adopt policies to: diversify energy supplies, sources, and uses; improve the efficiency of energy use with attendant economic benefit; stimulate the production of indigenous and renewable-based energy resources; foster development and use of new technology, products and services; enhance mobility; and minimize harm to the environment from energy use.

The *State Energy Plan and Final Environmental Impact Statement* (Energy Plan) recommends and supports policies designed to keep New York State at the forefront among states in providing its citizens with fairly priced, clean, and efficient energy resources. The Energy Plan positions New York to take advantage of technological developments among the most advanced uses of energy, and to participate in emerging markets for valuing and trading environmental attributes associated with energy use. In addition, implementation of the Energy Plan will stimulate job growth associated with the development of new technologies for the efficient production and use of a variety of energy sources and the expanded use of indigenous and renewable-based sources of power.

The Energy Plan is a blueprint to inform energy decision making and help ensure that customers have the ability to choose the energy products and services that best suit their needs, a secure and well-maintained energy infrastructure is provided, the State's transportation system becomes more energy-efficient, and adequate energy supplies that are critical to the State's stability are available.

State Energy Plan Overview

Providing a secure and well-maintained energy infrastructure, while ensuring adequate energy supplies, is critical to the State's economy. The State's economic resurgence and expanding employment since 1998 resulted in larger than anticipated increases in energy demand, particularly for electricity. In turn, this has hastened the State's need for new energy supplies and enhanced delivery capability. Further, in light of the recent terrorist attacks in New York and Washington, D.C., and continuing threats of attack, the State is working closely with the Federal government to protect the State's entire energy and transportation infrastructure against future terrorist attacks or acts of war.

In response to the tragic events of September 11, 2001, Governor Pataki created the Office of Public Security to coordinate and bolster anti-terrorist efforts throughout New York State. The Office, which reports directly to the Governor, is responsible for:

- Reviewing existing State policies, protocols and strategies designed to detect, respond to, and recover from terrorist acts or threats, identifying potential shortfalls, and implementing appropriate revisions and enhancements;

- Coordinating State resources for the collection and analysis of information regarding terrorist threats, and facilitating information sharing among local, State, and Federal law enforcement officials; and

- Assessing the preparedness of State and local health systems to respond to terrorists attacks.

The Office of Public Security is specifically charged with developing a comprehensive statewide anti-terrorism strategy, including an assessment of the vulnerability of critical systems infrastructures to terrorist attacks. Energy Planning Board agencies, specifically the State Departments of Transportation (DOT), Public Service (DPS), and the New York State Energy Research and Development Authority (NYSERDA), are working closely with the Office of Public Security and appropriate federal agencies to address security at important energy resources and public assets, including nuclear power plants and other electric generating facilities, electricity transmission and distribution systems, telecommunication systems, public roadways, railways, bridges and tunnels, natural gas and petroleum pipelines, and water systems. The Energy Planning Board agencies have committed their full support to the Office as it develops strategies and plans to protect these facilities from attack, and if attacks occur, ensure rapid restoration of critical infrastructures.

As energy demand increases, the effects of energy production and use on natural resources require that the State consider the implications of energy decisions on the State's environment and the public's health and safety. The Energy Plan balances the need for new energy supplies and investments in critical energy infrastructures with the need to protect the State's environment and public health. It also takes into consideration the significant changes that are transforming New York's energy markets. Finally, the Energy Plan provides strategic direction and policy guidance to foster further collaboration on the State's energy, environmental, transportation, and economic development activities.

The Energy Plan's balanced approach considers the role of new energy supplies, enhanced energy distribution infrastructure, and improved energy productivity, to meet energy needs. This balanced approach incorporates environmentally-sound strategies for developing new sources of energy, improving energy efficiency and energy demand management, and greater energy diversity. This balance requires access to the financial

resources necessary to develop new energy supplies and a commitment to environmental protection by energy decision makers. A benefit of greater energy diversity, as discussed elsewhere in the Energy Plan, is greater energy security in the form of reduced risk of energy supply disruption and price volatility. Moreover, a balanced portfolio of energy resources provides greater economic development opportunities within the State, particularly in the development of indigenous energy resources, including renewable energy resources, and greater energy service reliability.

Energy Planning Process

The Planning Board initiated the 2002 Energy Planning Proceeding at its March 12, 2001 meeting. A Notice of Commencement, published in the April 18, 2001 *New York State Register*, opened the 60-day public comment period that closed on June 18, 2001. Many parties and individuals continued to correspond with the Planning Board agencies' staffs throughout development of the Draft and Final State Energy Plan. During the initial comment period leading to development of the Draft Energy Plan, the Planning Board received 47 sets of written comments from interested parties regarding the issues raised by the Planning Board for inclusion in the Energy Plan. Parties that submitted comments are listed in Table A-1 at the end of Section 1. Throughout development of Draft Energy Plan, the staffs of the Planning Board agencies met with 50 interest groups, also listed in Table A-1. The increased outreach effort of agencies' staffs and the level of public comment by interested parties was unprecedented throughout development of the Draft Energy Plan.

Continuing precedent, the Planning Board scheduled a Technical Briefing on the content and analyses contained in the Draft Energy Plan, and nine Public Hearings held throughout the State to solicit public comment on the Draft Energy Plan.[1] In addition, the Planning Board opened a 60-day public comment period to solicit input and comments on the Draft Energy Plan that closed March 15, 2002. In total, 171 sets of oral comment were presented to the Planning Board at its nine public hearings and 740 sets of written comments were received. During this period, the Planning Board agencies' staffs continued to meet with interested parties throughout the State to ensure that anyone interested in participating in the planning process had the opportunity to do so. Parties and individuals that delivered comments at the public hearings and submitted written comments on the Draft Energy Plan are listed in Table A-2 at the end of Section 1. As

[1] The Planning Board is required by statute to hold three public comment hearings in three geographic locations in the State upon release of the Draft Energy Plan. The Planning Board held five public comment hearings in development of the 1998 Energy Plan.

with development of the Draft Energy Plan, the level of public participation in development of the Final State Energy Plan was unprecedented. As required by the State Environmental Quality Review Act (SEQRA), the Planning Board agencies' staff have responded to all of the comments and suggestions offered by parties and individuals on the Draft Energy Plan and modified the Plan as necessary, and, or appropriate, to reflect these comments and suggestions. The *Response to Comments* is provided under separate cover and accompanies release of the *State Energy Plan and Final Environmental Impact Statement*.

NEW YORK'S ENERGY MARKETS

New York's energy markets have changed dramatically over the past few years. These changes, especially in the utility sector, have focused the State's attention on ensuring that the transition to competition and customer choice unfolds in an orderly manner. While energy supplies and prices are determined to a great extent by world and national markets, the State continues monitoring markets and adopting polices to support the development of competitive energy markets and to maintain necessary consumer protections. The benefits of greater competition, in the form of increased diversity in energy and resource supplies, greater supply and resource availability, greater technological innovation, and prices that are lower than might otherwise be anticipated under regulation, are expected to be realized once this transition is completed. The State continues to monitor the reliability and safety of its energy infrastructure during the transition to competition to ensure that the quality of energy services is maintained.

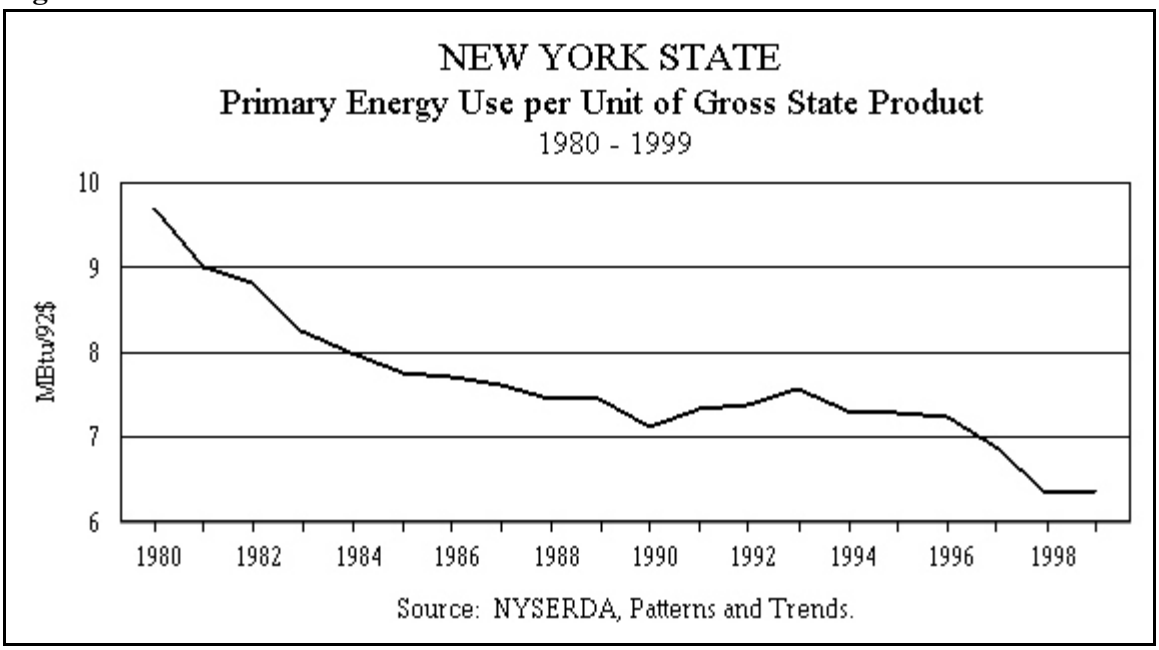
New York State Energy Overview

New York is the most energy-efficient state in the continental United States on a per-capita basis, accounting for less than 5% of the nation's primary energy use[2], while

[2] Primary use is defined as the total of all energy used directly, including natural gas, petroleum, coal, and biomass. Electricity is a secondary form of energy that is created from the use of primary energy sources.

being home to 7% of the nation's population.[3] New York State has the third lowest energy intensity among states, behind only Connecticut and Hawaii, despite being the fourth largest energy user of all states (behind Texas, California and Ohio).[4] New York used 7,388 Btus of energy per dollar of GSP in 2000, an amount that is 44% below the national average.[5] Figure 1 depicts the 20-year trend in New York's primary energy use per dollar of GSP.[6] The significant decline in energy intensity (or energy productivity) in the State, shown in Figure 1, is due to a general shift from a manufacturing economy to a service-based economy, as well as energy efficiency improvements resulting from a number of activities, including more stringent energy building codes and appliance standards, government- and utility-sponsored energy efficiency programs, and naturally occurring price-induced energy efficiency practices. Primary energy use as compared to

Figure 1



[3] Department of Energy, Energy Information Administration, *State Energy Data Report, 1999.*

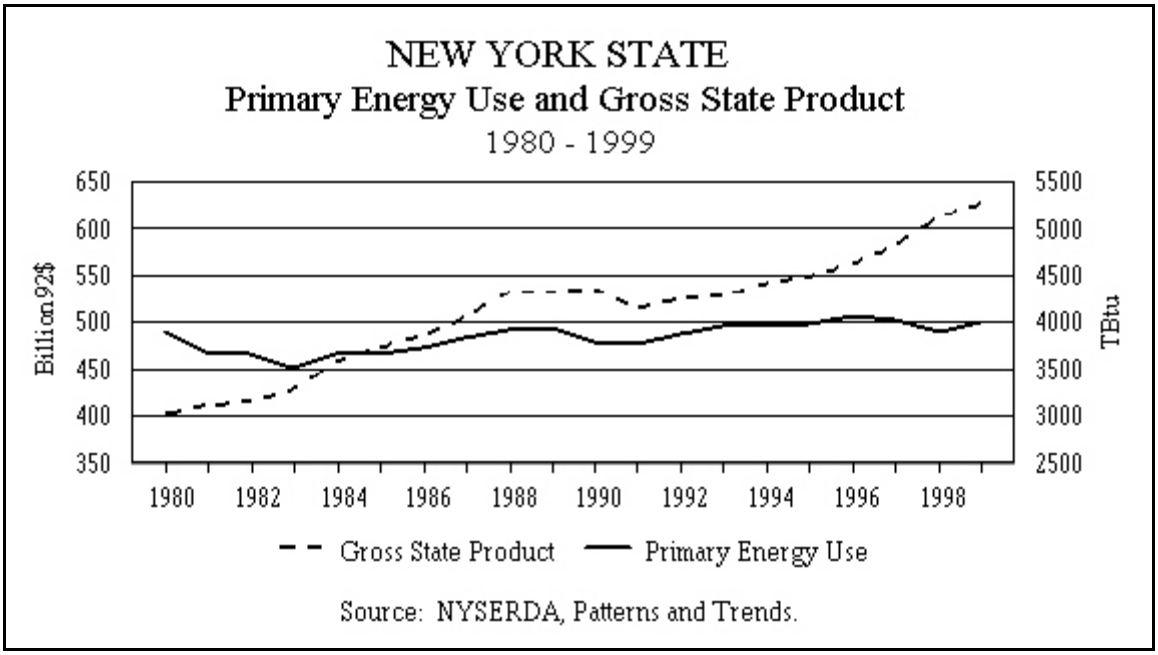
[4] Energy intensity is defined as the amount of British thermal units (Btus) of energy used to produce one dollar of Gross State Product (GSP). Lower energy intensity (or higher energy productivity) generally reflects greater energy efficiency.

[5] Department of Energy, Energy Information Administration, *State Energy Data Report, 1999* and U.S. Bureau of Economic Analysis, *Survey of Current Business, June 2000.*

[6] Primary energy is energy used by the four major sectors (transportation, industrial, commercial, and residential) and includes all fuels used to generate electricity.

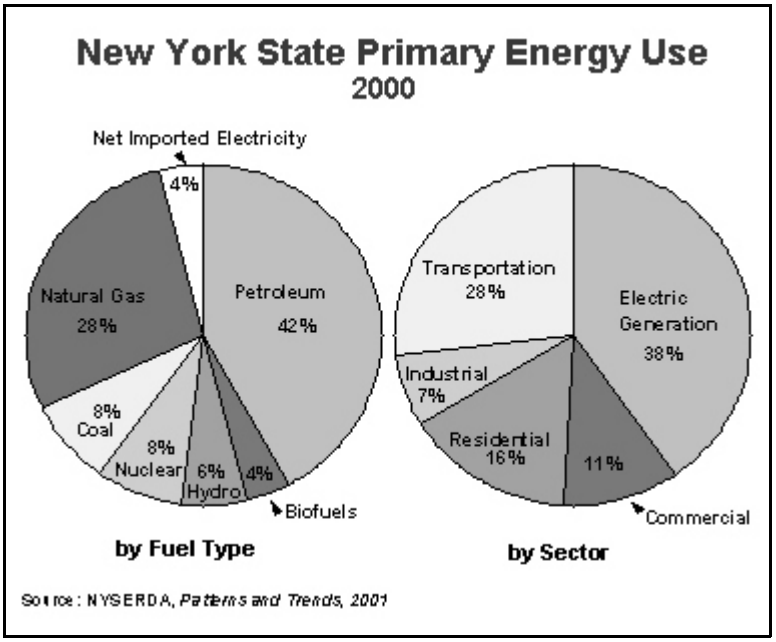
GSP over the same 20-year period is shown in Figure 2. This figure shows that GSP has risen despite relative stability in primary energy use.

Figure 2



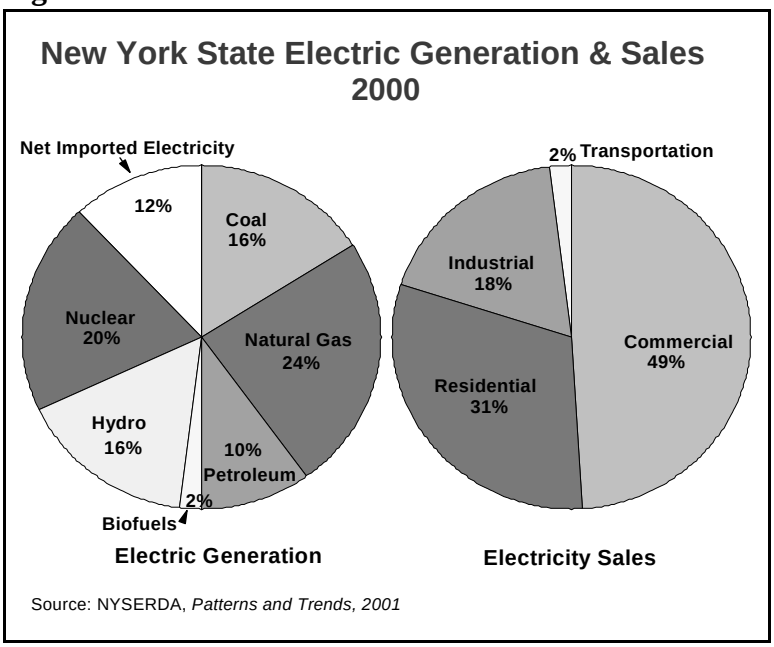
As shown in Figure 3, most of the State's energy is derived from fossil fuels (petroleum products, 42%; natural gas, 28%; and coal, 8%). Renewable energy resources supply 10% of the State's primary energy (hydroelectricity, 6%; and biofuels 4%). Nuclear fuel used to generate electricity accounted for 8%, while net imported electricity represents the remaining 4%. Only 11% of primary energy use is met by resources produced within the State. The largest in-State energy resource is hydroelectric power,

Figure 3



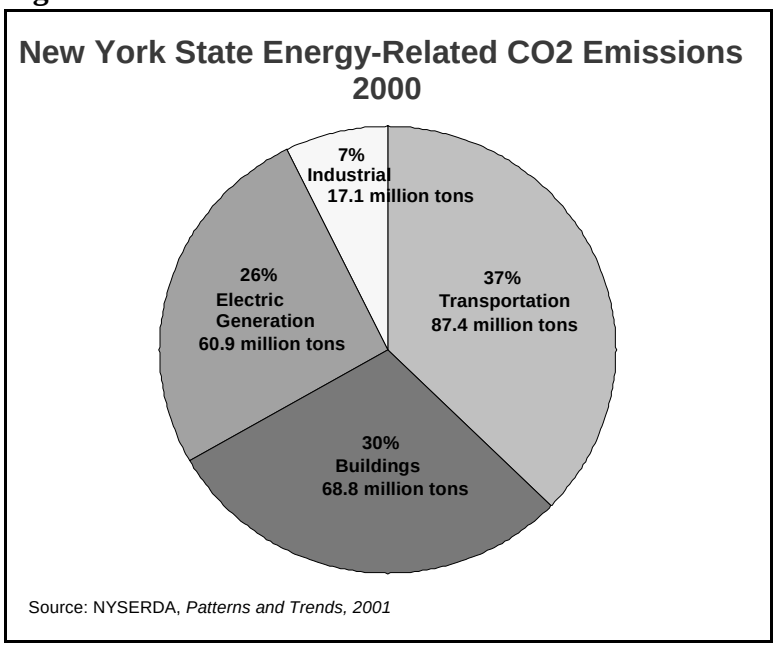
municipal waste. The State has very limited natural gas and crude oil production. While the State reduced its reliance on petroleum products as a share of total primary energy use over the past twenty-five years, New York's reliance on foreign oil as a proportion of total petroleum has increased to 85%.

Figure 4



In 2000, New York State emissions of carbon from energy use were estimated at 234 million tons, down 2% from the 1990 level, while total primary energy use rose by 8% since 1990. As shown in Figure 4, the transportation sector accounted for the largest share of carbon emissions (87.4 million tons), followed by buildings (68.8 million tons), and electric generation (60.9 million tons). The transportation sector's use of energy is dominated by petroleum. Motor gasoline accounts for about two-thirds of the petroleum consumed in the sector. Distillate fuel oil and jet fuel are other important petroleum products used in transportation.

Figure 5



Energy used in electricity generation represents the single largest contributor to primary energy use (38%), followed by energy used in transportation (28%), residential sector (16%), commercial sector (11%), and industrial sector (7%). As shown in Figure 5, the use of natural gas generated 24% of New York's

electricity, a larger percentage than any other fuel, followed by nuclear, coal, and hydropower.

Table 1: New York Energy Prices

Selected Energy Prices, 2000		
Fuel Type:	**New York State:**	**National Average:**
Electricity (¢/kWh)		
Residential	14.1	8.2
Commercial	12.5	7.2
Industrial	4.9	4.5
Natural gas ($/Mcf)		
Residential	9.86	7.76
Commercial	7.77	6.59
Industrial	6.13	4.48
Home-heating oil (¢/gal.)	152.6	131.0
Motor gasoline (¢/gal.)	158.8	156.3

Source: NYSERDA, *Patterns and Trends, 2001*

New York consumers pay more, on a per-unit basis, than the national average for most forms of energy, particularly electricity, as shown in Table 1. In 2000, New York residential electricity and natural gas prices were 72% and 27% higher, respectively, than the national average. New York's average home heating oil price was 16% higher than the national average, while its average motor gasoline price, for all grades was 2% higher than the national average. In 2000, New Yorkers spent $38.4 billion for energy, ranking third behind California and Texas in terms of total state energy expenditures, although New York ranks among the lowest on an energy expenditure per capita basis. Buildings account for the largest share of New York's total annual energy expenditure. Expenditures for lighting, heating, and cooling buildings was $23.4 billion, representing 61% of the State's $38.4 billion energy bill, followed by transportation at $12.6 billion (33%), and industries at $2.4 billion (6%), respectively. Expenditures on petroleum products (42%) represent the largest share of New York's annual energy expenditure followed closely by electricity (41%). In 2000, $16.4 billion was spent on petroleum products and $15.7 billion spent on electricity. The State spent $6.2 billion (16%) on natural gas in 2000.

Recent Accomplishments

During the past several years, the State's electric and gas customers have received the benefits of significant reductions in their electric and gas delivery rates. Since 1996, the New York State Public Service Commission (PSC) has issued orders that have resulted in cumulative customer rate reductions of about $3.3 billion through 2001, with at least $1.6 billion of additional savings expected to be available each year over the next several years. The Long Island Power Authority (LIPA) has similarly provided rate reductions for its customers in the amount of about $2 billion through 2001. In addition, further customer savings will result from the recent PSC Order determining electric

revenue requirements for the Niagara Mohawk Power Corporation ($152 million per year), and the New York State Electric and Gas Corporation ($205 million per year).

While changes are occurring in all energy markets, the State's electricity system has undergone profound changes. Utility companies have nearly completed the process of divesting their generation assets, including nuclear plants, transforming themselves from vertically integrated utilities to distributors of electricity and natural gas. Generation is largely independently-owned and managed in New York, with generators selling electricity, either directly to wholesale customers through bilateral contracts or to the wholesale market operated by the New York Independent System Operator (NYISO). This, in turn, has created opportunities for independently-owned energy providers, marketers, and brokers to serve New York's electricity customers. As a result of State regulatory initiatives, more than 80% of the electricity generating capacity formerly owned by regulated investor-owned utilities has been sold to independent power producers. Such independently-owned generating capacity now participates in the State's new competitive wholesale electricity market, operated since 1999 by the NYISO.

Currently, virtually all electricity and natural gas customers in New York are able to choose their electricity and natural gas commodity supplier or remain with their distribution utility as they wish. In addition, the PSC is requiring that metering (for 50 kilowatt or greater demand customers), billing, and associated administrative customer service functions be opened to competition.

Ensuring the delivery of adequate supplies of electricity remains an important challenge for New York. Recent State efforts have simplified the certification and review process for siting new power plants. Article X of New York State Public Service Law (PSL) authorizes the State Board on Electricity Generation and the Environment (Siting Board) to issue a Certificate of Environmental Compatibility and Public Need prior to construction and operation of an electric generating facility with a capacity of 80 megawatts (MW) or more. Article X was amended in 2001 (Chapter 222 Of the Laws of 2001) to require Siting Board action within six months for applications that replace or repower existing generating facilities and result in decreased water use and decreased emissions of certain air pollutants. The Article X amendments, in effect, expedite the certification process for applications that replace or repower facilities with new facilities that meet certain air and water standards.

In a competitive market, participants will determine when and where new electricity generation or demand reductions are most needed and economically viable. Plans for new electricity generation that promote or contribute to the development of a

competitive market will be consistent with the long-range plans for expansion of the State's electricity system, as envisioned in the State Energy Plan.

Many new independently-owned power plants have been proposed to serve the New York market. As of May 1, 2002, seven new power plants, totaling approximately 4,990 megawatts (MW) of additional capacity (representing a net addition of 4,426 MW), have been approved through New York's Article X siting process.[7] Developers of an additional 11 plants, totaling 6,883 MW, have filed applications and another six proposed plants, representing 4,325 MW, have been announced. As the metropolitan New York region faced a limited ability to import power and a rising demand that threatened to outpace local generation capacity in 2001, the New York Power Authority (NYPA) purchased and installed 11 new 44-MW natural gas-fired generating plants in New York City and Long Island, greatly adding to the reliability of the regional electric system, particularly during the peak summer demand periods.

In addition to opening the electricity and natural gas markets to greater competition, the PSC has enacted a public benefits program through which System Benefits Charge[8] (SBC) funds are used to promote energy efficiency, assist low-income customers, encourage research and development (R&D), and protect the environment. The PSC recognized the responsibility to ensure that electricity service be provided safely, cleanly, and efficiently, and that continuing such public benefits programs beyond what competitive markets might provide was necessary. This program, predominately administered by the NYSERDA, is funded through June 2006 at $150 million a year.[9] From 1998 through 2006, New York's public benefits funding is $984 million. With interest earnings, this amount will exceed $1 billion. In addition to this funding, the NYPA and the LIPA together will spend another $130 million annually on energy efficiency and related public benefits programs. In May 1999, LIPA's Board of Trustees approved a five-year, $170 million Clean Energy Initiative. This effort includes energy efficiency programs and research and development efforts aimed at customers, equipment manufactures, and the energy marketplace. Similarly, NYPA developed the Energy

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[7] One of the seven projects approved was subsequently canceled, yielding a potential net addition of 3,626 MW.

[8] The SBC is a non-bypassable charge on the transmission and distribution of electricity in New York State that is collected by the State's electricity load serving entities (distribution utilities).

[9] NYSERDA administers approximately $140 million annually with the remainder of funding being administered by utilities to serve selected low-income customer needs. These programs are described more fully in the Preserving Energy-Related Public Benefits Programs issue report, the Energy Efficiency, and Renewable Energy assessment reports in the State Energy Plan.

Services program in 1990 as a service to NYPA's government customers in New York City and Westchester County. Since its inception, Energy Services has expanded to serve State-operated facilities, public schools, community colleges, and county and municipal governments across the State.

Collectively, over the eight-year period of 1998 through 2006, the State will spend more than $2.0 billion on public benefits energy programs. Moreover, these programs are designed to forge partnerships with New York businesses requiring that cofunding be provided, as appropriate, for energy efficiency and improvements and research and development projects. Overall, these programs result in more than $2 of private investment for every $1 of public funding provided. In many instances, this amount is more than $3 for every $1 of public funding.

Improving energy efficiency remains a central focus of New York's energy policy. Effective energy efficiency programs reduce energy use and energy costs, and improve the environment through reduced pollutant emissions that result from energy use. Through its public benefits program, the State has begun assisting development of an energy services infrastructure that will help shift the impetus for providing energy efficiency to the private sector. The economic development potential of investments in energy efficiency, in terms of lower energy bills and jobs created or retained in the State, is on the order of 20 jobs per $1.0 million in energy savings. The long-term effects of facilitating market development, new technology manufacturing and use, and expanded choice in consumer services, are expected to help grow the State's economy in an environmentally-sound manner consistent with State and federal laws and regulations. Upon issuing Executive Order 111, Governor Pataki put State government in a leadership role for promoting energy efficiency and the wise use of natural resources to protect and enhance the State's environment and economy. Under the Executive Order, all State agencies, departments, and authorities must seek to reduce their buildings' energy use by 35% relative to 1990 levels and seek to purchase 20% of their electricity from renewable energy sources by 2010.[10]

During the transition period to competition, the State's SBC-funded public benefits programs are providing a wide range of services to residents and businesses. These programs provide energy efficiency and related services to small customers and low-income households, support development of markets for manufacturing, stocking and sales of energy efficient products, and support R&D activities in renewable energy

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[10] Guidelines for implementing the Executive Order were issued in December 2001, in the NYSERDA report entitled, *Executive Order No. 111 "Green and Clean" Buildings and Vehicles Guidelines.*

development, new product development and applications, and environmental protection. At the direction of the PSC, the State's public benefits program was expanded to include load management and emergency generation resources procurement to help meet the State's peak electricity needs until new generation resources become available. The combined effect of State government activities directed at improving energy efficiency and load management enhances the State's ability to meet peak electricity demand. The State's rapid efficiency deployment initiatives, collectively referred to as the Coordinated Electricity Demand Reduction Initiative, enhances the State's ability to respond to peak electricity demand periods with demand reduction measures such as increased efficiency, market-based responses, conservation, and public awareness campaigns. Contingency plans are in place for State agencies to respond quickly if the need arises.

In support of the State's load management initiatives, in 2001, the NYISO implemented a day-ahead economic demand response program. This program enables demand reductions and new electricity supplies to compete on equal footing to meet the State's peak load needs. The NYISO also implemented an Emergency Demand Response Program that requires participating customers to reduce demand when requested by the NYISO. These efforts facilitate competition among alternatives (*e.g.*, energy efficiency, load management and electricity generation) and are expected to promote greater customer choice and diversity in energy resources. During the summer of 2001, as a result of these coordinated NYISO programs involving energy service company and utility customers, the State's peak demand was reduced by nearly 500 MW. In addition, through public appeal, State government initiatives, voltage reductions, and other utility and NYISO programs, peak load was reduced by another 1,165 MW, bringing the total statewide reduction to approximately 1,665 MW. The availability of these demand management resources, including energy efficiency, enabled New York to assist neighboring states in maintaining electricity service and stabilized wholesale electricity prices at the time of system peak.

While load reduction and energy efficiency programs are important components of New York's strategy, California has demonstrated the risk in relying solely on these initiatives to meet future energy needs. As our economy continues to grow and businesses and residents become more reliant on technology, so too does the State's demand for electricity grow. To keep pace with this growth, the State must increase its capacity to generate electricity by siting new, cleaner, state-of-the-art power plants, repowering existing plants, and increasing other alternative sources of electricity generation.

As electricity and natural gas markets become more competitive, petroleum and other energy commodity markets become increasingly interdependent. Natural gas and petroleum markets are already very competitive in the heating fuels and industrial processes market. With greater competition in the electric industry, more electricity generating plants are being proposed that have dual-fuel capability, to burn natural gas or petroleum, depending on prevailing market economics. The volatile nature of these markets requires that energy decisions be made quickly and that an adequate energy supply infrastructure be in place to respond to nearly instantaneous changes in the demand for particular fuels.[11] In addition to the large number of new power plants proposed to serve the New York market, the Federal Energy Regulatory Commission (FERC) recently approved five natural gas pipeline projects to serve the Northeast, and another 13 projects have been proposed.

To address the environmental impacts of stationary sources of pollution, the State is currently developing and implementing strategies to reduce stationary source emissions. These include: (1) working with industry to promulgate emission standards for distributed generation; (2) implementing the Governor's Acid Deposition Reduction Program[12]; (3) providing expedited permitting procedures to encourage siting of electricity generating facilities that minimize aquatic and air quality impacts; (4) working with the Federal government to develop national strategies to reduce multi-pollutant emissions from electricity generating facilities; and (5) using Systems Benefit Charge-funding to promote the development of clean energy generation technologies.

The State continues to be heavily dependent on petroleum products for sectors other than electricity generation. These include motor gasoline, home heating oil, diesel fuel, propane, and residual oil. New York is the fourth largest petroleum fuel market in the U.S., exceeded only by Texas, California, and Florida, and the largest market for

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[11] The State is studying the interdependencies of its energy markets and assessing the need for energy system improvements to facilitate a workably competitive market for energy and energy services as described later in this State Energy Plan. The study is jointly funded by NYSERDA and the NYISO.

[12] The Acid Deposition Reduction Program announced by Governor Pataki in October 1999, calls for two measures to reduce emissions that cause acid deposition. First, the Department of Environmental Conservation (DEC) must act to limit emissions of sulfur dioxide (SO_2) from electricity generating units generating 25 MW or more to a level that is 50% of the quantity of emissions (in tons) that would otherwise be allocated under the federal acid rain program established in Title IV of the federal Clean Air Act. Second, DEC must act to limit emissions of nitrogen oxides (NO_x) from electricity generating units during the non-ozone season (October 1-April 30) to a level that corresponds to the emissions level allowed during the ozone season (May 1-September 30).

home heating oil in the U.S. A diverse distribution network has developed over the years to transport petroleum products into and throughout the State, including several pipelines connecting New York to Gulf and East Coast states and a vast port and barge waterway system. As demand for energy increases and investment in new supplies and distribution infrastructures becomes increasingly responsive to market forces, energy producers, suppliers, and users also must have the ability to respond to market forces.

The State is continuing its efforts to maintain and improve the existing transportation network to provide mobility to its residents and businesses and enhance the efficiency of the transportation system. Actions to enhance efficiency include greater emphasis on public transportation, technological innovations, alternative-fuel vehicle deployment, and pollutant emission reductions. To lessen the State's reliance on a single transportation fuel, the State now leads the nation in the use of alternative-fueled vehicles and is continually incorporating new clean-fueled vehicle technologies. Since 1995, the State has increased the number of alternative-fueled vehicles in the State fleet from less than one dozen to more than 1,400.

The transportation sector is continuing to invest in infrastructure enhancements throughout the State to improve mobility, promote economic development, and improve the environment. These projects include the purchase of new buses that use a clean-burning diesel technology and will reduce hydrocarbon and particulate emissions. In addition, beginning with model year 2004, the California Low Emission Vehicle (LEV II) standards will be required of all light- and medium-duty vehicles in New York State. The LEV II program: extends passenger car emission standards to sport utility vehicles and pick-up trucks; expands and tightens average fleet emission standards; and presents a super-ultra-low-emission vehicle category for light duty vehicles. In addition, LEV II requires that 10% of vehicles sold be advanced technology vehicles, which includes electric vehicles, hybrid vehicles, and vehicles powered by fuel cells.

These programs are expected to reduce the amount of air pollution from motor vehicles, especially in metropolitan areas, by continuing to drive the development of new technology to produce cleaner and more durable cars and trucks. DOT, through its Environmental Initiative, has integrated environmental considerations into its statewide transportation planning and project development. The State is developing and implementing innovative strategies to reduce environmental impacts from mobile sources of pollution by: (1) working with automobile and truck manufacturers to develop new technologies to reduce emissions from such vehicles, and to promote the introduction of such technologies into the marketplace; and (2) promoting the introduction of clean fuels, including renewable-based fuels, low-sulfur diesel, and other alternative fuels by

purchasing vehicles that use such fuels for use in the State fleet and developing incentives to encourage their use in the private sector.

To improve the energy efficiency of the transportation system, as part of an ongoing program, DOT has replaced 44,000 conventional incandescent signal lamps with energy-efficient light emitting diodes (LEDs). This accounts for approximately 35% of the traffic signals under DOT's control and represents an energy savings of 20 gigawatts. Through the HELP program (Highway Emergency Local Patrol), which provides assistance to motorists, non-recurring congestion delays have been reduced (about 32% on an annual basis in the Lower Hudson Valley alone). The HELP program made over 62,000 stops statewide in the year 2000 and has now been expanded to the Buffalo area. Also, the State's strong support for public transportation, including increased levels of operating assistance to transit agencies, has allowed them to stabilize fares. In many years, transit fares have remained unchanged since 1995.

New York State has established the first business park in the country that is specifically devoted to promoting the development of clean energy technologies. Over the next five years, the new Saratoga Technology and Energy Park (STEP), located in Malta, NY, will help attract between 1,000 and 1,500 jobs to the Capital Region as emerging, environmentally-friendly energy companies take advantage of the park's resources. The business park will provide companies with technology development and prototyping support through the University at Albany, funding to support technology development and commercialization through NYSERDA, and tax incentives and other economic development incentives through Saratoga Economic Development Corporation. The project advances the local development of cleaner energy technologies that address energy supply and reliability issues, as well as environmental impacts.

National statistics indicate that the energy technology sector grew by 134% in 2000 and the market for clean energy technologies is projected to grow from $7 billion per year to about $82 billion per year by 2010. New York State, already home to more than 20 leading energy technology companies, is well suited to take advantage of this rapid growth. The STEP demonstrates how the State can use its resources to partner with local communities and create opportunities for new jobs and new businesses. The partnership among State government, the Saratoga Economic Development Corporation, and the University at Albany can attract new businesses and jobs to New York State to address the growing need and demand for clean-energy and energy-efficient technologies.

The State's commitment to reducing energy costs and developing energy markets by lowering taxes, streamlining and eliminating unnecessary regulations, and providing energy customers with greater choices among energy service providers is an important impetus behind the polices and strategies in the State Energy Plan. Equally important, however, is the State's commitment to: improving energy diversity and energy efficiency; increasing energy supplies; fostering a sustainable market for indigenous and renewable energy; encouraging new, cleaner energy technologies; and improving transportation system efficiencies. These commitments will lead to increased economic development in an environmentally sustainable manner.

The 2000-2001 State Budget eliminated the Gross Receipts Tax (GRT) paid by manufacturers and industrial energy customers, began a gradual elimination of the GRT for all other business customers over five years, and provided a major reduction in GRT for residential energy customers over a five-year period. When fully implemented in 2005, annual tax savings from GRT modifications are expected to reach $330 million. The State also is eliminating the sales tax on the delivery of energy, providing $150 million in tax savings to the State's natural gas and electricity customers. The first phase of this tax cut began in September 2000, and the entire reduction will be fully implemented by September 2004. When combined with the GRT reductions, State taxpayers will save approximately $580 million a year, further lowering their energy costs.

NEW YORK'S ENERGY POLICY

The policies and strategies included in the State Energy Plan place New York on a path toward greater energy self-sufficiency and customer choice. The policy and strategy recommendations support a flexible and market-based approach to growing the State's economy, improving the environment, and enhancing the transportation system. The recommendations will drive technological innovation and facilitate competition in energy markets that will result in the delivery of new and efficient energy products and services at competitive prices. In addition, they are designed to provide for continued energy system security and reliability.

Energy Policy Objectives

The State Energy Plan provides broad statewide energy policy direction rather than prescribing specific government agency actions. As markets continue to develop

and new energy resources and services become available, new policies may be warranted. The broad public policy objectives are:

1. Supporting the continued safe, secure, and reliable operation of the State's energy and transportation systems infrastructures;

2. Stimulating sustainable economic growth, technological innovation, and job growth in the State's energy and transportation sectors through competitive market development and government support;

3. Increasing energy diversity in all sectors of the State's economy through greater use of energy efficiency technologies, and alternative energy resources, including renewable-based energy;

4. Promoting and achieving a cleaner and healthier environment; and

5. Ensuring fairness, equity, and consumer protections in an increasingly competitive market economy.

To meet these public policy objectives, State government policies must be balanced and based on long-term strategies that encourage and support development of new cleaner technologies, more efficient energy-consuming practices, and improved transportation, energy production, and delivery systems. New Yorkers want affordable energy from reliable, clean, and efficient sources. The energy policies and long-range planning strategies presented in the Energy Plan are designed to ensure that New York's energy needs are met by encouraging competition while ensuring fairness and equity, ensuring mobility, ensuring system reliability, and improving the State's environment.

SECTION 1.2

STATE ENERGY PLAN FINDINGS AND CONCLUSIONS

INTRODUCTION

In conformance with the Planning Board's direction, and in compliance with Article 6 of State Energy Law, the State Energy Plan contains five Issue Reports and six Assessment Reports. The Planning Board directed agencies' staffs to address these issues in the Energy Plan at its July 17, 2001 meeting, following a review of public comments and of the matters discussed during the staffs outreach meetings with interested parties. Broadly defined, these issues are:

1. Promoting Energy Industry Competition
2. Energy and Economic Development
3. Energy and the Environment
4. Energy and Transportation
5. Preserving Energy-Related Public Benefits Programs

Promoting Energy Industry Competition. The Energy Industry Competition report assesses the status and effects of energy industry competition on the development of energy markets, energy prices, energy facility planning and siting, and the interrelationships existing among major energy sources, including electricity, natural gas, and petroleum products.

Energy and the Environment. The Energy and the Environment report addresses the interactions between energy use and environmental quality, particularly with regard to current trends in environmental regulation, acid rain, greenhouse gas emissions, and non-air impacts.

Energy and Transportation. The Energy and Transportation report addresses the interactions between energy use and transportation, particularly with regard to transportation system use and management, technology, and efficiency. This report explores the interrelationship between a modern, effective, safe, and environmentally

sound transportation system and enhancing the efficient use of energy in the transportation sector.

Energy and Economic Development. The Energy and Economic Development report addresses the interactions between energy use, costs, and economic development, including the State's competitiveness in attracting and retaining jobs. This report also discusses the factors that influence New York's energy prices and rates, including taxes, delivery costs and infrastructure maintenance, and the effects of energy costs on the competitiveness of New York's industries and businesses.

Preserve Public Benefits for New York's Energy Consumers. This report addresses the role of market-based and needs-based public benefits programs in an era of energy industry restructuring and greater competitiveness in energy choices, particularly with regard to government-coordinated efforts to serve small commercial, residential, and low-income consumers.

In addition to the Issue Reports, the Energy Plan contains several Assessment Reports (20-year forecasts of energy demand and prices, and assessments of available energy supplies, including energy efficiency, renewable energy, electricity, natural gas, petroleum, and coal). The Assessment Reports identify emerging trends related to energy supply, price, and demand. The Energy Plan also contains a statement of the State's energy policies, long-range planning objectives and strategies, and recommendations for administrative and legislative actions to implement the State's energy policies, objectives, and strategies. A Final Environmental Impact Statement is integrated into the Energy Plan (Section 4) and the response to comments received on the Draft Energy Plan is provided under separate cover.

The Issue Reports are presented in the State Energy Plan as Sections 2.1 through 2.5, respectively. Following are the key findings from these Issue Reports.

ISSUE REPORT FINDINGS AND CONCLUSIONS

Promoting Energy Industry Competition

- The findings of the 1998 State Energy Plan related to the introduction of competition in the electricity and natural gas industries remain valid today.

- The State must remain vigilant and flexible and must resolve energy issues as they arise, in order for the competitive energy markets in New York State to reach their true potential and for New Yorkers to realize the full benefits of restructuring.

- The State's administrative approach to restructuring its energy industries was premised on input from stakeholders and experts, and designed to provide flexibility to make adjustments as barriers to effective competition are revealed and competitive markets develop. This approached has served New York State well.

- The primary barrier to achieving effective wholesale competition in the energy industries is the lack of adequate resources (electricity generation capacity, electricity and natural gas delivery infrastructure, and demand reduction techniques) in certain areas where they are needed.

- The Article X Power Plant Siting Process in New York State has benefitted the State while protecting the environment.

- The natural gas delivery system, built to serve the winter peak needs of residential, commercial, and industrial customers, is now fully used during peak periods. The competitive electricity generation market is moving toward a greater dependency on natural gas. Such a greater dependency on natural gas suggests a need to expand the natural gas infrastructure; use resources that will reduce our dependency on natural gas, such as greater use of renewable energy resources and advanced coal technologies; implement further electricity demand reduction techniques; and continue safe operation of nuclear power plants.

- The U.S. Congress can assist New York by repealing the mandatory purchase of power from qualified generating facilities required of utilities under the PURPA and by establishing national mandatory reliability rules for the bulk power system (while allowing states to continue to set more rigorous standards when it is in the public interest).

Energy and Economic Development

- Businesses need secure and reliable energy supplies that are reasonably priced to expand operations and grow in the State. Policies promoting greater energy supply certainty will lead to greater private sector investment in New York.

- Low-cost power programs have been successful to date in retaining and expanding employment opportunities in the State. Developing joint State and utility economic development programs has been successful in supporting economic development.

- Power for Jobs has been successful in retaining and creating jobs in New York while keeping energy costs down. There should be an additional authorization for another phase to provide for those customers whose initial allocations are expiring and for which there are few market alternatives.

- Offering electricity discounts as a means of retaining or attracting jobs is an important economic development tool.

- Efforts should continue to be made to forge State and private business partnerships to grow New York's economy in an environmentally-sound manner.

- Energy prices need to be brought more in-line with other states to compete more effectively for economic opportunities.

Energy and the Environment

- The generation and use of energy results in impacts on the environment, including the release of pollutants into the air and impacts on aquatic resources.

- Since the 1998 State Energy Plan was released, the State has made significant gains in reducing the environmental impacts associated with energy generation and consumption. Emission standards on new motor vehicles have been strengthened, as have the requirements on electricity generating plants and other stationary sources of air pollution. The impacts of energy generation on the State's aquatic resources are analyzed and addressed through existing regulatory programs. New electricity generating plants are required to use much less water than existing facilities, and the impacts on fish and other aquatic organisms must be minimized to the greatest extent possible.

- The State has become a national leader in developing new technologies to reduce emissions from diesel-powered trucks and buses, and has created a market for clean-burning low sulfur fuels. These programs will help ensure that New York, already one of the most energy-efficient states in the nation, produces and consumes energy with the lowest-possible impacts on the environment.

- New York has made great progress in meeting its air quality goals, currently meeting the National Ambient Air Quality Standards for five of the six federal criteria pollutants. The New York City metropolitan area has not yet attained the current National Ambient Air Quality Standard for ozone (one-hour), and is not likely to be designated as meeting the pending standards for ozone (eight-hour) or fine-particulates ($PM_{2.5}$). Meeting these standards will require additional emission reductions from all sectors.

- New York has adopted the most stringent tailpipe emission standards for new motor vehicles in the nation, and continues to develop new strategies to reduce emissions from mobile sources, such as cars and trucks.

- The State has made significant progress in reducing emissions that cause acid deposition and will soon adopt stringent new standards on power plants to further reduce these emissions. Scientific data indicate that many water bodies and forested regions in the State are still adversely impacted by acidic deposition and that there is a need for additional national efforts to address these impacts.

- Public transportation has the potential to significantly reduce the impacts of energy used in the transportation sector, particularly through the decrease in single occupant vehicles on the State's roadways.

- MTBE, added to gasoline to meet federal oxygenate requirements, has negatively impacted surface and ground waters in New York and across the nation. The State has enacted a legislative ban on MTBE beginning in 2004.

- Environmental Justice has become a significant issue in the siting of new power plants and other facilities. The State is working to develop a comprehensive policy on how Environmental Justice issues will be addressed.

Energy and Transportation

- New York has the most energy-efficient transportation sector in the United States due to its high-per-capita-use of transit. One-third of all national transit trips are in New York. The use of public transportation is experiencing unprecedented growth, averaging approximately 5% annually.

- Statewide, vehicle miles traveled (VMT) and congestion (especially urban congestion) continue to increase, but VMT should grow at a slower rate in the future. Transportation system management, technology improvements, and capital construction projects are underway to reduce the growth in congestion. Freight truck traffic increases are of concern.

- Bicycle and pedestrian initiatives, passenger ferry service, intermodal passenger and freight capabilities, and high-speed rail efforts are important measures to increase the energy efficiency of New York's transportation sector.

- New York has made a significant commitment in alternative-fueled vehicle (AFV) technology. More than 1,400 State-owned AFVs and over 50 commercial compressed natural gas stations are in use. Executive Order 111 requires State agency purchase of light-duty vehicles to be 100% AFV by 2010.

- Progress in reducing the transportation sector's energy use and air emissions is ongoing and will continue in the future through measures such as Commuter Choice, Ozone Action Days, and traffic signal coordination. Quantitative build and no-build energy and emissions analyses of transportation plans and programs would facilitate continued energy and environmental benefits.

- Energy efficiency can be enhanced by actions at the federal level. Reauthorizing federal surface transportation legislation can substantially affect New York's status as the most transportation-energy-efficient state by providing for transportation programs that enhance energy efficiency and reduce emissions.

- Fuel economy standards for vehicles have the potential to be the most significant action to conserve energy in the transportation sector. Fuel economy standards for passenger cars have been frozen since 1985 and for light duty trucks since 1996. Generally, fuel economy, has worsened between 1990 and 2000.

Preserving Energy-Related Public Benefits Programs

- Government interventions to assist in energy market development are necessary to align public and private interests, particularly in situations where markets are not allocating resources efficiently or fairly.

- Energy customer protections must be continued with the same vigor as they have been afforded in the past. This becomes increasingly important as energy markets become more competitive and customer choice in service providers increases.

- Public benefits programs have contributed to energy and cost savings for residential, low-income, small business, and municipal and institutional customers. These programs also provide environmental benefits, including cleaner air and water, for all of New York's energy customers.

- Opportunities to further coordination among State agencies that have roles in sponsoring and providing low-income energy assistance and other public benefits programs are beneficial to program participants and should be fostered.

- Public benefits programs directed toward research and development have significantly contributed to developing, demonstrating, and providing strategic energy technologies, including the advancement of renewable energy technologies, while encouraging and promoting environmental safeguards and protection.

ENERGY SUPPLY ASSESSMENTS FINDINGS AND CONCLUSIONS

In addition to the Issue Reports, a number of critical energy supply assessments are included, as required by Article 6 of the Energy Law. These include supply assessments for:

1. Energy Demand and Price Forecasts
2. Energy Efficiency
3. Renewable Energy Resources
4. Electricity
5. Natural Gas
6. Petroleum
7. Coal

Following are the key findings of these Issue Reports.

Energy Demand and Price Forecasts

- Demand and nominal prices for most fuels are forecast to increase at different rates over the forecast period; however, real prices (accounting for inflation) decline for most fuels over the forecast period.

- New York's aggregate demand for petroleum products is projected to rise moderately over the forecast period, with increases projected for motor gasoline and decreases for residential heating oil. Increased world demand is expected to exert upward pressure on prices, even given stable supplies. Over the forecast period, demand for motor gasoline is projected to increase 22.4%. Year 2000 prices were unusually high, $1.59 per gallon, so real prices are expected to drop 11.4% from this level, to $1.41 per gallon in 2021. Propane use rises 16.7% over the forecast period.

- Natural gas supply availability, being predominately domestic, is expected to be fairly stable. Natural gas prices rose sharply in 2000. This increase was due to tight natural gas supplies, both in production and storage. A result of this price increase was greater U.S. exploration and drilling, increases in inventory levels, and hence, lower real prices over the forecast period. Demand growth will be strong in New York, with 37.9% growth over the forecast period. This is

primarily due to a 61.0% increase in natural gas demand for electric power generation. Real natural gas prices are expected to decrease an average of 0.52% annually, from $6.95 per dekatherm in 2001 to $6.23 per dekatherm in 2021.

- Total electricity use in New York is expected to grow 22.9% over the forecast period, while prices in real terms decline. Real electricity prices are forecast to decline 10.1% over the forecast period due to increased competition among suppliers and lower fuel prices. Peak megawatt demand is forecast to grow at a slightly slower rate than total electricity requirements (21.1% versus 22.9%) over the forecast period.

- Coal demand is expected to decline, by a total of 19.5%, over the forecast period. Customer coal prices decline over the forecast period along with mine-mouth coal prices. Productivity increases continue to result from technology enhancements, economies of scale, and better mine design. As a result, real utility coal prices are forecast to decline 14.4% over the forecast period.

Energy Efficiency

- Over the past decade, energy efficiency programs in New York have evolved in terms of their depth, breadth, and focus. The State now offers a diverse portfolio of programs that is designed to better capture available energy efficiency potential where past efforts could not.

- Since 1990, the State has spent more than $2.9 billion on energy efficiency programs, even while total annual spending declined from a high in the early 1990s of more than $400 million per year. Annual energy efficiency spending has been increased through 2006 due to the continuation and expansion of the State's System Benefits Charge (SBC) program, and the anticipated spending of NYPA and LIPA on public benefits programs.

- Between 1990 and 2001, the State's major energy efficiency programs have saved 57,256 GWh of electricity and have reduced summer peak demand by nearly 1,700 MW. Cumulative annual savings in 2001 were 7,095 GWh[1], or about 5.2% of the 137,000 GWh of electricity sales to ultimate consumers in that year. Cumulative summer peak demand reductions in 2001 were 1,688 MW[2], or about 5.4%, of the 30,982 MW peak that occurred during that summer. Natural gas and oil savings of approximately 40 TBtu have also been achieved over this period.

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[1] The 7,095 GWh saved in 2001 is enough electricity to power approximately one million homes for a period of one year.

[2] The 1,688 MW saved is equal to the demand of approximately 1.6 million homes.

- The cumulative total electricity savings over the period from 1990 to 2001 are estimated to have led to emission reductions of nearly 43,000 tons of NO_X, 86,500 tons of SO_2[3], and 25 million tons of CO_2[4]. Cumulative natural gas and oil savings add an additional 2,000 tons of NO_X, 840 tons of SO_2, and 2.5 million tons of CO_2 reductions. Approximately 15,000 jobs were created or sustained as a result of these programs. These jobs will be sustained for the life of the energy efficiency equipment installed.

Renewable Energy Resources

- The State has abundant untapped renewable energy resource potential for additional wind, solar, and biomass, as well as more efficient hydropower at existing dams.

- Higher prices for renewable energy will continue to be a barrier to widespread adoption of renewable energy technologies. To foster greater investment in renewable energy-based distributed generation technologies, interconnection rules need to be monitored and periodically reevaluated with the goal of easing interconnections without compromising reliability and system protection, and stand-by rates need to be fair and equitable.

- The cost of renewable energy technologies will continue to be dependent on national and global renewable market development activities. Commercialization efforts, and hence, product prices, are currently driven by national and worldwide demand for renewable energy. As a consequence, it is important for the State to collaborate with other states, the Federal government, and private developers to support renewable energy technology and industry development.

- The State is making significant progress compared to other states in the promotion of renewable energy. By November 2001, New York had 48 megawatts of installed wind capacity, the highest capacity in any Northeastern state. The State is continuing to build a sustainable renewable energy industry by promoting growth in consumer demand, supporting consumer education, constructing and operating renewable energy facilities, and reducing regulatory barriers that might hinder greater development of renewable energy resources in the State.

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[3] The reduction in SO_2 and NO_X emissions is equivalent to shutting down approximately 1,000 MW of coal-fired electricity generation for one year.

[4] The 25 million tons of avoided CO_2 emissions is equivalent to removing approximately five million cars from the road for one year.

- The State's continued support for renewable energy is necessary to increase consumer interest, advance the development of renewable energy technologies, and achieve widespread commercialization and use.

Electricity

- New York is a national leader in restructuring its electricity industry. Consumers have benefitted with savings in their delivery service charges, and further savings will occur during the planning period. The utilities in the State have divested most of their generation facilities to third parties who now operate them in a competitive wholesale market. Further, more than 16% of customer load has switched from local utilities to new service providers. Most switching in retail service providers has occurred in the commercial and industrial sectors with considerable variability throughout the State. More progress in increasing customer choice can be expected, especially when more supplies and demand reducing options become available.

- The initial years of wholesale electricity market operations in New York coincided with periods of high fuel prices, significant transmission congestion, and tight supply conditions. Wholesale electricity prices reflected these conditions, but they have begun to moderate, although not in a uniform pattern, across the State. Average wholesale electricity prices are forecast to decline in real terms over the remainder of the decade, as are retail prices. This expectation is strongly conditioned on new demand and supply resources being added, especially at critical locations that will serve to reduce transmission congestion, and on continued expansion in natural gas resources.

- Electricity peak demand is forecast to grow at annual average rates ranging from 0.75% to 1.23%, with a mid-range value of 0.92%. The loss of load in New York City resulting from the terrorist attack on the World Trade Center is not factored into the forecast. This load is expected to be restored gradually during rebuilding efforts and completely restored once rebuilding efforts are finished. Load is projected to be fully restored sometime in the early half of the forecast period.

- Reserve margins, representing one measure of system reliability, are projected to exceed the current requirement of 18% throughout most of the planning period if a reasonable number of new resources are added and/or demand is reduced. A higher peak demand growth rate than projected, however, will require more resources, especially in the later years of the planning period.

- In the near-term, simple-cycle gas turbines and demand reduction programs will be used to address growth in peak electricity demand. Over the longer-term, demand reduction programs will continue, and renewable generation facilities and distributed generation will be added, but the bulk of the new resources will likely

come from gas-fired, combined-cycle base-load units subject to Article X of the Public Service Law. As of May 1, 2002, seven generating projects, which could add approximately 3,600 MW to the electric system, had been approved under Article X, and another 17 projects were in the regulatory review process or have been publicly announced.

- The State's transmission system is generally adequate to provide reliable electricity service, provided that the system is operated in accordance with reliability rules established by the North American Reliability Council (NERC), the Northeast Power Coordinating Council (NPCC), and the New York State Reliability Council (NYSRC). However, there are reliability limitations in the use of the transmission system for the economic transfer of power between regions of the State for economic reasons. The siting of additional generation and transmission facilities can reduce price impacts attributed to economic congestion of the transmission system. This finding is consistent with the Planning Board's recent *"Report on the Reliability of New York's Electric Transmission and Distribution Systems."*[5] Some local transmission reinforcements might also be necessary in the New York City and Long Island areas.

- A Northeast regional common market offers possibilities for enhanced market efficiencies and economic benefits for New Yorkers. A regional market structure may also offer a vehicle for developing new transmission lines to increase power transfers across New York's borders. There are certain principles for common market formation that should be followed to ensure benefits are realized by New York consumers.

- The share of electricity generation fueled by natural gas could increase significantly over the planning period. This trend is consistent with other regions of the Northeast. A major force behind this trend is the decisions of merchant generators to select natural gas as the preferred fuel of choice. The choice is also influenced by environmental factors that recognize the relatively clean air emission profile of natural gas generation. This shift in primary fuel requirements for electricity could result in diminished diversity in the fuel requirements for electricity generation. Reduced fuel diversity increases risk exposure to fuel supply disruptions and price swings. This Energy Plan describes and recommends efforts to reverse or mitigate this trend.

- Air pollutant emissions from electricity generation not under a cap in the State would be expected to decrease as new resources are added to the electric system, increasingly stringent environmental regulations are imposed, and increased electricity trading among regional electricity systems takes place. The Governor's Acid Deposition Reduction Program is a major factor in reducing the

[5] Report of the New York State Energy Planning Board as required by Chapter 636 of the Laws of 1999.

State's emissions. SO_2 emissions will be reduced to a level that is 50% less than required by the Federal Clean Air Act, and summertime NO_X control benefits will exist year-round.

- Retirement of all nuclear power plants in the State when their licenses expire would likely result in higher wholesale energy prices, greater potential emissions, reduced fuel diversity, and a need for substantial additional resources to be added to the system to replace the lost capacity as the retirements occur.

- Distributed generation facilities can provide the State with benefits by reducing wholesale electric energy prices and emissions of SO_2 and CO_2 and by improving diversity and transmission flexibility.

- The use of renewable technologies for electricity generation in New York State can provide the State with benefits, but there are costs and operational issues that must be addressed.

- Advanced coal technologies offer a means to provide fuel diversity, lower wholesale prices, and reduced emissions in relation to conventional coal-fired generation technologies, but not in relation to gas-fired generation.

- Energy trades with neighboring systems provide significant benefits for New York State. Reducing transmission constraints, both with neighboring States and within New York State, will provide increased benefits; but the costs and benefits of such efforts must be addressed on case-specific bases.

- The New York Independent System Operator's (NYISO) efforts to modify its capacity market rules is important for ensuring that adequate capacity will be built and maintained in New York State.

Natural Gas

- The demand for natural gas is expected to expand significantly over the planning period, particularly in the near-term, with the greatest increase in the use of gas for power generation.

- More pipeline capacity will be needed to meet the increased demand for natural gas. Interest in expanding interstate pipeline delivery capacity to the Northeast and New York State continues to be strong. The local distribution company (LDC) systems will also have to be expanded to meet these increased needs.

- The Federal Energy Regulatory Commission (FERC) recently approved 9 natural gas pipeline projects to serve the Northeast, and another 11 projects have been proposed.

- Natural gas prices will decrease slightly in real dollars over the long-term and are expected to remain volatile.

- There is a general need to continue LDC system integrity and safety programs, as well as to continue research and development efforts to develop cost savings techniques to maintain and upgrade the existing distribution system.

Petroleum

- U.S. production of crude oil continues to decline. Between 1990 and 2000, domestic production has declined 20.8%. As a consequence, both U.S. and New York State continue to increase their dependance on foreign sources of crude oil and refined petroleum products to meet consumer demand.

- In-State petroleum terminal storage capacity for distillate fuels, gasoline, and residual fuel continues to decline. The size of the decline for each fuel is: distillate, 15.9%; gasoline, 17.5%; and residual fuel, 16.0%. Reasons for this decline include land use concerns associated with storage, costs associated with properly maintaining facilities, increased insurance costs, lack of market incentives to construct new facilities, and the costs of holding large volumes of fuel.

- Lower inventory storage can result in degradation of the operational flexibility needed to satisfy consumer demand, greater supply uncertainty, and greater short-term price volatility.

- If the natural gas fueled electric generation facilities with interruptible gas contracts are unable to acquire their primary fuel and are forced to switch to distillate fuel, they will use significant quantities of distillate over a very short period of time. This could strain the ability of the petroleum infrastructure to respond to this need.

- Electricity generation facilities burning distillate fuel as a backup when natural gas is interrupted, have the potential to disrupt the delivery of electricity in cases where such facilities are being relied upon to meet peak demand and where availability of distillate fuel is limited. In addition, a sudden, large increase in petroleum use in electricity generation could potentially have negative impacts on air quality.

Coal

- Coal is America's most abundant indigenous fossil fuel resource, accounting for 95% of the nation's fossil energy reserves. The United States has a 250-year supply of coal.

- The U.S. is second only to China among world coal producers. In 2000, over one billion tons of coal were produced in the United States, mined in 25 coal-producing states.

- Approximately two-thirds of all coal mined in the United States is transported by rail, making coal the largest single source of freight revenue for United States railroads. Coal freight in New York accounts for approximately 37% of the total tons of freight hauled by rail.

- In 2000, nearly 12.1 million tons of coal were used in the State, representing less than 1% of the nation's coal demand. While coal use represents 8% of the State's total primary fuel mix, most of the coal (80%) was used to produce electricity.

- New York has 16 coal-fired electricity generation plants located in the State, representing nearly 4,000 MW of net summer capability for the State's electricity system.

- A major consideration in the use of coal as a fuel in electricity generation is the emission of sulfur dioxide, nitrogen oxides, particulate matter, and carbon dioxide. Advanced coal technologies offer utilities options for making substantial reductions in acid rain and greenhouse gas emissions, while providing health-related benefits as the result of improved air quality.

- Development and implementation of advanced coal technologies can be a significant contributor to achieving the State's energy, economic, and environmental goals.

SECTION 1.3

ENERGY POLICY OBJECTIVES AND RECOMMENDATIONS

INTRODUCTION

The State Energy Plan provides statewide policy guidance for energy-related decisions by government and private market participants within the State. With regard to State government, all energy-related actions and decisions by State agencies, Boards, Commissions, and Authorities are required by statute to be reasonably consistent with the forecasts, policies, and long-range planning objectives and strategies contained in the Energy Plan. Ideally, the State Energy Plan will guide the development of operational and program plans of State entities in fulfillment of their missions.

The Energy Planning Board's long-range planning objectives and strategies put New York on a path toward increased energy self-sufficiency while, at the same time, supporting a flexible, market-based approach to growing the State's economy and improving transportation systems and the environment. The strategies are presented in this Section and are grouped according to the primary objective that the strategies most directly support. Several recommendations support multiple objectives.

These strategy recommendations help New York State achieve the public policy objectives of the Energy Plan. In the future, however, additional analyses of some recommendations will be required prior to their implementation. Such analyses will take into consideration likely effects on energy costs, energy systems security and fuel diversity, protection of public health and safety, beneficial and adverse environmental impacts, and the State's ability to compete economically. Although the Planning Board supports movement toward all of the stated objectives, it recognizes that some of the recommendations conflict with one another. In these cases, a balance needs to be established that moves toward the broad policy objectives over time without significantly impeding progress toward the collective objectives. Although not required by law, the Energy Planning Board has instructed the agencies' staffs to report annually to the Board on the implementation status of recommendations, and update information, assumptions, and conditions that might affect the continued feasibility of specific recommendations and initiatives in the Energy Plan. In such instances where underlying assumptions and conditions might have changed, or where continued pursuit of one policy objective might significantly impede progress or undermine another, the Energy Planning Board will reconsider the pace of progress and act accordingly to maintain balance.

Summary Overview

The Energy Plan establishes a vision for New York's future that relies on existing and new energy resources, including increased improvements in energy efficiency and demand reduction strategies in buildings, industrial processes, and transportation, and places greater reliance on indigenous and renewable-based energy resources for electricity generation and transportation. The State recognizes the importance of maintaining and expanding the existing energy and transportation infrastructure and siting new electricity generation capacity to meet the demands of a growing economy.

The State is investing in this vision through reliance on flexible, market-based energy policies, a statewide public benefits program, research and development efforts administered by the New York State Energy Research and Development Authority (NYSERDA), and energy efficiency and renewable energy programs offered by the New York Power Authority (NYPA) and Long Island Power Authority (LIPA). In addition, the State Public Service Commission and the Departments of Environmental Conservation, Transportation, and Economic Development are reviewing regulations and policies and contemplating additional initiatives to meet the State's energy, environmental, transportation, and economic development needs.

In general, to meet the demands of New York's growing economy, the Energy Plan recognizes the need for between 5,000 and 7,000 MW of additional electricity supply and demand reduction resources during the early years of the planning period, and the need for new natural gas pipeline capacity to meet the growing demands for gas in all sectors of the economy, particularly in electricity generation. The Energy Plan adopts an energy efficiency goal of reducing primary energy use per unit of Gross State Product (GSP) 25% below the 1990 level by 2010. This is equivalent to reducing total primary energy use by approximately 150 Tbtu annually by 2010. For comparison purposes, this reduction represents approximately 20% of motor gasoline used in New York each year. In addition to the energy efficiency goal, the Energy Plan adopts a renewable energy goal of increasing the share of renewable energy use 50%, by 2020, as a percentage of total primary energy use. This would increase renewable energy as a percentage of primary energy use from 10% currently, to 15% by 2020. This is equivalent to increasing renewable energy use by 240 Tbtu by 2020. For comparison purposes, this reduction represents approximately one-third of the motor gasoline use in New York each year. The energy efficiency and renewable energy use goals apply across all energy using sectors, including transportation, electricity generation and buildings. The State is charting a course that will allow it to lead the nation in use of distributed generation technology by all economic sectors, and the State is developing a viable and sustainable

bio-fuels industry in New York. Notably, the Energy Plan calls for greenhouse gas (GHG) emission reductions of 5% below 1990 levels by 2010, and 10% below 1990 levels by 2020.

Strategies for achieving these goals and other public policy objectives are provided in the following section. The Energy Planning Board will review progress toward these and other energy policy goals and objectives periodically and determine whether additional actions need be taken to balance multiple competing interests.

1. <u>Supporting the continued safe, secure, and reliable operation of the State's energy and transportation systems infrastructures.</u>

A. The State will continue its study of the security of New York's energy infrastructure used for production, storage, and delivery. The study will include a risk and vulnerabilities assessment and recommendations for appropriate actions and will be conducted cooperatively by the Office of Public Security, appropriate Energy Planning Board agencies, and major energy market participants, in cooperation with appropriate federal agencies.

B. The State supports investments in natural gas and electricity transmission and distribution system infrastructures, including consideration of multiple redundancies, shared design practices, shared inventories, and flexibility necessary to ensure continued safe and reliable system operation.

C. The State requests that the New York Independent System Operator (NYISO) consider the certainty and availability of primary and backup fuels in valuing capacity from electricity generators in order to ensure that the reliability of the electricity, natural gas, and petroleum supply and delivery infrastructures would not be adversely affected if generator fuel supplies are disrupted. As an alternative, NYISO should consider the certainty and availability of primary and backup fuels in establishing local reliability rules.

D. The State supports greater energy diversity in all sectors of the economy through investments in technology and infrastructure development for indigenous and renewable fuels, demand reduction techniques, and energy efficiency, to reduce the risks associated with single fuel dependency and price volatility. In addition, the State supports the continued safe operation of nuclear, coal, natural gas, oil, and hydroelectric generation as part of a diverse portfolio of electricity generation resources.

E. The State will continue its efforts to reduce traffic congestion and delays and increase energy efficiency in transportation through a complement of actions that include supporting public transit, transportation management, intelligent transportation systems, and capital construction.

1. The State will work to ensure that transportation planning and construction is compatible with current and planned community development.

2. The State supports expanding intermodal freight capabilities as a means to reduce transportation sector energy use.

3. The State's emphasis on maintaining its existing transportation infrastructure through capital construction programs will be continued.

4. The State will work more closely with utility companies to better identify and, if possible, design project work around utility facilities. The State will work in partnership with municipal governments to accomplish this objective for municipal projects.

2. <u>Stimulating sustainable economic growth, technological innovation, and job growth in the State's energy and transportation sectors through competitive market development and government support.</u>

A. The Energy Planning Board recommends reauthorization of Public Service Law (PSL) Article X, scheduled to expire on January 1, 2003, relating to the siting of new major electric generating facilities. As part of this process, the following issues should be considered:

1. Increasing support for public participation in the Article X siting process through creation of an Office of Public Advisor to assist and advise interested parties and members of the public regarding participation in the siting and certification processes for major electric generating facilities. State agencies should continue their pre-application information programs and training workshops for prospective applicants and affected communities.

2. Evaluating the effectiveness of current statutory language providing for intervenor funding, giving consideration to providing funding at the time of project preliminary scoping, and allowing broader use of intervenor funding.

3. Evaluating the appropriateness of developing specific procedures with respect to the expansion, modification, or repowering of existing major generating facilities.

4. Additional modifications and measures to Article X's procedural requirements that would enable the Siting Board to streamline its review where interested parties, including affected community groups, have reached consensus as to the specific issues presented by an Article X application.

5. Adding the New York State Department of State and the New York State Office of Parks, Recreation, and Historic Preservation as statutory parties to Article X proceedings in order to coordinate relevant permit requirements for Article X applications.

B. The Energy Planning Board recommends reauthorization of Article 6 of the Energy Law, for statewide energy planning, scheduled to expire on January 1, 2003. Modifications should include reducing the forecasting period for energy demand and prices from 20 years to 10 years and changing statutory language to reflect changes in the electricity industry. In addition to statutory modifications, the following administrative steps should be taken:

1. The Energy Planning Board should meet annually to coordinate development and implementation of energy-related strategies and policies, receive reports from the agencies' staffs on the compliance of major energy suppliers with its information filing requirements, and receive summary reports on the information filed.

2. The information filing regulations of the Energy Planning Board should be modified to recognize new entrants into the energy marketplace and the need for pertinent energy-related information and data.

C. The State supports working expeditiously toward establishing a regional market in the Northeastern portion of the country.

1. The State will continue to participate in negotiations to bring about a larger, regional common market in order to ensure the incorporation of best practices of the NYISO and fair representation by market participants, including affected state governments, within the common market governance structure.

2. Any system developed for merging the NYISO into a larger market must be designed to incorporate appropriate State and local reliability requirements and ensure that short-term economic pressures do not adversely affect the reliable operation of New York's integrated electric system. In addition, any future system must allow full participation of demand management resources in the competitive procurement process.

D. The State will move expeditiously to a fully-competitive retail electricity marketplace while maintaining appropriate customer service protections.

1. The State supports the unbundling of electricity services and implementing statewide competitive services for metering, billing, and other services for which competition has the potential to lower costs and improve service quality.

2. The State will stimulate technological and institutional solutions that promote price responsive load management and load control technologies for all customer classes as appropriate, paying particular attention to the multifamily residential sector throughout New York State. The State supports the use of interval meters, where appropriate, to enable customers to respond to real-time electricity prices.

E. The State, in coordinating rebuilding efforts in lower Manhattan with private developers following the terrorist attacks of September 11, 2001, must ensure that these efforts maximize the use of energy-efficient and environmentally-sound transportation services and building design and construction practices to reduce energy use and costs, and emissions.

F. The State will continue to strive to reduce energy costs for all New Yorkers with the expectation of narrowing the disparities between New York's costs and costs in other states and regions of the country.

3. <u>Increasing energy diversity in all sectors of the State's economy through greater use of energy efficiency technologies and alternative energy resources, including renewable-based energy.</u>

A. The State supports significantly increasing energy resource diversity in electricity generation and transportation through increased reliance on indigenous, renewable, energy efficiency, and demand management resources.

1. The State adopts the goal of reducing statewide primary energy use in 2010 to a level that is 25% below 1990 energy use per unit of Gross State Product (GSP). In addition, the State adopts the goal of increasing the share of renewable energy as a percentage of primary energy use 50% by 2020, up from 10% in 2000 to 15% in 2020.

    a. The State should competitively solicit 60 to 120 MW of renewable electricity generation to meet the requirement of the Governor's Executive Order No.111, which requires up to 10% of State facilities' electricity be provided from renewable resources by 2005 and 20% by 2010.

    b. The New York Power Authority (NYPA) should competitively solicit bids for long-term contracts for the purchase of 100 MW of electricity capacity from renewable energy resources. In addition, NYPA should increase its annual investment in energy efficiency by 25% and continue to cooperate with NYSERDA and the Long Island Power Authority in program offerings and delivery.

    c. The Long Island Power Authority (LIPA) should competitively solicit bids for long-term contracts for the purchase of 100 MW of electricity capacity from renewable energy resources. In addition, LIPA should increase its annual investment in energy efficiency by 25% and continue to cooperate with NYSERDA and NYPA in program offerings and delivery.

2. NYSERDA will examine and report on the feasibility of establishing a statewide renewable portfolio standard (RPS) for electricity generation, assess the economic impacts of an RPS, and determine whether and how an RPS might be harmonized with a restructured and competitive electricity market and the goals from planned State actions to promote renewable energy development.

3. The State encourages greater use of indigenous fuels and renewable-based electricity generation by pursuing appropriate regulatory reform initiatives, wider application of net-metering programs where appropriate, continuing review of interconnection requirements, consolidating and enhancing tax incentives, and supporting development of a renewable fuels industry in New York.

4. The State supports expanding bio-fuels research and development activities with the goal of creating a self-sustaining private sector bio-fuels industry in the State within the next 5 to 10 years. The State will develop a specific plan for producing, refining, and marketing biomass fuels derived from waste, soybean, and corn oils, and from paper sludge, municipal solid waste, and other cellulose sources, working in cooperation with other states. The State supports the commercialization of bio-fuels technology and use of bio-fuels as vehicle fuel, heating fuel, emergency electricity generation fuel, and in marine applications.

5. The State supports research, demonstration, and commercialization of advanced electricity generating technologies and encourages the retrofit or repowering of existing generating facilities in the State to maintain the State's energy diversity.

B. The State supports the development and use of distributed generation (DG) and combined heat and power (CHP) technologies at customer sites, with the goal of becoming a national leader in the deployment of clean distributed generation technology. Primary focus should be on applications where such technologies can be shown to reduce energy costs, improve electricity system reliability, and reduce harmful pollutant emissions.

1. The State should continue its research and development support for DG and CHP technologies and applications, supporting, in particular, clean and renewable energy-based DG and CHP technologies.

2. The State should take all reasonable steps necessary to facilitate the interconnection of DG and CHP resources into the electricity system and increase the use of DG and CHP resources in the State.

3. The State should offer investment tax credits to spur private sector investment in environmentally-sound and cost-effective DG and CHP technologies.

C. The State supports fuel neutrality in its support for alternative-fueled vehicle technology. The New York Alternate Fuels Tax Credit program, scheduled to expire on February 28, 2003, should be extended and consideration given to enhancing it by including all types of alternative-fueled vehicles. Incentives should also be considered to support the development of an alternative fuels infrastructure in New York.

D. The State supports federal surface transportation legislation that leads to more energy-efficient transportation. Specific elements should include increased federal funding for transit, retention of the Congestion Mitigation and Air Quality program, continued funding for intelligent transportation systems and transportation systems operations, and modification of the Federal Transportation Equity Act for the 21st Century (TEA-21) programs to improve rail service.

E. The State encourages the Federal government to adopt new corporate average fuel economy standards for vehicles to address vehicle energy efficiency in a way that protects driver and passenger safety.

4. <u>Promoting and achieving a cleaner and healthier environment.</u>

A. The State should continue to develop and implement strategies to reduce environmental impacts from stationary sources of pollution. These should include:

1. Work with industry to promulgate emission standards for distributed generation.

2. Implement the Governor's Acid Deposition Reduction Program, which is expected to significantly reduce GHG emissions and the acid rain precursor SO_2 and NO_x.

3. Provide expedited permitting procedures to encourage siting of electric generation facilities that minimize aquatic and air quality impacts.

4. Work with federal government to develop national strategies to reduce multi-pollutant emissions from electric generating facilities.

5. Use System Benefit Charge funding to promote the development of clean energy generation technologies.

B. The State should continue to develop and implement innovative strategies to reduce environmental impacts from mobile sources of pollution. These should include:

1. Work with automobile and truck manufacturers to develop new technologies to reduce emissions from such vehicles, and to promote the introduction of such technologies into the marketplace.

2. Promote the introduction of clean fuels, including renewables, low-sulfur diesel, and other alternative fuels by purchasing vehicles that use such fuels for use in the State fleet and developing incentives to encourage their use in the private sector.

C. The State should proceed to phase out the use of methyl tertiary butyl ether (MTBE) as an oxygenate additive in motor gasoline as required by State law. At the same time, the State will seek Federal relief from the oxygenate requirement. The State will begin supporting infrastructure development for an indigenous and renewable-based substitute for MTBE in the event that relief is not provided. The State should recommend strategies for building and supporting such an infrastructure and industry in New York.

D. The State should lead the nation in taking actions to reduce greenhouse gas emissions, stressing the aggressive implementation of existing, and development of new technologies and strategies that would significantly reduce emissions. The State should build upon its successes to date in promoting energy efficiency and renewable energy technologies and transportation strategies, that have helped New York become the most energy-efficient state in the continental U.S., and a significant developer of renewable energy, which already accounts for 15% to18% of the State's electricity generation and 10% of primary energy use. The State will continue to evaluate the economics and environmental benefits of the recommendations of the Governor's Greenhouse Gas Task Force, and in the interim, adopts the following recommendations.

1. Commit to a statewide goal of reducing greenhouse gas (GHG) emissions 5% below 1990 levels by 2010, and 10% below 1990 levels by 2020.

2. Develop a GHG emission registry program for registering base-line GHG emissions and emission reductions from actions implemented at facilities.

3. Emphasize the greenhouse gas emission reduction potential, most notably of carbon dioxide (CO_2), as a criterion in developing new program initiatives in the State's public benefits programs.

4. Expand the State's efforts to improve the efficiency of electricity generation and encourage use of indigenous and renewable energy resources, including solar, wind, waste methane, geothermal, sustainable biomass, combined heat and power, clean and efficient distributed generation.

5. Adopt a specific plan to develop an indigenous bio-fuels industry in New York to produce, refine, and market transportation and other fuels from indigenous biomass resources.

6. Develop a program that allows businesses to enter into voluntary agreements to meet certain energy efficiency targets and reduce greenhouse gas emissions. To assist businesses in meeting such voluntary agreements, the State should offer technical assistance, public recognition, expedited regulatory permit review, and financial incentives, as appropriate or necessary.

7. Redirect transportation funding toward energy-efficient transportation alternatives, including public transportation, walking, and bicycling, and provide incentives to encourage greater use of related alternatives that improve transportation efficiency.

8. Include in the State transportation planning and State Environmental Quality Review Act (SEQRA) related processes, consideration of CO_2 production and mitigation strategies, as appropriate.

9. Target open space funding to prevent suburban sprawl, promote Quality Communities, reduce vehicle miles traveled, and support, adopt, and enhance transportation measures that reduce energy use and pollutant emissions.

10. Support, adopt, and enhance transportation measures that reduce energy use and pollutant emissions, such as Commuter Choice, Ozone Action Days, diesel vehicle retrofits, improved traffic signal coordination with light emitting diode (LED) replacement technology, transportation system management, and other similar actions.

11. Encourage low-cost, passive building efficiency measures, such as white roofs, passive solar design, and improved foundation membranes, and incorporate such measures in the State's building construction codes. In addition, the State should support local building and development projects that include funding for open space conservation and urban forestry and that reduce the need for air-conditioning in urban "heat islands."

12. Expand research, development, and demonstration (RD&D) of energy and GHG-efficient vehicle technologies, add GHG goals to vehicle tax credits and incentives, and coordinate with other states to encourage improvements in vehicle fuel economy.

13. Working with regional and local planning organizations, analyze and quantify the energy use and air pollution emissions expected to result from transportation plans and programs.

14. Support the design and construction of energy-efficient and environmentally-friendly "green buildings" through financial incentives, technical assistance, and related program initiatives.

5. <u>Ensuring fairness, equity, and consumer protections in an increasingly competitive market economy.</u>

A. The State will examine the feasibility of effectively aligning public policy interests in energy efficiency, combined heat and power, and indigenous and renewable-based electricity generation with the financial interests of distribution utilities and their customers.

B. The State supports expediting efforts to have electricity distribution and customer service prices to consumers reflect the true cost of service and eliminate inter-class and intra-class subsidies, to the extent practicable.

C. The State should review the recommendations from the Department of Environmental Conservation's Environmental Justice Advisory Group and implement appropriate recommendations in a timely manner.

D. The State encourages agencies to consider the effectiveness, efficiency, and coordination of their low-income energy assistance programs, including the **New York Energy $mart℠** program, the Weatherization Assistance Program, the Low-Income Home Energy Assistance Program, and other State programs that offer incentives, assistance, and information services to improve the efficiency of energy use and reduce the energy burden of low-income households. The State should consider consolidating programs where opportunities exist to improve administrative efficiency and customer service.

Table A-1: Participants in Interest Group Meetings During Energy Plan Development

AES Westover, LLC
American Wind Energy Association
Assisted Environmental Decisions
Association for Energy Affordibility
Business Council of New York State, Incorporated
Central Hudson Gas and Electric Corporation
Citizen's Awareness Network
Citizens Campaign for the Environment
Communities United for Responsible Energy
Consolidated Edison Company of New York, Incorporated
Consumer's Union
Couch White, LLP
Dynegy, Incorporated
East River Environmental Coalition
Empire State Petroleum Association
Energy Association of New York State
Environmental Advocates
Environmental Defense
Ford Motor Company
Honorable Joseph R. Lentol, New York State Assemblyman, 50th Assembly District
Honorable Paul D. Tonko, New York State Assemblyman, 105th Assembly District
Hudson River Sloop Clearwater, Incorporated
Independent Power Producers of New York, Incorporated
Integrated Waste Services Association
KeySpan Energy Corporation
Long Island Association, Incorporated
Long Island Power Authority
Mirant Corporation
Mr. Chuck Dworkin, Esq.
Mr. Guy Merckx
Mr. Robert A. Smith
Mr. Sigmund F. Zakrzewski, Ph.D.
Ms. Pamela Slater
Ms. Lois M. Sturm
Mother Earth Research
Multiple Interveners
National Association of Energy Service Companies
National Fuel Gas Company
Natural Resources Defense Council
New York City Corporation Counsel
New York City Department of Environmental Protection
New York City Economic Development Corporation
New York City Environmental Justice Advocates
New York City Environmental Justice Alliance
New York Gas Group
New York Independent System Operator
New York Lawyers for the Public Interest, Incorporated
New York Power Authority
New York Public Interest Research Group
New York State Electric and Gas Corporation
New York State Office of the Attorney General
Niagara Mohawk Power Corporation
Orange and Rockland Utilities, Incorporated
Orion Power Holdings, Incorporated
Pace Energy Project
Riverkeeper, Incorporated
Rochester Gas and Electric Corporation
Sierra Club, Atlantic Chapter
Sierra Club, Niagara Chapter
Sithe Energies, Incorporated
Small Customer Marketer Coalition
Stop the Barge
Sustainable South Bronx
The Point Community Development Corporation
Uprose
Western New York Sustainable Energy Association
Williamsburg Watch

Notes: Regular text indicates Outreach Meeting attendance only. *Italic text indicates submission of written comments only.* Bold-faced and italicized text indicates both Outreach Meeting attendance and submission of written comments. Forty-seven sets of comments were received from 43 parties.

TABLE A-2: Commentors to Draft State Energy Plan

Name	Organization	Comments
Acker, Dr. William P.	MTI MicroFuel Cells Inc.	Written
Alford, Tahira Faune	Individual	Oral
Allan, Janet	Individual	Oral
Ames, Oakes	Environmental Advocates of New York	Oral
Anuszkiewicz, Mr.	Individual	Oral
Arcarese, Jo Ann	Individual	Written
Arceo, Thelma	Community Environmental Center, Senior Manager	Oral
Armentano, Joseph	Paraco Gas of Purchase, New York	Written/Oral
Babbie, Jason K.	New York Public Interest Group, Inc. (NYPIRG)	Written/Oral
Babiuk, Stanley A.	El Paso Corporation	Written
Barrett, Marshah-Reaff	Individual	Written
Bashaw, Bryan J.	Comlinks Neighborhood Revitalization Program	Written
Beckwith, Herbert S.	A.E.S. New York	Oral
Beller, Jeff	Biofuels America	Oral
Belluso, Rhonda	Individual	Written
Bertoni, Frank	Individual	Written
Bolbrock, Richard J.	Long Island Power Authority (LIPA)	Written/Oral
Bostaph, Jennifer	Individual	Written
Bradbury, David	Individual	Oral
Breyman, Steve	Environmental Advocates of New York, Board of Directors	Oral
Brown, Carolyn	Independent Power Producers of New York (IPPNY)	Oral
Brown, Ruben S.	Joint Supporters; includes The E Cubed Company, LLC; Distributed Power Coalition of America; KeySpan Technology, Inc.; RealEnergy, Inc.; Capstone Turbines, Integrated Energy Concepts Engineering P.C.	Written/Oral
Browning, Kenya	Individual	Written
Bubbins, Harry J.	Bronx Environmental Action Coalition	Written
Bucci, Richard	City of Binghamton	Oral
Burdis, Linda Anne	Pace University School of Law, Pace Energy Project, New York Shines	Oral
Buxbaum, Diane	Sierra Club, New York City	Oral
Buzel, Mark	A.E.S. New York	Oral
Cala, Erin	Individual	Oral
Cardell, Cathy	Individual, member Citizens Awareness Network	Oral
Carey, Timothy S.	Battery Park City Authority	Written
Carrier, Rick	Bald Eagle Power Company, Inc.	Written/Oral
Casey, Charles J./Catalano, Joan	Northfield Community L.D.C.	Written
Catapano, Lisa M. - et al. (335)	Natural Resources Defense Council (NRDC)	Written
Caumont, Susan	Individual	Oral
Cavazzini, Monica	Better Queens Environment; Coalition to Help Organize a Kleaner Environment (CHOKE)	Oral
Cernik, Christopher	Multiple Intervenors	Written/Oral
Chao, May M.	New York State Consumer Protection Board	Written/Oral
Chender, Amy	Individual	Written
Clagett, William H.	New York State Reliability Council	Written
Clark, Brian	Manufacturers Association of Central New York, Inc.	Written/Oral
Clark, Francis	New York Public Interest Research Group (NYPIRG)	Oral
Contino, Cartherine	Student Activist, SUNY Albany, Niagara chapter of NYPIRG	Oral

Name	Organization	Comments
Cooper, Alix	Individual	Written
Corneau, Keith F.	Adirondack Hydro Development Corporation	Written
Cornell, Harriet	Rockland County Legislature	Written
Crandell, Stacy	Individual, member Citizens Awareness Network	Oral
Crossett, Susan	Niagara Mohawk, a National Grid Company	Oral
Cullen, Katie	Integrated Waste Services Association	Written/Oral
Cullen, Scott	Star Foundation	Oral
Cullinane, Beth	Better Queens Environment	Written
D'Arco, Lawrence	Individual	Written
Davis, Diane A.	Individual	Written
Davis, Stephen G.	Individual	Written
Davoli, Michael	New York Public Interest Research Group (NYPIRG)	Oral
Day, William L.	Binghamton University	Written
DeAngelis, Pat	Individual	Oral
Deperio, Jessica	New York Public Interest Research Group (NYPIRG)	Oral
Donohue, Gavin	Independent Power Producers of New York (IPPNY)	Oral
Downs, Roger	Individual	Oral
Duffy, Timothy	New York Independent System Operator (NYISO)	Written/Oral
Dunlea, Mark	Green Party of New York State	Written/Oral
Durr, Eric	Independent Power Producers of New York (IPPNY)	Written/Oral
Dworkin, Marc	NRG Energy Inc.	Written
Ebenhack, Ben W.	Individual	Written
Ellsworth, Kathryn	Mayor, Village of Montebello	Written
Elmer, Fred	Individual	Oral
Esposito, Peter	Dynegy Inc.	Written/Oral
Evans, Dr. Richard	Individual	Written
Evans, Richard	Individual	Written
Evers, Johnny	Business Council of New York State, Inc.	Written/Oral
Ewing, Alexander - et al.	Individual	Written
Fancher, Michael	Albany NanoTech, the University of Albany	Written/Oral
Fargnoli, Connie	Individual	Oral
Feiner, Paul	Town of Greenburg	Written
Ferraro, Francis A.	Wheelabrator Technologies, Inc.	Written
Foley, Elizabeth	New York Public Interest Research Group (NYPIRG)	Oral
Ford, Elsa	Brentwood-Bay Shore Breast Cancer Coalition	Oral
Foster, Robert	Citizens Campaign for the Environment (CCE)	Written
Freeman, A. Myrick	Clean Air Task Force, Analysis of the Pataki Power Plant Proposal vs. Full Environmental Comparability Using the New York Externalities Cost Model -- Final Report	Written
Gateley, Susan Peterson	Lake Shore Environmental Action of Wolcott	Written
Gerosa, Alix	Scenic Hudson, Inc.	Written/Oral
Glaser, Dani	Individual	Oral
Glover, Deborah Marie	Individual	Written
Golden, Melanie	Individual	Written
Goldstein, Andrew	Green Party, Erie County	Oral
Golemboski, William	Innovative Energy Solutions	Oral
Goodman, Doug	Individual	Oral
Green, Justin	Individual	Written
Greene, Manna Jo	Hudson River Sloop Clearwater	Written/Oral
Griffen, Mary	Individual	Written
Guerrier, Wedlyne	Individual	Written

Name	Organization	Comments
Gupta, Ashok	Natural Resources Defense Council (NRDC)	Oral
Gupta, Ashok, Director, Air and Energy Program; Katherine Kennedy, Senior Attorney; Alexander L. Perera, Research Associate (NRDC); Paul Elston (NYLCV)	Natural Resources Defense Council (NRDC), New York League of Conservation Voters	Written
Haase, Walter	City of Jamestown, Board of Public Utilities	Written/Oral
Hall, Marah	New York Power Authority	Oral
Harris, L.A.	Individual	Written
Harris, Linda	Hudson River Sloop Clearwater, Inc.	Written/Oral
Harris, Wendy	Individual	Oral
Hartman, Donald	IST Imaging & Sensing Technology	Written
Hassig, Donald	Cancer Action, New York	Oral
Helme, Edward A.	Center for Clean Air Policy	Written/Oral
Hepinstall, David	Association for Energy Affordability	Written/Oral
Hernandez, Kristian	51st Assembly District, representing Assemblyman Felix W. Ortiz	Oral
Hipius, Joseph J.	Niagara Mohawk, A National Grid Company	Written/Oral
Holsapple, John G.	Environmental Energy Alliance of New York	Written
Jaffee, Ellen	Rockland County Legislature	Written
Jones, Daniel	Individual, member of NYPIRG Board of Directors	Written
Kamen, Ron	Individual	Written
Kane, Raymond	Torne Valley Preservation Association	Written
Kaplan, Eve	North Fork Environmental Council	Oral
Kaplan, Gitelle	Better Queens Environment	Oral
Kaplowitz, Michael B.	Westchester County Board of Legislators	Written/Oral
Kelley, Roger	Independent Power Producers of New York (IPPNY)	Written/Oral
Kenny, Cathy A.	New York State Petroleum Council	Written/Oral
Kiefer, D.	League of Women Voters of Tompkins County	Written
Kiley, Thomas	New York Gas Group (NYGAS)	Written/Oral
King, Peter	Individual	Oral
King, Susan	American Ref-Fuel®, Director of Government Affairs	Written
Klein, Art	Adirondack Mountain Club, Sierra Club	Oral
Kniffin, Kevin	Green Party	Written/Oral
Koganeya, Toshijuki	Individual	Written
Kralovich, Joseph	Old Lindenmere Civic Association, Merrick	Oral
Kreshik, Petra	New York State Office of Parks, Recreation and Historic Preservation	Written
LaBine, Bill	Renewable Energy Works	Oral
LaCen, Ramona	Individual	Oral
Lake, Howard	A.E.S. New York	Oral
Lambert, Robert	Individual	Written
Leidig, David	Individual	Written
Leonard, Ron	New York State Renewable Energy Coalition	Oral
Lewis, Neal	Long Island Neighborhood Network	Oral
Leyden, Tom	Power Light Corp.	Oral
Link, Ann	Individual	Written/Oral
Little, James	Individual	Oral
Logan, Timothy	New York City Environmental Justice Alliance, NYS Sustainable	Oral

Name	Organization	Comments
	Energy Campaign, Communities United for Responsible Energy, New York Citizens Utility Board	
Loughney, Robert M.	Multiple Intervenors, COUCH WHITE, LLP	Written
Lowe, Leslie H./Logan, Timothy J.W.	New York City Environmental Justice Alliance	Written
Lupardo, Donna	Individual	Oral
Lynch, Mark	Mirant New York	Written/Oral
Madronero, Dorice	Rockland County Conservation Association, Inc.	Written
Makarowski, Katie	Individual	Oral
Mangano, Joseph J.	Radiation and Public Health Project (RPHP)	Written/Oral
Manning, David	KeySpan Corporation	Oral
Marner, Eugene	Individual	Oral
Maskin, Daniel	New York State Community Action Association; New York State Weatherization Directors' Association; Family Development Association of New York State	Written/Oral
Masters, Deborah	Stop the Barge	Written/Oral
Maxwell, Brett	Individual	Written
McConnell, Shawn	New York Public Interest Research Group (NYPIRG)	Oral
McCorry, Timothy	Individual	Oral
McCray, Nathaniel	Citizen Campaign for the Environment	Written
McCullough, Kathryn Cook	Hudson River Sloop Clearwater, Inc.	Written
McGarvey, James	New York State Weatherization Program	Oral
McGinnis, Jocelyn	New York Public Interest Research Group (NYPIRG)	Oral
McKinney, Megan	Green Party, Broome County	Oral
McManus, Mike	Innovative Energy Solutions	Oral
Mercincavage, C. Michael	Individual	Oral
Michael, Jerry/Alvaire	Individual	Written/Oral
Miller, Gail M./Suchman, E. Gail	Communities United for Responsible Energy (CURE), New York Lawyers for the Public Interest, Inc.	Written
Miller, Richard B.	New York City Economic Development Corporation	Written/Oral
Miquet, Annie Wilson	Individual	Oral
Moore, Jesse	Individual	Oral
Mulligan, Jim	A.E.S. New York	Oral
Museler, William J.	New York Independent System Operator (NYISO)	Written/Oral
Neuroth, Don	Individual	Oral
Oates, Joseph P.	Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc.	Written/Oral
Ortiz, Assemblyman Felix W.	51st Assembly District	Written
Panzarella, Carl	NHS of South Buffalo, Inc.	Oral
Parent, Belinda J.	Joint Council for Economic Opportunity, Inc.	Written
Patasaw, Natalie	Individual	Written
Pendzich, Marie	Sierra Club, Long Island Group	Written/Oral
Pereira, Anthony	Alternative Power, Inc.	Oral
Perera, Alexander	Natural Resources Defense Council (NRDC)	Oral
Picardi,Matthew J./Espositio, Peter	Dynegy Inc.	Written
Pijacki, Mark D.	National Fuel Gas Distribution Corporation (NFGDC)	Written/Oral
Plessner, Laura	Torne Valley Preservation Association	Written
Quinn, Peter	Long Island Coalition for Democracy	Written
Quinn, Peter	Sustainable Energy Alliance; Suffolk County Electrical Agency; Long Island Coalition for Democracy	Oral

Name	Organization	Comments
Rabin, Kyle	Riverkeeper, Inc.	Written/Oral
Ramos, Nelson	Sunset Park Redevelopment Committee	Oral
Ramsey, Lynn	Bald Eagle Power Company	Oral
Reutling, Karl	Lewis County Opportunities, Inc.; New York State Weatherization Program Public Action Committee	Written/Oral
Montblan, J. Reyes, Gregory J./ Funk, Peter/West, Donald	Cooperative Coalition to Prevent Blackouts c/o HDFC Council	Written
Reynolds, Anne K.	Environmental Advocates of New York	Written/Oral
Rice, Wendell	Weatherization Assistance Program, Bedford-Stuyvesant Restoration Corporation (BSRC-WAP)	Oral
Rieber, Dan	Northern Manhattan Weatherization Corporation	Written/Oral
Robbins, Julie	Environmental Advocates of New York	Oral
Rodriguez, Hector	Scenic Hudson Inc.	Written
Rodriguez, Rev. Daniel	New York City Clergy for Justice Association	Oral
Rojas, Ricardo	UPROSE, Environmental Justice Community Organizer; Communities United for Responsible Energy (CURE)	Oral
Roland, Fogel, Koblenz & Petroccione, LLP	Empire State Petroleum Association, Inc.	Written
Roll, Doug	A.E.S. New York	Oral
Rooney, Kevin	Oil Heat Institute of Long Island, Inc.	Written/Oral
Rosenberg, Leah	Individual	Oral
Rosenblum, Daniel W.	Pace Law School Pace Energy Project	Written
Saillant, Dr. Roger	Plug Power, Incorporated	Written/Oral
Salo, Tom	Individual	Written
Schell, Dr. Lori Smith	Independent Power Producers of New York, Inc. (IPPNY); Trigen Energy Corporation	Oral
Schibli, Alex	Individual	Oral
Schneiderman, Eric T.	New York State Senator - 30th District	Written
Seebachan, Barry S.	Bronx Shepherds Restoration Corporation; Association for Energy Affordability; Policy Advisory Council to the New York Weatherization Program	Written/Oral
Seidler, Irmgard	Individual	Written
Serotoff, Mark	Sustainable Energy Alliance of Long Island - Townline Association	Written/Oral
Seyfried, Curtis	New York State Sustainable Energy Coalition (NYS-SEC), Communities United for Responsible Energy (C.U.R.E.), We Stay / Nos Quedamos Committee, Inc., Community Advocate	Written/Oral
Shapiro, Howard	Energy Association of New York State	Written/Oral
Shapiro, Susan/Ritter, Maureen	Rockland Close Indian Point, Rockland Citizens' Awareness Network	Written
Simpson, Walter	Western New York Sustainable Energy Association (WNYSEA); SUNY Buffalo	Written/Oral
Sinclair, Jim	El Paso Corporation	Written/Oral
Sinton, Chris	Alfred University	Oral
Slatkin, Marcia	Individual	Written
Smith, Jeffrey K.	New York State Electric & Gas Corporation	Written
Smith, Robert A.	Individual	Written/Oral
Smyth, Elizabeth Cunningham	Individual	Written
Sontag, Charles	Individual	Oral
Soos, Paula	Convanta Energy Corporation	Written
Stebbins, Todd	New York Public Interest Group, Inc. (NYPIRG)	Oral
Stetzer, Susan	East River Environmental Coalition; Communities United for	Written/Oral

Name	Organization	Comments
	Responsible Energy (CURE)	
Stouffer, John	Sierra Club, Atlantic Chapter	Written
Stout, David	Individual	Oral
Sturm, Lois M.	Individual	Written/Oral
Super, Reed W.	Riverkeeper, Inc.	Written/Oral
Sussman, Edna	Federated Conservationists of Westchester County, Inc.; Environmental Advicates	Written/Oral
Swartley, Kevin	New York Corn Growers Association (NYCGA)	Written/Oral
Sweet, Alan	Chenango North Energy Awareness Group (CNEAG)	Oral
Teetz, Robert D.	KeySpan Corp.	Written
Teneyck, Michelle	Individual, Citizens Awareness Network	Oral
Tevelin, Ben	Individual	Oral
Thomas, Wayne	CDR Management Corporation, Subdivision of Asset Management Division of Bedford Stuyvesant Restoration Corporation	Oral
Tonko, Paul D.	105th Assembly District, Assemblyman	Written
Trabold, Christopher	Independent Power Producers of New York, Inc. (IPPNY)	Written/Oral
Trikha, Ashok K.	Individual	Written
Tripp, James T. B.	Environmental Defense	Written/Oral
Trisko, Eugene M.	Center for Energy and Economic Development, Inc. (CEED)	Written
Tyner, Joel	Individual	Written
Vercolen, Michael	Green Party, Broome County	Written/Oral
Victor, Shirley M.	Individual	Written
Vitek, Bill	Clarkson University Center for Environmental Management	Written/Oral
Wahl, Gerald F.	Harbec Plastics, Inc.	Written/Oral
Warren, Barbara	Consumers Union	Written/Oral
Wells, Barbara	Individual	Written
Wentlent, Christopher	A.E.S. New York	Written/Oral
Wertman, Sheldon	Atlas Copco Air Compressors	Oral
White, Donald R.	Individual	Written
Whitley, Kathleen	Sustainable Energy Alliance of Long Island	Written/Oral
Wilder, Ian	Babylon Greens, Town of Babylon	Oral
Wilkens, Paul C.	Rochester Gas and Electric Corporation, R.G.S. Energy Group	Written/Oral
William Day	University of Binghamton	Oral
Williams, Jeffrey	Niagara Mohawk, A National Grid Company	Oral
Winkelman, Steve	Center for Clean Air Policy; Transportation Working Group for Governor Pataki's Greenhouse Gas Task Force	Oral
Wood, Robert	Clarkson University	Oral
Wooley, David	American Wind Energy Association (AWEA)	Written/Oral
Wooster, Margaret	Great Lakes United	Written/Oral
Wright, Jonathan	Green Party	Oral
Wright, Senator James	New York Senate Energy and Telecommunications Committee	Written/Oral
Yahm, Elinor	Individual	Written
Yehle, Raymond A.	NYS Weatherization Directors Assoc.; P.E.A.C.E., Inc.	Written/Oral
Young, Margaret Hays	Sierra Club, New York City; Sierra Club, New York State	Written/Oral
Zacharia, Mary Ann	American Lung Association of Nassau-Suffolk	Oral
Zadlis, Peter	Individual	Written
Zeltmann, Eugene W.	New York Power Authority	Written/Oral
Zerbian, Tina	Cattaraugus Community Action, Inc.	Written
	Association of Energy Engineers, New York Chapter	Written
	Consumers Union, Consumer Policy Institute	Written

Name	Organization	Comments
	EnergyPlus Cooperative of the Southern Tier and Finger Lakes	Written
	New York State Tug Hill Commission	Written
	Niagara Mohawk, A National Grid Company	Written
	NY Renewable Energy Coalition	Written
	Tomkins County Environmental Management Council Energy Committee	Written

SECTION 2.1

PROMOTING ENERGY INDUSTRY COMPETITION

INTRODUCTION

The 1994 State Energy Plan introduced the potential for energy competition in New York State, and the 1998 State Energy Plan identified New York's vision and the State's actions and plans for achieving that vision. This 2002 State Energy Plan (Energy Plan) reflects on the achievements made to date in opening energy markets to greater competition and considers whether any changes should be made in the State's vision for the future. The pursuit of effective competition, wherever practicable, in the provision of natural gas and electricity services is the policy of the State of New York. Such competition has the potential to reduce energy costs over the long term, increase customer choices and satisfaction, provide economic development advantages, enhance system reliability, promote technological changes and improvements, and improve environmental quality.

In the wake of recent developments in energy markets, particularly in the western region of the country, many people question whether customers are better off today than they were under full regulation of utility services. To answer that question, several key areas should be considered: price, reliability; economic development; adequacy of supply and delivery capability; and environmental impact. Each of these were discussed in the 1998 Energy Plan and findings were made. This section of the Energy Plan will discuss those areas, relating the 1998 findings to current conditions, and then will present and discuss several specific issues that are currently facing New Yorkers. The Electricity and Natural Gas Resource Assessments, found elsewhere in this Energy Plan, provide a more detailed review of the state of the competitive markets, as well as the state of the infrastructures available to support those markets.

STATUS OF COMPETITION

Price

The 1998 State Energy Plan noted that the natural gas and electric industries were in transition to retail competition. Prior to reaching the end-state, however, the 1998 State Energy Plan concluded that customers would still experience reduced prices because of multi-year rate plans that had been authorized by the New York State Public Service Commission (PSC) and because customers would now begin to have the ability

to choose suppliers. In particular, the 1998 State Energy Plan projected that electric rates could be expected to decrease statewide by an average of 9.7% by 2002 even though modest increases in the prices of fuels used to generate electricity could be expected. The 1998 State Energy Plan also found that restructuring the gas and electric industries would provide consumers with competitive energy prices and services, stimulate economic growth, and improve the job market.

From 1998 until recently, the State has experienced significant economic growth, job markets have improved, and energy delivery rates have declined, as anticipated. In addition, those customers that have opted to seek competitive suppliers have been able to receive lower commodity prices than they might have received through their utility company as full service customers. Wholesale commodity prices for both natural gas and electricity, however, increased significantly in 2000 due to factors mainly unrelated to industry restructuring, which in turn had significant impacts on the overall prices that customers paid for their utility services. Of these factors, the most significant was the sharp increase in the wholesale price of natural gas from the second quarter of 2000 to the second quarter of 2001 (see the "Natural Gas Assessment" for a discussion of this increase).

Subsequent to that time, wholesale natural gas prices receded toward the level prior to the dramatic run-up in 2000. Electricity prices have also fallen back to earlier levels. In the long-term, wholesale natural gas prices (which are beyond the State's control) are forecast to decline in real terms through 2006 and then increase slowly until the end of the planning period, but they are not projected to exceed the real price experienced in 2000. Retail natural gas prices are forecast to follow a similar trend, as discussed in the Natural Gas Resource Assessment. With regard to electricity prices, the "Electricity Resource Assessment" presented in this Energy Plan projects that average retail prices should decline in real terms throughout the planning period.

Reliability

The 1998 State Energy Plan found that electric system reliability can be maintained or enhanced in a competitive market. Indeed, since the transition to wholesale electric competition began, the State has continually met or exceeded all of the reliability criteria established by the Northeast Power Coordinating Council and by the New York State Reliability Council. While bulk electric resources have been strained at times, the criteria have not been violated. As new generation and demand reduction resources become available over the next few years, bulk electric system reliability should continue to improve. With regard to electric distribution system resources,

reliability has generally remained stable, although pressures have increased for utility managers to minimize capital costs, as well as operations and maintenance costs. Utilities have responded by utilizing preventative maintenance programs and increasing the productivity of their work forces.

Economic Development

The 1998 State Energy Plan held that it is sound policy for New York State to use some of the benefits of restructuring the electric and natural gas utility industries to maximize economic development. Industrial and large commercial customers have taken advantage of the opportunities available to them to choose their energy suppliers through the competitive markets, and they have also benefitted from reduced delivery charges that became available through the regulatory process. Innovative programs, such as the new price response demand and load bidding programs established by the utilities and the New York Independent System Operator (NYISO), are also important opportunities that can help these classes of customers manage their utility budgets effectively. As new electricity generation and additional gas transportation capability become available, the benefits of competition will expand and so will the potential for greater economic development.

Adequacy of Supply and Delivery

The 1998 State Energy Plan held that energy supplies should continue to be adequate throughout the planning period, but new facilities would be needed sometime within the 2001 to 2005 time frame. Recent events have shown that the 1998 prediction was accurate, although the need for the new resources arrived somewhat earlier than was expected due to economic and load growth at the upper bound of the forecast range. Fortunately, the policies put in place to facilitate competition in New York have set the stage for new baseload generation to be built and operational in the near future and for demand reduction programs to be developed. Prior to the summer of 2001, the New York Power Authority's (NYPA) "Power Now!" projects added approximately 450 megawatts (MW) of new gas turbines in the New York City and Long Island areas. In addition, public and private sector utilities and the NYISO developed and initiated demand reduction programs that enabled the State to maintain a reliable electric system as the new baseload generation and further growth in demand reduction programs are pursued. The Electricity Resource Assessment, presented later in this Energy Plan, provides an in-depth assessment of the electricity infrastructure and demonstrates that electric system reliability can be maintained as competitive markets develop.

With regard to the siting of major electric facilities under Article X of New York's Public Service Law (PSL), the 1998 State Energy Plan held that certification may be premised on a determination that the proposed facilities would promote or contribute to a competitive market for wholesale or retail electricity. As of May 1, 2002, twenty four major electric power plant proposals subject to Article X have been announced formally to date, and 18 formal applications have been filed (one was subsequently withdrawn). Seven of those proposals have been approved (one of the seven has recently been canceled), and four projects are now under construction. With regard to natural gas, additional delivery system facilities are needed, and several proposals are pending before the Federal Energy Regulatory Commission (FERC) or have recently been authorized. The New York State Energy Research and Development Authority (NYSERDA) and the NYISO initiated a study to assess the interrelationships between natural gas and electricity, as well as the interrelationship with petroleum products. The results of that study to date are discussed below (see "Natural Gas and Electricity Interrelationships").

Environmental Impacts

The 1998 State Energy Plan maintained that increased competition in the energy markets would not have an undue adverse impact on the environment, as compared with traditional industry regulation, because environmental oversight would continue and mitigation measures would be implemented as necessary. Most of the Article X applications filed to date are for efficient, gas-fired combined cycle generation units; several are simple cycle installations. All use state-of-the-art clean technology, and several will result in the repowering of existing, inefficient, and more polluting generation. Modeling on these proposed power plants show expected reductions in air pollution in the State through the displacement of older, more polluting, electricity generation, and the analyses performed for the Electricity Resource Assessment in this Energy Plan support these results. Equally important are new programs designed to reduce customer energy demand, increase the efficiency of generation technologies, and promote indigenous and renewable resource development.

All Article X applicants and non-Article X power project developers must apply for applicable air and water quality permits from the New York State Department of Environmental Conservation (DEC). The permits are based on compliance with all applicable State and federal air and water quality regulations and requirements, including Prevention of Significant Deterioration (PSD), New Source Review (NSR), and Maximum Achievable Control Technology (MACT). Many Article X applicants have proposed air-cooled condensers (dry cooling), which use very little water compared to wet evaporative cooling or once-through cooling technologies. Additionally, depending

on site locations, other environmental mitigation measures have been imposed by the Article X Siting Boards.

The events of the past four years continue to support the validity of the 1998 State Energy Plan findings. In all the key areas (price, reliability, economic development, adequacy, and environmental impact), the evidence shows that competition has been beneficial, but greater benefits can be achieved. The transition to competitive energy markets continues, and the State must remain ready to identify and resolve issues as they may arise.

COMPETITIVE ISSUES FOR THE FUTURE

The Electricity and other Resource Assessments presented in this Energy Plan provide assessments of both the state of the energy infrastructure and the markets supported by this infrastructure. The Assessments identify issues and barriers that confront the implementation of competitive markets and present various options that might be available to address those issues or overcome the barriers. With the background provided by the Assessments, this section addresses in more detail several critical issues affecting competition.

Policy Framework

The rigid, statutory-based approaches used for restructuring the utility industries in other regions of the country have led to significant problems and caused some advocates of competition to reevaluate their positions. Consequently, several states have retreated to “wait and see” positions, and some have even considered reversing course. In contrast, New York State’s flexible approach to restructuring is designed to allow adjustments to be made as new policies are implemented and competitive barriers are revealed.

For example, most stakeholders agree that a primary barrier to effective wholesale competition in the energy industries is the lack of adequate resources in certain areas where they are needed most. This translates to a need for additional supply resources (either commodity or delivery resources) and demand-reduction techniques. The lack of adequate natural gas delivery and storage infrastructure in some areas constrains the market, which, in turn, leads to more volatile prices. For electricity, additions to the delivery system and/or added generation and reduced demand in certain areas of the State are needed. In response, the State has advocated increasing gas and

electric transmission into constrained areas, and it has taken steps to install small gas-powered facilities in New York City and on Long Island.

The "Electricity Resource Assessment" and the "Natural Gas Resource Assessment" in this Energy Plan each describe the state of competition for their sectors and discuss the remaining impediments to fully competitive markets, competitive prices, and additional choices for customers. The Assessments then identify the many initiatives and actions that have been taken and are underway. As these initiatives and actions unfold, the impediments identified are being addressed, and the State will endeavor to make any modifications that might be necessary for those issues that fall under its purview.

As described in the Assessments, the regulation of wholesale electricity and natural gas is primarily under the jurisdiction of the FERC. Consequently, the State has little direct control over the wholesale price of energy, but it does take an active advocacy role in support of maintaining system reliability and truly competitive markets. Over the next several years, wholesale markets will continue to mature, the NYISO will continue to improve its operations, the FERC will continue its deliberations on regional transmission operations, and the U.S. Congress will continue to consider nation-wide industry restructuring legislation. New York will monitor these activities and provide input where necessary to ensure that the State's interests are protected, especially with regard to energy systems security and reliability, and the ability of consumers to seek the lowest possible commodity prices.[1]

One concern that has surfaced in the wake of recent reports of the financing practices of major electricity generating companies involves the ability of merchant plant developers to obtain financing in the absence of long term contracts for the output of proposed plants. New York designed and implemented an installed capacity (ICAP) market to provide a stable source of revenue for recovering capital costs associated with the construction of plants. The ICAP market, however, has proven to be volatile, tending to provide very little revenue to generators whenever supplies are adequate (greater than reserve requirements). PSC Staff, along with the NYISO and the market participants, are discussing ways to redesign the ICAP market, among other solutions, to address the problem of access to financing.

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[1] The State supports development of a single, regional common market, subject to certain principles described in the Electricity Resource assessment. Similarly, as discussed later in this issue paper, the State supports federal legislation to remove some of the current barriers to effective competition in the utility industries.

While it remains the policy of the State of New York to pursue effective competition whenever practicable, the State recognizes that it may be required to advocate for customers at FERC and the NYISO, and also take other actions at times to protect the public, the environment and the industry. The State has assisted in establishing the NYISO and its organizational structure, established demand reduction programs at the utilities and the NYISO, and enabled construction and operation of critically needed additional electricity generation in the New York City and Long Island areas. The State recognizes that actions taken to secure adequate resources must be well-considered and undertaken with utmost restraint so as not to interfere unreasonably or unnecessarily in the development and operation of the market.

Power Plant Siting

PSL Article X authorizes the Siting Board to issue a Certificate of Environmental Compatibility and Public Need prior to construction and operation of an electricity generating facility with a capacity of 80 MW or more. Article X, enacted July 24, 1992, expires on January 1, 2003. It remains operative and effective with regard to applications filed on or before December 31, 2002.[2]

Article X provides for a pre-application process that encourages early public involvement and agreement between the affected agencies and parties on the scope of studies and analyses necessary to complete an application. Intervenor funding is available to municipal and local parties for expert witnesses and consultants once an application is filed. The Siting Board is required to render a final decision within twelve months of notice of a complete application. The Siting Board is required to make specific findings in support of its decisions on applications. Local laws apply, but the Board is authorized to waive application of any local laws upon certain findings (PSL § 168 (2) (d)).

Article X has been modified and streamlined in several ways. In 1999, the State enacted amendments to Article X that authorize the Department of Environmental Conservation (DEC) to issue air and water permits for proposed facilities. The

[2] Before enactment of Article X, PSL Article VIII established requirements relating to siting of major steam electric generating facilities. Article VIII was first enacted as Chapter 385 of the Laws of 1972; it expired in 1978 and was re-enacted by Chapter 708 of the Laws of 1978, which expired in 1988 when Chapter 519 of the Laws of 1992 became effective. The Law was subsequently amended in 1999 and 2001. An interruption in the PSL certification process occurred from January 1, 1989 to January 20, 1993. The State Environmental Quality Review Act applied to developers of major generating facilities during the interruption.

amendments were necessary to ensure continued federal delegation for air and water permits. The 1999 amendments also increased intervenor funding (from $150,000 to $300,000 per application) and strengthened the agencies' mandate for public involvement programs and increased public awareness and involvement in the process. In 2001, Article X was further amended to provide a shortened certification period for repowering projects, provided that certain air emissions will be reduced by at least 75% and water usage will be reduced dramatically.

The State agencies administering Article X and the air and water permitting have also undertaken measures to streamline the process and to provide opportunities for participation. Intervenor funding is initiated soon after an application is determined to be complete, and the New York State Department of Public Service (DPS) web site was expanded to provide ready access to case documents, status reports and a user friendly guide to Article X. The agencies conduct workshops to explain the process and filing requirements to applicants, as well as forums to explain the process to the public. The agencies also conduct one-on-one meetings with potential applicants and public interest groups to disseminate Article X material. These measures have helped Article X certification develop maturely into a smooth and expeditious process, which enhances public participation without unduly delaying consideration of the applications.

In response to the State Energy Planning Board's (Planning Board) request for comments on the scope of the Draft Energy Plan, written and oral comments were received regarding the effectiveness of Article X. In general, the comments call for extending Article X for five years. Recommendations for improving Article X included proposals for:

- Streamlining Article X procedures, including conducting more expeditious proceedings;
- Providing priority for brownfield and repowering facilities;
- Exempting mini power plants (a single turbine or pairs of turbines with a nameplate rating of over 80 MW but an actual output to the electric system of under 80 MW);
- Providing more and earlier public involvement;
- Requiring cumulative power plant and neighborhood impact (environmental justice) analyses;

- Evaluating health issues associated with fine particulates ($PM_{2.5}$) and non-ammonia technologies;
- Coordinating reviews by State and federal agencies;
- Locating generating facilities closer to the loads they are intended to serve; and
- Ensuring reliability of supply.

Comments subsequently received on the Draft Plan's discussion of Article X reflected those submitted during the scoping process.

Some commentors propose streamlining Article X to shorten the process. In addition, citizen and environmental groups and local governments request more meaningful public participation. These two objectives might be addressed through evaluation of the effectiveness of the current statutory language for intervenor funding and continuation/expansion of State agencies' pre-application information programs and training workshops for prospective applicants and others interested in the process. In addition, the Article X procedural requirements might be modified to enable Siting Boards to streamline review where interested parties, including affected community groups, reach consensus on specific issues presented by an Article X application.

In addition to Article X certification, construction of proposed generating facilities is subject to other federal and State requirements. Some groups call for more coordination between the Article X review process and the processes conducted by other State and federal agencies. Applicants could improve coordination by filing applications earlier with the other State and federal agencies and providing regular reports to the Siting Board on the other regulatory review processes. In addition, the State could consider amending Article X to designate as statutory parties other State organizations with responsibilities relating to siting electricity generating facilities.[3] Statutory parties are required to participate in the certification process if they determine that a proposed facility impacts a resource under their jurisdiction.

The benefits that Article X provides the State justify its reauthorization. In that process, the following should be considered:

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[3] The New York State Department of State has been delegated responsibility for coastal zone management, and the Office of Parks, Recreation, and Historic Places has been delegated certain responsibilities with regard to historic places and parks.

1. Increased public participation in the Article X siting process through creation of an Office of Public Advisor to assist and advise interested parties and members of the public regarding participation in the siting and certification processes for major electric generating facilities. State agencies should continue their pre-application information programs and training workshops for prospective applicants and affected communities.

2. The effectiveness of current statutory language providing for intervenor funding, giving consideration to providing funding at the time of project preliminary scoping and allowing broader use of intervenor funding.

3. The appropriateness of developing specific procedures with respect to the expansion, modification, or repowering of existing major generating facilities.

4. Additional modifications and measures to Article X's procedural requirements that would enable the Siting Board to streamline its review where interested parties, including affected community groups, have reached consensus as to the specific issues presented by an Article X application.

5. Adding the New York State Department of State and the New York State Office of Parks, Recreation, and Historic Preservation as statutory parties to Article X proceedings in order to coordinate relevant permit requirements for Article X applications.

Natural Gas and Electricity Interrelationships

Natural gas is the fuel of choice for new power generation projects (see Electricity Resource Assessment). Plans to build about 15,000 MW of new gas-fired generation capacity have been announced, with about 70% of these to be located in an area extending from Orange and Rockland counties through and including Long Island. It is not clear which and how many of these plants actually will be built or when they will be built. In addition, the sponsors of some of these proposed plants are seeking permits to burn oil as an alternate fuel and have proposed the installation of oil storage facilities. Other proposed generators would be natural gas-only plants. These new plants will compete against other generators and may well displace natural gas now used in older, less efficient power plants.

The natural gas delivery capacity that exists today was built to serve the winter peak needs of core (residential, commercial, and industrial) customers. In essence, it is now operating at maximum capacity during peak periods. Some project sponsors have signed agreements for capacity on proposed pipeline projects, at least to meet some of their requirements. Others, however, have not and plan to rely on wholesale marketers to

provide them with natural gas. Some wholesale marketers have contracted for capacity on proposed new pipeline expansion projects, but that capacity would not necessarily be dedicated to particular power plants.

NYSERDA and the NYISO initiated a study of the interrelationships between the electricity and natural gas systems in New York. Through integrated modeling of the natural gas pipeline and electric generation systems, the study analyzed the level of gas and oil use for electricity generation under a variety of pipeline and electricity generation expansion scenarios. Ongoing analysis is examining the interactions of the gas and electric system in contingency situations (*e.g.*, pipeline or compressor station outages, electric generator failures and system re-dispatch). See the "Natural Gas Assessment."

As a starting point, for the year 2002, the analysis assumes that electric generation and natural gas system expansion projects currently under construction, or expected to be in service throughout 2003, are completed. This includes a net increase in electric generating capacity of 527 MW and an increase in natural gas pipeline capacity of 465 MDT/D (see Natural Gas Asseessment for details).

The study focused on the downstate area where much of the proposed increase in electricity generation capacity would be located and the ability of various increases in gas pipeline capacity to meet electricity generation needs. The study did not evaluate particular pipeline projects but instead examined post-2003 capacity addition of up to 800 MDT/D.

The study's overall findings are that:

1. If no post-2003 pipeline expansion projects are built, the existing gas and oil systems will be adequate to meet all electricity generation scenarios. Additional pipeline capacity, however, would benefit New York through reduced air emissions and enhanced contingency protection;

2. Pipeline capacity additions of between 300 MDT per day and 800 MDT per day would provide additional benefits to the electricity and natural gas systems, including enabling the use of larger quantities of cleaner-burning natural gas and providing better contingency protections.[4] Nonetheless, the more natural gas pipeline capacity built and used to serve electricity generation, the more dependent the electricity system is on natural gas availability and the more exposed it is to natural gas price variation.

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[4] Work is continuing to assess the impact on the electricity and natural gas systems resulting from additional contingencies.

3. If 800 MDT/D of post-2003 pipeline capacity projects are built into the downstate New York area, natural gas could meet 100% of all generation scenarios; and

4. If less than 800 MD T/D of pipeline expansions and/or less additional generating capacity are added, a substantial portion of the maximum potential gas demand for generation can still be met. Some oil would need to be burned, but the total annual oil burn in all cases examined in 2005 would be less than the amount burned in 2000 and 2001.

The study considers pipeline capacity that is built to the New York market as capacity that will remain available to customers in New York. This assumes an open pipeline capacity market where bidders can acquire capacity on a short-term basis if they are willing to bid high enough. However, this same pipeline capacity could be used to deliver gas to upstream points. There is a risk that upstream customers (*e.g.*, new generators or other users) might emerge and be willing to sign a long-term contract for that pipeline capacity. If that were to happen, that pipeline capacity would become unavailable to the New York market, and building replacement pipeline capacity may take several years.

New York needs more pipeline capacity for several reasons:

1. New combined cycle generators will seek to burn gas as their only or primary fuel. Depending on how much new generation is added, existing pipeline capacity may be inadequate to meet that need;

2. New market developments could further increase the demand for natural gas to generate electricity (*e.g.*, recommendations for reducing State greenhouse gas emissions);

3. The study assumes that the steam units remain available, and can use residual oil when needed, providing important flexibility to meet peak electricity generation needs. The addition of 4,435 MW of generation capacity and 300 MDT/D of pipeline capacity will result in existing steam units running at very low load factors. Unless these plants can offset this loss of income from the energy market through capacity and ancillary service markets, they could become uneconomic and retire. To the extent that these steam units are retired, either more pipeline capacity will be needed to meet the electric generation needs, or new combined cycle plants will need to have the ability to burn distillate oil as required to meet load. As currently planned, these new combined cycle plants will have neither the distillate oil storage capacity nor air emissions permits to do that;[5] and

[5] Air permits usually limit the use of oil to 720 hours at dual-fueled facilities.

4. The study also assumes normal winter weather for the purpose of calculating non-generation loads. Local distribution companies hold capacity to meet severe weather requirements and can offer that capacity to the market when the weather is less than severe. Electricity generators are unlikely to hold capacity needed in a severe winter. To the extent that weather is colder than normal, less pipeline capacity would be available for the electricity generation market.

Federal Competitive Agenda

There are several actions that the U.S. Congress can take to assist New York State in its energy industry restructuring efforts. These include: repeal of the mandatory purchase of power from qualified generating facilities by utilities under the Public Utility Regulatory Policy Act (PURPA) and establishment of national mandatory reliability rules for the bulk power system (while allowing states and sub-regional reliability organizations such as the NYSRC to continue to set more specific or more rigorous State and local reliability standards when it is in the public interest).

FINDINGS AND CONCLUSIONS

- The findings of the 1998 State Energy Plan related to the introduction of competition in the electricity and natural gas industries remain valid today.

- The State must remain vigilant and flexible and must resolve energy issues as they arise, in order for the competitive energy markets in New York State to reach their true potential and for New Yorkers to realize the full benefits of restructuring.

- The State's administrative approach to restructuring its energy industries was premised on input from stakeholders and experts, and designed to provide flexibility to make adjustments as barriers to effective competition are revealed and competitive markets develop. This approached has served New York State well.

- The primary barrier to achieving effective wholesale competition in the energy industries is the lack of adequate resources (electricity generation capacity, electricity and natural gas delivery infrastructure, and demand reduction techniques) in certain areas where they are needed.

- The Article X Power Plant Siting Process in New York State has benefitted the State while protecting the environment.

- The natural gas delivery system, built to serve the winter peak needs of residential, commercial, and industrial customers, is now fully used during peak

periods. The competitive electricity generation market is moving toward a greater dependency on natural gas. Such a greater dependency on natural gas suggests a need to expand the natural gas infrastructure; use resources that will reduce our dependency on natural gas, such as greater use of renewable energy resources and advanced coal technologies; implement further electricity demand reduction techniques; and continue safe operation of nuclear power plants.

- The U.S. Congress can assist New York by repealing the mandatory purchase of power from qualified generating facilities required of utilities under the PURPA and by establishing national mandatory reliability rules for the bulk power system (while allowing states to continue to set more rigorous standards when it is in the public interest).

SECTION 2.2

ENERGY AND ECONOMIC DEVELOPMENT

INTRODUCTION

Policies that promote a secure, competitive, and reasonably priced energy supply will help attract, retain, and expand businesses in New York. These include policies that support reducing energy costs to consumers, improving the reliability of the State's energy supplier and infrastructures, and developing energy-related businesses in New York. In addition, promoting cost-effective energy-efficiency improvements, indigenous and renewable energy resource development, and alternative-fueled vehicles, stimulates in-State job creation, particularly when these technologies or their components are manufactured in New York. A secure and reliable energy supply will provide businesses with the confidence necessary to invest in New York. The increase in business profitability and consumer purchasing power that results from lower energy costs will further stimulate business investment, consumer spending, and employment growth within the State.

ENERGY SUPPLY

With the growth in electricity demand that has occurred over the last five years, adequate and reliable energy supplies are critical to the State's continuing economic prosperity. New York has added 802,000 private sector jobs since 1995, leading all other Northern industrialized states in the rate of job creation. From 1999 to 2000, the State ranked tenth among all states for private sector job growth. Continuing this economic growth will depend, in part, on the State securing additional energy resources, including electricity generation and infrastructure improvements.

The State has taken a number of actions to ensure that electricity supply is adequate to meet demand. In the near-term, the New York Independent System Operator (NYISO) has implemented the Emergency Demand Response and Day-Ahead Demand Bidding programs, the New York Power Authority (NYPA) has installed new generators in the metropolitan New York City area, and the New York State Energy Research and Development Authority (NYSERDA) and utilities have implemented new programs to assist businesses in reducing demand and becoming more energy-efficient. In the long term, the siting of new base load plants will help ensure reliability and support more stable pricing. In addition to new generation resources, the State is promoting greater investment in energy efficiency, indigenous and renewable resources, and distributed generation.

ROLE OF ENERGY PRICES IN BUSINESS LOCATION AND EXPANSION

Geographic variation in energy prices gives businesses some degree of control over the prices they pay, but only to the extent that they are able to easily relocate. As a result, energy prices tend to be important factors in business location and expansion decisions, particularly for energy-intensive businesses. Other considerations of varying importance, depending on the type of business, include availability and reliability of energy supply, taxes, availability of raw materials and other process inputs, access to capital, proximity to transportation systems and markets, availability of a skilled workforce, labor costs, government regulation, and environmental policies.

In a national survey of businesses that primarily included manufacturers, 81% of respondents considered energy cost and availability to be either an important or very important site-selection factor.[1] Given the relative cost of energy in New York, manufacturers in the State regard energy costs as being even more significant than is indicated by the national survey. For most businesses in New York, the cost of energy represents less than 5% of total product cost; however, energy prices can have a substantial impact on profits. In many industries, profit margins are extremely thin, representing less than 5% of gross sales.[2] Reducing energy costs, therefore, can have a substantial effect on a business' profitability. Moreover, facilities in New York compete with other companies within the State and with facilities within the same company located in states with lower operating costs. In some cases, same-company facilities compete for additional capacity and jobs; in other cases, they compete to remain in operation. Corporations routinely favor locations that have the greatest profit potential. Less profitable facilities will, at best, not be expanded. At worst, they will be closed, with a resultant loss of jobs.

ECONOMIC DEVELOPMENT PROGRAMS

To overcome relatively higher energy costs, various programs, policies, and initiatives have been developed to attract and retain businesses in the State. Both of the State's public power authorities, the Long Island Power Authority (LIPA) and NYPA,

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[1] *Area Development, Sites and Facility Planning,* "Corporate Survey," December, 1997.

[2] Glen Weisbrod (Hagler Bailly Consulting, Inc.) and Howard Friedman (DynCorp), *Economic Competitiveness Impacts of Utility Rates and Programs*, April 1, 1996, p.8.

have economic development programs to attract and retain businesses in New York.[3] NYPA also administers the Power for Jobs program. NYSERDA offers a variety of programs to encourage business growth, and the State's investor-owned utilities offer flexible rates and fixed discount programs to businesses that meet strict eligibility criteria.

New York Power Authority

NYPA provides low-cost electricity to businesses through programs designed to promote economic development. In 2001, NYPA provided more than 1,500 megawatts (MW) to 990 employers, ranging from heavy manufacturing and financial services to health care facilities and cultural institutions. NYPA's low-cost power supports more than 450,000 jobs statewide. It operates two major hydroelectric power projects (Niagara and St. Lawrence-FDR), a pumped storage hydropower project (Blenheim-Gilboa), five small hydroelctric plants, two fossil fuel power projects (Poletti and Flynn) and 11 small natural gas-fired turbines. In 2000, these facilities generated 22,710,360 megawatthours (MWh) of electricity. That figure does not include the electricity produced by the FitzPatrick and Indian Point 3 nuclear facilities, which were sold to Entergy in November 2000. The output of the nuclear facilities is purchased by NYPA under a long-term agreement. Besides providing electricity, NYPA provides energy efficiency assistance and other customized services to help its customers and other public entities lower energy costs.

One of New York's most valuable economic development tools is the low-cost electricity produced by NYPA's major hydroelectric facilities. For example, approximately 50,000 jobs at nearly 100 companies in Western New York are tied to the 2,400 MW Niagara Power Project. In addition, NYPA's 800 MW St. Lawrence-Franklin D. Roosevelt Power Project in Northern New York provides some of the least-expensive power in the nation for businesses and other upstate customers.

NYPA's programs to assist economic growth include two programs using low-cost hydropower from its Niagara Power Project. The Expansion Power program provides 250 MW earmarked under State law for job creation and retention in New York's three westernmost counties. The Replacement Power program provides 445 MW designated by federal law for industries located in the Niagara Mohawk service territory within 30 miles of the Niagara Power Project. Under both programs, the contracts for the power allocations include customer commitments to sustain agreed-upon levels of employment.

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[3] It is estimated that LIPA's four-year electric rate cut, rebates, and capital programs have contributed to the expansion of Long Island's economy by $10 billion.

NYPA's sales of low-cost power to the State's 51 municipal electric systems and rural cooperatives also benefit many businesses located within these service areas. The Economic Development Power (EDP) program provides for job creation and business revitalization throughout the State. Electricity for this program is supplied by the FitzPatrick Purchased Power and Energy Agreement with Entergy. To receive EDP, companies must commit to maintain a specific level of jobs and, in the case of business retention, invest in real property improvements. The State EDP Allocation Board, created by the State Legislature, evaluates applications and makes recommendations to NYPA's trustees. New York's businesses also benefit from NYPA's Municipal Distribution Agency (MDA) power, another designated portion of the FitzPatrick nuclear power that is sold to downstate local municipal distribution agencies.

The Power for Jobs program was signed into law in July 1997. This program provides low-cost electricity to assist New York employers at risk of reducing or closing their operations or moving out of State, or that were willing to expand job opportunities in the State. The program authorizes NYPA to allocate an additional 450 MW of low-cost electricity to New York businesses that commit to preserve or create jobs, with up to 100 MW set aside for small businesses and not-for-profit corporations. Applications are recommended by the EDP Allocation Board to the NYPA trustees. One-half the electricity provided under the Power for Jobs program is produced at the FitzPatrick Nuclear Power Plant and the remainder is purchased by NYPA under a competitive procurement process. Allocation of the power available under the first three phases of the program was completed by March 28, 2000. In 2000, NYPA was authorized to provide a fourth phase of the Power for Jobs program, making 300 MW available beginning January 1, 2001. Allocation of power available under Phase Four of the program was completed by July 1, 2001. Power for Jobs has led to the creation and retention of more than 300,000 jobs by providing low-cost power to more than 700 businesses and not-for-profit organizations. Over the life of the program, Power for Jobs will save businesses more than $500 million. The Governor has proposed legislation that would extend the Power for Jobs program to allow new allocations and authorize companies with expiring Power for Jobs contracts to be eligible for reallocations.

In October 2001, legislation was signed into law containing an array of measures to address New York's economic recovery in the wake of the events of September 11, 2001. Among the provisions of the legislation was authorization for NYPA to sell up to 80 MW to assist in the economic recovery of New York City. NYPA had previously provided 80 MW of electricity to the Port Authority of New York and New Jersey for the World Trade Center. The New York City Economic Recovery Power program will provide low-cost electricity to former tenants of the World Trade Center and other

businesses located in, or intending to locate in, the Liberty Zone and Resurgence Zone, as designated by the legislation. This power is expected to save businesses more than $6 million annually.

New York State Energy Research and Development Authority

NYSERDA is a public benefit corporation created by the State Legislature in 1975. It provides technical and financial assistance for the development and deployment of innovative technologies that improve energy efficiency and reduce energy-related environmental impacts for businesses, municipalities, and residents.

In January 1998, the New York State Public Service Commission (PSC) designated NYSERDA the administrator of the public benefits program. This program, known as **New York Energy $mart℠**, supports activities that are not expected to be adequately carried out during the transition to a more competitive electricity market. Activities supported by the public benefits program include energy efficiency deployment, low-income assistance programs, research and development, and environmental monitoring and protection. A total of $174 million was made available to NYSERDA to develop and implement a variety of programs for the initial three-year period from July 1, 1998 to June 30, 2001. In January 2001, the PSC extended and increased the amount of public benefits program funding to approximately $150 million per year through June 2006. The extended programs continue to address market barriers, but will also expand peak load reduction and price-sensitive load initiatives, including non-electric energy efficiency measures to promote fuel-switching, and expand the statewide coverage of the programs.

NYSERDA's research, development, and demonstration (RD&D) program focuses on developing high-value-added energy and environmental products, addressing energy-related environmental concerns when there is insufficient private-sector incentive to do so, assisting customers, and providing objective technical analysis. The program has five main areas: Industry, Buildings, Energy Resources, Environment, and Transportation and Power Systems. Funding for this program reaches about $16.5 million per year and funds approximately 150 projects each year with businesses, municipalities, institutions, and universities. Since 1991, NYSERDA's RD&D program has stimulated new product sales of $200 million for New York companies, created 1,174 permanent jobs, developed 141 new products, processes, or services for commercial use, and leveraged nearly $2 of funding from outside sources for every dollar invested by NYSERDA.

NYSERDA's energy efficiency deployment program complements its RD&D program by aiding in the commercialization of new technologies and encouraging their use. The program targets five areas: small business, institutions and government, residential, low-income, and vehicle fleets. It focuses on stimulating markets and promoting competition for energy-efficient and environmentally-clean products, removing barriers to market adoption of proven technologies and practices, and building manufacturing and sales infrastructure to make energy efficiency products available to customers. Value-added services and technical economic assistance are provided to help small customers stay competitive. Since 1991, NYSERDA's programs have saved $277 million in energy and other costs for New York's businesses, municipalities, and institutions.

NYSERDA's newly created Economic Development Program strives to improve the State's business climate through strategic partnerships and product development. The Economic Development Program provides assistance to companies concerned with energy and environmental efficiency, innovative product development, and product commercialization to help these companies create, enhance, and retain jobs. Using both internal and external sources of funding to enhance its efforts, NYSERDA works to forge strategic partnerships with a variety of organizations (both public and private) to be able to provide expertise in marketing, financing, and business development to its constituents. The types of assistance pursued by NYSERDA include federal and State grants, loans, bond financing, venture capital, and technical services.

In August 2001, NYSERDA announced the creation of the Saratoga Energy Technology Park, specifically devoted to promoting the development of new, clean energy technologies. NYSERDA, working jointly with the University at Albany and the Saratoga Economic Development Corporation (SEDC), hopes to attract between 1,000 and 1,500 jobs to the Capital Region when emerging, environmentally-friendly energy companies take advantage of the park's resources.

NYSERDA is forging other partnerships with many public and private organizations to work on the following projects:

1. Promoting NYSERDA's core programs to support the State's revitalization efforts in the Niagara Falls area. This has led to the investment of $4 million in various energy and environmental programs and projects.

2. Working to establish partnerships with local businesses, government, and developers to build wind farms in Central New York. Over 40 MW of wind

power generating capacity has been installed in the Towns of Fenner and Madison.

3. Examining the potential development of Power Quality Parks. Such parks, if developed, will feature industrial sites with reliable power sources to help attract new businesses.

4. Working with the Rensselaer Polytechnic Institute (RPI) and its Venture B Series Program to find venture capital for businesses. NYSERDA is also a member of the Tech Valley Angel Network (TVAN) as a partner in this program. NYSERDA serves as a link between entrepreneurs and investors in northeastern New York to facilitate access to venture capital.

Department of Public Service

Staff of the Department of Public Service (DPS) assist businesses in learning about economic development programs, resolving disputes between businesses and utilities about economic development issues, working with State and local government in retaining, attracting and expanding businesses, and participating in the Power For Jobs program. DPS staff have participated with parties in several recent utility restructuring, rate, and merger proceedings to improve the utilities' ability to assist in economic development. For example, as a result of the PSC's decision in a recent Central Hudson Gas & Electric Corporation case, a collaborative effort among the utility, DPS, Empire State Development, State and local governments, and other interested parties has been initiated to design new, more effective economic development programs, including electricity discounts, suited to the needs of the utility's customers.

The PSC's electricity cost and pricing policies are changing to reflect the restructuring of investor-owned utilities, the transition to competitive markets, and the need for more service unbundling. These policies are pointing in the long-term to separating the delivery function from commodity sales. Such policies will be especially beneficial to businesses by reducing delivery costs of electricity, and facilitating the ability of businesses to shop for electricity. During the transition to competitive markets, there is a continuing need to maintain economic development incentives and discounts that will ensure that the State will have the ability to retain, expand, and attract businesses.

Utility Flexible Rates and Fixed Discount Programs

Since 1983, New York's electric and gas utilities have encouraged economic growth by filing tariffs with the PSC that provide discounted rates to qualified commercial and industrial customers, including incentive rates for businesses that are certified as eligible for Economic Development Zone (Empire Zones) benefits pursuant to State law. Utilities have designed economic development programs to suit the needs of their particular regions by offering varying terms and levels of discounts from the standard tariff rates. Among other things, such programs include: *Flexible Rates*, designed to allow individually negotiated contracts with customers who have competitive energy alternatives to standard utility service; *Business Incentive Rates*, designed to bring in new businesses or expand existing commercial or industrial load in a utility's service territory; *Economic Revitalization* rate programs, designed to retain customers by helping them regain economic competitiveness; and *Economic Development (Empire Zone) Rates,* designed to attract businesses to locate in specially designated areas.

The Empire Zones Program was developed to encourage economic development, with a mission to assist in the revitalization of economically distressed geographic regions within New York characterized by "persistent and pervasive poverty, high unemployment, limited new job creation, a dependence on public assistance income, dilapidated and abandoned industrial and commercial facilities, and shrinking tax base." Currently, there are 62 Empire Zones in New York. Among the incentives applicable to businesses locating within these zones are capital investment credits, wage tax credits, sales and local tax relief, and low-cost power contractual agreements with utilities, usually with ten-year terms. Certified businesses within the State's Empire Zones are eligible to receive significant tax credits and other benefits valued at more than $213 million annually, when fully effective. More than 3,800 businesses participated in the program in 2000, creating more than 30,000 new full-time jobs and investing more than $670 million of private capital in Empire Zone communities.

The discount programs offered by utilities are designed to encourage business retention and expansion, as well as to encourage new businesses to expand or locate in economically depressed areas, while preventing rate increases for remaining customers that might otherwise be necessary if the participating customers were to leave the utility system. Utility economic development programs provide an estimated $85 million in discounts annually. In today's newly competitive era, however, the issue of how to appropriately fund such electricity discounts needs to be considered.

To that end, in the recent Central Hudson Gas and Electric Corporation, Niagara Mohawk Power Corporation, and New York State Electric and Gas Corporation rate proceedings, funding of these economic development programs has been discussed. It has been determined that these activities should be financed through the development of an Economic Development Fund. This will enable each utility to continue its commitment to economic development activities in their respective service areas. Empire State Development is working with other economic development professionals and the utility staffs to ensure the programs developed provide for continuing and expanding appropriate economic development programs. These economic development programs will help attract and retain business in New York. Benefits will flow to utilities in terms of increased sales and enhanced revenues, which in turn will help keep rates down for all ratepayers.

Energy Programs and Policies to Promote Economic Development

Between 1985 and 1994, New York lost more than 342,634 (or nearly 26%) of its manufacturing jobs.[4] The State, however, has been able to add more than 802,000 private sector jobs since 1995. These data highlight the importance of job growth and retention in the State's industries that drive economic activity, including manufacturing and other higher-wage industries that export services from the State. Industries that drive economic activity, typically large, higher-wage industrial and commercial firms, support a variety of other industries that provide intermediate inputs to production of goods and services, as well as numerous service industries and retail establishments. The State has taken a number of steps to attract business, including reducing State taxes, providing incentives to municipalities to lower local taxes, reducing workers' compensation costs, and modifying or removing regulations that hinder business productivity and economic growth.

The cost of energy, however, remains an obstacle to overcome in New York's efforts to retain, expand, and attract businesses. New York's success in working with businesses that could relocate to other states frequently depends on the availability of discounted, low-cost energy and incentives offered through various State and local government and utility-sponsored programs. Even though a competitive electricity market is expected to result in lower prices, New York's energy prices may remain somewhat higher than those of most other states in the short-term. Therefore, effective

[4] NYS Department of Labor Employment Review, December 1996, p. 7.

energy-related economic development programs for businesses will continue to be necessary to help preserve and expand the State's economic base.

ECONOMIC DEVELOPMENT POTENTIAL OF REDUCING ENERGY COSTS

Reducing energy costs will make the State's businesses and industries more competitive with other states and regions of the country. In addition, lower energy costs will position New York to attract new businesses and retain and expand existing businesses. Moreover, lower energy costs will increase business profitability and consumer purchasing power, which, in turn, will stimulate business investment and consumer spending and contribute to continued job growth. An economic analysis, using the REMI statewide economic model, demonstrates the importance of energy cost reductions as a means to stimulate economic growth.[5] Important indicators of economic development potential include: *gross output*, or total sales value of goods and services produced, which is an indicator of total economic activity in the State; *personal income,* which measures the aggregate wages, salaries, and proprietors' income earned by in-State workers; and *employment*, which is the number of in-State jobs. The analysis reflects the expected effects on economic activity of increased business profits and consumer spending that result from lower energy costs. The analysis estimates that a permanent energy price reduction of $100 million per year would stimulate, over a ten-year period, the development of approximately 1,600 jobs in New York, increase the State's gross output of goods and services by about $119 million, and increase personal income by about $105 million. Incremental output of goods and services, personal income, and jobs created as a result of lower energy prices would generally be sustained over time because the incremental business profits and consumer purchasing power would be available in each subsequent year, resulting in a continued higher level of business investment and consumer spending.

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[5] The REMI Economic and Demographic Forecasting Model, developed by Regional Economic Models, Inc. of Amherst, MA., is a 53-sector dynamic structural model of the New York State economy that is linked to a U.S. economic model. The model simulates inter-industry transactions and trading flows into and out of the State, based on the costs of doing business. The relative cost of doing business is built up for each industry based on wages, costs of intermediate inputs, fuel costs, and taxes.

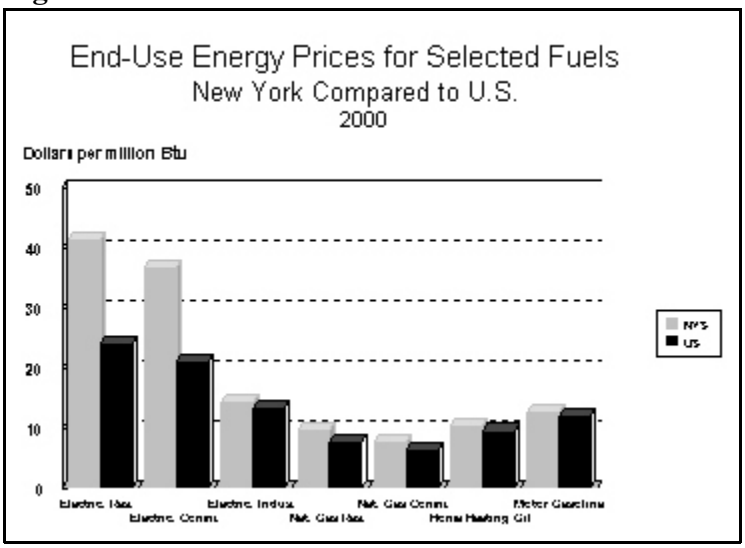
EMPLOYMENT IMPACTS OF ENERGY EFFICIENCY IMPROVEMENTS

While the State is the fourth-largest energy user among all states, only an estimated 11% of New York's total end-use energy requirements are met from indigenous resources, of which 55% is hydroelectric power and 41% is from bio-fuels. In 2000, New Yorkers spent $38 billion on energy, consisting of $15.7 billion for electricity, $5.9 billion for natural gas, $16.3 billion for petroleum products, and $0.1 billion for coal. Petroleum products include distillate and residual fuel oil, motor gasoline, aviation fuels, kerosene, and propane.

Because New York imports most of its primary energy supplies from other states and foreign sources, a large portion of the $38 billion annual energy expenditure flows out of the State to pay for imported energy. While imported energy supplies contribute to some economic activity within the State, investment in cost-effective energy efficiency reduces economic leakage, as more dollars are retained in the State, thereby increasing discretionary income. In addition to the jobs created by in-State spending of energy savings, jobs are created by the purchase and installation of new equipment, to the extent that the equipment or its components are manufactured in New York, purchased from in-State suppliers, and installed by in-State labor. The precise number of jobs created is site- and industry-specific and is sensitive to business and consumer spending patterns, payback periods, and useful life-spans of the technologies installed.

NEW YORK'S ENERGY PRICES COMPARED TO U.S. AVERAGES

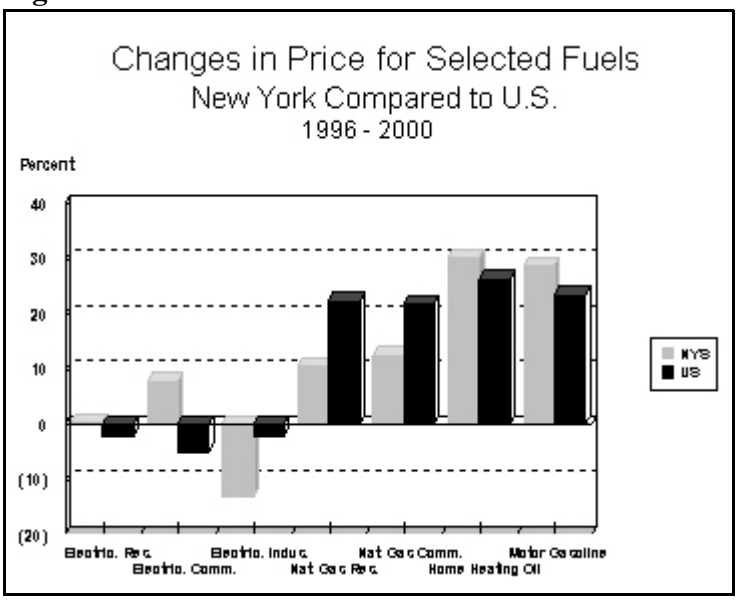
Figure 1



This section compares New York's retail energy prices to U.S. averages. The energy prices analyzed include electricity, natural gas, heating oil, gasoline, and diesel fuel. Figure 1 compares New York's end-use energy prices for selected fuels to U.S. average prices for comparable fuels in 2000. New York's retail energy prices are generally higher than

national average prices for comparable fuels and customer sectors. Figure 2 shows, for each fuel, the change in price from 1996 to 2000 for New York compared to the U.S.

Figure 2



Since 1996, improvements in the price differential between New York and U.S. prices have been observed for industrial electricity, residential natural gas, and commercial natural gas. In contrast, the differentials between New York and U.S. prices in 2000 were somewhat greater than in 1996 for residential electricity, commercial electricity, home heating oil, and motor gasoline. It should be recognized that use of year 2000 prices for comparative purposes presents an incomplete picture of energy prices because of the unusual short-term run-up in natural gas prices that year, which have since returned to lower levels. Year 2000 prices, however, are the most recent available and are used in the comparisons that follow.

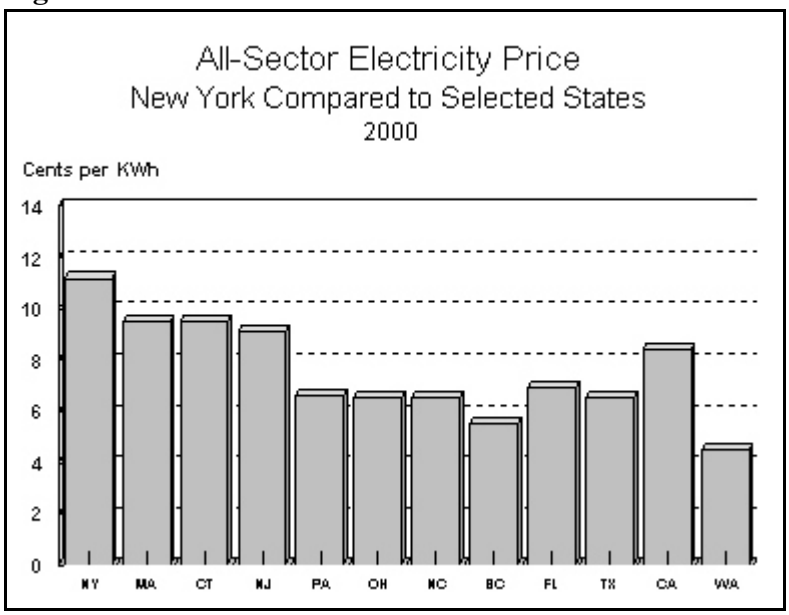
NEW YORK'S ENERGY PRICES COMPARED TO SELECTED STATES

This section compares New York's retail energy prices to prices paid in other states that compete with New York in attracting business. To the extent possible, the analysis includes component analyses of retail energy prices for the eleven states studied. These states include two New England states (Massachusetts and Connecticut), two Mid-Atlantic states (Pennsylvania and New Jersey), one Midwestern state (Ohio), three Southeastern states (North Carolina, South Carolina, and Florida), and one South Central state (Texas). Two West Coast states (California and Washington) are also included to present a wider perspective.

This analysis of the various fuel types considers property taxes and State and federal income taxes, where applicable, as components of distribution costs. Data are not available to estimate the specific amounts of these types of taxes for electricity, natural gas, and petroleum products. As a result, the tax components shown for these fuels reflect only taxes that are easily isolated and are specifically added to the retail price of fuel, such as the Gross Receipts Tax, franchise tax, Petroleum Business Tax, excise tax, and state sales tax. Local sales tax is not included due to the variability between states and localities within states.

New York has historically taxed energy products and services to a greater degree than other states. In an effort to reduce energy costs, the State has initiated the phase-out of the Gross Receipts Tax (GRT) on energy and telecommunication utilities, as well as the sales tax on transmission and delivery of electricity and natural gas for industrial and commercial consumers. When fully effective on January 1, 2005, elimination of the GRT is expected to save energy users approximately $330 million per year, and it is anticipated that the sales tax phase-out will save them approximately $150 million per year when fully effective on January 1, 2004. Phase-out of the GRT, collected by utilities but paid by both businesses and consumers, was initiated in 1998 and will continue in stages, ultimately resulting in total elimination by the end of 2004. Also, the Petroleum Business Tax (PBT), a business tax surcharge, will be reduced on oil used by commercial and industrial customers by up to eight cents per gallon. The PBT was, in essence, a "tax on a tax" that added approximately 15% to the amount of GRT collected from all customers. Effective in 1997, the net PBT on commercial heating and railroad fuel was reduced, and the manufacturing fuel oil PBT was eliminated. Also, the net PBT on diesel fuel was reduced.

Figure 3



Electricity

Figure 3 compares New York's average electricity price in 2000 with the average electricity prices in eleven other states. With the advent of restructuring, data to perform a complete analysis of the various components of electric prices are no longer available. This is because certain market participants are no longer required to file data with the Federal Energy Regulatory Commission. Nevertheless, the primary factors that contribute to New York's high electricity prices relative to other states are well known. As documented in the 1998 State Energy Plan, these factors include: higher State and local taxes on electricity and on equipment and property used to generate, transmit, and distribute electricity; the cost of power purchased by utilities under contract (as mandated by State and federal laws); the costs associated with two large nuclear projects; and the higher costs, in wages and operations and maintenance, of doing business in New York.

The State has taken steps to address each of these factors:

- In addition to the State tax reform initiatives described earlier, the new owners of divested utility generating plants have in many cases negotiated reductions in local property taxes. These lower tax levels can be expected to be passed along to customers in the form of lower wholesale prices, as generators lower the prices charged for their output.

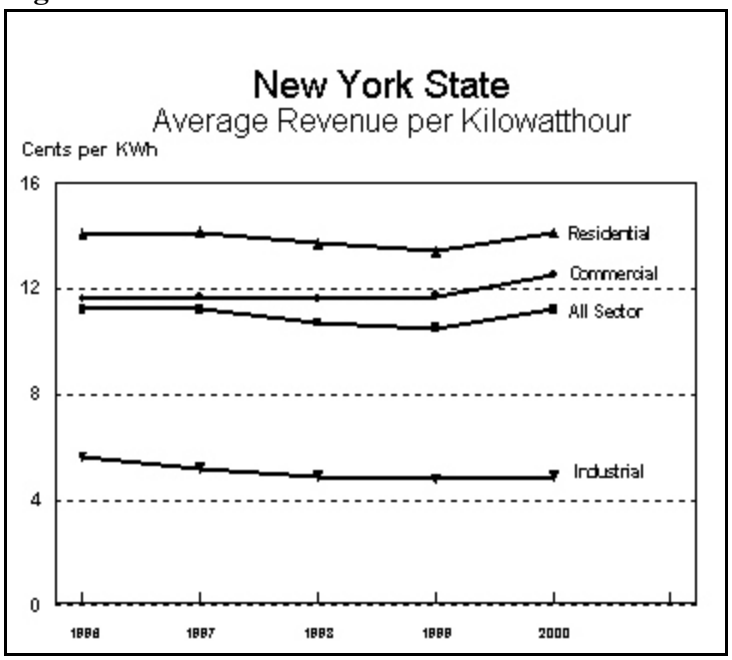
- Since the repeal in 1992 of the mandatory minimum six-cent per kilowatt-hour purchase price for power produced by cogenerators and other qualifying facilities, utilities have generally lowered the costs for purchased power to market-based levels. In addition, some utilities have been successful in renegotiating long-term power purchase contracts to obtain a lower price. Still, the legacy of the six-cent law and contract prices based on administratively-determined long-run avoided costs continue to be a major cost driver in New York's electricity prices.

- The State has been more successful in reducing the costs associated with the Shoreham and Nine Mile Point 2 nuclear plants. LIPA, as part of the takeover of the electric system on Long Island, refinanced the debt associated with Shoreham, decreasing rates significantly on Long Island. More recently, nearly all of the remaining debt associated with the Nine Mile Point 2 plant has been eliminated in the process of the sale of that plant to an independent firm, Constellation Energy.

- Finally, after more than a decade of price caps and other incentive plans to reduce rates, utilities have significantly reduced wage, operating and maintenance costs.

As shown in Figure 4, New York's statewide electricity price (average revenue across all sectors) fell 6.3% from 1996 to 1999, a direct result of the above-described efforts and rate restructuring orders issued by the PSC. Despite the reduction in rates for the portion of utility services that remain regulated after restructuring, the dramatic increase in natural gas prices starting in the second quarter of 2000, and persisting into the second quarter of 2001, had the effect of increasing retail electricity prices, particularly downstate, during that time period.[6] In particular, customers of Consolidated Edison and Orange and Rockland endured steep increases in the price for power, associated with natural gas-fired generation setting the wholesale market clearing price for power. Because these utilities purchase much of their power directly in short-term markets, and pass fuel and purchased-power costs through to customers every month, bills for electric service from these utilities increased by about 16% in 2000. Although most of the other utilities in the State had capped rates in 2000, the increase in downstate bills was enough to cause statewide average retail prices to increase approximately 6%, temporarily reversing the gains of the previous three years.

Figure 4



Utilities in the other states used for comparison either are less dependent on natural gas and oil for electricity generation, or had to wait for the outcome of regulatory proceedings before passing through increased power costs to their customers. Therefore,

[6] In a study presented to the New York ISO, the ISO's market advisor concluded that the increase in natural gas and oil prices and the sustained outage of the Indian Point 2 nuclear plant in Buchanan were the primary factors in the run-up in wholesale electricity prices in 2000 (New York Market Advisor Annual Report on the New York Electric Markets for Calendar Year 2000).

the gap between New York electric prices and the other states compared widened in 2000.[7]

Since the second quarter of 2001, natural gas prices have dropped to previous levels. Electric prices have also declined, and the most recent bills for Consolidated Edison and Orange and Rockland customers have moderated significantly from 2000 levels.[8] In addition, in 2001, the PSC significantly lowered distribution rates for customers of Consolidated Edison, Rochester Gas & Electric, and Central Hudson Gas and Electric. Niagara Mohawk's annual distribution revenues were reduced by $152 million (largely offsetting earlier approved increases in commodity prices) with the approval of its merger with National Grid and New York State Electric and Gas' distribution revenues were reduced by $205 million with the approval of its merger with Rochester Gas & Electric. The trend in lower distribution rates, with decreasing, but perhaps volatile, commodity prices, is expected to continue in the future (see the Electricity Resource Assessment).

Residential Natural Gas

New York's average natural gas price, after taxes, for residential customers in 2000 was $10.51, lower than Connecticut and Florida but higher than the other states studied, as shown in Figure 5. The wellhead price component for natural gas is identical for all states because this price is determined by North American market conditions rather than by actual production costs.

The largest price component is "processing, transportation, and distribution." *Processing* refers to any cleaning or liquid removal that occurs after the natural gas is removed from the wellhead. *Transportation* refers to moving the natural gas from the wellhead to the entry point of the local distribution carrier's network. *Distribution* refers to moving the natural gas through the local distribution carrier's network and delivering the product to end-users. Besides the direct costs of installing, maintaining, and repairing the natural gas distribution system itself (*e.g.*, materials, wages, workers' compensation

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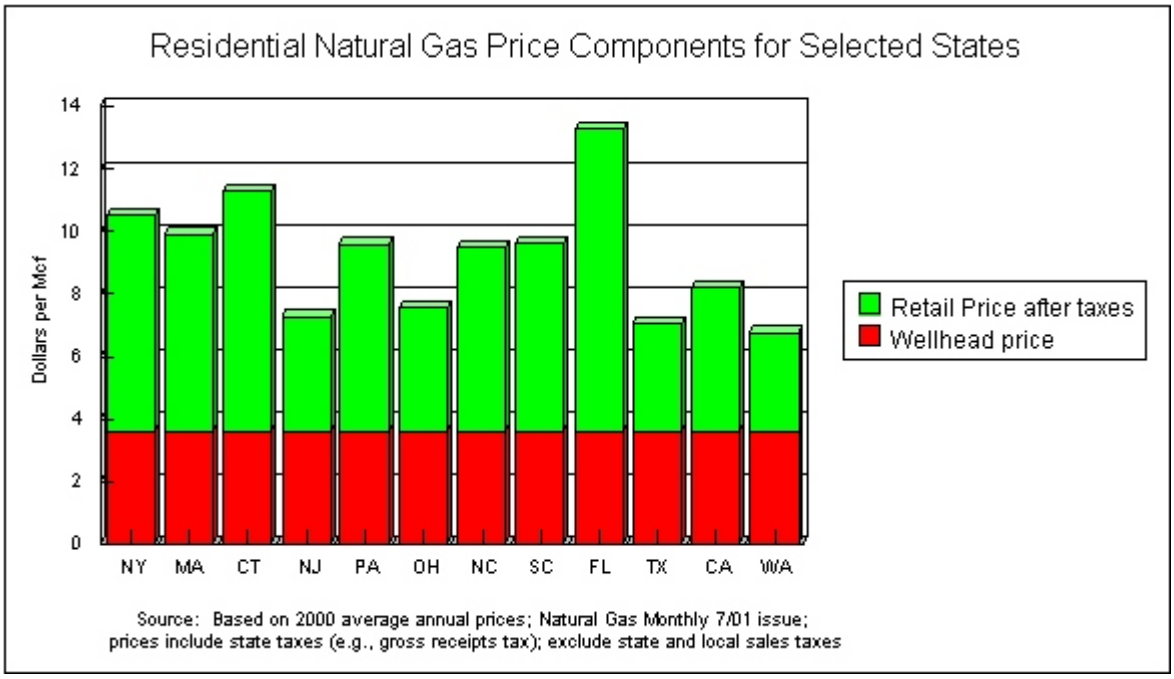
[7] A comparison of New York's average price in the first seven months of 2001 to that of MA, PA, FL, TX and CA shows the difference in prices to be much reduced from what it was in 2000, as utilities in these other states gained approval to increase retail rates in response to increased power costs.

[8] For example, the October 2001 bill for the typical Consolidated Edison residential customer was $50.87 or 17.0 cents per kWh, compared to $56.88 or 19.0 cents per kWh in October 2000.

premiums, etc.), distribution costs include, for example, local property taxes, income taxes, and return on equity.

Figure 5



Many other states assess taxes on residential natural gas sales that are comparable to New York's. While New York does not collect general sales tax on residential natural gas sales, the residential retail price does include a GRT of 2.5%, equivalent to about 21 cents per thousand cubic feet (Mcf). Tax legislation enacted in 1997 reduced the GRT on residential natural gas from 3.5% to 2.5%. This tax will be completely phased-out by January 1, 2005, and is expected to improve New York's price position relative to other states.

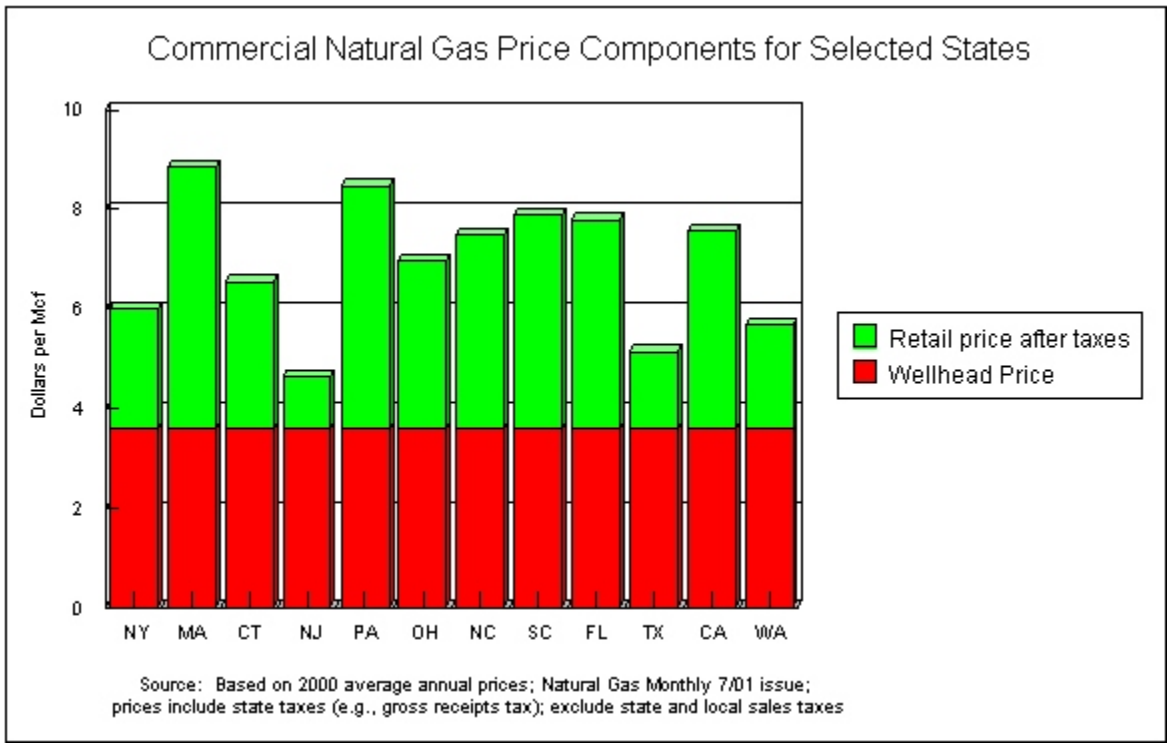
New York's average price for residential natural gas is higher than the average price of the other states studied, primarily due to the processing, transportation, and distribution components of the price. Distribution costs, which comprise the major portion of this component, are higher in New York than in most other states. This is largely due to the higher costs of installing, maintaining, and repairing natural gas distribution facilities in the densely populated New York City metropolitan region. For example, the low-cost trenching techniques used for most natural gas systems cannot be used in New York City. Distribution costs in the downstate region are further increased by programs to replace aging cast iron natural gas pipes. New York's higher natural gas

price compared to states to its south and west is also partially due to the State's location near the end of the interstate pipeline distribution system.

Commercial Natural Gas

The relationship of New York's average commercial natural gas price to those of other states studied is similar in most respects to that of the residential natural gas price, as shown in Figure 6. In 2000, New York's average price was $6.00 per Mcf which is lower than in eight of the eleven states studied. Only Texas, Washington, and New Jersey had lower prices. Many other states assess taxes on commercial natural gas sales that are comparable to New York's. New York's retail commercial gas price includes a GRT of 2.5% (about 15 cents per Mcf), as well as State sales tax of 4% (about 24 cents per Mcf). As with residential natural gas sales, the differences in average prices from state to state are largely due to variation in distribution costs.

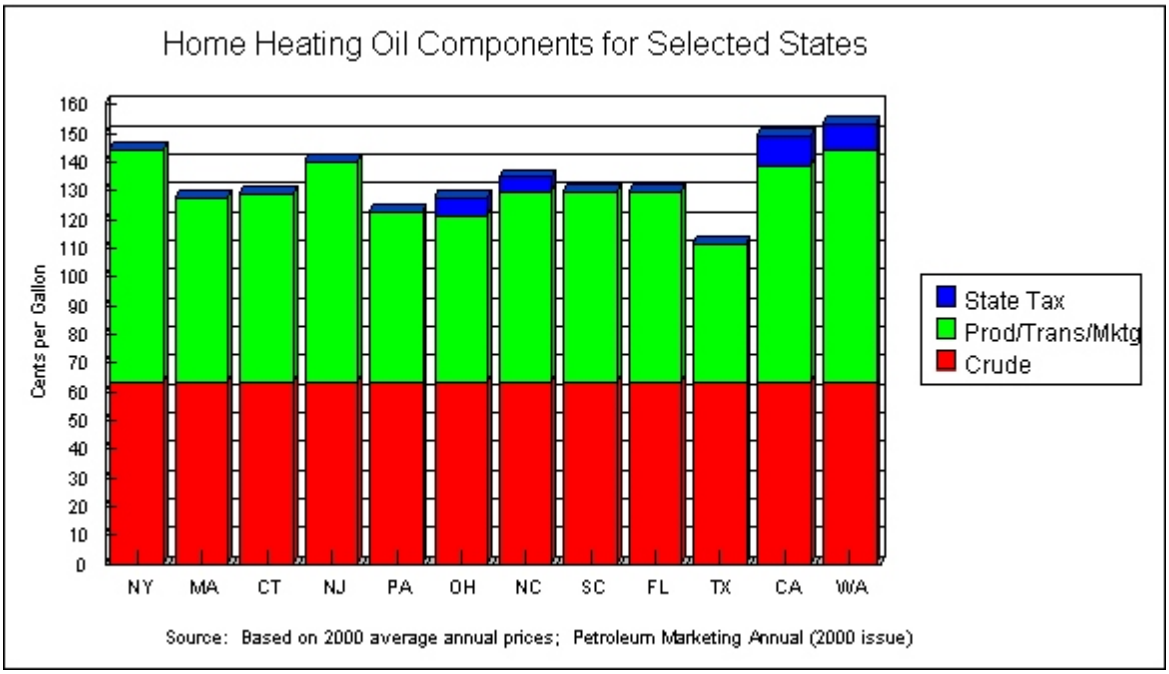
Figure 6



Home Heating Oil

New York's average price for home heating oil in 2000 was $1.44 per gallon, which was three to 32 cents higher than the average price in most of the other states studied. Home heating oil prices have increased in all states for which data is available. The two West Coast states had average prices higher than New York, as shown in Figure 7. Of the states studied, California, North Carolina, Ohio, and Washington tax the use of home heating oil; New York does not. New York's higher-than-the-national-average home heating oil price is largely a result of higher costs of doing business, particularly downstate, which include higher local property taxes, wages, workers' compensation premiums, and State income taxes.

Figure 7

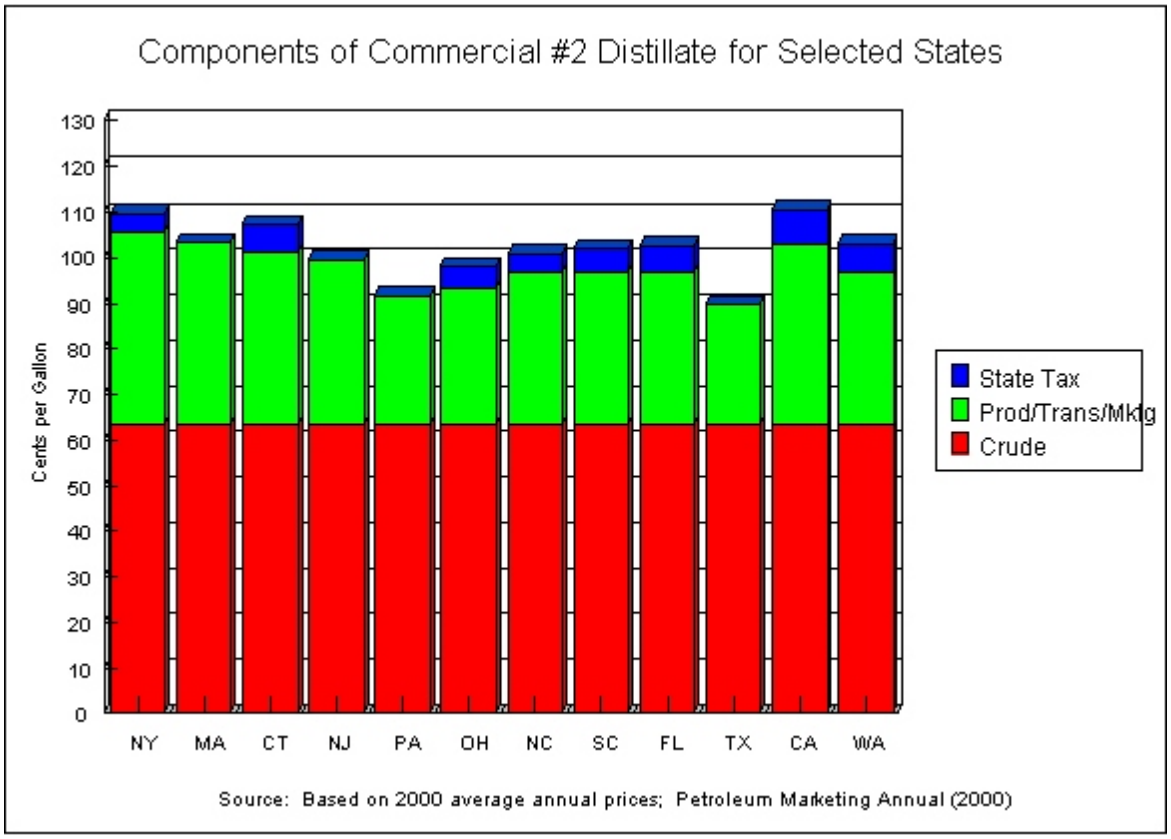


<u>Commercial Distillate Oil</u>

New York's 2000 average distillate oil retail price for commercial customers was $1.10 per gallon, which was two to 22% higher than the average price in each of the other states studied, except California, as shown in Figure 8. The states with average prices closest to New York's were California, which was virtually equal, and Connecticut, which was three cents per gallon lower. Most of the studied states' average prices were two to 22 cents per gallon lower than New York's. Many of the states studied, like New

York, collect some sales tax on commercial distillate oil, but no other state collects a PBT or other oil tax comparable to New York's. The PBT increases New York's average commercial distillate oil price by approximately 7.3 cents per gallon.

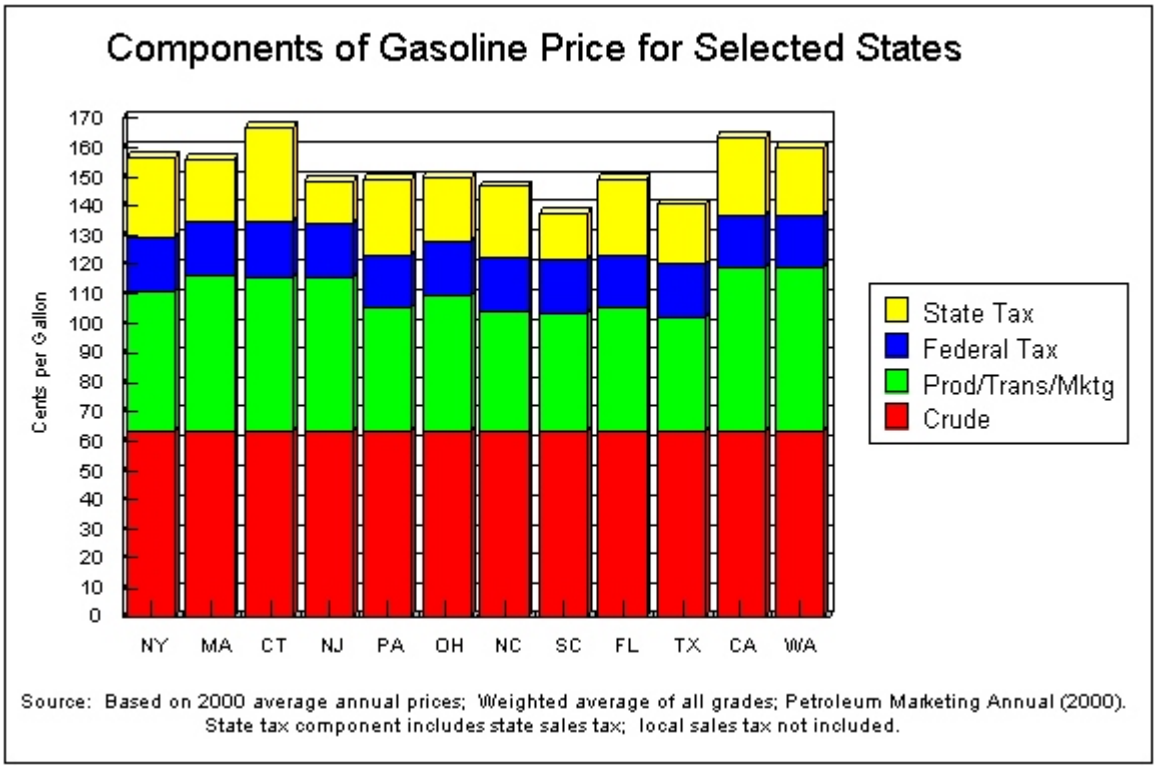
Figure 8



Gasoline

New York's 2000 average gasoline price for all grades of gasoline was $1.56 per gallon (excluding local sales taxes), as shown in Figure 9. This price was higher than that in seven of the states studied, but it was lower than Connecticut, California, and Washington. Connecticut's average price was 10 cents per gallon higher than New York's, due primarily to higher state taxes. Washington's average price was higher than New York's, due primarily to the longer transport distance to retail outlets. Average gasoline prices in New Jersey and South Carolina were lower than in New York as a result of lower state taxes. Average gasoline prices in the remaining states studied were between six and 18 cents per gallon less than in New York.

Figure 9



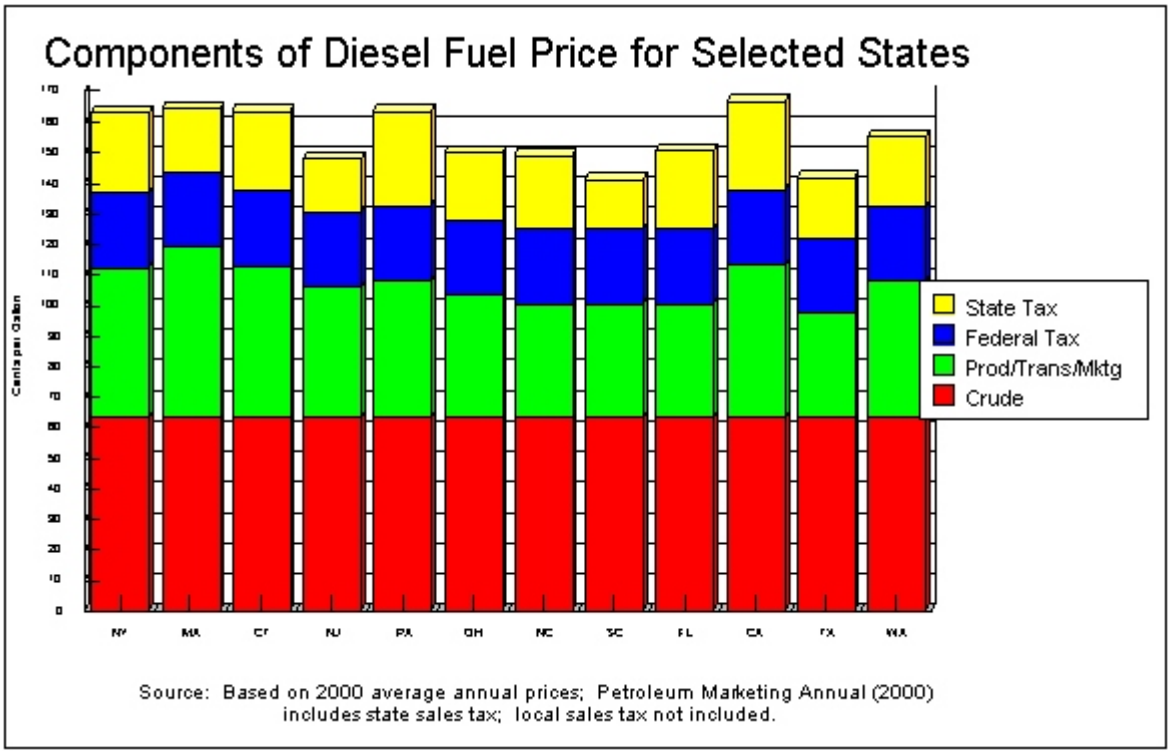
Gasoline prices vary from state to state largely as a result of differences in state tax policies and regional differences in costs of doing business. Refiner acquisition costs of crude oil are identical for all states because crude oil commodity prices are determined by world markets. Similarly, the federal gasoline tax of 18.4 cents per gallon is the same for all states. Most of the states studied, with the exception of Connecticut, New Jersey, and South Carolina, impose a combination of excise or other taxes on gasoline. The combined effect of these taxes on retail price is comparable to that of New York's excise tax and PBT. For example, New York's excise tax and PBT are 22 cents per gallon; similar state taxes in Massachusetts, Pennsylvania, and Ohio are 21, 26, and 22 cents, respectively. New York's average price appears to be higher than those of the other states studied largely due to the fact that it collects general State sales tax on gasoline. Of the study group states, New York and California are the only states to assess a sales tax on gasoline.

Diesel Fuel

As shown in Figure 10, New York's 2000 average price for diesel fuel was $1.63 per gallon (excluding local sales tax). This price was higher than that in many of the

other states studied. New York's average price appears to be higher largely because it collects general State sales tax on diesel fuel. States with the lowest diesel fuel prices are New Jersey, South Carolina, and Texas, which have relatively low state taxes as well as low refining, transportation, and distribution costs.

Figure 10



FINDINGS AND CONCLUSIONS

- Businesses need secure and reliable energy supplies that are reasonably priced to expand operations and grow in the State. Policies promoting greater energy supply certainty will lead to greater private sector investment in New York.

- Low-cost power programs have been successful to date in retaining and expanding employment opportunities in the State. Developing joint State and utility economic development programs has been successful in supporting economic development.

- Power for Jobs has been successful in retaining and creating jobs in New York while keeping energy costs down. There should be an additional authorization for another phase to provide for those customers whose initial allocations are expiring and for which there are few market alternatives.

- Offering electricity discounts as a means of retaining or attracting jobs is an important economic development tool.

- Efforts should continue to be made to forge State and private business partnerships to grow New York's economy in an environmentally-sound manner.

- Energy prices need to be brought more in-line with other states to compete more effectively for economic opportunities.

SECTION 2.3

ENERGY AND THE ENVIRONMENT

INTRODUCTION

All New Yorkers use energy to heat, cool, and light our homes and offices. Appliances and equipment need electricity, and cars, trucks, and off-road equipment run on petroleum or other fossil fuels. Even the technologies we use to produce and refine energy need energy to operate. All of these sectors of energy production and use result in impacts on the environment.

This issue report examines recent trends in air and water quality, and summarizes some of the programs created to identify and mitigate the impacts energy generation and use have on the environment. Some of these programs address the environmental impacts from cars, trucks, and other mobile sources. New York is a recognized leader in developing new strategies to reduce emissions from transportation sources. For example, the State has adopted the most stringent emission standards in the nation for new motor vehicles, developed and implemented an innovative program to detect high polluting vehicles and ensure they are repaired, and pioneered efforts to supply cleaner-burning fuels to the State's motorists.

New York has also developed other innovative programs aimed at reducing air emissions from stationary sources of pollution, such as power plants and factories. In an effort to reduce the impacts of power generation on the State's forests and aquatic resources, New York implemented the most stringent air pollution control requirements in the nation for electric generating facilities. Factories, boilers, and other stationary sources are also subject to stringent controls.

This report will also examine the impacts of energy generation on water quality and aquatic life. Many older power plants using antiquated cooling technologies use vast quantities of water, negatively impacting water bodies and causing increased mortality in fish and other aquatic organisms. New power plants sited and built in New York will be required to use cooling technologies that use considerably less water, and take steps to minimize impacts on marine life.

Finally, this issue report will discuss new efforts to understand how environmental impacts from energy generation and use affect different socio-economic

groups in the State. New facilities will need to consider such "environmental justice" impacts before they can be sited.

TRENDS IN NEW YORK STATE AIR QUALITY

The 1990 amendments to the federal Clean Air Act requires states to monitor ambient levels of six pollutants in the atmosphere. These contaminants, called "criteria pollutants," include lead, sulfur dioxide, nitrogen dioxide, carbon monoxide, and particulate matter measuring less than 10 microns in diameter (PM_{10}).

The New York State Department of Environmental Conservation (DEC) operates an extensive network of air quality monitors designed to provide accurate information about ambient air quality in New York. This network, which is designed, sited, and maintained to meet strict federal guidelines, provides the data necessary to determine whether air quality in the State meets the National Ambient Air Quality Standard (NAAQS) for the six criteria pollutants. The allowable concentrations for each of these pollutants is established by the U.S. Environmental Protection Agency (U.S. EPA) as required by the federal Clean Air Act. The criteria pollutants are regulated because health experts and scientists have identified them as posing a large threat to public health and the environment. Going beyond these federal requirements, New York also monitors ambient concentrations of 39 toxic volatile organic compounds (VOCs). In addition to being toxic to humans, many of these VOCs are also precursors to ground-level ozone (smog), and measuring for them can often provide data as to the source of the pollution.

For the purposes of air quality compliance monitoring, the State is divided into two main regions: the downstate region, consisting of New York City, Long Island, and Westchester, Rockland, Putnam, and lower Orange Counties; and the upstate region, consisting of the remainder of the State. All regions of New York have attained the NAAQS for lead, sulfur dioxide, and nitrogen oxide. Portions of New York have been found to be in non-compliance with the standards for carbon monoxide, ozone, and PM_{10}, although U.S. EPA recently announced that the entire State is now in compliance with the standard for carbon monoxide.

The following is a description of the NAAQS for each of the five criteria pollutants, and number of days from 1996 to 2000 that the standard was violated for each of the two regions. Air quality data for 2001 is available on DEC's website at www.dec.state.ny.us.

1. Carbon Monoxide. NAAQS - 1 hour: 35 ppm; 8 hour: 9 ppm. Upstate - no violations during time period. Downstate - no violations during time period.

2. Lead. NAAQS - quarterly average: 1.5 $\mu g/m^3$. Upstate - no violations during time period. Downstate - no violations during time period.

3. Nitrogen Dioxide. NAAQS - annual average: 0.05 ppm. Upstate - no violations during time period. Downstate - no violations during time period.

4. PM_{10}. NAAQS - 24 hours: 150 $\mu g/m^3$; annual average 50 $\mu g/m^3$. Upstate - no violations during time period. Downstate - no violations during time period.

5. Sulfur Dioxide. NAAQS - 3 hour: 0.5 ppm; 24 hour: 0.14 ppm. Upstate - no violations during time period. Downstate - no violations during time period.

U.S. EPA proposed a new NAAQS for particulate matter measuring less than 2.5 microns in diameter ($PM_{2.5}$) in 2000. Since that time, an industry organization has challenged U.S. EPA's statutory authority to create the new standard, and a federal court asked for more information supporting the new NAAQS. On March 26, 2002, the court issued a decision finding that the new standards for particulates are neither arbitrary nor capricious, and U.S. EPA is moving forward to implement the new standards. Federal law requires that three years worth of monitoring data be collected before a given region can be designated as being in compliance or non-compliance with a NAAQS. Since monitoring has not been completed for three years, no region of the State has yet been designated as being in violation of the standard for annual averages. The NAAQS for $PM_{2.5}$ is as follows:

> 24 hours - 65 $\mu g/m^3$; annual (average over 3 years) - 15 μ g/m^3. Data collected to date in New York is as follows: Upstate - no values > 65 $\mu g/m^3$; one site > 15 $\mu g/m^3$ annual average in 2000. Downstate - One value > 65 $\mu g/m^3$; seven sites > 15 $\mu g/m^3$ annual average in 2000.

In addition to the existing NAAQS for ozone, which measures concentrations of the pollutant over a one-hour period, U.S. EPA recently proposed a new eight-hour ozone standard. Scientists felt that the eight-hour standard would provide better information about long-term exposure to the contaminant. As with the new standard for $PM_{2.5}$, the new ozone NAAQS was challenged by an industry organization and remanded by a federal court back to U.S. EPA for additional supporting information. The March 2002 court decision also found the new standards for ozone are neither arbitrary nor capricious. DEC has installed the equipment needed to monitor both the one-hour and eight-hour

ozone standards. The NAAQS for ozone is as follows: 1 hour - 0.12 ppm; 8 hour - 0.08 ppm (average of fourth highest daily value for past three years). Table 1 indicates the number of days ozone levels exceeded the standard.

Table 1. Ozone Level Exceedance in New York (Number of Days)

	Downstate		Upstate	
Date	**8 Hour**	**1 Hour**	**8 Hour**	**1 Hour**
1996	15	3	14	2
1997	25	9	15	0
1998	19	3	28	0
1999	27	9	28	5
2000	11	1	9	0
2001 (Jan. 1 - Aug. 13)	13	4	23	3

With the litigation surrounding the creation of the eight hour ozone and $PM_{2.5}$ now resolved, New York will be working with the U.S. EPA to determine which areas of the State fail to meet the new standards. Once these designations have been made, New York will develop State Implementation Plans to bring these areas into attainment.

RECENT AIR QUALITY IMPROVEMENT PROGRAMS

New York has established itself as a national leader in the development and implementation of programs to reduce air pollutant emissions into the atmosphere. These include a number of approaches to reducing air pollution, including emissions testing for light and heavy-duty vehicles, adoption of the California Low Emission Vehicle standards for new cars and trucks, clean fuels, and advanced technologies to reduce soot emissions from trucks. The State has implemented a number of control strategies for stationary sources like power plants and factories to reduce acid rain and ground-level smog. In addition, strategies to reduce emissions of greenhouse gases are being developed by the Governor's Greenhouse Gas Task Force.

California Low Emission Vehicle Program

Although many people often identify air pollution as coming from factories and power plants, automobiles and other motor vehicles are significant contributors of

pollution. In the greater New York City area, these mobile sources account for about half of the emissions of volatile organic compounds and nitrogen oxides, and virtually all of the carbon monoxide emitted into the air.

In recognition of the large contribution of mobile sources to air pollution, the 1970 federal Clean Air Act authorized the U.S. EPA to create emission standards for new cars and light trucks. Prior to this, there were no restrictions on the emissions motor vehicles could release into the atmosphere with the exception of vehicles sold in California, which had implemented its own new vehicle standards in the early 1960's. As a result, the Clean Air Act allowed California to continue to set its own emission standards, but prohibited other states from creating their own. Amendments to the Clean Air Act passed in 1977 allowed other states the option of using the federal standards or opting into the California program. In 1993, New York became the first state in the nation to adopt the more stringent California standards.

As emissions control technologies have matured, California has continued to increased the stringency of its standards and recently implemented a second round of its Low Emission Vehicle program, referred to as LEV II. New York has since followed suit, formally adopting the LEV II program in 2000 and implementing the California standards for medium-duty vehicles weighing up to 14,000 pounds. In this manner, new vehicle sales of Sport Utility Vehicles in New York are now covered by the more stringent standards. Because most of these vehicles are built on truck-based platforms, many were exempt from emission standards for passenger cars. This is no longer the case.

Diesel Particulate Filters

Although light-duty cars make up the majority of vehicles on the road, trucks, buses and other heavy-duty vehicles are also significant contributors to air pollution. Because most of these vehicles are powered by diesel engines, the contaminants they release are different from those that are emitted by gasoline-powered cars and light trucks. For instance, diesel-powered vehicles tend to be high emitters of fine particulates. The New York City metropolitan area boasts one of the largest mass transit systems in the world. Along with subways and commuter trains, this system includes over 4,000 transit buses. Although mass transit results in lower total emissions than single-occupant vehicles, the fine particulate and soot emissions from diesel-powered buses are a considerable source of air pollution. In an effort to address this pollution, the New York Metropolitan Transportation Authority (MTA), working in conjunction with the DEC, developed and now uses a new generation of technology, called Diesel Particulate Filters,

which has been demonstrated to make diesel-powered buses as clean as those powered by alternative fuels such as compressed natural gas. Initial testing of this technology, conducted on four transit buses in service in New York City, and at a Canadian emissions laboratory in Ottawa, Ontario, is so promising that MTA has committed to using filters on its entire diesel-powered fleet. Although alternative fuel technology is beginning to make in-roads into the heavy-duty vehicle market, it is clear that diesel engines will dominate this sector for the foreseeable future. The New York project was the first of its kind in the nation to demonstrate that significant emission reductions can be achieved from diesel trucks and buses. As a result, a number of cities and states across the country are implementing their own programs patterned on the New York model.

Low-Sulfur Fuels

One obstacle to utilizing Diesel Particulate Filters has been that the technology requires the use of ultra-low sulfur diesel fuel, which had not been readily available in the United States. Sulfur levels in such fuel is below 30 parts per million (ppm), compared to 500 ppm or more found in regular diesel fuel. Although such fuel is necessary to use the diesel particulate filters, there is evidence that lower sulfur levels provide some environmental benefits in standard diesel engines, as well. An arrangement was worked out for special delivery of the required fuel for the four-bus demonstration project, but much larger quantities were required before MTA's entire fleet could be converted to use the new technology. As a result of the State's action, refineries are now producing the low sulfur fuel in the quantities needed to supply MTA's entire fleet. The program has generated technical evidence to support U.S. EPA's efforts to reduce sulfur levels in diesel fuel and gasoline nationwide.

Status of Acid Deposition Initiative

Both the 1984 State Acid Deposition Control Act and the 1990 federal Clean Air Act included provisions intended to reduce the devastating impacts of acid deposition on New York's natural resources. Although tremendous progress has been made, there is still strong evidence that the problem of acid deposition has not yet been adequately addressed, especially in the sensitive forests and water bodies of the Adirondack Mountains. The National Acid Precipitation Assessment Program estimates that 24% of Adirondack Lakes are seriously acidic. A 1995 U.S. EPA study found that, even with the emission reductions required by the federal Clean Air Act, the number of acidic lakes in the Adirondacks will double by 2040 and that 100% of its rivers and streams will be too acidic to support life during spring snow melts. The report called for additional reductions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) of 40 to 50%.

Because so much of the emissions that result in acid deposition come from power plants and other facilities located upwind from New York, the State has continued to lobby Congress to adopt legislation that would address the problem on a national level. New York has also taken steps to reduce emissions from sources located within the State.

The Acid Deposition Reduction Program (ADRP) announced by Governor Pataki in October of 1999, calls for two measures to reduce emissions that cause acid deposition. First, DEC must act to limit emissions of SO_2 from electricity generating units of 25 MW or more to a level that is 50% of the quantity of emissions (in tons) that would otherwise be allowed under the federal acid rain program established in Title IV of the federal Clean Air Act. Second, DEC must act to limit emissions of NO_x from electricity generating units during the non-ozone season (October 1 - April 30) to a level that corresponds to the emissions level allowed during the ozone season (May 1 - September 30).

DEC is promulgating regulations that would establish emissions "cap and trade" programs. These regulations are patterned after the existing ozone-season NO_x cap and trade program. DEC developed the program to comply with the federal NO_x control requirements and the State's commitment to reduce NO_x emissions under a 1994 agreement among Northeastern states, referred to as the "Northeast Ozone Transport Commission NO_x Memorandum of Understanding." Part 237 would implement a new NO_x cap and trade program that would operate throughout the year. As with the existing NO_x cap-and-trade program, the statewide NO_x emissions cap is calculated based on an average NO_x emissions limit of 0.15 lb/MMBtu. Each subject unit would be allocated NO_x allowances based on an allocation methodology crafted by DEC. Each allowance represents a limited authorization to emit one ton of NO_x during the non-ozone season. The number of tons of permissible emissions from each subject unit for a particular non-ozone season is limited to the number of allowances that the unit has in its "allowance tracking account" for that time period. As with Part 204, the allowance and emissions tracking systems for the regulatory program would be administered by U.S. EPA. The program will begin on October 1, 2004.

A new SO_2 cap and trade program would also apply year-round. The regulation would cover the same units that are subject to the federal acid rain program. The SO_2 emissions cap would be set at approximately 130,000 tons annually (about half of the number of federal SO_2 allowances annually allocated to the subject sources). As with the NO_x programs, the new SO_2 program would maintain the emissions cap by use of allowances that will be allocated pursuant to a methodology developed by DEC. U.S. EPA will administer the allowance and emissions tracking systems. The program will

take effect starting in January 2005 with implementation of 25% of the total emissions reduction for the program. Full implementation would be achieved by January 2008.

DEC issued preliminary drafts of the proposed regulations to representatives of the electricity generating industry on January 18, 2001. A stakeholders working group, with representation from the generating industry, the environmental community, and other interested parties, was created to develop the regulatory tools necessary to implement the ADRP. Some of the energy industry participants in this work have expressed concern about aspects of the program, including the potential for higher electricity costs. As a result, DEC and the New York State Energy Research and Development Authority (NYSERDA) have performed computer modeling to determine the impacts of the ADRP on generator fuel choices, capacity implications, and energy prices. This effort used the Market Assessment and Portfolio Strategies (MAPS) model, which determined that implementation of the ADRP will have some minimal impacts on the fuels used to generate electricity as well as its costs in certain regions of the State. The modeling found that some generators may switch from coal and oil to natural gas in order to meet the requirements of the ADRP, and that the program could result in an increase of wholesale energy prices by an average of 5.4% across the State. Higher increases are predicted on Long Island and in the Rochester area, although it is important to note that wholesale energy prices comprise only a portion of the retail electricity price and, therefore, retail prices would increase less.

Energy Efficiency and Renewable Set-Aside Component of NO_x Budget Trading Program

Established by the adoption of 6 NYCRR Part 204, the program provides incentives to implement electric end-use energy efficiency and renewable generation projects by allocating 3% or about 1,200 tons of New York's ozone-season NO_x allowance budget to eligible projects beginning in 2003. A pilot program under which 115 tons of NO_x allowances are available for end-use efficiency projects has been in place since 1999. Projects are certified as tradeable emission allowances that can be bought and sold on the open market.

NO_x allowances are accredited at the rate of 0.0015 lb per kWh, or one ton per 1,333,333 kWh reduced during the five-month ozone season. This rate approximates the heat input-based rate of 0.15 lb per MMBtu used to allocate the Ozone Transport Region NO_x Budget among individual states from the 2003 control period forward. Certifiable

kWh reductions from energy efficiency projects are based on the International Performance Measurement and Verification Protocol (IPMVP), developed jointly by the U.S. Department of Energy (U.S. DOE) and a consortium of public and private organizations for the purpose of establishing the industry standard for measuring and evaluating the outcome of investments in energy efficiency.

The Set-Aside Program recognizes that emission reductions needed to meet air quality objectives can be achieved by implementing end-use electric energy efficiency measures and renewable energy projects as well as by installing control devices on fossil fuel-fired electricity generation sources. Ancillary environmental benefits of the program include year-round reductions of NO_x emissions, thereby contributing to reducing acid deposition in the sensitive receptor areas of the Adirondacks, as well as reducing eutrophication (*i.e.* nutrient-loading) of water bodies such as the Long Island Sound. Furthermore, energy efficiency measures and renewable energy projects contribute to reducing emissions of carbon dioxide, the primary greenhouse gas, thereby providing long-term climate change benefits. New York's Energy Efficiency and Renewable Set-Aside program is one of the first of its kind in the nation. This is another example of the State's innovative approach to improving energy efficiency and reducing the environmental impacts of energy production. NYSERDA will develop a plan to improve industry awareness and participation to ensure that the full benefits of the program are realized.

Status of Governor's Greenhouse Gas Task Force

In June 2001, Governor Pataki announced the formation of a Greenhouse Gas (GHG) Task Force comprised of representatives from the business community, environmental organizations, State government, and universities. The GHG Task Force is charged with advising the Governor on specific actions and policies to achieve major GHG reductions across all sectors of the State's economy, and to position New York as a national leader in addressing these issues.

The GHG Task Force was formed in direct response to the national and international policy concern that increasing concentrations of carbon dioxide and other GHGs are causing long-term changes in global climate by trapping more of the sun's heat within the atmosphere. Increasing average global temperatures and severity of weather patterns over the next century could cause the world's oceans to rise, damage forests and other ecosystems, disrupt agriculture, and increase health risks, posing risks to large numbers of inhabitants and businesses, as well as to infrastructure such as roads and bridges.

The GHG Task Force has convened several times since its inception, and is working toward its objectives through five sector-specific Working Groups: electricity generation, buildings and industry, transportation, agriculture and forestry, and emissions trading. Preliminary recommendations for actions and policies from each Working Group have been vetted by the Task Force and are included in "Energy Plan Findings and Recommendations" (Section 1.2). Recommended actions include establishing a statewide target for GHG emission reductions relative to 1990 levels, promoting renewable energy resources, optimizing use of combined heat and power, improving the mass transit infrastructure, developing an indigenous bio-fuel industry, developing programs to encourage more efficient use of oil and natural gas at customer sites, and establishing a GHG registry to document baseline emissions and voluntary emissions reductions for participating customers. The GHG Task Force work will result in a Final Report, to be completed by Summer 2002.

GREEN BUILDING TAX CREDIT PROGRAM

A Green Building Tax Credit was enacted in Chapter 63 of the Laws of 2000 that provides tax credits to building owners and tenants of eligible buildings and tenant spaces that meet certain "green" standards which, among other things, increase energy efficiency, improve indoor air quality, and reduce the environmental impacts of large commercial and residential buildings in New York. The State is the first in the nation to implement a tax incentive program for the construction of environmentally-friendly green buildings. New York provides up to $25 million in tax breaks for green buildings that meet requirements for energy efficiency, indoor air quality, and use of recycled materials and wood resulting from sustainable forestry practices. Regulations have been proposed to implement the program, which were crafted with input from the DEC, the Departments of Health (DOH), Tax and Finance, and NYSERDA, as well as experts in the building trades, real estate, and environmental communities. The program has become the model for other states and nations interested in ways to promote green buildings.

METHYL TERTIARY BUTYL ETHER (MTBE)

Metyl tertiary butyl ether (MTBE) was approved by U.S. EPA for use in gasoline in 1979 as an additive to boost the octane rating of motor fuel as it required phasing out of earlier octane enhancers, such as tetra-ethyl lead and benzene. In the mid 1980s it was discovered that adding oxygen to motor fuel promoted more complete combustion and reduced pollutant emissions. Early programs in Colorado and elsewhere reported

approximately 10% reductions in carbon monoxide emissions, as well as reductions in VOCs. As a result of these early programs, the 1990 amendments to the federal Clean Air Act required the use of "reformulated gasoline" (RFG) in areas that failed to comply with national ambient air quality standards for ozone specifying, among other things, that the fuel be 2% oxygen by weight.

Fuel providers had two primary options to meet the oxygen requirement: ethanol, an alcohol made primarily from corn and other biomass, and MTBE, generally made from natural gas. During the 1970s, the federal government and many states (including New York) conducted pilot programs to evaluate the potential of ethanol to extend fuel supplies. New York's program, like most others, ended in failure due to the tendency of ethanol to dissolve fuel lines and gasket materials, and because its use resulted in significantly higher emissions of VOCs through increased evaporation of the fuel. Auto makers have since employed new materials that eliminate the fuel line and gasket corrosion, but the volatility problem of ethanol remains.

The other primary option to meet the oxygen requirement is MTBE. MTBE has several chemical properties that make it an excellent fuel additive, including its relatively low toxicity (compared to lead or benzene), its octane enhancing ability, and its relatively low volatility. Unfortunately, it also has some unique hydro-geologic properties that make it a threat to groundwater. It is highly soluble in water, so that if spilled it tends to migrate further and be more difficult to remediate than the other gasoline additives. It also has a strong turpentine-like smell that makes it easy to taste and smell at low concentrations [levels below 50 parts per billion (ppb)].

DEC recently finalized an ambient water quality guidance value of 10 ppb for MTBE, the lowest allowable concentration in the nation. Prior to this action, DEC used DOH’s unspecified organic contaminant drinking water value of 50 ppb as a clean up goal. It is anticipated that DOH will shortly finalize similar standards for drinking water. In February 2000, DEC evaluated the extent of MTBE contamination in New York and found that of 5,262 spills, 1,706 (32%) were identified to have MTBE impacts to groundwater. In addition, 866 private wells and 47 public water supplies were found to be impacted by MTBE. These numbers have continued to climb over the ensuing year, and it is clear that MTBE poses a severe threat to New York's groundwater and drinking water.

Because of these impacts, several Northeast states and California have taken steps to reduce the harmful effects of MTBE. States including New York have enacted legislative phase-outs of MTBE. New York's action will take effect in 2004. In addition,

several states (including Maine and California) have requested U.S. EPA to waive the oxygenate requirement as provided for in Clean Air Act. U.S. EPA recently notified California that it will not approve the oxygenate waiver. Because California (like New York) has a pending ban on MTBE, and no other readily available additive has been tested and determined to be acceptable, U.S. EPA's decision effectively becomes a mandate for the use of ethanol to meet the oxygenate requirement.

Use of ethanol, however, raises new concerns such as the potential for higher VOC emissions. Also, there is currently little if any ethanol production capacity in the Northeast. Ethanol is hydroscopic, absorbing moisture from the air, thus making it difficult to ship gasoline containing ethanol via pipeline. As a result, ethanol would most likely have to be trucked separately from production sites and blended at gasoline distribution centers. Additionally, it is unlikely that the national ethanol production capacity exists to replace MTBE any time soon. MTBE accounts for approximately 10-12% of the fuel supply in greater New York City. There is currently insufficient ethanol production capacity in the Northeast to replace the portion of the fuel supply currently made up of MTBE.

Removing MTBE from gasoline and replacing it with ethanol could have several negative effects. Ethanol has unique characteristics of its own that could have impacts on water and air quality. Ethanol co-mingled with gasoline may be as difficult to remove from groundwater as MTBE, and it has been found to cause damage to the structures used to contain spills at fuel storage and distribution facilities. As mentioned previously, ethanol has been shown to dissolve gaskets and hoses in older cars, and may cause similar problems in off-road equipment like lawnmowers, chain saws, and older outboard engines.

From an air quality perspective, substitution of ethanol for MTBE will most likely result in increased evaporative emissions from fuel tanks. Fuel companies are already seeking permission to raise the volatility of gasoline to allow for the use of ethanol. Along with its role as a source of oxygen, MTBE also increases the octane rating of fuels. Additives used to replace the octane lost with the elimination of MTBE could potentially increase the toxicity of fuels.

If ethanol were used in New York as a substitute for MTBE to comply with the 2%-by-weight oxygen requirement of federal reformulated gasoline, it is likely that ethanol would be used at about 5.7% by volume to comply with the requirement. The Energy Policy Act of 1992 includes provisions granting a partial excise tax exemption for ethanol used in gasoline. The excise tax exemption is 54 cents per gallon (cpg) of

ethanol, which translates to 5.4 cpg for 10% by volume blends and 3.08 cpg for 5.7% by volume blends.

New York State uses roughly 350,000,000 gallons of MTBE annually. Because ethanol has a higher oxygen content than MTBE it would take about 180,000,000 gallons of ethanol to replace the MTBE. Substitution of ethanol for MTBE in New York would, therefore, result in over $100,000,000 a year in losses to New York's contribution to the Highway Trust Fund.

ENVIRONMENTAL JUSTICE ISSUES

Environmental Justice (EJ) is meant to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. In order to effect fair treatment and meaningful involvement of all people, environmental justice efforts focus on under-served communities and seek to address adverse environmental effects that bear disproportionately on minority and low-income populations.

On October 4, 1999, in response to the concerns raised by parties interested in environmental justice, DEC announced a new program to address environmental justice concerns and ensure community participation in the State's environmental permitting process. DEC named an Environmental Justice Coordinator to oversee the Office of Environmental Justice and develop the DEC's Environmental Justice Program, and created two staff positions in the Division of Environmental Permits. DEC also established the New York State Environmental Justice Advisory Group ("Advisory Group") comprised of representatives from State, local and federal government, community groups, environmental groups, and the regulated community. The Advisory Group, chaired by the Environmental Justice Coordinator, was asked to develop recommendations for an environmental justice permit policy and recommend elements for an effective environmental justice program.

On January 2, 2002, the Advisory Group submitted a report to DEC containing its recommendations for creating an effective environmental justice program. The report: *Recommendations for the New York State Department of Environmental Conservation Environmental Justice Program* focuses on the environmental permit process and is intended to ensure DEC's programs are open and responsive to environmental justice concerns. Additional recommendations for the environmental justice program are also included in the report. DEC is reviewing the report and public comments received on the

report to determine appropriate legislative, regulatory, and policy changes that might be implemented. DEC is currently drafting a Commissioner's policy on environmental justice and DEC permitting. Once finalized, the policy will better enable DEC to address environmental justice concerns through permitting.

Major electric generating facilities regulated under Article X of the Public Service Law require permits issued by DEC, including air pollution control permits and State Pollutant Discharge Elimination System (SPDES) permits. Permits authorized by delegation for sources subject to the federal requirements of prevention of significant deterioration (PSD) are subject to a review process under federal regulations and will continue to undergo an environmental justice analysis consistent with United States Environmental Protection Agency (U.S. EPA) policy and guidance. Additional DEC permits required for Article X facilities will be subject to DEC's environmental justice policy, consistent with the provisions of the policy. DEC should continue to address environmental justice issues and incorporate environmental justice concepts into a variety of DEC programs.

CLEAN WATER/CLEAN AIR BOND ACT UPDATE

The Clean Water/Clean Air Bond Act authorizes $230 million for projects to improve the State's air quality. These funds support programs that use innovative and modern technologies to provide the State's citizens with a healthier and cleaner environment. This portion of the Bond Act provides funding for the following program categories related to energy use: the Clean Air for Schools Program; Clean Transportation projects, which includes funding for clean-fueled buses and vehicles; and other air quality improvement projects. As of September 1, 2001, $224 million has been appropriated from the Bond Act for air quality improvement projects, with more than $175 million committed to specific air quality initiatives.

Clean Air for Schools Program

The Clean Air for Schools Program, administered by the New York Power Authority (NYPA), is making dramatic progress to ensure that New York's children have a clean and healthy environment in which to learn and grow. The Bond Act authorizes $125 million for this program to replace aging coal-fired furnaces at public schools with modern boilers that use cleaner-burning fuels.

Through September 1, 2001, $117 million has been appropriated and fully committed to projects at 74 schools in New York City, Buffalo, and Long Island. The

projects are producing real and measurable benefits in the air quality of these schools and surrounding neighborhoods. As a result, emissions of air pollutants, such as sulfur dioxide, nitrogen oxide, and particulate matter have been significantly reduced, and students, teachers, and community residents are breathing cleaner air. This program has resulted in eliminating use of coal-fired boilers in school buildings, and largely reducing pollutants. NYPA estimates that the project has reduced air pollutants by 31,000 tons annually, including 30,400 tons of carbon dioxide.

Clean-Fueled Bus Program

The Bond Act also supports the State's Clean-Fueled Bus Program, which has had tremendous benefits for the State's environment and economy. The Program, administered by NYSERDA, has assisted municipalities and transportation authorities in replacing dirty diesel-powered buses with buses using cleaner energy sources, while also promoting the manufacture of clean technologies in New York. Under the Program, Bond Act funds are awarded for up to 100% of the incremental cost of a clean-fueled bus, infrastructure related to refueling or recharging clean-fueled buses, and any required depot conversions. Clean-fueled buses are defined as motor vehicles with a seating capacity of 15 or more passengers that are used for transportation on public highways, and are powered by compressed natural gas, propane, methanol, hydrogen, ethanol, or electricity, including electricity from solar energy. Eligible applicants include municipalities, school districts, State agencies, and public authorities.

Four rounds of funding have been awarded to date, which have resulted in the purchase of 300 buses powered by compressed natural gas, 67 hybrid electric buses, and 11 battery electric buses. NYSERDA estimates that these buses will result in reductions of 10,000 tons of NO_x, 560 tons of particulate matter, and 1.3 million tons of carbon dioxide over the lifetime of the buses.

Projects are selected for Bond Act funding by NYSERDA after a competitive application process. Priority is given to projects that: result in the greatest emissions reduction per dollar invested; are located in areas where air quality improvements are needed; provide the greatest economic benefits to the State; leverage additional funding from the applicant or other sources; support emerging technologies; and, are consistent with other clean-fuel vehicles activities. As of September 1, 2001, $16 million in Bond Act funding has been committed to the purchase of 376 clean-fueled buses for operation in New York City, Long Island, Onondaga County, the City of Rochester, and the City of Ithaca, as well as funding for two fueling infrastructure projects in New York City. The buses being purchased include a combination of electric, hybrid-electric diesel, and

compressed natural gas.

State Clean-Fueled Vehicles Program

Funding from the Bond Act also supports the State Clean-Fueled Vehicles Program. The Program, administered by the Office of General Services (OGS), is a coordinated effort to assist New York State agencies, public authorities, and the State University of New York in acquiring and using alternative fueled vehicles. OGS also serves as the Chair of the Clean-Fueled Vehicles Council, a working group of State agencies and authorities that guides the State's efforts to acquire clean-fueled vehicles and develop the fueling infrastructure to support the vehicles.

Through September 1, 2001, $16 million was appropriated from the Bond Act for the State Clean-Fueled Vehicles Program. The program finances the incremental costs associated with the State's acquisition of clean-fueled vehicles, as well as costs for related refueling and recharging facilities. To date, State agencies have acquired or committed to purchase nearly 1,000 electric and alternative fueled vehicles for use in their daily operations. A number of agencies have received funding from the Bond Act under this program, including: the Departments of Transportation, Motor Vehicles, and Correctional Services; DEC; OGS; Office of Mental Health; Thruway Authority; Olympic Regional Development Authority; and the State University of New York (SUNY) campuses at Albany and Buffalo.

Bond Act dollars are also being used to develop a comprehensive plan to provide conveniently-located fueling sites for the State agencies' clean-fueled vehicles. The first phase of the plan calls for construction of 30 new compressed natural gas fueling stations to supplement 52 existing stations across the State. The first site, located off of I-87 in Latham, Albany County, opened in the spring of 2000, and the second site, in Hudson Falls, Washington County, is also in operation. The remaining sites are expected to be operating soon. The second phase of the infrastructure plan includes establishing 18 high-volume compressed natural gas fueling stations that will be easily accessible and located in major metropolitan areas along high-profile travel corridors, including the State Thruway between Albany and New York City. Bond Act funding will also be used to address the need for other alternative fuels, and will include a network of electric vehicle charging sites.

Other Air Projects

The Bond Act provides up to $20 million for projects that enhance the quality of

the State's environment and the State's air quality. To date, funding from this category has supported four programs. The newest program funded under this category is the Heavy-Duty Vehicles Inspection and Maintenance Program. Other programs supported include: the Ultra-Clean Power Generation Technologies Program, the Clean Diesel Vehicle Program, and the Vehicle Inspection and Maintenance assistance program.

Heavy-Duty Vehicles Inspection and Maintenance Program

In 1998, the State required emissions testing for heavy-duty diesel vehicles. The law requires that diesel-powered vehicles of 8,500 pounds or more be tested annually to determine if they meet federal emissions standards for particulates or smog. These new requirements will reduce pollution from diesel vehicles, improve air quality, and protect public health. To facilitate implementation of the new testing requirements, Bond Act funding has been committed for a Heavy-Duty Vehicle Inspection and Maintenance State Assistance Program. The Program, administered by the Environmental Facilities Corporation (EFC), will provide resources to eligible service station owners and other eligible participants toward the purchase of certified equipment to test emissions from heavy-duty diesel vehicles. Under the program, State assistance payments of $1,000 to $2,000 per project will be made available to eligible facilities throughout New York that perform heavy-duty vehicle emissions tests for the public and to municipalities that purchase equipment necessary to test emissions from heavy-duty diesel vehicles. To date, $1.15 million in Bond Act funding has been set aside for this program.

Ultra-Clean Power Generation Technologies

A total of $5.6 million in Bond Act funding has been awarded under this program for ultra-clean power generation technologies that demonstrate improvements to air quality. This competitive program, administered by the NYSERDA, has provided funding to projects that improve air quality by accelerating the widespread use of ultra-clean, innovative, and advanced power generation technologies. Projects must also provide air quality, energy, and economic benefits to New York.

Clean Diesel Vehicle Program

Under this program, administered by DEC, proposals were sought for projects to demonstrate technologies with the potential for reducing emissions from diesel-powered vehicles. A total of $1 million was awarded to New York City Transit for a project to demonstrate a specific technology designed to reduce air pollutants from diesel-powered buses. Under the project, diesel buses operating in Manhattan and the Bronx are being

retrofitted with Continuously Regenerating Technology (CRT) devices. The device captures and burns pollutants before emission. This demonstration project will verify the emissions reduction benefits of the technology, as well as the durability of the technology on buses operated in a rigorous urban duty cycle. The project is also an important element of the Metropolitan Transportation Authority's (MTA) new capital plan. The unprecedented, multi-part plan ensures that MTA will have the cleanest bus fleet in the world. As part of the initiative, MTA will step up the purchase of clean-fueled buses, retrofit diesel buses, phase-out older and dirtier buses from its fleet, use low-sulfur fuels, and develop depots with alternative fueling capabilities. These strategies will significantly reduce emissions and greatly improve air quality.

Enhanced Vehicle Inspection and Maintenance Assistance Program

Funding has been provided from this portion of the Bond Act for grants to service station owners in New York City, as well as larger stations outside the City, that are participating in the State's Enhanced Vehicle Inspection and Maintenance Program. These facilities were not eligible for funding under the Small Business Environmental Compliance section of the Bond Act. EFC is administering this program which provides $5,000 to eligible service stations toward the purchase of the required testing equipment. Through September 1, 2001, approximately $6.2 million was provided to 1,250 participating service stations in New York City, Westchester, Nassau, and Suffolk Counties.

MITIGATING THE AQUATIC IMPACTS OF ELECTRIC GENERATION

Construction, operation, and maintenance of energy projects can produce negative environmental impacts on associated water bodies as well as other media such as air quality, terrestrial habitat, and wetlands. However, with appropriate mitigation measures, electric generation can have minimal environmental impacts. DEC has achieved great success in reducing the impacts of existing projects and preventing negative impacts from new projects while simultaneously ensuring the development of cleaner energy projects.

Steam-Electric Power

Most steam-electric projects use water to condense steam, although many new plants are using dry condenser (air) cooling, a form of closed-cycle cooling.

Environmental impacts to aquatic life can be significantly reduced or eliminated through the use of closed-cycle cooling where water use is greatly reduced by recycling. There are numerous examples of operating steam-electric plants of various sizes that have virtually no fish impact, as well as several recently permitted low-impact closed-cycle plants. Similar energy projects are either under consideration in hearings or in the application process.

Many older steam plants do not recycle water in closed-cycle systems, but rather use significant quantities of water to cool the steam condensers with once-through cooling systems. In fact, energy projects are among the largest water users in the State. As a consequence of using this amount of water, fish and other aquatic life may be drawn into the plants and be impinged on the intake screens (designed to keep debris in the water from entering the plant), or passed through the screen mesh and into the station (a process called entrainment). Entrainment usually results in 100% mortality to the eggs and larvae; small adult fish are also entrained. Impingement may damage or cause mortality to fish. Adverse impacts to aquatic life can also occur through the discharge of thermal pollution (heated cooling water) back to the lake or river. Thermal pollution can kill fish directly, block fish migrations, and cause the growth of nuisance species.

DEC has been, and continues to be, a national leader in finding ways to mitigate the impacts of these older plants without adverse impacts on power production. Some mitigation measures, like variable speed pumps, fish return systems, and chlorine minimization studies, have saved money and improved plant efficiency. New York was also the first to successfully employ new technologies to substantially reduce fish mortality while permitting once-through cooling to continue without de-rating plant generation. Examples are filter fabric aquatic life exclusion systems around intake pipes and high-power, high-frequency sonar repulsion system for alewives (herring). Conversion of older plants to closed-cycle cooling to mitigate significant impacts may also be used where appropriate. Under legislation signed into law by Governor Pataki in November 2001, applicants seeking an expedited, six-month approval process for modifying or siting of major electric generating facilities in New York must install air-cooled condensers or evaporative cooling water intake systems that use no more than 15 gallons of water per minute per megawatt of total plant generating capacity. Several pending applications for re-powering have proposed reducing aquatic impacts to 1% of current levels, while increasing energy output and nearly doubling energy production efficiency. Conversion of existing once-through plants to closed-cycle cooling is also possible, but will result in some lost energy production. For example, to produce a 95% reduction in water use and fish entrainment mortality using closed cycle cooling, a 1200-MW fossil-fueled plant might typically be de-rated 35 MW (2.9%) in the summer and 17

MW (1.4%) for the rest of the year.

Hydropower

The manner in which a hydroelectric project is operated can also dramatically affect fish and wildlife resources. DEC has been a national leader in getting projects licensed, re-licensed, or permitted through exemption, while restoring water quality and minimizing associated environmental impacts without causing significant energy losses. This has been accomplished through:

- Restoring adequate base flows in rivers within project operating limitations. This ensures navigation and dampens the impact to aquatic organisms, vegetation, and wetlands of pulsed generation that may be permitted.

- Restoring minimum river flows and fish passage flows in main stem reaches that are bypassed by penstocks or power canals. This eliminates water quality violations and restores an acceptable (though impacted) aquatic ecosystem.

- Reducing impoundment fluctuations to acceptable levels, especially during fish spawning seasons. Often more liberal fluctuations are permitted outside ecologically critical times.

- Reducing fish impingement and entrainment mortality through appropriately-sized trash racks and fish bypass systems. If trash rack replacement is necessary to protect fish it is often scheduled for a year when routine wear-and-tear replacement is scheduled. And fish bypass flows are often integrated with minimum flows required to maintain water quality standards.

New York has also been a leader in using the Federal Energy Regulatory Commission's (FERC) collaborative Alternate Licensing Process where the developer and stakeholders cooperate in a streamlined licensing process. It has been successfully used in re-licensing facilities on the Hudson River. Governor Pataki announced in October 2001 that NYPA had submitted its application to FERC for a new 50-year license to operate the 800 MW St. Lawrence-Franklin D. Roosevelt Power Project in Massena. The current license expires in 2003. The Governor said that the application, which was developed using the alternative licensing process, achieved "an unprecedented level of community support." The FERC license for the largest project in the State, NYPA's 2,400 MW Niagara Power Project on the Niagara River, expires in 2007. In March 2002, NYPA filed with FERC a Request to Use Alternate Licensing Procedures (ALP), designed to enhance public participation in the licensing.

FINDINGS AND CONCLUSIONS

- The generation and use of energy results in impacts on the environment, including the release of pollutants into the air and impacts on aquatic resources.

- Since the 1998 State Energy Plan was released, the State has made significant gains in reducing the environmental impacts associated with energy generation and consumption. Emission standards on new motor vehicles have been strengthened, as have the requirements on electricity generating plants and other stationary sources of air pollution. The impacts of energy generation on the State's aquatic resources are analyzed and addressed through existing regulatory programs. New electricity generating plants are required to use much less water than existing facilities, and the impacts on fish and other aquatic organisms must be minimized to the greatest extent possible.

- The State has become a national leader in developing new technologies to reduce emissions from diesel-powered trucks and buses, and has created a market for clean-burning low sulfur fuels. These programs will help ensure that New York, already one of the most energy-efficient states in the nation, produces and consumes energy with the lowest-possible impacts on the environment.

- New York has made great progress in meeting its air quality goals, currently meeting the National Ambient Air Quality Standards for five of the six federal criteria pollutants. The New York City metropolitan area has not yet attained the current National Ambient Air Quality Standard for ozone (one-hour), and is not likely to be designated as meeting the pending standards for ozone (eight-hour) or fine-particulates ($PM_{2.5}$). Meeting these standards will require additional emission reductions from all sectors.

- New York has adopted the most stringent tailpipe emission standards for new motor vehicles in the nation, and continues to develop new strategies to reduce emissions from mobile sources such as cars and trucks.

- The State has made significant progress in reducing emissions that cause acid deposition and will soon adopt stringent new standards on power plants to further reduce these emissions. Scientific data indicate that many water bodies and forested regions in the State are still adversely impacted by acidic deposition and that there is a need for additional national efforts to address these impacts.

- Public transportation has the potential to significantly reduce the impacts of energy used in the transportation sector, particularly through the decrease in single occupant vehicles on the State's roadways.

- MTBE, added to gasoline to meet federal oxygenate requirements, has negatively impacted surface and ground waters in New York and across the nation. The State has enacted a legislative ban on MTBE beginning in 2004.

- Environmental Justice has become a significant issue in the siting of new power plants and other facilities. The State is working to develop a comprehensive policy on how Environmental Justice issues will be addressed.

SECTION 2.4

ENERGY AND TRANSPORTATION

INTRODUCTION

This issue report examines the relationship between meeting New York's transportation needs and the complementary goals of fostering economic growth, preserving and enhancing the environment for an improved quality of life, and increasing energy efficiency. The success in meeting transportation needs is an important determinant in successfully achieving these other important goals. The 1998 State Energy Plan laid the foundation for many of the State's transportation policies with regard to energy-efficient travel. The themes, policies and objectives, identified in the 1998 State Energy Plan remain valid today. Many of the strategies and implementation steps discussed in that Plan are continuing. In addition to the importance of establishing energy related goals and objectives for the State, the State Energy Plan is valuable because it also facilitates the integration and coordination of important policy decisions by the State. The State Energy Plan is coordinated with the statewide Master Transportation Plan prepared by the State Department of Transportation and the State Implementation Plan for air quality prepared by the State Department of Environmental Conservation.

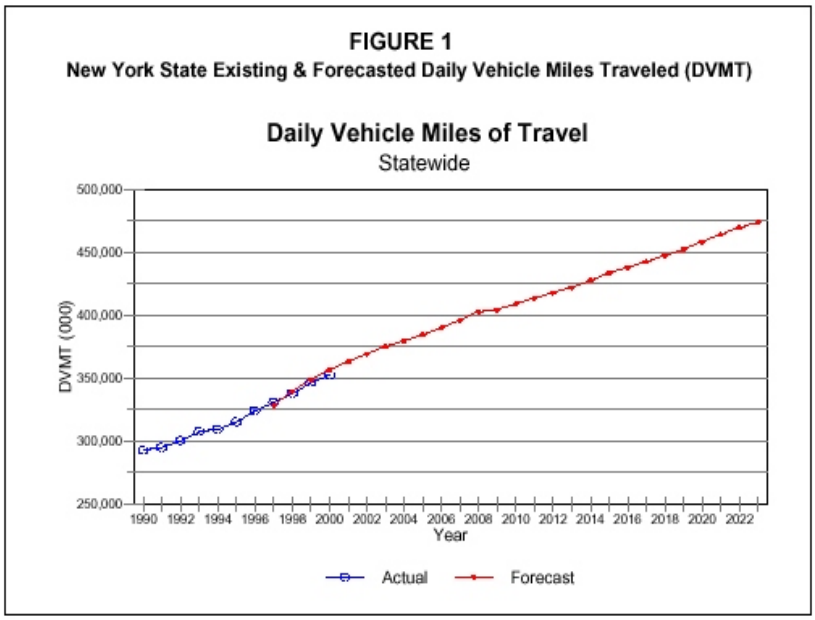
This issue report stresses several broad themes, in the context of energy-efficient transportation, including:

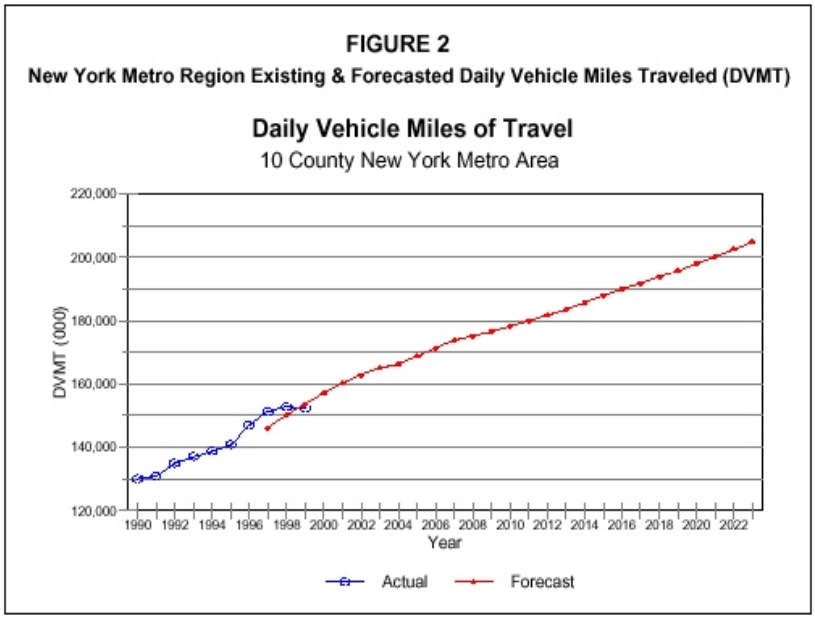
- Trends in transportation and travel;
- How State, regional, and local transportation providers can effectively enhance and encourage efficient transportation;
- Innovation in transportation technology for improving energy efficiency in the transportation sector;
- Activities and programs that enhance the use of alternative fuels and alternative fuel technology and infrastructure to reduce the transportation sector's overwhelming dependence on conventional fuels; and,
- Role of energy-efficient transportation measures for meeting federal and State air quality goals.

TRANSPORTATION PATTERNS AND TRENDS - AN OVERVIEW

Highways

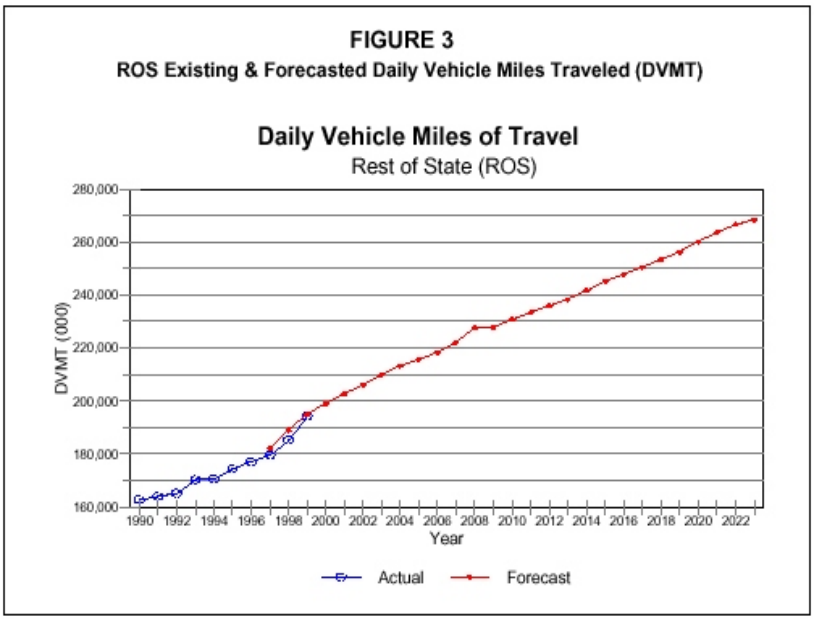
Highway travel [in daily vehicle miles traveled (DVMT)] on New York roadways from 1990 to 2023 is presented in Figure 1. Travel on New York roadways is currently about 352 million vehicle miles per day. This traffic volume results in an annual total of 128.7 billion vehicle miles traveled (VMT). Vehicle travel in New York has grown by approximately 2.5% to 3% or more per year since 1950. During the 1990s, however, growth in vehicle miles traveled has slowed to about 2% per year. While DVMT is expected to grow throughout the 20-year forecast period, the rate of growth is expected to decline slightly with a 10-year growth rate of about 1.4% annually from 2000 to 2010, and 1% annually from 2010 to 2020. Nonetheless, if current trends continue, DVMT on New York roadways are forecasted to increase by 30% in the next 20 years.





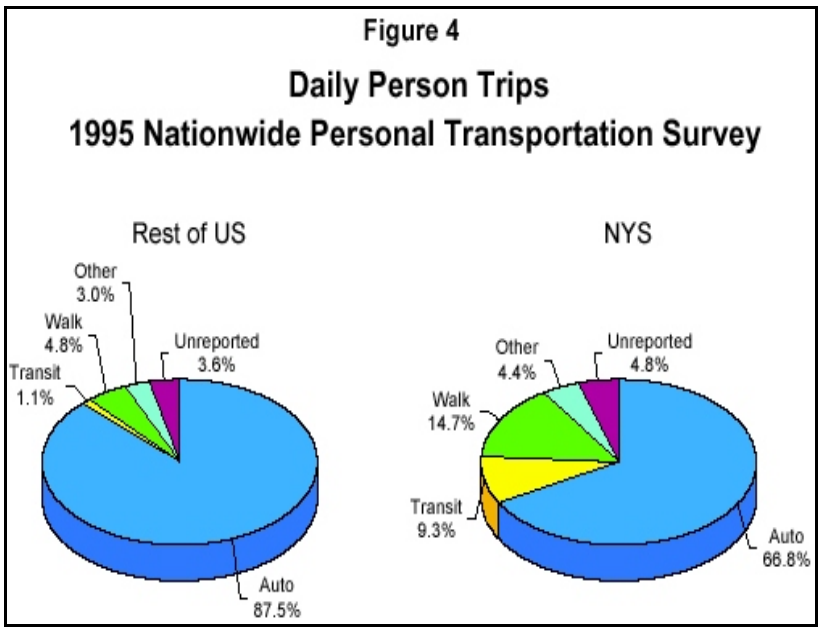
The existing and forecasted vehicle travel trends for the downstate New York metropolitan region are shown in Figure 2. Vehicle travel

trends in upstate New York are shown in Figure 3. The forecasted increase in vehicle travel in the New York City metropolitan region is slightly lower than the remainder of the State. The higher use of public transit in the New York City metropolitan region slows downstate DVMT growth compared with upstate New York, where development patterns continue to result in increasing vehicle travel, as household discretionary travel and work trip distances both increase, and related truck delivery trips also rise.



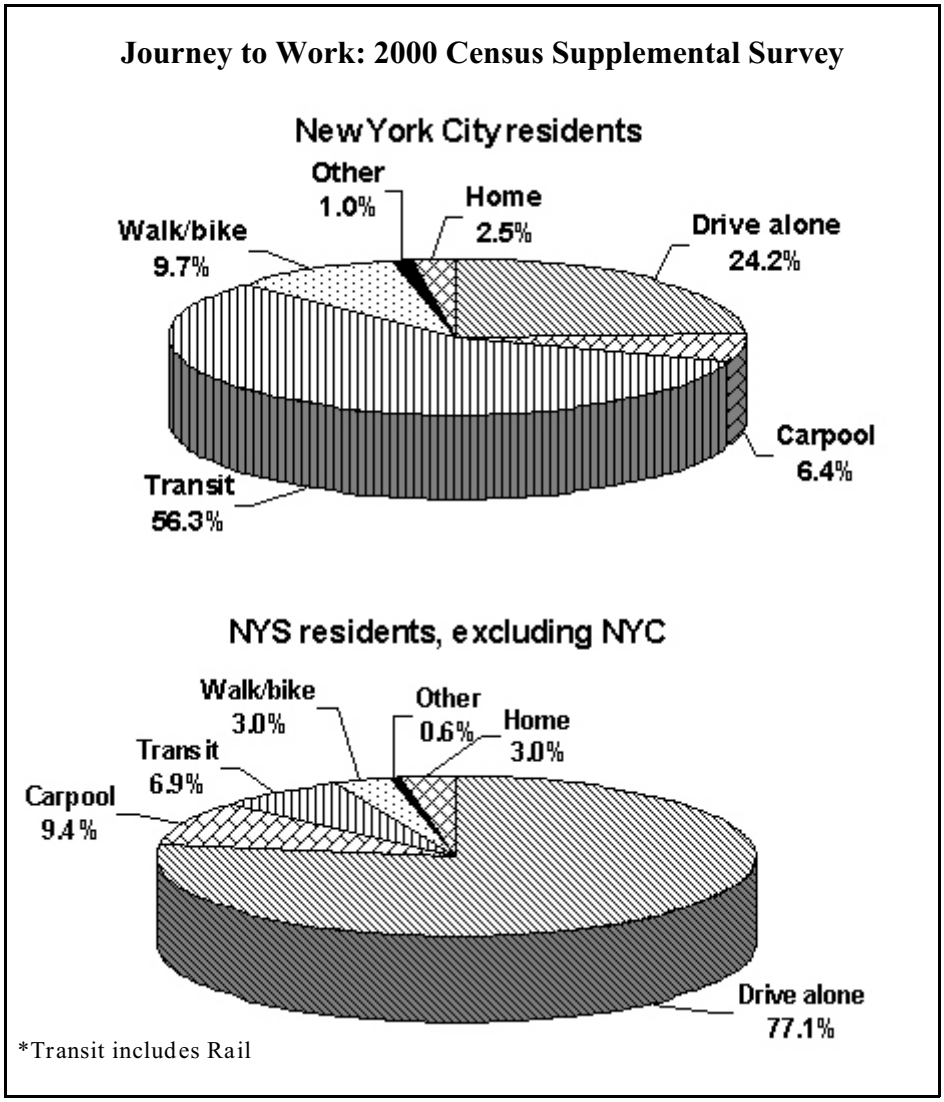
Transit

New York has the most energy-efficient transportation sector in the nation, owing to the high per-capita use of transit alternatives including buses, subways, commuter rail, and ferries. More than one-third of all national transit passengers are in New York. The percentage of all daily person trips by travel mode for all travel purposes reported in the 1995 National Personal Transportation Survey (NPTS) is shown in Figure 4, with New York having a much larger percentage of transit trips than the rest of the U.S. (9% vs. 1%). Examining journey-to-work trips, Figures 5 and 6 clearly delineate the impact of 56% transit use for



the New York City metropolitan area compared to the overall State travel picture and the rest of the nation, respectively. New York leads the nation with the lowest fuel use per capita of any state. Also contributing to low per-capita fuel use is the number of New York residents working at home. This figure has increased from 2.6% of all workers in 1990 to 5.1% in 1995, as reported by the 1995 NPTS.

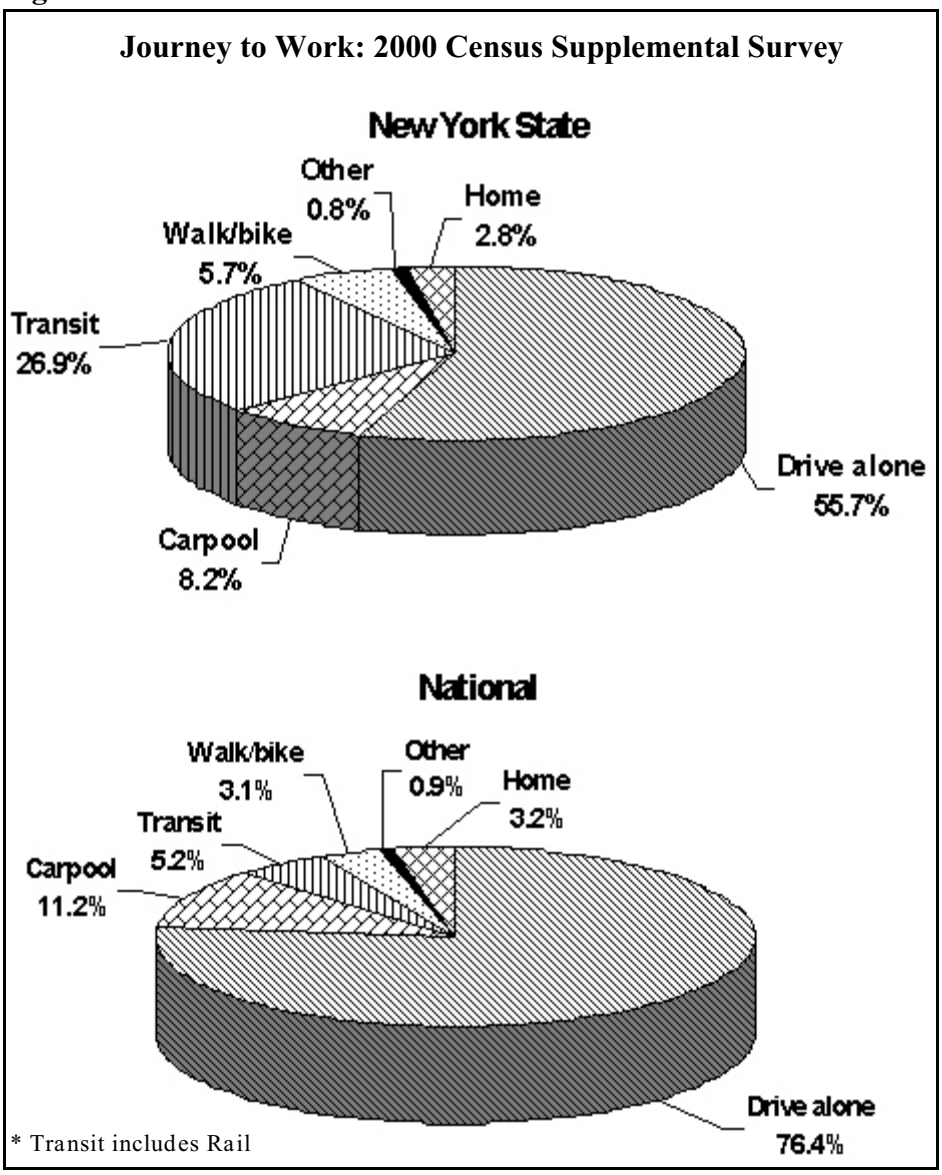
Figure 5



The statewide Master Transportation Plan emphasizes maintaining transit infrastructure and providing operating improvements that will continue to improve the energy efficiency of travel in New York. The significant continuing investment in Intelligent Transportation Systems (ITS) statewide is also expected to have a positive

effect on future energy use. Were it not for New York's investment in public transit service, resulting in a more energy-efficient transportation system, the diversion of those riders to single-occupant vehicles would increase annual vehicle miles traveled by 25 billion miles.

Figure 6



Freight

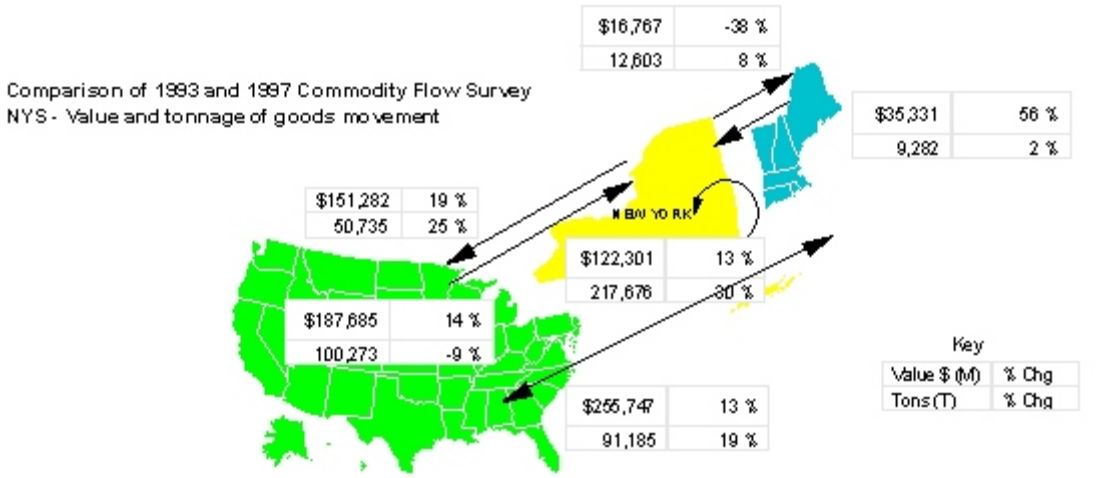
There is evidence of the recent growing importance of freight truck traffic on New York's roadways. Truck traffic showed increases of 20% to 37% on six of the eight bridge crossings between New York and Canada from 1996 to 2000. Clearly, the North Atlantic Free Trade Agreement (NAFTA) has had an impact on truck travel in the State, as the number of trucks traveling through New York to and from Canada, as well as to and from destinations in New York, have led to this increase. In the New York City metropolitan area, while auto traffic dominates in terms of the overall number of vehicles, on a percent basis, the increases in truck traffic on bridge crossings were also substantially higher than increases in auto traffic. This represents significant future challenges for infrastructure repair, congestion, economic development, and air quality goals.

Trends in freight travel are presented in Figure 7, which compares the value and tonnage of goods movement between New York and destinations in the rest of the U.S. in 1993 and 1997, with the New England states also included as a subcategory of trade. Based on the Census Bureau's 1997 Economic Census' Commodity Flow Survey, the value of goods shipped to New York is increasing while the total tonnage of these goods is decreasing. This underlines the fact that heavy raw materials, which tend to have higher tonnage and lower value, relative to higher-value goods (*e.g.*, computer software and electronic retail goods) are a declining percentage of freight travel to New York, while the lighter, high-value freight shipments are increasing. Note also the summary table of total commodity flow in Figure 7 indicates that New York is a net importer of freight shipments, as both the value and tonnage originating outside New York is greater than the amount New York ships to the rest of the nation.

Trucking is the predominant mode of freight transportation in New York. Rail carries a substantial amount also; in 1997 over 7 million tons of freight were exported from New York. Waterborne freight exports accounted for nearly 20 million tons. These freight travel trends have implications for future energy use. The increase in the professional service sector has also spawned an increase in overnight deliveries of letter packages because smaller trucks (*e.g.,* Federal Express, United Parcel Service) comprise a higher portion of goods movement in New York than previous years. The New York City metropolitan region, a large market with excess disposable income resulting in deliveries of high-end value goods, disproportionately contributes to increases in truck traffic. Traditional heavy-duty, long-haul trips still make up a significant portion of the travel and resulting congestion in New York, but are not growing as fast as the short-trip

deliveries of high-value goods for New York's retail and business markets and consumers.

Figure 7



	Value $ (000,000)		Value $ (000,000)			Tons (000)		Tons (000)		
Shipment Direction	1993	Share	1997	Share	% Chg	1993	Share	1997	Share	% Chg
Originating In NYS										
To Other States	154,081	23 %	168,049	22 %	9 %	52,369	13 %	63,338	13 %	21 %
To Within NYS	107,813	16 %	122,301	16 %	13 %	167,403	42 %	217,676	45 %	30 %
Total	261,894	39 %	290,350	38 %	11 %	219,772	55 %	281,014	58 %	28 %
Originating Outside NYS										
To NYS	187,014	28 %	223,016	29 %	19 %	119,080	30 %	109,555	23 %	-8 %
Total NYS	448,908	67 %	513,366	67 %	14 %	338,852	84 %	390,569	81 %	15 %
Through NYS	226,039	33 %	255,747	33 %	13 %	63,799	16 %	91,185	19 %	19 %
Net NYS	674,947	100 %	769,113	100 %	14 %	402,651	100 %	481,754	100 %	20 %

Source: 1997 Economic Census, Commodity Flow Survey

Personal Travel Trends

The NPTS household travel trends provides a breakdown of personal travel throughout the State by trip purpose, travel mode, and vehicle type. The NPTS trends provide an estimate of how changing travel patterns impact energy use, taking into account estimates of fuel use by vehicle type. The United States Department of Transportation's (U.S. DOT) Federal Highway Administration also provides national reports on the entire NPTS that are valuable for judging regional and interstate travel trends, which are growing in importance for examining future transportation energy impacts.

The personal travel trends identified by New York's portion of the NPTS follows the national trends in several key categories that impact energy use. The 1995 results showed that the number of persons per household continues to decline, while the number of vehicles and workers per household continues to increase and the average trip length continues to grow. These trends combine to increase DVMT even with a stable population base. In addition, the 1995 NPTS showed that the number of trips per household and the miles traveled to work both continued to increase compared with previous survey years. Another NPTS is currently underway, so that it will be possible to see if these trends are continuing. For now they lead to the conclusion that the personal travel portion of New York's DVMT will likely continue its upward trend, with the resulting total statewide DVMT also impacted by the general business cycle for the remaining portion of business travel.

The policies and objectives set forth in this Energy Plan provide many areas where efforts to improve the efficiency of the transportation system are aligning with these new travel trends, such as the statewide ITS program, passenger rail and bus infrastructure upgrades, transit (including ferry service) enhancements, promotion of new pedestrian and bicycle facilities, intermodal freight access improvements, and the New York High Speed Rail Initiative.

ENHANCING AND ENCOURAGING ENERGY-EFFICIENT TRANSPORTATION

Energy use in the transportation sector is derived from the amount of travel, expressed as VMT, and fuel economy, expressed as miles per gallon (MPG). Increasing energy efficiency in the transportation sector can be accomplished by reducing VMT, increasing the fuel economy of the vehicles used for travel, or by reducing congestion and vehicle delays. Reducing VMT can be achieved in a number of ways, from an absolute reduction in travel to increasing the occupancy of each vehicle to move the same or more travelers in fewer vehicles (shifting from single-occupant vehicles [SOVs] to high-occupancy vehicles [HOVs], which include carpools, vanpools, and transit vehicles).

As travel has increased, the level of congestion, often expressed as vehicle hours of delay (VHD), on many roads has also increased. A major impact of congested travel is an increase in the amount of fuel used to make a trip. For 2000, it is estimated that travel delays on the State highway system resulted in almost 285 million gallons of wasted fuel. If nothing is done to address congestion, the amount of wasted fuel would rise to over 400 million gallons by 2006, an increase of 40%. Across the State, many actions have been

taken to reduce the worsening congestion on New York's highways, but it remains a major challenge, especially in urban areas. New York is proposing and implementing a number of congestion mitigation measures as part of its capital and operating programs. Estimates from the most recent capital program update in 2000 for the 5-year period from State fiscal year (SFY) 2001/2002 through SFY 2005/2006, indicate that these congestion mitigation measures would reduce the growth of VHD by almost 120,000 hours per day, resulting in estimated fuel savings of 45 million gallons annually, a savings of over 10% compared to the fuel wasted under the "no build" projection. As congestion decreases, air pollutant emissions and energy use also decline. The following section describes some of the actions undertaken by New York that enhance mobility within the State through congestion mitigation and have a positive impact on energy use and efficiency in the transportation sector.

Reducing Person Hours of Delay And Vehicle Miles Traveled

The cost of congestion to New York residents is exceedingly high, including unnecessary extra vehicle wear and tear, lost time, increased fuel use, and increased delivery costs. Using current information on traffic flows and roadway facilities, the New York State Department of Transportation (DOT) estimates that congestion on State-owned highways alone cost New Yorkers almost $5 billion in 2000. Assuming nothing is done to ease congestion, and assuming typical traffic growth rates and current fuel prices, this figure grows to just under $7 billion in 2006, a 40% increase. These figures do not include travel and delays on roads owned by local governments, which generally have lower traffic volumes.

The primary methods used to reduce congestion and its impacts are decreasing VHD and total VMT. Every action undertaken by the State or local transportation agencies to mitigate the growth of congestion attempts to accomplish one or both of these objectives. These actions by nature are multi-modal, covering highway construction and operating projects, transit capital projects and operating policies (*e.g.,* fare incentives), and motor carrier and rail freight services. As an example of the scope and range of activities, the following international border crossing projects and initiatives have been implemented or are being implemented at New York's international border crossings to help reduce congestion and reduce energy use:

- Deploying two Intelligent Transportation Systems and Commercial Vehicle Operations (ITS/CVO) units at the Peace Bridge, which are expected to improve the efficiency and flow of traffic and trade across the border by reducing the time

for processing commercial vehicles and reducing the number of required secondary inspections.

- Developing a strategic plan with the Niagara Falls Bridge Commission (NFBC) to address the traffic queuing and safety concerns within the plaza and along the approaches to the Lewiston/Queenston bridge, including installing cameras within the plaza, and variable message signing and pavement sensors on the approaches and connecting highway that will be tied to a transportation management center.

- Modernizing the Interstate Route 87/Champlain Inspection Plaza to increase its capacity and reduce traffic queues.

Carefully selected highway construction and operating projects can enhance mobility, reduce traffic congestion, increase travel speeds, and decrease energy use. Highway and bridge construction projects can improve traffic conditions and travel speeds that lead to energy savings.

Examples of highway capital projects that decrease energy use through mobility improvements include the following:

- Rebuilding State Route 17 into a four-lane, controlled-access facility for designation as Interstate Route 86. This will result in increased safety and economic development along the Southern Tier and in Western New York, and will reduce delays along this corridor.

- Expanding the HOV lane network along the Long Island Expressway in Nassau and Suffolk counties.

- Reconstructing the Interstate Route 684, State Route 120, and State Route 22 interchange in Westchester County.

- Widening State Route 22 from Interstate Route 84 to County Road 65 in Putnam County.

In addition to capital improvements to the highway system, New York addresses the operating efficiency of the network through the use of Transportation Demand Management (TDM) actions and Transportation System Management (TSM) measures. TDM actions alleviate traffic problems through improved management of vehicle trip demand. These actions are primarily directed at commuter travel and are structured to reduce the dependence on and use of SOVs, or to alter the timing of travel to other, less-

congested times outside the peak periods.[1] TSM measures are focused on increasing the efficiency of the transportation system through measures such as ITS techniques, traffic signal improvements and coordination, incident management, and providing traveler information through Variable Message Signs (VMS). It is important to recognize that there are two kinds of delay that must be addressed. Recurring delays occur when traffic volumes exceed the roadway capacity and tend to happen on a regular basis. Actions to reduce recurring delay include most of the TDM strategies and TSM actions such as signal coordination and ITS. Incident, or non-recurring, delay is caused by incidents on the roadway that reduce traffic flow. Incidents include accidents, vehicle breakdowns, debris in the travel lanes, or special events. Most incident delays are random, unpredictable events. Incident management strategies specifically target the congestion resulting from traffic incidents.

All TDM and TSM measures have the potential to save substantial amounts of fuel by reducing VMT or reducing delay. A wide variety of TDM and TSM actions are targeted at reducing the growth of congestion in the State. Some examples of these TSM and TDM actions include the following:

- Implement a Highway Emergency Local Patrol (HELP) program to decrease highway delay caused by incidents, such as accidents and breakdowns. HELP trucks are currently operating in several areas across the State, including New York City, Long Island, the Lower Hudson valley, and the Capital District. This program has recently been expanded to include Scajaquada and Kensington Expressways in Buffalo.

- Coordinate traffic signals, which reduces delay at intersections and smooths traffic flow on arterial streets.

- Develop and expand express bus and vanpool/shuttle services in the Cross Westchester Expressway and Long Island Expressway transportation corridors.

- Develop and expand park-and-ride lots, primarily in the lower Hudson Valley and Long Island.

- Install TDM signs to promote carpooling opportunities on the Staten Island Expressway.

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[1] TDM focus areas included: the monitoring, program funding, and evaluation of voluntary TDM programs; TDM incentive and grant programs to facilitate participation in alternative commute modes; TDM integration with other mobility and capital programming initiatives; TDM modeling and evaluation mechanisms; commuter choice/employer issues; employer based technical assistance services; and development of TDM partnerships.

- Provide grants to assist private employers on Long Island and in the lower Hudson Valley to develop alternative commuter transportation services at work sites.

ENCOURAGING ENERGY-EFFICIENT ACTIONS BY TRANSPORTATION PROVIDERS

Governments at all levels provide transportation infrastructure by constructing, maintaining, and operating roads, bridges, and other facilities. This infrastructure is used by travelers and public and private transportation providers such as public transit authorities, intercity bus companies, and the trucking industry. Government agencies need to work with these public and private transportation providers to encourage them to adopt programs and policies that meet traveler needs and contribute to improving energy efficiency. Government agencies can encourage energy-efficient actions by transportation providers through pricing structures, taxing methods, subsidies, and regulations. In addition, government transportation providers must carefully apportion transportation resources between existing facilities and the need to expand the network to satisfy unmet demand. Using the majority of scarce resources to keep transportation facilities in a state of good repair continues to be an essential element of good energy policy. Inadequate infrastructure investment increases direct and indirect costs to businesses and consumers. A deteriorated highway and bridge network increases direct economic and energy-related costs, including unnecessary fuel consumption, motor vehicle depreciation, labor costs, and accidents.

In 1995, the Governor developed a five-year capital program to address the infrastructure needs of the State's highways and bridges. The goal of the program was to stabilize the condition of the State's roads, improve the condition of the State's bridges, and facilitate economic expansion through the implementation of capital and preventive maintenance work. During the five-year period between SFY 1996/97 and SFY 2000/01, DOT received bids on nearly $6 billion worth of construction. Fully 88% of those projects, at a cost of over $5 billion, were infrastructure projects and it is expected that over the next five years this percentage will stay about the same. In addition, capital projects include energy-saving improvements such as new or improved traffic signals and other intersection improvements. These activities improve traffic flow, reduce travel time, and increase mobility. DOT employs nighttime construction on its most heavily-traveled roadways to make infrastructure repairs under low-traffic conditions, while still moving the majority of people and goods during the day in an effective and energy-efficient manner.

A sizeable portion of this construction work may involve relocation of utility facilities. Currently, under existing law, most relocation costs are not reimbursed to the affected utilities. The utility industry has asked DOT to review the existing legislation and related policy regarding utility relocation. The industry seeks relief from the expenses it incurs when it is required to move its facilities because of a DOT project. DOT has had a long standing policy that it views as fair: access is provided to the right-of-way without any fees and while the purpose of the highway infrastructure is mainly for its customers, the traveling public and business, every effort is made to accommodate the needs of and the costs to the utilities. DOT continues to seek ways to reduce overall project costs, including utility relocation, and has modified its policies and procedures, consistent with existing state law, regarding when and how utilities are reimbursed. DOT continues to work with the utilities to make the process more efficient and reduce costs by developing projects more closely with the utility industry, precisely identifying the locations of utilities and, if possible from a highway and safety standpoint, designing around them. This approach is becoming more critical as the demand for use of the right-of-way expands with new technology. DOT is willing to share its successful approach with interested municipalities on their projects, which constitute the largest number of relocations.

Encourage Use of More Fuel-Efficient Vehicles

Efforts to encourage energy efficiency in transportation have traditionally focused on encouraging the shift from SOVs to multi-occupant vehicles. While the fuel efficiency of the vehicle is unchanged, the multi-occupant vehicle trip is many times more energy-efficient than a SOV trip. Some government programs promote the purchase of more fuel-efficient vehicles, require stricter fuel economy standards on manufacturers (see later section on CAFE standard), and offer tax rebates for the purchase of alternative-fuel vehicles. Each of these measures will provide some incentive for the traveling public to buy and use more fuel-efficient vehicles.

The Quality Communities Initiative

The Governor's Executive Order 102 created an interagency Quality Communities Task Force that was charged with studying community growth in New York and assisting communities in implementing effective land development, preservation, and rehabilitation strategies that promote both economic development and environmental protection. The Task Force's report, *State and Local Governments Partnering for a Better New York,* identified elements critical to Quality Community development and

defined the challenges inherent in that development. Among the seven quality community principles recommended to improve the quality of life for the citizens of New York were enhanced transportation choices, more liveable neighborhoods, and sustainable development.

DOT's participation on the Task Force reinforced the need to ensure that transportation planned for a community is compatible with current and future community development. A number of programs have been implemented or expanded that will better address community objectives and, at the same time, result in more cost-effective delivery of energy or reduced transportation sector energy demands. These include: implementing new and enhanced rural public transportation in the North Country and countywide coordinated transit services in Sullivan County; planning for passenger intermodal transportation centers[2] in Binghamton, Jamaica, New Rochelle, Poughkeepsie, Saratoga Springs, Rochester, Utica and Tompkins County; and developing a freight intermodal terminal on Long Island. Successfully implementing these and other similar programs will result in less VMT, reduced congestion, and improved traffic flow, all leading to less fuel use and improved energy efficiency.

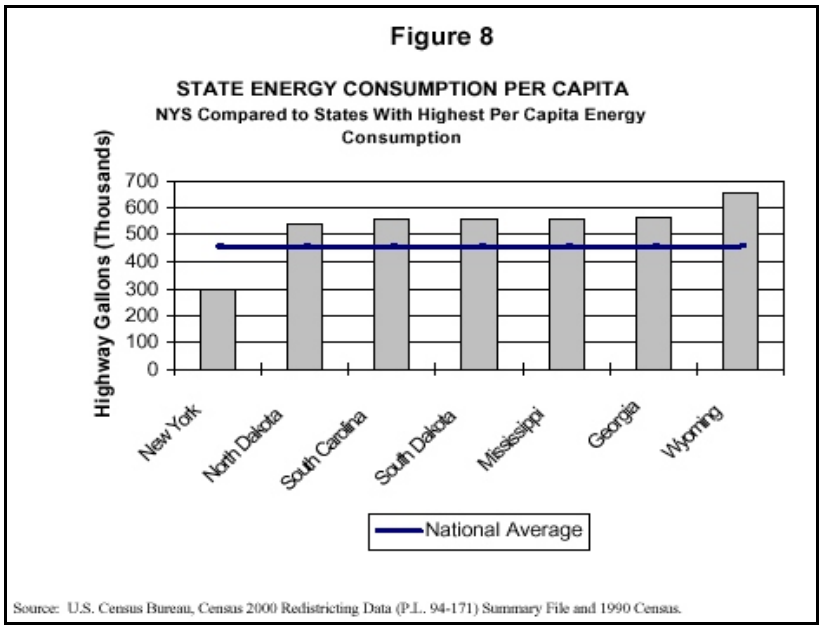
DOT's Main Street Initiative, where State highways traversing villages are reconstructed in ways that enhance the quality of life for residents and support the economic framework of rural "Main Streets," is underway across the State. Sidewalks, bicycle travel ways, and better transit access are all potential components of a Main Street initiative and encourage a more energy-efficient local transportation system.

Public Transportation

An efficient, safe, and environmentally sound public transit system is essential to moving people in both rural and urban areas and is a fundamental part of the State's multi-modal transportation infrastructure. The State's extensive public transportation network provides mobility alternatives for residents in the State's urban areas that are essential to the health of New York's economy. Public transit also provides mobility for rural and elderly residents in the State's small towns and villages, without access to other modes of transportation, to travel to medical, social service, and other necessary services. A direct result of New York's extensive support for public transportation is the fact that

[2] Passenger intermodal transportation centers are locations where travelers can switch from one mode of travel to another. Examples include subway or rail stops at airports and bus terminals co-located at passenger railroad terminals.

the State has the lowest per capita energy use for transportation of any state in the nation. Energy consumption for transportation purposes in New York is approximately two-thirds the national average (Figure 8).



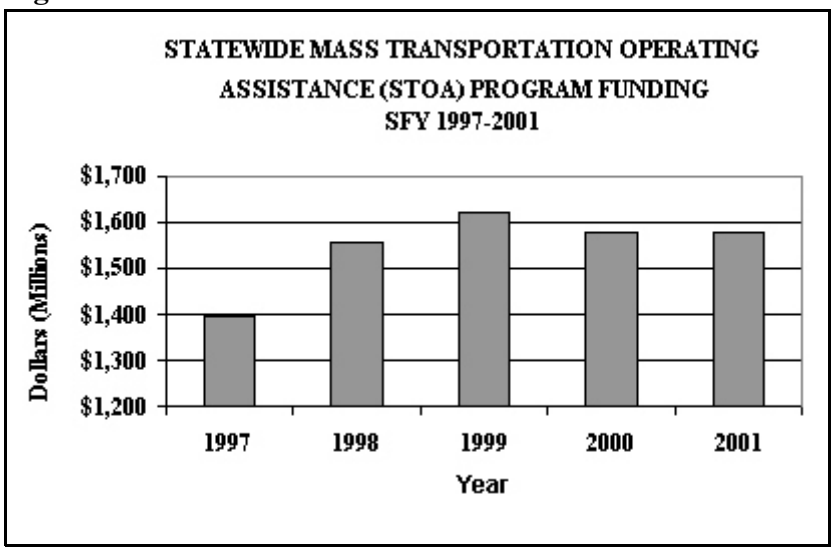
New York continues to experience an unprecedented increase in using public transportation. Transit ridership in New York not only accounts for one-third of the nation's ridership, but in 2000, more than 50% of the increase in national transit ridership occurred within the State. Much of the resurgence of public transit within the State can be attributed to the State's fiscal and fare policies (as discussed below). Based on analysis provided by the American Public Transportation Association (APTA), the average commuter who uses public transportation conserves approximately 200 gallons of gasoline annually when compared to driving alone. Based on this estimate, it is projected that the availability and convenience of public transportation in New York results in the conservation of more than 875 million gallons of gasoline or the equivalent of nearly 21 million barrels of oil annually.

State Public Transportation Assistance

Under the Governor's leadership, the State has made and will continue to make important capital and operating investments to improve New York's transportation system. New York provides approximately $1.6 billion in operating assistance annually for public transportation, more than any State in the nation. Not only does public transportation support economic and environmental policies, the State's significant financial assistance helps create energy efficiencies while at the same time mitigates traffic congestion in the State's major urbanized areas. Including the SFY 2001/2002 budget recommendation, State support for public transportation operating assistance has increased by approximately 22% since 1997 (Figure 9). This significant level of State

assistance has allowed transit systems to maintain and enhance public transportation services as well as enable the State and transit systems to support emerging public transportation needs, including the following: suburban mobility, welfare-to-work, special needs of the elderly, and accessibility for persons with disabilities. This strong support has enabled transit systems in the State's urbanized and rural areas to maintain fares at or below the national average making transit a viable and affordable transportation alternative. Assuming current funding levels, it is anticipated that the State will provide more than $8 billion in operating assistance over the next five year period, resulting in the conservation of more than 4.4 billion gallons of gasoline.

Figure 9



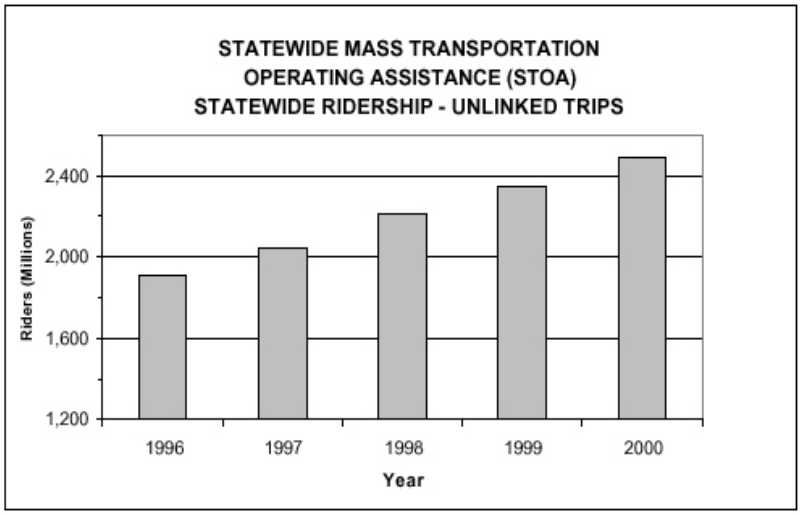
In addition, the Governor's multi-year capital program has identified nearly $2.2 billion in State funding for the Metropolitan Transportation Authority's (MTA) capital program for the 2000-2004 period. For systems other than the MTA, the multi-year program includes $146 million in capital assistance during this period. These new funds will be used for bus acquisition, maintenance facility improvements, and other regionally-significant capital projects that are expected to have a positive energy impact within the State.

Return on Investment

The return on State investment in public transportation is clear. In 2000, ridership on services receiving Statewide Mass Transportation Operating Assistance (STOA) increased by 7% to 2.4 billion trips annually - the largest ridership level since the program was authorized in 1974. Additionally, over the past five years, ridership statewide has increased by 31% (Figure 10). It is estimated that more than 70% of these trips are work-related, significantly supporting the State's economic growth. Assuming that current

growth continues for the national and State economies, that no major changes occur in local fare policies, and increased roadway congestion, it is estimated that State transit ridership will continue to increase over the next five years by approximately 5% annually to a level of 3.2 billion trips annually (Figure 11).

Figure 10

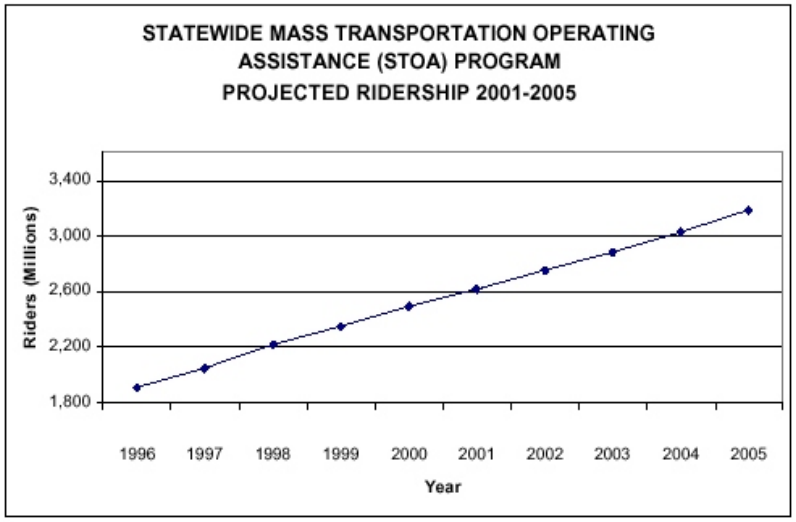


Source: New York State Department of Transportation

MetroCard Fare Policies/Incentives

Direct State support of public transportation has enabled transit systems in the State's urbanized and rural areas to maintain fares at or below the national average. In addition, the Governor has championed one of the most aggressive fare incentive policy programs in the nation within the New York City metropolitan area. In July 1997, MTA began implementing the MetroCard program on a system-wide basis for its operating services, for private bus services sponsored by the New York City Department of Transportation (NYCDOT), and for suburban bus service operated in Nassau County by MTA Long Island Bus (MTA-LIB). The MetroCard program, a series of fare discounts offered by MTA, has proven beneficial in terms of increasing transit ridership thereby mitigating highway

Figure 11



Source: New York State Department of Transportation

congestion and automobile pollution as well as increasing the State's overall energy efficiency.

The following are the fare discounts/incentives implemented under the MetroCard program since 1997**:**

- Free bus-to-subway or subway-to-bus transfer -- effectively eliminating the two-fare zone;
- Eliminated the fare for pedestrian passengers on the Staten Island Ferry;
- Established an 11-for-10 discount program whereby an individual who purchases 10 rides will automatically get the 11th ride for free;
- Reduced express bus fares by 25% (from $4.00 to $3.00); and,
- Implemented 30-day, 7-day, and 1-day fun passes, which provide unlimited use for those time periods.

As a result of fare incentives, ridership has dramatically increased on participating systems. For example, comparing the first half of 1997, before the MetroCard fare incentives went into effect, with the first half of 1999, after all the MetoCard fare incentives went into effect, finds that subway and bus ridership in New York City increased 19%. Nearly 5% of that increase can be explained by the increase in the number of jobs created in New York City. The remaining 14% can be explained by the fare incentive program. Similar ridership increases occurred on NYCDOT private bus and MTA-LIB services. Comparing 1996 annual ridership with 2000 annual ridership finds that NYCDOT ridership increased 33.8% and MTA-LIB ridership increased 16.6%. The State, through its Master Links initiative, is reviewing opportunities to extend MetroCard to all public transit services within the immediate New York City Metropolitan area.

Commuter Choice

The Governor has proposed a new transit initiative to reduce the need for individual commuting by New York State employees and further stimulate ridership for transit systems around the State. This new initiative will allow employees to set aside up to $1,200 annually in pre-tax income to pay for public transportation and other eligible commuter expenses. The pre-tax transit benefit will apply to most forms of public transportation services, including buses, trains, ferries, and vanpools.

Legislation is already in place that allows employers, including New York State, to establish pre-tax programs for implementing Commuter Choice programs. Commuter Choice offers the opportunity for New York's already energy-efficient transportation system to become even more energy-efficient (see the discussion on the transportation/energy/air quality connection).

Ferries

Over the past several years there has been a resurgence in the use of ferries in New York. This resurgence has been especially noticeable in the New York City area, where 15 ferry routes are operated carrying approximately 100,000 passengers daily. The publicly- owned-and-operated Staten Island Ferry is by far the largest and serves 65,000 daily passengers free-of-charge. The remaining private operators, which started service after 1986, currently provide daily service to approximately 35,000 commuters. Ferries are one of the most energy efficient means of transporting people.[3] Accordingly, the presence of this ferry service has energy benefits not only because of its relatively low fuel consumption but also because of its ability to divert passengers from longer and more congested automobile trips.

Bicycle and Pedestrian Initiatives

Pedestrian and bicycle travel provides many benefits for the community. These include improved mobility, public health, and environmental quality, while at the same time reducing vehicle congestion, emissions, and energy consumption. The State, through its Bicycle and Pedestrian Program at DOT, promotes the benefits of bicycling and walking as an alternative to the continued-reliance on motorized vehicles for all trips. DOT recognizes engineering, encouragement, and education as the keys to making the State more walkable and bikeable, and therefore, more energy-efficient.

According to the 1995 NPTS statistics for New York, 14.7% of all trips in the State are made by bicycling or walking, accounting for 1.2% of all personal miles traveled or 1.1 million miles annually. Statistics from the 1994 National Bicycling and Walking Study indicate that replacing automobile trips with non-motorized, energy-efficient bicycling or walking trips would save between $.05 and $.22 for every

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[3] Again using the Staten Island Ferry as an example, its large Kennedy Class boats can carry upwards of 6,000 persons per trip. The Staten Island Ferry removes a significant percentage of potential automobile commuters from extremely congested highways and bridges that connect Staten Island with Manhattan.

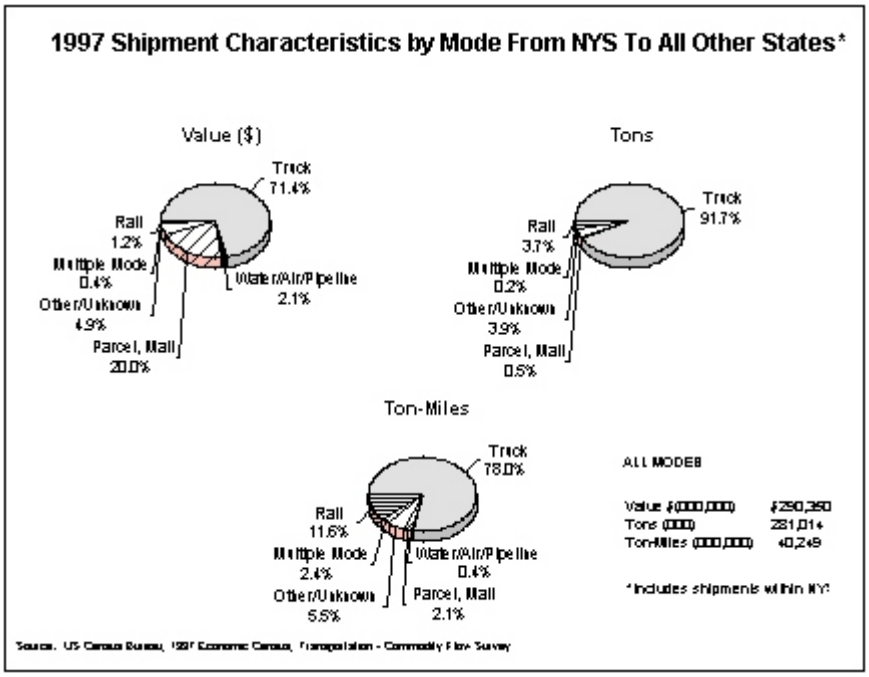
automobile mile displaced, or between $55 millon and $242 million annually. To promote walking and bicycling, the State has created or sponsored thousands of miles of on-road bicycle facilities (including over 1,200 miles of State bicycle routes), tens of thousands of miles of sidewalk, and over 16,000 miles of shared use and special use paths. The State has recently changed its policy to allow stand alone bicycle or pedestrian projects within the right-of-way of a local road to be eligible for State funding to further encourage this mode of travel. Previously, bicycle lanes or pedestrian walkways had to be part of an ongoing roadway project to be eligible for funding.

An important aspect of encouraging walking and cycling in New York is to have seamless linkage between walking and bicycling, and public transportation trips. National surveys have shown that many persons would walk or ride their bicycles to get to public transportation, if appropriate facilities were provided. Bicyclists would be more willing to use public transportation if provided with: (1) suitable bicycle parking facilities where cyclists can store their bicycles, protected from the weather, theft, and vandalism; and, (2) bicycle racks on buses, thereby expanding the range that cyclists may practically use their bicycles. For pedestrians, the facilities needed include: (1) a secure, well maintained shelter; and (2) access to bus stops provided through designated paths or walkways and effective street crossings that provide a direct linkage between their home or work, and the transit stop.

Intermodal Transportation

The trend in the movement of both passengers and freight is toward intermodal transportation. Intermodal transportation entails the use of multiple modes (*e.g.,* highway, rail, air, waterborne) of transportation to take advantage of the

Figure 12



efficiencies and flexibility of each mode for specific portions of a trip. Figure 12 shows the distribution of freight shipments in New York by various modes. Freight shipments from New York were valued at nearly $300 billion in 1997, the latest year for which data are available, representing over 280 million tons. This is up significantly from 1993 levels of over $260 billion and 220 million tons. Freight shipments by truck were the predominant mode of shipping, representing about three-fourths of all freight shipments. The advantages of developing multi-modal or intermodal alternatives include cost-efficiency through increased competition, increased transportation capacity through non-highway modes, and energy savings due to the energy efficiencies of modes other than personal passenger cars or trucks used for intercity freight movement.

Technologies for truck and rail intermodal transportation effectively reduce energy use. Container-on-flatcar (COFC) and trailer-on-flatcar (TOFC) and bulk cargo transfer technologies are both cost- and energy-efficient. To date, New York has not been able to take full advantage of these intermodal technologies because of vertical clearance restrictions on rail lines serving some major markets, such as New York City and Long Island, and because of the lack of intermodal transfer facilities. The State, in partnership with the Canadian Pacific Railroad, is working to address these physical constraints to enable full intermodal freight access to all areas of the State. Specific initiatives underway or in the planning phase to better use existing rail and highway capacity, as well as reduce energy use include the following:

- Initiating a bridge-over-rail program that provides a minimum clearance of 17'-6" for TOCF and COFC trains and subsequently 20'-6" of clearance for all structures between Montreal and New York City.

- Expanding the number of rail car barges and improving the rail infrastructure at the New York Harbor to provide direct rail access from either Staten Island or New Jersey to Brooklyn and other points in the New York City and Long Island area. This will divert truck traffic to rail and also eliminate the need for New York City rail traffic originating in the southern U.S. to be routed via Albany.

- Continuing development of a proposed freight intermodal center at the Pilgrim State Hospital site in Islip, Long Island. This intermodal center will become a key facility for freight movement onto Long Island.

- Continuing ongoing work with other New York City-based agencies to identify and implement improved rail access and intermodal facilities. Initiatives under study include a rail tunnel between Staten Island or New Jersey and Brooklyn, improved freight port facilities in Brooklyn, and establishing a major freight intermodal facility at Maspeth, Queens.

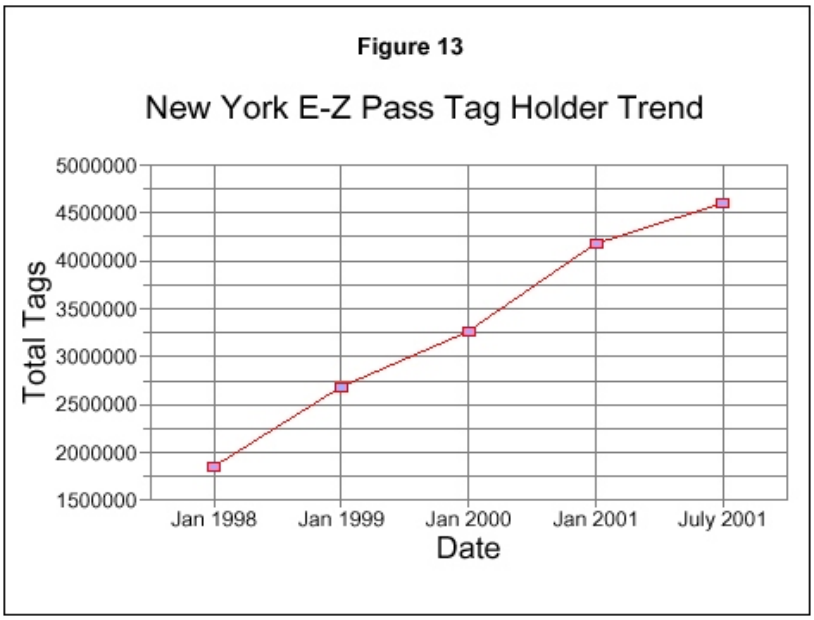
In addition to these specific initiatives, the State is working with the major railroads to identify projects in New York that can increase rail capacity, promote intermodal transportation, and provide improved rail access for economic development.

INNOVATION AND NEW TRANSPORTATION TECHNOLOGIES

As in telecommunications and many other arenas, the use of new technologies and development of innovative applications of existing technologies to transportation serves to advance the state of practice and also makes the transportation system more energy-efficient. Innovative approaches to congestion and ridership patterns enable the transportation system to meet basic transportation needs of the public within the context of the current network.

Intelligent Transportation Systems

New advances in this technology are allowing even faster speeds through toll plazas, further reducing fuel use at these sites. A prime example is the E-Z Pass system, which has seen significant growth in use due to its ability to reduce delays at toll barriers. Figure 13 shows the trends in the numbers of vehicles using E-Z Pass tags.



ITS applies advanced technologies, such as information processing, communications, computer controls, and electronics to implement new management, control, and information systems that improve transportation safety and energy efficiency, reduce congestion, enhance mobility, minimize adverse environmental impacts, and promote economic productivity. DOT is advancing a statewide ITS program called NY

MOVES. Strategic deployment plans for this program have been developed for each of the major metropolitan areas of the State (New York City, Long Island, Hudson Valley, Albany, Rochester and Buffalo are complete - Syracuse is still being developed), as well as the small urban and rural areas.

The following sections summarize some of the key elements of ITS that are expected to significantly reduce transportation energy use in the State. Table 1 highlights the energy benefits of these type of projects. By 2006, ongoing and planned ITS projects are expected to reduce vehicle delay by about 42,000 hours daily.

TABLE 1
Energy Benefits of ITS Projects

	Reduced Delay/Travel Time	Reduced Fuel Consumption
Freeway Management Systems:	30% reduction in travel time for recurring delay, 60% for non-recurring delay	Up to 41% during congestion periods
Incident Management Programs:	Time to detect and clear incidents on the Gowanus Expressway reduced for 90 minutes to 31 minutes (61%) with breakdowns reduced to 19 minutes	Predicted fuel reduction of 41.3 million gallons (42%)
Traffic Signal Systems:	17 - 37%	6 - 12%

Traffic Management Systems

Traffic Management Systems involve deploying sensors and traffic control devices to quickly detect and respond to traffic incidents. They facilitate improved real-time management of traffic on freeways and arterials, alert incident management patrols that assist motorists, and improve traffic signal timing and operations. Also included are automated systems that can expedite traffic flow at international border crossings.

Traveler Information Systems

Providing timely, accurate information on routing and current travel conditions allows travelers to make smart choices on the best route, time, and mode, allowing motorists to travel more efficiently and save fuel. A study of Long Island's INFORM

system[4] showed a doubling of reported diversions to avoid delay when active messages providing specific routing information (such as *Delay Ahead - Choose X Alternate Route*) were used rather than passive messages that provided general information (such as *Delay Ahead - Choose Alternate Route*).

Public Transportation and Multimodal Traveler Information Systems

Sustaining the high levels of transit ridership that account for New York's uniquely energy-efficient transportation network requires careful attention to the needs of the transit rider. Providing reliable, convenient, comfortable, and easy-to-navigate service is essential to sustaining ridership among customers with transportation choices.

Transit ITS systems are becoming increasingly popular among New York's transit providers. Transit ITS has three major emphasis areas:

- Increasing the efficiency and reliability of transit service by managing the fleet based upon real-time performance information;
- Improving customer access to service information such as customized itineraries that permit them to navigate the transit system from door-to-door, or next-bus arrival information at bus stops to improve the customer's confidence in the reliability of the service; and
- Improving the convenience of transit use by providing more options and ease in fare payment.

Nearly all the major urban transit systems in New York have or are procuring automated vehicle location (AVL) systems. These systems provide dispatching and control centers with real-time information on bus location and on-time performance information.

ITS Research and Development

The State actively participates in the national ITS Automated Highway System program. This is a long-term program that is assessing and developing prototype systems to automate the vehicle/driver operation so that vehicles can safely travel at high speeds

[4] USDOT Report No. FHWA/TX-99/1790-3 "ITS Benefits: Review of Evaluation Methods and Reported Benefits" October 1998.

and close headways. This system has the potential to double the capacity of each highway lane, significantly reducing congestion and accruing the associated energy benefits of more consistent speeds, fewer stops, and less time idling. While an automated highway system is estimated to be at least 20 years from becoming fully-operational, this research should lead to incremental improvements in vehicles, accruing benefits within the next few years. A prototype system was tested in San Diego, California in 1997.

High Speed Rail Program

The State and Amtrak are advancing a $200-million program to bring high-speed rail service from New York City, through Albany and on to Buffalo (the Empire Corridor). The program includes the re-manufacturing of seven high-speed turboliner trainsets as well as track and signal improvements. The High Speed Rail Program will reduce travel time, offer more frequent and reliable service, and improve passenger amenities, resulting in an expected increase in ridership along the Empire Corridor by as much as 150 percent. This ridership increase means less automobile travel, resulting in substantial time and energy savings.[5] Rail infrastructure projects include safety improvements at both public and private grade crossings, new track, bridge rehabilitation, curve straightening, and signal improvements.

DOT is also testing the feasibility of a new military propulsion technology to improve the third-rail propulsion systems on the trainsets. The new technology involves light-weight, high-speed motors and control systems recently developed for the military and now available for civilian applications.

ALTERNATIVE FUELS AND ALTERNATIVE FUEL TECHNOLOGIES

One of the most prominent and significant developments in recent years has been alternative-fueled vehicles (AFVs) and the technology and infrastructure associated with them. This technology is a highlight example of innovation and application of new (as well as existing) technology in the transportation sector.

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[5] The new turboliners will have two-1600 horsepower diesel turbine power units -- one in each of the two locomotives, which will be located at opposite ends of the train. The diesel power units are quieter, cleaner, more fuel efficient and less polluting than other passenger train equipment. Each trainset is also equipped to operate on third-rail electricity.

Alternative Fuel Vehicles

New York has been a leader in adopting programs and technologies that lead to improved energy efficiency and air quality. The State is leading by example to reduce reliance on imported energy and to improve air quality and energy efficiency by committing to the use of alternative-fuel vehicles and technology in its own fleet of vehicles. Governor Pataki's 1996 Clean Water/Clean Air Bond Act stipulated creating a clean-fueled vehicle program by the Office of General Services, for the purpose of acquiring clean-fueled vehicles for State use and testing, and for evaluating clean-fueled vehicle technologies. The driving force behind this program is the Clean-Fueled Vehicles Council (Council), established in 1998.[6] The Council ensured that State government would move quickly in a coordinated approach to using AFVs in its daily operations. In mid-1999, the Council began formulating a comprehensive fueling infrastructure plan to accommodate the State's growing fleet of AFVs. In formulating an overall statewide infrastructure plan, compressed natural gas (CNG) was determined to be the most suitable fuel at this time.

When fully implemented, a two-phase plan will double the number of existing CNG fueling stations in the State. Phase I calls for 30 low-volume FuelMaker CNG sites at DOT facilities across the State. These sites are open to State vehicles only, and are capable of producing up to 100 gallons of CNG per day. The first station was opened in June 2000 and since then, 29 more have opened. Phase II calls for up to 16 high-volume CNG stations capable of dispensing a minimum of 500 gallons per day under a joint public/private partnership. State agencies provide the land and the private-sector constructs and operates the fueling stations. These fast-fill CNG stations, installed strategically around the State at DOT, New York State Thruway, Office of General Services, and Corrections facilities will be commercially-operated and open to the public. The fuel infrastructure plan also addresses the need for other alternative fuels, and includes installing a number of electric vehicle charging sites. As an initial step, seven

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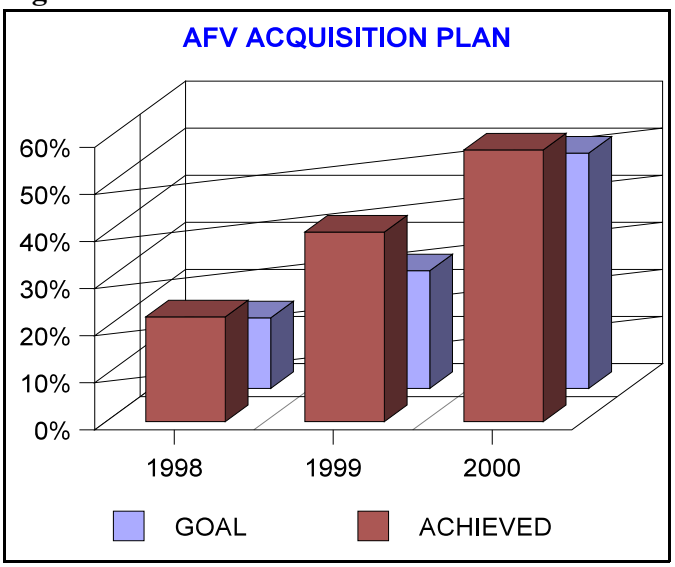
[6] The Clean Fueled Vehicles Council includes the following members:

- Department of Agriculture and Markets
- Department of Correctional Services
- Department of Environmental Conservation
- Department of Motor Vehicles
- Department of Transportation
- Division of the Budget
- Empire State Development Corporation
- New York Power Authority
- New York State Energy Research and Development Authority
- New York State Thruway Authority
- Office of Children and Family Services
- Office of General Services
- Office of Mental Health
- Office of Mental Retardation and Developmental Disabilities
- Office of Parks, Recreation and Historic Preservation
- State University of New York
- Department of Taxation and Finance

charging stations have been installed at the Empire State Plaza in Albany to accommodate visitors. In addition, the feasibility of establishing ethanol and propane fueling stations is being addressed.

Figure 14



The Federal Energy Policy Act of 1992 (EPAct) requires State agencies to acquire AFVs in increasing annual percentages of their fleet light-duty vehicle purchases, beginning in model year 1997. EPAct further requires annual reporting to the U.S. Department of Energy (U.S. DOE). As shown in Figure 14, New York has exceeded federally- mandated acquisition requirements under EPAct for the past three years as follows:

1998 Goal 15%;	NewYork achieved 22.25%
1999 Goal 25%;	New York achieved 40.26%
2000 Goal 50%;	New York achieved 57.70%

New York expects to continue to meet or exceed EPAct goals, which increase to 75% for 2001 and thereafter. As of July 1, 2001 New York has acquired 1,416 AFVs. In calendar year 2000, New York purchased 200,000 gasoline-gallon equivalents of CNG. In calendar year 2001, this figure jumped to 750,000 gasoline-gallon equivalents. New York is working with the Northeast states in a united effort to influence the direction of alternative fuel programs. The principal features of New York's clean-fueled vehicle program model - creative planning, multi-agency participation, and promoting favorable manufacturer relations - are strategies that can be easily adapted by other states.

To underscore the importance of AFVs in meeting New York's transportation, energy, and environmental goals, Governor Pataki, in Executive Order 111, directed that by 2005, at least 50% of State agencies' light-duty vehicle purchases must be AFVs. By 2010, this percentage increases to 100%. The Executive Order covers all agency vehicles, regardless of the number of vehicles in the agency's fleet or where they are assigned.

New York Power Authority Electric Transportation Program

The New York Power Authority (NYPA) Electric Transportation Program is actively engaged in initiatives that employ electricity as a transportation fuel to address concerns about clean air, noise pollution, and traffic congestion. NYPA is the nation's largest supplier of electricity for mass transit, powering the subway and commuter trains of metropolitan New York City. In addition, NYPA has put into service several hundred electric cars, light trucks, buses, vans, and other vehicles for use by its customers and at its own facilities. In 2000, those vehicles achieved the "million mile mark" for combined AFV-mileage, making NYPA the first utility in the Northeast to achieve this milestone. The array of NYPA electric vehicle projects includes hybrid-electric transit buses, station/commuter cars, all-electric school buses and shuttles buses, small urban electric vehicles and electric delivery vans and trucks. In October 2001, NYPA and Ford Motor Company's electric vehicle group, TH!NK Mobility, launched the "Clean Commute" commuter station car demonstration in cooperation with MTA, the New York State Energy Research and Development Authority (NYSERDA), the Long Island Power Authority, DOT, NYCDOT, and U.S. DOE. The demonstration program will lease 100 electric vehicles to passenger rail commuters in the metropolitan New York City region.

Alternative Fuel Technology for Transit

New York is a national leader in combining transportation improvements with environmental benefits and new energy technologies. In 1991, the State sponsored a consortium of transit systems interested in alternative fuel development. As a result of the initial consortium pilot, several transit systems around the State have committed to mainstreaming AFVs into their urbanized-area fleets. Most transit systems currently use CNG-powered buses and MTA-New York City Transit is also making a significant commitment to utilizing hybrid-electric buses. Incorporating alternative-fuel buses into transit fleets has steadily increased, from 31 in 1991 to more than 2,300 programmed through 2004. In addition, MTA-New York City Transit has stated that all of its purchases of standard-sized buses after 2004 will be as clean as AFVs. Relatedly, bus depots are being converted to facilities that can store and refuel these buses.

The most significant impediment to further expanding the use of AFV technology is its incremental cost and the associated infrastructure. To mitigate the impact of cost associated with AFV deployment, NYSERDA, in cooperation with DOT, has been providing competitive awards from the Clean-Fueled Bus Program (authorized under the 1996 Clean Water/Clean Air Bond Act) for the purchase of alternative fuel buses. The

Clean Fueled Bus Program makes funding available annually to cover the incremental cost of procuring alternative-fuel transit buses and infrastructure.

Alternative Fuel Technology for the Private Sector

To promote fuel diversity and efficiency, it is important that private sector fleets begin to adopt alternative fuel technologies. Progress is being made in this area, primarily as a result of government incentives. NYSERDA is using approximately $6 million of federal Congestion Mitigation and Air Quality Program (CMAQ) funds to support introduction of natural gas, electric, and hybrid-electric vehicles in New York City, including heavy-duty trucks, delivery vehicles, and taxis. A similar program is operated on Long Island through the local Clean Cities organization. Other federal funds awarded to New York are used for projects to develop the necessary fueling infrastructure to support further introduction of alternative fuel vehicles in all sectors.

The New York Alternative Fuels Tax Credit program for placing these vehicles sunsets in 2002; the tax credit for manufacturers sunsets in 2003. The alternative fuel incentives described above have been a success. A program that includes all types of alternative-fuel, light-duty vehicles; medium- and heavy-duty vehicles for the same vehicle technology; and incentives for alternative fuel providers to encourage their availability (such as a credit for every gallon of gasoline equivalent provided and a credit for installation costs of alternative fuel infrastructure) is expected to induce even greater penetration of these vehicles into fleets.

Energy Research Program

New York is committed to investigating and testing the economic, energy, and environmental factors aggressively for all emerging alterative-fuel technologies and to advance the most appropriate technologies and combinations of technologies that address and support the State's needs. Based on viability and cost effectiveness, CNG and liquefied natural gas (LNG) are currently the focus of short-term and long-range planning. New York promotes the research, development, deployment, and use of all fuels and technologies designed to improve air quality and reduce the reliance on conventional energy sources.

The Clifton Park Rest Area on Interstate Route 87 was selected by NYSERDA to demonstrate fuel cell technology. Three 7.5-kW-rated fuel cells are being tested there, and three additional fuel cells were recently installed at a Saratoga County maintenance

facility. Funding was provided from the 1996 Clean Water/Clean Air Bond Act. In collaboration with other State agencies, authorities, universities, and private industry, the DOT State Planning & Research Program (SPR), makes funding available for research projects, many of which will reduce the demand for transportation-sector energy.

THE TRANSPORTATION/AIR QUALITY/ENERGY CONNECTION

New York continues to be a national leader in meeting the challenges of improving air quality in all parts of the State. Although New York's air quality continues to steadily and dramatically improve, there is still much to be done, especially in the New York City metropolitan area. Transportation has a role in achieving air quality goals through more energy-efficient transportation systems.

Lead emissions and concentrations have been reduced to the point where lead is no longer considered a transportation-related air pollutant. Carbon monoxide levels and particulate matter less than 10 microns (PM_{10}) have also improved to such an extent that attaining National Ambient Air Quality Standards is anticipated soon. Meeting the one-hour ozone, eight-hour ozone, and particulate matter less than 2.5 microns standards, however, will require more effort. A list of transportation measures that are under consideration to reduce emissions of ozone precursors and, thereby, help lower ozone concentrations is shown in Table 2. The list includes measures that have been considered previously in New York or elsewhere in the nation. It also includes measures that have not been traditionally considered as transportation actions available to reduce emissions (*e.g.,* construction and maintenance equipment). Each measure also has costs to government or industry that affect its feasibility as an emissions reduction alternative.

The measures in Table 2 are being considered in a three-phased approach. The first phase has DOT taking actions to improve air quality. Given the size and importance of its capital programs, DOT can influence other transportation agencies to take similar steps. The second phase includes the Federal government and other regional and local governments. Collectively, these governments can provide substantial air quality benefits through coordinated implementation efforts. The last phase carries this effort to include the private sector in the metropolitan areas, which can yield maximum emissions reduction benefits. For improving air quality, the more effective measures include limiting emissions from construction and maintenance equipment; implementing Commuter Choice and Ozone Action Day programs; limiting emissions from bridge painting and traffic marking operations; coordinating traffic signals; and retrofitting diesel equipment. Some measures that improve air quality also reduce energy use, such

as the Commuter Choice and Ozone Action Day programs. Replacing standard traffic signal light bulbs with energy-efficient light emitting diodes (LEDs), enhancing transportation system management measures (such a carpooling, van pooling, *etc.*), and enforcing speed limits can provide substantial energy benefits, but the last two measures are not particularly effective in reducing ozone precursor emissions. The measures listed in Table 2 are shown in Table 3 for ozone precursor reductions and in Table 4 for energy reductions. Tables 3 and 4 also include information on program costs and cost-effectiveness. A measure that reduces ozone precursor emissions may not save energy.

New York is committed to operating an energy-efficient and low-polluting transportation system. Examining and analyzing the transportation system's energy consumption and air emissions when long-range plans and Transportation Improvement Programs are adopted would enhance this commitment. This examination could be on a build/no build basis and include public review. If a plan or a program increases air emissions or uses more energy than doing nothing at all, additional measures or modifications to the plan or program could be considered to minimize the increases as much as practicable. This review would be in addition to existing federal and State requirements to address transportation conformity regulations in air quality non-attainment and maintenance areas.

ENERGY ISSUES RELATED TO TRANSPORTATION ENERGY AT THE FEDERAL LEVEL

The Federal Transportation Equity Act for the 21st Century (TEA-21) provides funding for highways and transit. TEA-21 expires on September 30, 2003. Work has already begun to reauthorize TEA-21. The reauthorized TEA-21 would help New Yorkers conserve energy and reduce pollution while enhancing the mobility and safety of goods and people to expand the regional economy.

Increase Federal Funding For Transit

New York has one-third of the nation's transit users. As a result of this heavy transit use, New York has the lowest-per-capita gasoline consumption in the nation. Transit ridership is growing at record rates nationwide, but especially in New York. The core capacity of New York's transit system is inadequate to meet this new demand for service. Increased federal transit funding is needed to maintain the existing system and increase its capacity.

TABLE 2

Possible Transportation Actions to Reduce Emissions

Possible Actions	
Construction equipment: limit/avoid use of heavy duty off-road equipment. Continue and expand nighttime construction. Limit use of equipment to p.m. periods and Ozone Action Days.	Enhance bicycle/pedestrian programs e.g bike racks on busses, bike lanes, pedestrian crossings, and connections.
Maintenance equipment: limit/avoid use of small and medium engine equipment such as lawn mowers/tractors, chainsaws, and weedwackers. Limit use of equipment to p.m. periods and Ozone Action Days.	Alternative fuels: private, transit, state, local fleets conversions to alternative fuels, promote/reward use of alternative fuels, clean engines in construction/maintenance equipment.
Ozone Action Days: continue Ozone Action Days. Extend public education/outreach to encourage alternative travel and avoid actions that pollute.	ITS: improved incident response, corridor management with optimized signals.
Commuter Choice, Parking Cash-out programs.	Speed limit reduction and enforcement.
Architectural coatings: limit bridge painting to p.m. periods and Ozone Action Days.	Programs for improved public transit: expand and enhance service, discounts tied to Ozone Action Days and employer incentives.
Replace fixed-time and semi-actuated traffic signals with fully actuated signals to reduce delay and idling.	Congestion pricing measures at tolled facilities to reduce vehicle usage, perhaps tied to Ozone Action Days.
Replace bulbs with LEDs in traffic signals.	Increase HOV requirement to 3+.
Maximize coordination of traffic signals.	Increase park and ride facilities.
Transportation management plans for employers to encourage ridesharing, vanpooling, telecommuting, flex time, and guaranteed ride home.	Aircraft and ground support operational and maintenance controls.
Freight improvement projects, convert freight carried by truck to other modes.	Limitations and enforcement on idling.
Retrofit of existing engines with catalytic converters, particulate traps, etc to reduce emissions.	

Table 3. Potential Ozone Precursor emission reductions from transportation actions

		Tons/Day		Annual Program Costs for Maximum Benfits		Dollars/Ton/Day Reduced for Maximum Benefits	
		NOx	VOCs	NOx	VOCs	NOx	VOCs
1 Construction							
	Total Metropolitan Area	5.3 - 29	1 - 6.2	$5,257,643	$10,000,000	$500	$4,386
	Government Component	0.9 - 5	0.1 - 2.3	$841,223	$5,000,000	$500	$5,839
	NYSDOT Component	0.1 - 0.7	0.02 - 0.4	$136,699	$1,000,000	$500	$6,387
2 Maintenance							
	Total Metropolitan Area	0.02 - 0.03	1.4 - 4.4	$1,051,529	$2,000,000	$83,504	$1,247
	Government Component	0.001 - 0.007	0.03 - 0.5	$168,245	$1,000,000	$69,828	$5,543
	NYSDOT Component	0.0002 - 0.001	0.005 - 0.09	$27,340	$200,000	$68,082	$5,912
3 Ozone Action							
	Total Metropolitan Area	4.3	3.0	$1,500,000	$1,500,000	$945	$1,391
	Government Component	4.3	3.0	$1,500,000	$1,500,000	$945	$1,391
	NYSDOT Component	4.3	3.0	$1,500,000	$1,500,000	$945	$1,391
4 Commuter Choice							
	Total Metropolitan Area	0.5 - 6.9	0.4 - 4.6	$123,750,000	$123,750,000	$49,136	$73,705
	Government Component	0.5 - 6.9	0.4 - 4.6	$123,750,000	$123,750,000	$49,136	$73,705
	NYSDOT Component	0.0	0.0	NA	NA	NA	NA
5 Coating							
	Total Metropolitan Area	0	0.03 - 3.9	NA	$3,489,714	NA	$2,452
	Government Component	0	0.03 - 0.56	NA	$542,844	NA	$2,656
	NYSDOT Component	0	0.03 - 0.5	NA	$92,284	NA	$506
6 Signals-replace fixed time with Actuated							
	Total Metropolitan Area	0.154	0.463	$4,671,875	$4,671,875	$83,012	$27,671
	Government Component	0.154	0.463	$4,671,875	$4,671,875	$83,012	$27,671
	NYSDOT Component	0.020	0.061	$703,125	$703,125	$95,506	$31,835
7 LED							
	Total Metropolitan Area	0.04	0.01	-$15,923,561	-$15,923,561	NA	NA
	Government Component	0.04	0.01	-$15,923,561	-$15,923,561	NA	NA
	NYSDOT Component	0.005	0.001	-$2,396,523	-$2,396,523	NA	NA
8 Signals-coordinate							
	Total Metropolitan Area	0.23	0.69	$1,495,000	$1,495,000	$20,375	$6,792
	Government Component	0.23	0.69	$1,495,000	$1,495,000	$20,375	$6,792
	NYSDOT Component	0.03	0.09	$225,000	$225,000	$20,375	$6,792
9 TransMgmt							
	Total Metropolitan Area	0.26	0.19	$27,500,000	$27,500,000	$288,302	$388,188
	Government Component	0.26	0.19	$27,500,000	$27,500,000	$288,302	$388,188
	NYSDOT Component	0.18	0.07	$7,500,000	$7,500,000	$116,485	$290,225
10 BikePed							
	Total Metropolitan Area	0.036	0.02	$4,345,511	$2,437,726	$327,090	$327,090
	Government Component	0.036	0.02	$4,345,511	$2,437,726	$327,090	$327,090
	NYSDOT Component	0	0	NA	NA	NA	NA
11 AltFuels							
	Total Metropolitan Area	27.4	-0.19	$126,147,408	NA	$12,610	NA
	Government Component	7.6	-0.05	$35,000,000	NA	$12,610	NA
	NYSDOT Component	0.01	0	$40,000	NA	$10,959	NA
12 ITS							
	Total Metropolitan Area	-0.01	0.077	Net Savings	Net Savings	NA	NA
	Government Component	-0.01	0.077	Net Savings	Net Savings	NA	NA
	NYSDOT Component	-0.01	0.077	Net Savings	Net Savings	NA	NA
13 SpeedLim							
	Total Metropolitan Area	0.68	0.087	$14,040,000	$14,040,000	$56,872	$440,662
	Government Component	0.68	0.087	$14,040,000	$14,040,000	$56,872	$440,662
	NYSDOT Component	0	0	NA	NA	NA	NA
14 PubTrans							
	Total Metropolitan Area	0.12	0.37	$2,500,000	$2,500,000	$57,078	$18,512
	Government Component	0.12	0.37	$2,500,000	$2,500,000	$57,078	$18,512
	NYSDOT Component	0	0	NA	NA	NA	NA
15 Cong Pricing							
	Total Metropolitan Area	0.2	0.3	$52,328,065	$52,328,065	$645,161	$444,444
	Government Component	0.2	0.3	$52,328,065	$52,328,065	$645,161	$444,444
	NYSDOT Component	0	0	NA	NA	NA	NA
16 HOV increase							
	Total Metropolitan Area	0.01	0.01	$750,000	$750,000	$205,479	$205,479
	Government Component	0.01	0.01	$750,000	$750,000	$205,479	$205,479
	NYSDOT Component	0.01	0.01	$750,000	$750,000	$205,479	$205,479
17 ParkRide							
	Total Metropolitan Area	0.033	0.029	$13,500,000	$13,500,000	$500,739	$563,331
	Government Component	0.033	0.029	$13,500,000	$13,500,000	$500,739	$563,331
	NYSDOT Component	0.08	0.03	$9,000,000	$9,000,000	$306,686	$727,361
18 Aircraft Support							
	Total Metropolitan Area	7.83	1.5	$12,800,000	$12,800,000	$82,295	$82,295
	Government Component	0.23	0.036	$12,800,000	$12,800,000	$82,295	$82,295
	NYSDOT Component	0.01	0.01	$252,000	$252,000	$69,041	$79,674
19 Idling							
	Total Metropolitan Area	0.02	0.03	$14,040,000	$14,040,000	$1,966,493	$1,433,416
	Government Component	0.02	0.03	$14,040,000	$14,040,000	$1,966,493	$1,433,416
	NYSDOT Component	0	0	NA	NA	NA	NA
20 Retrofit							
	Total Metropolitan Area	0	0.54	NA	$5,250,000	NA	$52,798
	Government Component	0	0.54	NA	$5,250,000	NA	$52,798
	NYSDOT Component	0	0.27	NA	$2,625,000	NA	$26,556
21 Freight							
	Total Metropolitan Area	0.6	0.1	$254,200,000	$254,200,000	$1,151,812	$4,730,850
	Government Component	0.6	0.1	$254,200,000	$254,200,000	$1,151,812	$4,730,850
	NYSDOT Component	0.6	0.1	$254,200,000	$254,200,000	$1,151,812	$4,730,85
TOTALS:							
	Total Metropolitan Area	5.9 - 77.7	2.7 - 26.4	$643,953,469	$530,328,818		
	Government Component	1.4 - 26.1	0.6 - 13.9	$547,506,357	$521,381,949		
	NYSDOT Component	0.1 - 6.0	0.1 - 4.7	$271,937,641	$275,650,886		

NA - indicate no cost is applicable because no reduction of the corresponding pollutant is calculated.

Table 4. Potential energy reductions from transportation actions

		Emission Benefit (Btu/Day) Energy	Annual Program Costs for Maximum Benfits Energy	Dollars/Million Btu/Day Reduced for Maximum Benefits Energy
1 Construction				
	Total Metropolitan Area	15,479,820 – 29,421,422	TBD	TBD
	Government Component	4,707,427 – 13,947,933	TBD	TBD
	NYSDOT Component	764,957 – 2,549,857	TBD	TBD
2 Maintenance				
	Total Metropolitan Area	TBD	TBD	TBD
	Government Component	TBD	TBD	TBD
	NYSDOT Component	TBD	TBD	TBD
3 Ozone Action				
	Total Metropolitan Area	18,223,885,116	$1,500,000	$0.23
	Government Component	18,223,885,116	$1,500,000	$0.23
	NYSDOT Component	18,223,885,116	$1,500,000	$0.23
4 Commuter Choice				
	Total Metropolitan Area	54,237,488,333	$123,750,000	$6
	Government Component	54,237,488,333	$123,750,000	$6
	NYSDOT Component	0	NA	NA
5 Coating				
	Total Metropolitan Area	0	NA	NA
	Government Component	0	NA	NA
	NYSDOT Component	0	NA	NA
6 Signals-replace fixed time with Actuated				
	Total Metropolitan Area	551,875,988	$5,375,000	$27
	Government Component	488,034,293	$4,671,875	$26
	NYSDOT Component	63,841,695	$703,125	$30
7 LED				
	Total Metropolitan Area	939,257,600,000	-$18,320,083	NA
	Government Component	816,389,600,000	-$15,923,561	NA
	NYSDOT Component	122,868,000,000	-$2,396,523	NA
8 Signals-coordinate				
	Total Metropolitan Area	827,813,983	$1,720,000	$6
	Government Component	732,051,440	$1,495,000	$6
	NYSDOT Component	95,762,543	$225,000	$6
9 TransMgmt				
	Total Metropolitan Area	1,385,482,207	$29,000,000	$57
	Government Component	827,151,227	$21,500,000	$71
	NYSDOT Component	558,330,980	$7,500,000	$37
10 BikePed				
	Total Metropolitan Area	167,679,528	TBD	TBD
	Government Component	167,679,528	TBD	TBD
	NYSDOT Component	0	NA	NA
11 AltFuels				
	Total Metropolitan Area	0	NA	NA
	Government Component	0	NA	NA
	NYSDOT Component	0	NA	NA
12 ITS				
	Total Metropolitan Area	126,059,950	TBD	TBD
	Government Component	126,059,950	TBD	TBD
	NYSDOT Component	126,059,950	TBD	TBD
13 SpeedLim				
	Total Metropolitan Area	2,140,778,937	$14,040,000	$18
	Government Component	2,140,778,937	$14,040,000	$18
	NYSDOT Component	0	NA	NA
14 PubTrans				
	Total Metropolitan Area	379,816,993	$380,000,000	$2,741
	Government Component	379,816,993	$380,000,000	$2,741
	NYSDOT Component	0	NA	NA
15 Cong Pricing				
	Total Metropolitan Area	660,478,427	$134,047	$1
	Government Component	660,478,427	$134,047	$1
	NYSDOT Component	0	NA	NA
16 HOV increase				
	Total Metropolitan Area	0	NA	NA
	Government Component	0	NA	NA
	NYSDOT Component	0	NA	NA
17 ParkRide				
	Total Metropolitan Area	512,523,586	$22,500,000	$120
	Government Component	258,046,200	$13,500,000	$143
	NYSDOT Component	254,477,386	$9,000,000	$97
18 Aircraft Support				
	Total Metropolitan Area	TBD	TBD	TBD
	Government Component	TBD	TBD	TBD
	NYSDOT Component	TBD	TBD	TBD
19 Idling				
	Total Metropolitan Area	56,711,587	$14,040,000	$0
	Government Component	56,711,587	$14,040,000	$0
	NYSDOT Component	0	NA	NA
20 Retrofit				
	Total Metropolitan Area	0	NA	NA
	Government Component	0	NA	NA
	NYSDOT Component	0	NA	NA
21 Freight				
	Total Metropolitan Area	617,500	$254,200,000	$1,127,836
	Government Component	617,500	$254,200,000	$1,127,836
	NYSDOT Component	617,500	$254,200,000	$1,127,836
TOTALS:				
	Total Metropolitan Area	1,018,558,233,557	$827,938,964	
	Government Component	894,702,347,464	$812,907,361	
	NYSDOT Component	142,193,525,027	$270,731,603	

TBD - To be determined
NA - indicate no cost is applicable because no reduction of the corresponding pollutant is calculated.
Numbers in parentheses ( ) are negative cost values.

Communities across the nation are constructing new transit systems. The TEA-21 New Starts program provides funds to extend existing rail and subway systems or build new systems. Currently, 190 New Starts projects are authorized for development nationwide with a total value estimated at $ 75 billion. TEA-21 will make available approximately $6.1 billion to develop these projects. In New York, the authorized New Starts projects that have received federal funding are listed in Table 5. To meet the current demand for new transit service, Congress must increase New Starts funding in the next Surface Transportation Act.

TABLE 5

New York TEA-21 New Start Projects with Funding Authorizations

Project	FFY 1998-2003 Authorization	Appropriations through FFY 2002	% of Authorization
Long Island Rail Road East Side Access	$353.0	$68.2	19.3%
Second Avenue Subway	$5.0	$2.0	40.0
Staten Island - Whitehall Intermodal Terminal (1)	$40.0	$6.9	17.3%
Nassau Hub	$10.0	$0.5	5.0%
St. George's Ferry Intermodal Terminal	$20.0	$2.5	12.5%
Midtown-West Ferry Terminal (2)	$16.3	(2)	--
Total Authorization/Appropriation	$444.3	$80.1	18.0%

(1) FFY 2001 appropriation allocated to Whitehall/St. George.

(2) Project received $16.3 million appropriation from FHWA in FFY 2000.

Retain the Congestion Mitigation And Air Quality Program

The CMAQ program provides funds to implement transportation projects that reduce air pollution in air quality non-attainment areas. Many of these projects not only reduce air pollution, but also reduce fuel consumption. For instance, CMAQ funds have been used to fund rail freight projects and an electric station car pilot project in the New York City metropolitan area, and other transit projects in communities across the State. CMAQ funding is also an important source of funding for Governor Pataki's High Speed Rail Plan. The CMAQ has a vital role in New York's energy conservation strategy.

Continue Funding for ITS and Transportation System Operations

Information technology is an important tool for improving the energy efficiency of the transportation system. TEA-21 provides funds to deploy ITS technologies that provide traveler information, help manage traffic incidents, manage traffic flow, improve the movement of freight, ease the connections between modes, and provide data on the

system's condition and performance. Continued federal funding for ITS will help make the transportation system operate more efficiently and save energy.

Modify TEA-21 Programs To Improve Rail Service

Freight traffic is expected to double in the next 20 years. The highway system cannot absorb this traffic growth. The Northeast Association of Transportation Officials (NASTO) is leading an effort of to prepare a strategic multimodal international freight investment plan for the Northeast trading bloc, which extends from Halifax, Nova Scotia to Norfolk, Virginia to Chicago, Illinois. The plan will identify major bottlenecks in the existing freight transportation system and recommend strategic capital and operating improvements for the regional system.

Although TEA-21 is primarily aimed at providing federal funding for the highway and transit systems, some elements of TEA-21 are designated for improving rail service. The Transportation Infrastructure and Innovation Act of 1998 (TIFIA) provides loan guarantees and credit enhancements for major rail transportation projects. While TIFIA could be a powerful tool for promoting investment in energy-efficient rail projects, the project threshold size of $100 million limits the usefulness of the program. TEA-21 also established the Railroad Rehabilitation and Improvement Financing (RRIF) program, which provides credit enhancements to fund investments in regional and shortline railroads. Providing federal funds to underwrite the risk premium on loans to shortline and regional railroads will help ensure that rural New York will continue to have access to energy-efficient rail freight transportation.

Corporate Average Fuel Economy Standards

Since the initial oil crisis in 1973 and throughout subsequent episodes in the late 1970s, passenger automobile fuel economy has been a significant transportation energy issue. The authority to administer a program for regulating new passenger and light-truck fuel economy standards was delegated to the Secretary of Transportation by the Motor Vehicle Information and Cost Savings Act of 1972. In 1975 the Energy and Conservation Act established Corporate Average Fuel Economy (CAFE) standards that were initially implemented for all passenger cars in 1978 and for light-duty trucks in 1979. CAFE standards for passenger cars were established at a minimum level of 27.5 miles-per-gallon for model year (MY) 1985 and have been frozen at that rate through MY 2002. Light-duty truck standards have been frozen at the 1996 rate of 20.7 miles-per-gallon through MY 2002. Increasing the CAFE standards for passenger cars and light-duty trucks for model years beyond 2002 will conserve energy.

Given the most recent national VMT projections, which assume that annual highway investment will stay at the 1997 funding level for the next 20 years, urban VMT can be expected to increase at an annual average rate between 1.78% and 1.83%. Rural VMT can be expected to increase at an annual average rate between 2.68% and 2.72%. Conversely, vehicle fuel economy performance for passenger cars and light-duty trucks has decreased by 1% over the 10-year period from 1990 to 2000. Fuel economy performance for the entire fleet was 25.4 mpg in 1990 and at 25.2 mpg in 2000.

FINDINGS AND CONCLUSIONS

- New York has the most energy-efficient transportation sector in the United States due to its high-per-capita-use of transit. One-third of all national transit trips are in New York. The use of public transportation is experiencing unprecedented growth, averaging approximately 5% annually.

- Statewide, vehicle miles traveled (VMT) and congestion (especially urban congestion) continue to increase, but VMT should grow at a slower rate in the future. Transportation system management, technology improvements, and capital construction projects are underway to reduce the growth in congestion. Freight truck traffic increases are of concern.

- Bicycle and pedestrian initiatives, passenger ferry service, intermodal passenger and freight capabilities, and high-speed rail efforts are important measures to increase the energy efficiency of New York's transportation sector.

- New York has made a significant commitment in alternative-fueled vehicle (AFV) technology. More than 1,400 State-owned AFVs and over 50 commercial compressed natural gas stations are in use. Executive Order 111 requires State agency purchase of light-duty vehicles to be 100% AFV by 2010.

- Progress in reducing the transportation sector's energy use and air emissions is ongoing and will continue in the future through measures such as Commuter Choice, Ozone Action Days, and traffic signal coordination. Quantitative build and no-build energy and emissions analyses of transportation plans and programs would facilitate continued energy and environmental benefits.

- Energy efficiency can be enhanced by actions at the federal level. Reauthorizing federal surface transportation legislation can substantially affect New York's status as the most transportation-energy-efficient state by providing for transportation programs that enhance energy efficiency and reduce emissions.

- Fuel economy standards for vehicles have the potential to be the most significant action to conserve energy in the transportation sector. Fuel economy standards for passenger cars have been frozen since 1985 and for light duty trucks since 1996. Generally, fuel economy, has worsened between 1990 and 2000.

SECTION 2.5

PRESERVING ENERGY-RELATED PUBLIC BENEFITS PROGRAMS

INTRODUCTION

New York is continuing to support open and competitive energy markets while providing the opportunity for smaller energy customers to benefit from competition. New York's public-benefits program: (1) provide energy efficiency and related services to smaller customers and low-income households; (2) support development of markets for energy-efficient product manufacturing, stocking and sales; and, (3) support research and development (R&D) activities in renewable energy development, new product development and applications, and environmental protection. This Issue Report discusses the role of government in the developing competitive energy market, identifies and reviews the State's public benefits programs, assesses their effectiveness in meeting public policy goals, and reports on additional efforts that might be required to maintain necessary consumer-safeguards and provide benefits to smaller customers during the transition to competitive energy markets.

THE ROLE OF GOVERNMENT

The responsibility for preserving public benefits for residential, low-income, small business, municipal, institutional, and educational energy customers during the transition to a competitive energy market lies with many energy industry participants, including government. Government must continue to ensure that energy markets are operating efficiently and that each energy user has access to available energy options. Government has been regarded by energy customers and energy industry participants as having a leadership role in facilitating market development, coordinating program design and delivery, and providing public benefits to low-income and other energy customers. In December 2000, the Center for Research and Public Policy (CRPP) issued a final report[1] to the New York State Energy Research and Development Authority (NYSERDA) that presented results of a *New York State Energy Competition Study*. The findings of this report provided input on New York's competitive energy markets, including the roles and need for continuing public benefits programs. As part of the study's focus, energy customers were provided with a definition of public benefits

[1] The Center for Research and Public Policy. *New York State Energy Competition Study*; prepared for the New York State Energy Research and Development Authority. December 2000.

programs and then asked to rate the importance of each program. Over 90% of energy customers[2] surveyed rated programs to help low-income residents afford energy and programs for other energy customers such as elderly, blind, and disabled, as very important or somewhat important. When asked who should pay for such programs, energy customers identified: (1) government, (2) local utilities, and (3) competitive energy suppliers. Government was selected by a majority (over 50%) of energy customers, as the most appropriate to pay for both of these program types.

Another recent study, conducted by the American Council for an Energy-Efficient Economy (ACEEE), examined the role of private market actors (*e.g.*, Energy Service Companies - ESCOs, electricity commodity providers, and distribution utilities) in providing energy efficiency services.[3] In a study of nine key states,[4] ACEEE found that:

> (1) There are major gaps in the market segments served by private market actors. In particular, they generally have demonstrated little interest in serving the residential and small commercial customer markets.
>
> (2) The ESCO industry is intricately involved with, and supported by, existing government and regulatory policies and funding programs. Such programs have been a substantial influence on the creation of the ESCO industry and continue to play a major role in sustaining ESCO projects today. The ACEEE study focused on whether or not private market actors and forces could be relied on independently to achieve energy efficiency in the competitive energy market. Findings of the study suggest that government and regulatory policies and programs are necessary to provide energy efficiency, and would support, complement, and possibly enhance private market forces' ability to provide such services. As such, government-assisted programs maximize private sector efforts while ensuring certain public benefits are provided.

The CRPP study found that consumers rate government as the most appropriate provider of energy efficiency public benefits, especially to residential customers. The

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[2] Energy customers targeted through the survey included: general customers; African Americans; Hispanics; Switchers (customers who have switched energy suppliers); and Business.

[3] Kushler, Martin. Ph.D., and Patti Witte M.A. September 2001. *Can We Just "Rely on the Market" To Provide Energy Efficiency? An Examination of the Role of Private Market Actors in an Era of Electric Utility Restructuring.* American Council for an Energy Efficient Economy.

[4] These states are: Arizona, California, Connecticut, Illinois, Massachusetts, Michigan, New York, Pennsylvania, and Rhode Island. These states were selected by ACEEE for the study because they were early implementors of electric restructuring. These states were also selected by ACEEE because they provide geographic diversity and a wide range of restructuring policies in terms of "public benefit" funding for energy efficiency.

ACEEE study affirms private market actors' recognition that the role of government as the vehicle for delivering energy efficiency programs, especially to residential and small commercial customers, is beneficial to their sustained business practices.

New York State Role

New York State government plays an objective and active role in administering public benefits programs. The State studies the patterns, trends, and behaviors of energy customers lacking market influence, such as low-income households, looking for cost-effective opportunities to better serve their needs. The common goals that the State uses as guidelines to build its network of public benefits programs is presented in Table 1.

To address their energy needs, it is necessary to understand how these customers are currently being served by public benefits programs. The State coordinates public benefits efforts by balancing and aligning the interests, needs, and goals of residents and businesses. Aligning goals requires the State to support: (1) technology development and transfer; (2) information and education; (3) policy development and analysis; (4) market support, including infrastructure development; and (5) collaboration through the formation of strategic public and private alliances while facilitating stakeholder interests. Figure 1 summarizes this interaction.

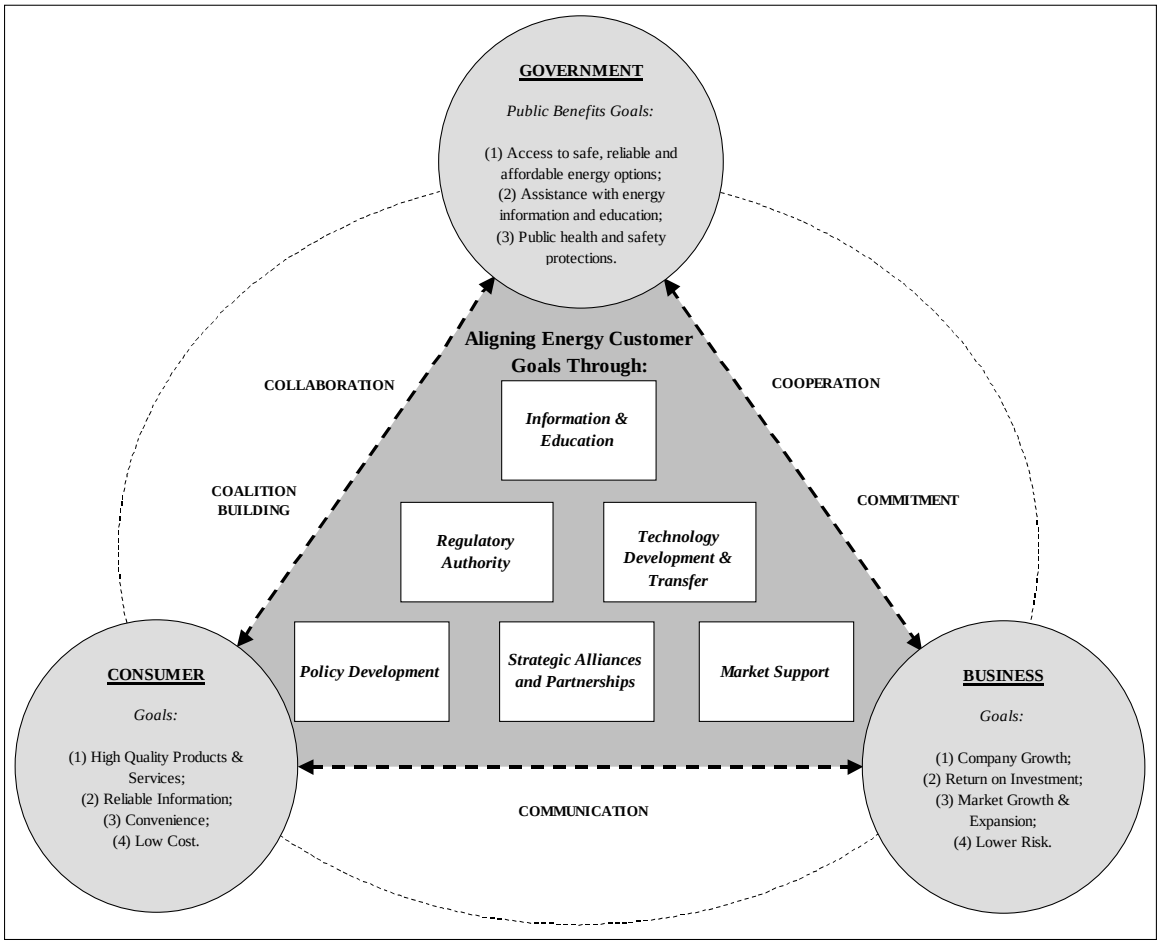
Table 1. New York State's Public Benefits Program Goals

1. Improve access to energy efficiency initiatives.
2. Improve energy customer access to energy options (*e.g.*, renewable resources, "green" power).
3. Reduce the environmental impacts of energy production and use via energy efficiency and R&D initiatives.
4. Facilitate competition for energy efficiency and energy options to benefit a larger number and variety of end-users.
5. Improve system-wide electricity reliability, energy efficiency, and environmental benefits through end-user actions.
6. Facilitate the provision of affordable energy, including affordable rates and other payment

Energy customers in New York with less market influence require government assistance largely because competitive market forces have not yet fully addressed their energy needs. Their energy needs include: access to safe, reliable, and affordable energy options; energy commodity price protection; assistance with energy information and education; and enhanced public health and safety protections. Numerous market barriers exist, and must be addressed and overcome for these customers to have greater market representation. Market barriers that are faced by these energy customers, and that provide the justification for government assistance, include:

- Lack of market influence;
- Insufficient market and technology information available to energy customers;
- Lack of awareness of energy service options, available technology choices, and energy savings potential and opportunities;
- A high energy burden (the proportion of income devoted to energy costs);
- An underdeveloped residential and small business energy efficiency services infrastructure;
- Lack of interest on the part of energy efficiency services providers; and,
- Energy-efficient products in retail stores are in short supply or are not promoted.

Figure 1. Aligning and Balancing the Goals of Energy Customers



NEW YORK'S PUBLIC BENEFITS PROGRAMS

The Evolution of Public Benefits in New York

Prior to electric utility restructuring in New York, public benefits programs were provided by utilities, local, State and Federal governments, and not-for-profit and community-based organizations (CBOs). The earliest investor-owned utility program for low-income customers in the State was approved by the Public Service Commission (PSC) in 1988. The program, a pilot project entitled the Power Partnership Pilot, was administered by the Niagara Mohawk Power Corporation. The design of this program, which tested the utility company's ability to provide comprehensive energy efficiency services to low-income customers, influenced the design of future programs. Prior to 1988, low-income programs in New York were funded by the Federal government including the Low-Income Home Energy Assistance Program (LIHEAP) and the Weatherization Assistance Program (WAP). Both programs were administered by the New York State Department of State. The first statewide comprehensive program targeting low-income customers, referred to as the Utility Low-Income Energy Efficiency Program (ULIEEP), was implemented shortly after the Niagara Mohawk pilot.[5] This program was established in June 1991, and gas and electric utilities in New York provided energy efficiency services, including weatherization, to low-income customers for three years. As the State initiated electric industry restructuring, and as competitive market forces began to emerge, the government's role in providing services to low-income and other energy customers lacking market influence, was revisited. Mindful that a competitive energy market might reduce services to these customers, the System Benefits Charge (SBC) public benefits program was created.

The Current State of Public Benefits in New York

Nationally, public benefit funding for energy efficiency programs is underway in over two dozen states. The purpose of these programs is to ease the transition to full electric retail competition by continuing to support energy efficiency, environmental protection, renewable resource development, and public benefit R&D. In New York, public benefits programs are provided by public and private entities including: investor-owned utilities, not-for-profit organizations, public benefits corporations, and corporate instrumentalities of the State. Funding for public benefits programs comes from federal, State, and private sources. In New York, these programs are working to support the development of the market for energy-efficient goods and services and are supporting

[5] New York State Public Service Commission. April 3, 2001. Case 00-M-0504. Concepts, Issues, and Views of the Future: Report of the Parties' Collaborative Efforts.

R&D activities directed toward renewable energy development, new product development and applications, and environmental protection.

Since the release of the 1998 State Energy Plan[6], public benefits programs have made great strides in achieving their purpose. A sample of the accomplishments achieved include:

- The State has successfully created a SBC program to fund energy efficiency, energy research and development, environmental protection, and low-income programs during its transition to competition.

- The New York Power Authority (NYPA) and Long Island Power Authority (LIPA), are supplying low-cost electricity to government, industrial and commercial customers, municipal and rural electric corporations, and investor-owned utilities. NYPA has been a major contributor to creating and retaining jobs in the State, while LIPA has provided comprehensive energy efficiency services on Long-Island.

- The WAP continues to be an important component to the State's strategy to improve the energy affordability of low-income energy customers, and has provided significant energy savings to its customers.

- The State continues to monitor, track, and respond to energy customer needs and works to ensure that they have necessary and appropriate consumer protections. For example, the PSC requires that ESCO's offer reasonable consumer protections.[7] The PSC has many proceedings underway that deal with consumer protections and safeguards, and how energy customers may be best served by the developing competitive energy market.

- The State has initiated environmental disclosure labeling[8] on electric utility bills. Such disclosure, required to appear at least twice annually, is instrumental in allowing consumers to make informed choices about their energy sources.

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[6] New York State Energy Plan and Final Environmental Impact Statement. November 1998.

[7] Reasonable consumer protections identified by the PSC includes: a statement disclosing the ESCO's complaint resolution process; a 15 day notice before discontinuing service; choice of service from another ESCO or the utility when an ESCO discontinues service; clear procedures for switching suppliers; and convenient complaint handling.

[8] The NYS PSC approved an environmental disclosure program for State consumers in 1998. Environmental disclosure labeling allows consumers to see the percentage of their electricity that comes from biomass, coal, natural gas, oil, hydro-electric, nuclear, solar, solid waste, and wind. The label is required to be provided twice during every twelve-month period, and provides information on nitrogen oxide, sulfur dioxide, and carbon dioxide emissions to consumers, comparing these emissions to a statewide average.

The remainder of this Section will discuss these and additional public benefits program accomplishments in greater depth.

Public and Private Utility-Sponsored Programs

Low-income public benefits programs in New York are provided by public authorities, utilities, and State agencies. Some of New York's utilities continue to offer arrearage reduction programs to low-income customers while also contributing to the State SBC program. Table 2 displays the utility-sponsored public benefits programs in New York targeted to low-income customers.

Table 2. Public and Private Utility Sponsored Public Benefits Programs in NYS

Utility-Run Low-Income Program	Targeted Customers/ Typical Services Provided
Consolidated Edison Company of New York, Inc. Total funding: *$6.4 million annually*	Consolidated Edison Company of N.Y., Inc. Low-Income Plan. Targets electric customers. The program objective is to reduce energy bills and promote energy efficiency for low-income customers. RESULTS. The Low-Income Plan program has saved an estimated $1.8 million on electric bills for Direct Vendor customers since program inception in April 1996. As of May 31, 2000: • 21,473 Direct Vendor customers were participating; • 1,521 refrigerators have been replaced for SSI or HEAP customers; and,
Keyspan Energy Total funding: *$2 million annually*	Residential Reduced Rate (RRR). Program targets natural gas customers. The objective is to increase the affordability of natural gas customers. In addition, the program provides a benefit to all ratepayers by reducing the uncollectible balances and associated costs. RESULTS. There are 20,000 active participants in the RRR program.
National Fuel Gas (NFG) Total funding: *$2 million annually*	Low Income Residential Assistance (LIRA). Targets natural gas customers. The program objective is to change the payment behavior of participants and to provide benefits to all ratepayers by reducing the uncollectible balances and associated costs. RESULTS. The LIRA program has 1,874 active participants of which 69% are currently paying their bills on time. Debt forgiveness for the program has exceeded $2 million and conservation credits exceed $80,000.

Table 2. Public and Private Utility Sponsored Public Benefits Programs in NYS	
Utility-Run Low-Income Program	**Targeted Customers/ Typical Services Provided**
National Fuel Gas (NFG) *Cont.*	Public Assistance Cooperative for Energy (PACE). Targets natural gas customers. The objective of the program is to provide the benefits of competition to low-income, payment-troubled customers by offering the opportunity to reduce energy costs. RESULTS. Program has saved Erie, Chautauqua, and Niagara counties in excess of $1.4 million.
National Fuel Gas (NFG) *Cont.*	Elderly, Blind or Disabled Payment Troubled Residential Assistance (EBDPTRA). Program targets natural gas customers. The objective of the program is to change the payment behavior of participants and to ensure the health and safety of "under-served" customers. In addition, the program provides benefits to all ratepayers by reducing the uncollectible balances and associated costs. RESULTS. The EBDPTRA program has: • 265 active participants of which 91% are paying on time; • Spent over $84,000 on energy audits, large dial thermostats, heating repair/replacement, and insulation of participant residences.
New York State Electric and Gas Corp. (NYSEG) Total funding: *$6.25 million annually ($1.25 million capped for the Gas Affordable Energy Program)*	Power Partner Program. NYSEG offers its 'Power Partner' program to low-income and elderly energy customers throughout their service territory who want to reduce their energy bills, thereby becoming more financially self-reliant. RESULTS. NYSEG anticipates serving 22,500 customers through its Power Partner program. As of May 31, 2000: • 16,067 customers enrolled in Power Partner; • 1,817 received new refrigerators; • 596 had their water heater replaced or converted; • 668 received energy audits; and, • 1,019 had their heating systems upgraded.
New York State Electric and Gas Co. *Cont.*	NYSEG Gas Affordable Energy Program. The program objective is to make natural gas more affordable for customers. Offers a reduced service charge to all participants. Participants pay a $6.40 per month service charge whereas sales service non-participants will have minimum charges of $10.00 or $14.00 per month, and aggregation non-participants will have a minimum charge of $13.00 per month. RESULTS. Program is fully subscribed, and is anticipated to serve 13,500 customers.

Table 2. Public and Private Utility Sponsored Public Benefits Programs in NYS	
Utility-Run Low-Income Program	**Targeted Customers/ Typical Services Provided**
Niagara Mohawk Power Corp. (NMPC) Total funding:*$5 million annually*	The Affordability Program. Targets electric and gas customers who are not on temporary assistance who have a documented "inability to pay" for their full energy costs. The program provides participants with a negotiated maximum monthly partial payment, energy use management education, and arrears forgiveness (50% up to a maximum of $250 annually). Energy efficiency services may also be provided, depending upon customer need. Services include: weatherization services, refrigerator replacement,
Niagara Mohawk Power Corporation, *Cont.*	Onondaga County DSS Gas Aggregation Project. Targets natural gas customers. The project seeks to make energy more affordable for participants by obtaining supply at lower cost and by packaging energy efficiency services to lower overall customer use
Niagara Mohawk Power Corporation, *Cont.*	County Gas Aggregation Grant Program. Targeted to natural gas customers. The objective of the program is to encourage the aggregation of low-income consumers within NMPC service territory by providing funding to counties for consultant services and other assistance to develop gas aggregation initiatives that target low-income customers. RESULTS. Not Available.
Orange and Rockland Utilities, Inc. Total funding: *$0.4 million annually*	Orange and Rockland Utilities, Inc. Energy Saving Partners. Targets gas and electric customers in the 12771 zip code. The program objective is to reduce energy bills and promote energy efficiency for low-income customers. The program achieves this through its refrigerator replacement and arrears forgiveness efforts. RESULTS. The ORU Energy Saving Partners program has: • Installed 51 refrigerators; and • Provided arrears forgiveness and/or weatherization for 40 customers. ORU also operates an aggregation program.
Rochester Gas and Electric Corp. Total funding: *$0.5 million annually*	Low-Income Assistance Partnership Program. Provides customers assistance (lowered monthly payments, arrears forgiveness, and budget and energy efficiency counseling). Also provides a weatherization grant program.
TOTAL $23.1 million annually	**Estimated Annual Expenditure From Utility-Run Low-Income Program in New York State.**

Local, State, and Federal Public Benefits Programs in New York

New York State System Benefits Charge.[9] The SBC program in New York was established in 1996 by the PSC.[10] In January 1998, NYSERDA was designated as the program administrator. NYSERDA has designed, developed, and implemented a broad portfolio of programs, collectively named the **New York Energy $mart℠** Program, to administer public benefits including energy efficiency, low-income services, R&D, and environmental protection during the State's transition to electric retail competition.[11] In February 2001, the PSC affirmed the continuation of the SBC program, with additional provisions, for a period of five years. Funding was set at approximately $150 million per year. Of this annual budget, approximately 14.1% will be allocated to low-income customers, 8.7% to residential customers, 3.6% to municipal and institutional customers, and 3.0% to small business customers. In addition to these programs, 2.9% was allocated to energy efficiency and strategic research and development (R&D) initiatives, 1.9% was allocated to environmental monitoring and analysis efforts, 9.1% was allocated to renewable energy technologies, and 9.1% was allocated to distributed generation and combined heat and power energy applications. The SBC program was continued, in part, because it was recognized that market inefficiencies, including the inequitable distribution of electricity and load constraints, require government assistance in the form of public benefits initiatives. The success of the SBC program in New York helped to confirm that public benefits programs can be implemented in a cost-effective manner. Results indicate that the SBC program is meeting needs and delivering benefits that would otherwise not be available to energy customers in New York that have less market influence and unique energy needs.[12]

The **New York Energy $mart℠** Program benefits all energy customers, but especially those who have less market influence or who have more specialized energy

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[9] For a full description of New York Energy $mart℠ Program initiatives funded through the SBC Program, refer to, New York State Energy Research and Development Authority. March 15, 2002. System Benefits Charge: Revised Operating Plan for New York Energy $mart℠ Programs (2001-2006); pursuant to PSC Order Issued and Effective July 3, 2001.

[10] New York State Public Service Commission. Cases 94-E-0952 *et al.* In the Matter of Competitive Opportunities Regarding Electric Service, Opinion No. 96-12, *Opinion and Order Regarding Competitive Opportunities for Electric Service.* Issued and effective May 20, 1996.

[11] New York State Public Service Commission. Cases 94-E-0952 *et al.* In the Matter of Competitive Opportunities Regarding Electric Service, Opinion No. 98-3. *Opinion and Order Concerning System Benefits Charge Issues.* Issued and effective January 30, 1998.

[12] New York State Energy Research and Development Authority. *New York Energy $mart℠ Program Evaluation and Status Report: Report to the System Benefits Charge Advisory Group.* September 2000.

needs. As shown in Table 3, the **New York Energy $mart℠** Program, through its portfolio of Energy Efficiency, Low-Income, and Research and Development programs, has achieved about 1,000 GWh in annual electricity savings. These energy savings translate into emissions reductions of 1,111 tons of NO_x, 1,827 tons of SO_2, and 829,559 tons of CO_2. **Collectively, the annual CO_2 reduction is equivalent to removing approximately 165,000 automobiles from New York's roadways.**

Table 3: Summary of New York Energy $mart℠ Program Results

Outcomes		Anticipated from Program Funds Committed as of 12/31/01
Annual Electricity Savings*		1,004.9 GWh
Summer Peak Demand Reduction Potential (MW)**		561.9 MW
Energy Generation from Renewable Energy		105.1 million kWh
Oil and Gas Savings (tBtu)		5.3 tBtu
Annual Energy Bill Reductions - all fuels***		$152.2 million
Environmental Benefits (emission reductions)	NO_X (tons per year)	1,111
	SO_2 (tons per year)	1,827
	CO_2 (tons per year)	829,559
Economic Benefits	Jobs Created (jobs created or retained in New York per year)	2,900

* Based on an eight-year program budget of $915.6 million.

** Including energy efficiency measures, curtailable load, and clean generation from wind and PV

*** Includes bill savings from electricity, oil, and natural gas.

The cost savings from reduced energy use (from electricity, oil, and natural gas bills) is expected to be approximately $152 million per year, leading to the creation or retention of about 2,900 jobs in New York's services and retail trade industries.[13] Additionally, 562 MW of summer peak demand reduction has been achieved by the Program.[14]

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[13] These jobs will be supported annually for as long as the implemented energy efficiency measures remain in effect.

[14] New York State Energy Research and Development Authority. *New York Energy $mart℠ Program Evaluation and Status Report: Quarterly Report to the New York State Department of Public Service; For the Quarter Ending December 31, 2001.* Results are based on **New York Energy $mart℠** funds awarded through December 31, 2001. Energy savings include clean generation from wind and PV generation sources.

New York Power Authority. Created in 1931, NYPA serves New York as a non-profit, public benefit energy corporation. It provides low-cost electricity to government agencies, municipally-owned electric systems and rural electric cooperatives, job-producing companies and non-profit institutions, private utilities for resale without profit to their customers, and neighboring states under federal requirements. In 2000, NYPA supplied 22% of New York's electricity. NYPA does not use tax revenues or State credits. It finances its projects through bond sales to private investors.

NYPA's public benefits programs include energy services that assist consumers to enhance their energy efficiency. NYPA's Energy Services Programs (ESP) began a decade ago. By 2001 NYPA had completed more than 1,000 energy efficiency projects in public schools, colleges and universities, and governmental facilities across the State. These projects produce annual energy bill savings of more than $70 million. They reduce electricity consumption by nearly 720,000 MWh each year and lower peak load demand by 166 MW. NYPA's energy services projects reduce greenhouse gas emissions by nearly 500,000 tons annually. Among NYPA's energy efficiency projects is its Refrigerator Replacement Initiative partnership with the New York City Housing Authority (NYCHA), cofunded by NYSERDA, U.S. Department of Energy (DOE), and the Consortium for Energy Efficiency (CEE). The program has annually replaced 25,000 refrigerators with models that use one-third the electricity. NYPA estimates that by 2003, the program will replace 181,000 old refrigerators with new energy-efficient models. NYPA also administered the Clean Air for Schools Program, funded with $125 million from the Clean Water/Clean Air Bond Act of 1996 and $12.5 million in NYPA funds. The program replaced coal-burning furnaces in New York City public schools with cleaner natural gas and oil-fueled boilers, resulting in the elimination of over 911,200 pounds of emissions annually.[15]

Long Island Power Authority. LIPA was created in 1986 as a corporate municipal instrumentality of the State. It was established to provide lower utility rates on Long Island and to assume decommissioning responsibility for the Shoreham Nuclear Power Plant. LIPA provides a portfolio of energy efficiency programs to electricity customers on Long Island through its Clean Energy Initiative (CEI).[16] The CEI began in 1999 and is a five-year, $170

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[15] The 911,200 pounds of air emission reductions constitute: 576,000 pounds of SO2; 106,400 pounds of NOX; 225,800 pounds of particulate matter (PM) and 3,000 pounds of volatile organic compound (VOC).

[16] Long Island Power Authority. *Clean Energy Initiative: As Approved by the LIPA Board of Trustees.* May 3, 1999.

million effort targeted at achieving energy and capacity savings for LIPA, delivering electric bill savings to customers, and providing environmental benefits to society. The CEI program funds residential and non-residential programs geared toward addressing energy efficiency, peak load reduction, clean distributed generation, and renewable energy technologies. In 2000, the CEI program achieved: 51,781 MWh in total energy savings, a 70 MW reduction in peak energy needs; $5.5 million in energy bill savings for 145,000 program participants; and, emission reductions of 184.7 tons of NO_x, 46.5 tons of SO_2, and 54,179.8 tons of CO_2.[17] LIPA administers a Residential Energy Affordability Partnership (REAP) program through the CEI program. LIPA's REAP program is dedicated to improving energy affordability for low-income households through the direct installation of a comprehensive set of cost-effective energy efficiency measures, extensive energy education and counseling, and an energy bill arrearage reduction plan. LIPA's REAP program funding averages $2.25 million annually.[18] In 2000 the REAP program achieved 0.2 MW of peak demand reduction and achieved 2.4 GWh in annual energy savings.[19] Refer to Section 3.2, Energy Efficiency Assessment, for further detail on LIPA's CEI program.

Weatherization Assistance Program. The WAP is federally-authorized and funded through the U.S. DOE. Funding is used to assist low-income persons, particularly the elderly, handicapped, and families with young children, and to reduce energy consumption, while minimizing the impact of higher fuel cost on low-income families. In New York, the Office of Temporary and Disability Assistance (OTDA) receives an allocation from the U.S. Department of Health and Human Services to fund the WAP statewide. The WAP is administered by the New York State Department of Housing and Community Renewal (DHCR). Weatherization services provided through the WAP program are identified by on-site energy audits that includes a life-saving health and safety test, and an analysis of fuel consumption and lifestyle. Since its inception in 1977, the WAP has weatherized more than 400,000 dwellings or 26.7% of the estimated eligible units. It has been estimated that 1.5 million dwelling units are eligible for the WAP. Servicing these could result in vast energy savings and environmental benefits, plus more affordable energy to those who occupy the dwellings. Between 1990-2000, the WAP allocated over $429 million to sub-grantees of the

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[17] These results are based upon an Clean Energy Initiative program expenditure of $29.8 million through December 2000

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[18] The $2.25 million average annual budget for LIPA is based upon an average for their 1999 and 2000 annual budgets. In 1999 LIPA afforded $1.37 million to its REAP program, and in 2000 $3.12 million was allocated.

[19] Long Island Power Authority. *Clean Energy Initiative, Draft Biennial Report.* June 2001.

program. Over this time period, the WAP achieved 40 TBtu of cumulative annual energy savings in one-to-four family and multi-family dwellings. For the 2001 program year, an estimated $45.4 million[20] will be available for the New York WAP. Estimated energy savings for the 2001 WAP year have been estimated to be 29.4 MMBtu (average annual energy savings per unit in multi-family buildings). One-to-four family buildings have been projected to achieve an average annual energy savings of 45.5 MMBtu per unit. Table 4 presents an estimated savings summary for WAP housing in NYS for the 2001 program year.

State Regulation and Consumer Protections

New York's residential and low-income customers are protected from monopolistic and anti-competitive market behavior through regulatory protections. As energy competition in the State advances, and as the State furthers deregulation activities, ongoing preservation and evaluation of existing consumer protection laws and regulations is required. The Home Energy Fair Practices Act is one example of how consumers may continue to be protected.

Home Energy Fair Practices Act (HEFPA). The HEFPA provisions of the New York State Public Service Law are designed to provide protections to energy customers in their relationships with utilities, which until recently were the sole providers of electricity and gas services. The Act "...establishes as State policy that the continued provision of gas, electric and steam service to residential customers without unreasonable qualifications or lengthy delays is necessary for the preservation of the health and general welfare and is in the public interest."[21] The Act was signed into law in 1981 and was permanently approved by the PSC in 1982. The HEFPA affords consumer protections through its provisions regarding termination and restoration of utility service, as well as on payment agreements between an energy customer and utility. The Act specifies the circumstances in which protections shall be provided by utilities to energy customers.

[20] These 2000 and 2001 WAP Program figures include carry-over funds from prior years.

[21] Home Energy Fair Practices Act, Rules. Part 11. Public Service Law, art. 2 §§§§4(1), 30-51, 66, 80(1)).

Table 4. WAP Savings Summary, 2001 Program Year			
Savings Summary	**Housing Type**		**Total**
	Multi (>4 Units)	**1-4 Units**	
average savings / unit heating	29.4 MMBtu	45.5 MMBtu	
average savings / unit electric	615 kWh	1230 kWh	
units to be weatherized in 2001 program year	2,718	3,323	6,041
average savings / unit[a] heating and electric	$1.14 million	$2.29 million	$3.43 million
savings[b] after 15 years heating and electric	$17.1 million	$34.35 million	$51.45 million
average WAP cost per unit	$2,000	$2,250	$2,125
savings per unit of life of installed measures[c]	$6,300	$10,320	
benefit/cost savings to investment ratio	3.15	4.59	

[a] Based on an estimate of $11.50/MMBtu average for the fuel mix in NYS; and $0.134/kWh average electric rate.
[b] In 2000 dollars.

Source: NYS Division of Housing and Community Renewal, Energy Services Bureau. *Weatherization Assistance Program; State Plan: 2001 Program Year, April 1, 2001 - March 31, 2002.*

The emergence of a competitive energy market, including the entrance and influence of new market participants such as ESCOs, may warrant a review of the language and provisions of HEFPA. As energy service providers, ESCOs operate under the rules of a competitive energy market and can replace the traditional roles of incumbent utilities, but the utilities are providers of last resort (POLR) under the rules and regulations of HEFPA.

Public Benefits Programs and Partnerships

New York is working to overcome barriers associated with the transition to more competitive energy markets and the existing limitations of these markets, so that energy customer needs might be effectively served. The State leverages its efforts with community-action groups, businesses, and other stakeholders through the use of strategic partnerships. Partnerships provide additional resources and a longer-term

commitment toward reducing or overcoming market barriers. In 1997 New York began a statewide dialogue on low-income energy affordability issues. The Low-Income Forum on Energy (LIFE) serves as a medium for exchanging information on best practices in program delivery and identifying problems and solutions, to providing services to the low-income sector. The LIFE forum has attracted energy market participants that have an interest in serving low-income customers and in solving the problems associated with doing so. Representatives from New York State agencies, utility companies, energy service companies, not-for-profit and consumer advocacy groups, independent living centers, energy cooperatives, credit unions, State Assembly and Senate representatives, and community action agencies, among many others, have participated in LIFE conferences and dialogue. All of these organizations have designed their programs to produce benefits to low-income residents; however, the lack of a concerted program design and evaluation effort inhibits the realization of these benefits and actually furthers the energy burden of lower-income residents. This situation has been recognized by low-income service advocates and leaders in New York and in other States wanting to better serve low-income energy customers.[22] The following lessons and recommendations resulted from the November 2000 LIFE Conference in Albany, New York:[23]

- Existing agency relations and activities should be coordinated and centralized.
- There should be a centralized database of information on low-income programs and services in the State that can be accessed by workers to more effectively refer low-income customers to them.
- Consistent information regarding customer protection issues, reliability issues, and energy bill arrearages, is needed from regulators, agency networks, and utilities that delivers an accurate message to customers.
- To promote aggregation, additional outreach is essential to inform municipalities, not-for-profits, and county governments.
- Involvement by community-based organizations is necessary for programs to succeed.

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[22] Colton, Roger D., Fisher, Sheehan & Colton; Public Finance and Economics. September 2000. "Outreach Strategies for Iowa's LIHEAP Program: Innovation in Improved Targeting". Prepared for: Iowa Department of Human Rights, Des Moines, Iowa.

[23] Low-Income Forum on Energy (LIFE) 2000 Fall Conference. November 16 and 17, 2000. Albany, New York. *LIFE Work Groups Summary of Recommendations.*

In addition to the LIFE process, the State has taken steps necessary to ensure that public benefits programs are better coordinated. Most recently, a catalog of publicly-available energy assistance programs used in the rehabilitation or new construction of public housing has been created, and is used by public housing officials, managers, and technical assistance providers in identifying and accessing such programs and their incentives.[24]

CONTINUING ENERGY-RELATED PUBLIC BENEFITS PROGRAMS

Providing public benefits programs in the future will require that customer needs are continuously identified and evaluated. In addition, strategic R&D and renewable technologies that have potential to serve public needs and provide benefits to ratepayers, should continue to be evaluated and promoted. Administrators of public benefits programs including LIPA, NYPA, NYSERDA, and the State and Federal government have put programs in place to continue to provide public benefits through the transition to competition and beyond.

Governor's Executive Order 111. The energy needs and requirements of municipal and institutional energy customers can be met through market-based and government-sponsored programs. In June 2001, Governor Pataki issued Executive Order 111 requiring that all State agencies, departments, and authorities seek a 35% reduction in energy use by 2010, relative to their energy use in 1990. In addition, each agency, department, and authority is directed to purchase 10% of its energy from renewable energy sources by 2005, increasing to 20% by 2010. Compliance with the Order by local governments and school districts is being actively encouraged. By seeking to reduce its own energy use, improve its energy efficiency, and improve its environment, New York is striving to eliminate barriers to energy efficiency and become a national leader in energy efficiency and environmental policy. The State will provide technical support and assistance to meet these goals.

System Benefits Charge Program. The PSC approved NYSERDA's Proposed Operating Plan for **New York Energy $mart℠** Programs (2001-2006).[25] This five-year operating plan outlines the various energy efficiency, low-income, and research and development initiatives that would be publicly funded and administered with the

[24] Hamilton, Rabinovitz & Alshuler. 2001. Resources for Energy Efficiency Rehabilitation of Multi-Family Publicly Assisted Housing: A Catalog of Programs.

[25] New York State Energy Research and Development Authority. February 15, 2001. Systems Benefits Charge. Proposed Operating Plan for New York Energy $mart℠ Programs (2001-2006).

intention to: (1) improve system-wide reliability through end-user efficiency actions; (2) reduce environmental impacts of energy production and use; (3) facilitate competition to benefit end-users; and (4) improve energy efficiency and access to energy options for under-served customers. Through the 2006 period the **New York Energy $mart℠** Program anticipates achieving 3,500 GWh in electricity savings and more than 1,000 MW in peak demand savings.

Clean Energy Initiative. In May 1999, the LIPA's Board of Trustees approved a five-year $170 million Clean Energy Initiative. Described earlier in this Issue Report, and provided in greater detail in the Energy Efficiency Assessment, Section 3.2, the Clean Energy Initiative provides energy efficiency programs and research and development efforts for customers on Long Island. The CEI Program concludes in 2004. During its five-year operational period, the Program anticipates achieving over 300 GWh in electricity savings and more than 170 MW in peak demand reduction.

Energy Services Program. NYPA's Energy Services Program will continue to provide energy efficiency services into the future. The ESP Program provides financing, technical services, and direct installation of energy-efficient electric technologies. The ESP Program targets residential, commercial, industrial, and municipal and institutional energy customers. Between 2002 and 2004 the ESP Program anticipates on spending $300 million on efficiency and demand programs achieving approximately 120 GWh in electricity savings and 26 MW in peak electric demand savings.

Low-Income Home Energy Assistance Program. The LIHEAP program is a federally-funded energy assistance program. In New York, this program is funded through a federal grant, allocated to OTDA. New York's LIHEAP program is administered through DHCR for weatherization services and the State Office for the Aging for outreach and referral services. In 2002, over $212 million was allocated for the LIHEAP program in New York.[26]

There are, in addition to the programs listed above, financing, tax incentive, and legislative mandated programs that were initiated in the past, and are still available to assist the State in providing energy-related public benefits. These include the Clean Water/Clean Air Bond Act, the Alternative Fuel Vehicle Tax Incentive, the Green

[26] U.S. Department of Health and Human Services. Low-Income Home Energy Assistance Program (LIHEAP) - FY 2002 State Net Allotments.

Building Tax Credit, and Energy Efficiency Standards for State Purchasing.[27] Each of these are described in greater detail in the Energy Efficiency Assessment, Section 3.2 of this State Energy Plan.

Coordination of Public Benefits Programs

While many low-income public benefits programs across the State are interrelated, opportunities remain to coordinate and comprehensively deliver public benefits to energy customers through greater cooperation among public benefits providers. The benefits of low-income programs, for example, could be maximized if the services of several programs were coordinated and a common strategy was established. Many programs are trying to achieve similar goals, but rigid program designs, lack of coordination, different eligibility criteria, and jurisdictional conflicts among programs inhibits the ability to achieve desired results. These structural inadequacies can, over time, create inefficiencies in program delivery, unnecessary overlap of services, and confusion on the part of customers (*e.g.*, mixed messages, overload of inconsistent information, inability to choose between program offerings).

FINDINGS AND CONCLUSIONS

The issues and public benefits programs addressed by this report lead to the following findings and conclusions:

- Government interventions to assist in energy market development are necessary to align public and private interests, particularly in situations where markets are not allocating resources efficiently or fairly.

- Energy customer protections must be continued with the same vigor as they have been afforded in the past. This becomes increasingly important as energy markets become more competitive and customer choice in service providers increases.

- Public benefits programs have contributed to energy and cost savings for residential, low-income, small business, and municipal and institutional customers. These programs also provide environmental benefits including cleaner air and water, for all of New York's energy customers.

[27] New York State Energy Law Article 5, Section 5-108-a.

- Opportunities to further coordination among State agencies that have roles in sponsoring and providing low-income energy assistance and other public benefits programs are beneficial to program participants, and should be fostered.

- Public benefits programs directed toward research and development have significantly contributed to developing, demonstrating, and providing strategic energy technologies, including the advancement of renewable energy technologies, while encouraging and promoting environmental safeguards and protection.

SECTION 3.1

FORECAST SUMMARY

INTRODUCTION

Twenty-year forecasts of energy demand and prices for electricity, natural gas, petroleum, and coal were developed for the State Energy Plan. The base year for forecasting is 2000. Forecasts include: (1) an Outlook Case bounded by (2) a High Economic Growth Case and (3) a Low Economic Growth Case for a total of three forecast scenarios. Forecasting methodologies and more detailed forecast information are provided in the Forecast Appendix, which is available on request.

The Energy Plan forecasts are consistent with and derived from the Energy Information Administration's (EIA) *Annual Energy Outlook (AEO) 2002*. The Mid-Atlantic *AEO 2002* forecast, which includes the states of New York, Pennsylvania, and New Jersey, serves as the basis for the Energy Plan forecasts. Electricity demand projections were derived in part from the *AEO 2002* electricity forecast developed specifically for the New York Control Area (NYCA). This forecast was adjusted to reflect energy efficiency and demand reductions in New York not factored into the AEO forecast. This adjusted forecast was an input the NYCA Market Assessment and Portfolio Strategies (MAPS) electricity market model, which then calculated the specific primary fossil fuel mix required to meet electricity demand. Fossil fuel use projected from the MAPS model was added to the AEO 2002-based forecasts of other sector fossil fuel use to derive total fossil fuel demand.

FORECAST METHODOLOGY

New York projections were derived from the EIA Mid-Atlantic Region all fuels demand and price forecasts and the NYCA Electricity Market Module demand and price forecasts. EIA produces regional forecasts under various economic and price scenarios. EIA uses the National Energy Modeling System (NEMS)[1] energy market projections of the *AEO 2002*.

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[1] NEMS is a computer-based, energy-economy modeling system for U.S. energy markets, using an integrated modular approach to represent macroeconomic activity, international energy supply availability, and end-use consumption sectors. For each fuel and consuming sector, the model balances energy supply and demand while accounting for competition among various energy fuels and sources. NEMS projects the production, importation, conversion, consumption, and consumer prices of energy based on macroeconomic and financial factors, world energy markets, resource availability and costs, market behavior, cost and performance of technologies, and demographic assumptions.

The Energy Plan forecasts represent a reasonable range of possible future energy demand and prices as a basis for assessing energy markets and future market needs.[2] Macroeconomic variables, used by EIA for its Outlook, High, and Low Economic Growth Cases, affect predictions of future capital investment, productivity gains, and technology and market development to name a few. Growth rates for key economic variables determine energy demand growth in both the EIA national and New York's forecasts. The primary growth rates for determining economic activity are provided in Table 1.

Table 1

Annual Average U.S. EIA Growth Rates (2000-2020) of Economic Variables			
	High Case	Outlook Case	Low Case
Productivity	2.4%	2.2%	1.9%
Labor Force	1.0%	0.8%	0.6%
GDP	3.4%	3.0%	2.4%
World Oil Price	0.4%	-0.5%	-2.3%

These economic variables are measured by EIA at a national level, but interact differently with regional variables in the ten census division (NEMS) economic modules. The High Economic Growth Case incorporates population, labor force, and productivity growth rates that are higher than the Outlook Case. Productivity gains result in lower inflation and interest rates. The Low Economic Growth Case assumes lower population, labor force, and productivity gains than the Outlook Case, with higher interest and inflation rates.[3]

Method Overview

The New York forecasts were derived from EIA's regional fuel demand and price forecasts, by determining the historic relationships between fuel demand and prices in New York and those of the Mid-Atlantic region. New York's energy use as a percentage of Mid-Atlantic energy use has remained fairly stable over the last three to four decades. Thirty-nine years (1960-1999) of New York fuel use, expressed as a percentage of the

[2] Of the many scenarios simulated by NEMS, three forecasts, each featuring a different rate of economic growth, were chosen. These scenarios included the EIA Outlook Case forecast and projections based on high and low economic growth to reflect the uncertainties inherent in forecasting future economic activity.

[3] EIA Assumptions to the Annual Energy Outlook 2002, pg 58

Mid-Atlantic region's fuel use, defines the historic relationship between the two, by end-use sector. Twenty nine years (1970-1999) of New York fuel prices, expressed as a percentage of Mid-Atlantic prices, by sector, define the historic relationship used to modify the Mid-Atlantic forecasts. These demand and price relationships were projected into the future using linear regression and a univariate time series forecast. The forecasted percentages were then applied to the EIA Mid-Atlantic regional forecasts to obtain 20-year New York forecasts. The 2000 New York forecasted data were then replaced with actual 2000 data reported in New York State Energy Research and Devlopment Authority's (NYSERDA) *Patterns and Trends 2000*.

SYSTAT® 9.0 for Windows® was used to generate year-to-year New York forecasts. Regression analysis and univariate time-series metholodogies were used. The regression analysis model produces a more dynamic forecasted ratio of New York to Mid-Atlantic, but in the cases where the historical trend flucuates and history is determined to not be an accurate predictor of the future, the time-series model is used. The time-series model is preferred in this case because it weighs recent years more heavily than years past.

To predict New York as a percentage of the Mid-Atlantic using regression analysis, the SYSTAT® program fits an equation into to a set of data in order to best describe the relationship between the variables. In this case, the relationship established between the ratio of New York data to Mid-Atlantic for a given fuel and over a specified period of time, was linear. The relationship between New York and Mid-Atlantic was fairly stable for most fuel prices and demands by sector. Test statistics revealed the historical ratio was a positive predictor of the future, and therefore acceptable.

The SYSTAT® program ran a time-series projection using an Auto Regressive Integrated Moving Average (ARIMA) model[4] to determine New York's growth trend in relation to that of the Mid-Atlantic region. The historical data series used to generate New York demand and price forecasts for electricity, natural gas, petroleum, and coal satisfied standard statistical tests, and were deemed to sufficiently capture the

[4] ARIMA models use either past values (the autoregressive model), past errors (the moving average model), or combinations of past values and past errors to create an accurate projection. A Box-Jenkins univariate time series model is the specific ARIMA model used. The Box-Jenkins ARIMA modeling process occurs in three stages: Identification, Estimation, and Diagnosis. With SYSTAT®, models are identified with Transform, Case series plot, ACF –Autocorrelation plot, and PACF Partial Autocorrelation plot functions, differenced to create a stationary data series, estimated with ARIMA and diagnosed to determine their adequacy with more plots.

relationship between all of the New York energy demand and prices and those of the Mid-Atlantic region.[5] Table 2 shows New York forecasts by sector and fuel. Forecasts for each of the listed fuel sectors can be found in the Forecast Appendix.

Table 2

New York State Forecasts (2000-2021)						
	Residential	**Commercial**	**Industrial**	**Electric Generation**	**Transportation**	**Total**
Petroleum tBtu	Distillate, Propane Demand and Price	Distillate, Residual Demand and Price	Distillate, Residual, Propane, Demand and Price	Distillate, Residual Demand and Price	Distillate, Motor Gasoline Demand and Price	Demand and Price
Electricity GWh	Demand and Price	Demand and Price	Demand and Price		Demand and Price	Peak(MW) Energy
Natural Gas mmdt	Demand and Price	Demand and Price	Demand and Price	Demand and Price		Demand and Price
Coal tBtu	Demand	Demand	Demand	Demand		Demand

NEW YORK STATE ENERGY DEMAND

A summary of Statewide energy demand forecasts is shown in Table 3. The forecasts highlight the demand for electricity, total and residential natural gas, total petroleum, home heating oil, gasoline, and coal over the forecast period for the Outlook Case. The Outlook Case assume 3.0% average annual economic growth over the period. The electricity forecasts represent the electricity requirements for retail customers. Using a weather-adjusted base, an average annual growth rate of 1% for total electricity requirements, measured in gigawatt-hours (GWh), is predicted over the forecast period.

[5] The autoregressive (AR) model addresses serial correlation of errors. For example, a residual from our model reveals an autocorrelation statistic of .953. Correlation coefficients can be squared to reveal the proportion of variance, or in this case, the variation in error terms. This means that over 89% of the variation in error from predicting New York's percentage of Mid-Atlantic in one year can be accounted for by the error in predicting the previous year's percentage. Where serial correlation was found in plotted residuals, the appropriate number of AR parameters were added to eliminate their influence on the forecast.

Table 3

Energy Demand in New York State							
	Actual	Outlook	Outlook	Average Annual Growth			Total Growth
	2000	2006	2021	2000-2006	2006-2021	2000-2021	2000-2021
Electricity, Gwh	155,681	167,490	191,401	1.23%	0.89%	0.99%	22.94%
Peak, MW	30,200	32,319	36,568	1.14%	0.83%	0.92%	21.09%
Natural Gas, tBtu	1,135.1	1,346	1,555.5	2.77%	0.97%	1.51%	37.03%
Residential	362	420	443	2.50%	0.36%	0.97%	22.50%
Petroleum, tBtu	1,725	1,614.9	1,875.1	-0.07%	0.89%	0.40%	8.70%
Home Heating Oil, tBtu	197	167	140	-2.68	-1.18%	-1.61%	-28.88%
Gasoline, tBtu	697	757	853	1.40%	0.79%	0.97%	22.41%
Coal, tBtu	311	218	251	-5.76%	0.93%	-1.03%	-19.52%

The Outlook Case is bounded by Low and High Economic Growth Case forecast rates ranging from 0.8% to 1.3% per year. Peak demand growth, measured in megawatts (MW), lags behind projected growth in total electricity requirements. A variety of demand-side management programs reduces peak demand on extreme-weather days. Peak electricity demand is expected to grow at an average annual rate of 0.9%. The Low and High peak demand forecasted growth rates are 0.8% and 1.2% per year, respectively, over the forecast period.

Total natural gas demand is expected to increase at an average annual rate of 1.5% in the Outlook Case, over the forecast period. The Low and High Economic Growth Case forecasted rates for total natural gas are 1.3% and 1.7% per year, respectively. All sectors, electric generation, residential, commercial, and industrial, exhibit projected increases in demand for natural gas. Despite a recent trend of contracting demand, downstate[6] demand for natural gas has historically been stronger than upstate[7] demand, particularly in the residential sector. Forecasted downstate growth

[6] Downstate comprises these utility areas: Central Hudson Gas & Electric Corp., Consolidated Edison Co. of N.Y., Inc., Keyspan New York, Keyspan Long Island, and Orange & Rockland Utilities, Inc.

[7] Upstate comprises these utility areas: Corning Natural Gas Corp., National Fuel Distribution Corp., New York State Electric and Gas Corp., Niagara Mohawk Power Corp., Rochester Gas & Electric Corp., and St. Lawrence Gas Company, Inc.

may be further slowed due to the World Trade Center disaster.[8] The increases in total gas demand are largely attributable to projected fuel requirements for electricity generation.

The predicted downturn in demand for petroleum (-0.07% average annual growth from 2000-2006) and a predicted slow 0.9% average annual growth from 2006 to 2021 is largely driven by declining use of distillate and residual oil for electric generation. In the Outlook Case, residual oil-fired generation decreases by 64.2% and distillate oil-fired generation declines by 90.44% over the forecast period. Home heating oil use decreases 28.9% over the forecast period. Home Heating oil price declines hold steady at about 1.6% per year in the both the Low and High Economic Growth Cases. The Energy Plan forecast results indicate growth in distillate requirements for the industrial and transportation sectors, increasing an average of 0.9% and 1.8% per year over the forecast period, respectively.

Average distillate use is projected to decrease in the residential, commercial, and electric generation sectors, by 1.6%, 0.2%, and 10.6% per year, respectively, over the forecast period. Average annual residual oil requirements are forecasted to decline 0.6% in the commercial sector, 0.9% in the industrial sector, and 4.8% in the electric generation sector over the forecast period. Demand for motor gasoline is expected to increase 22.4% over the forecast period. Demand for motor gasoline in the transportation sector is expected to grow between 0.7% and 1.2% per year, with most of the growth projected over the first ten years of the forecast. In the Outlook Case, propane demand rises 16.7% or 0.7% annually. Residential propane demand rises 24.0% in the Outlook Case, 1.0% annually. In the Low and High Economic Cases, propane demand rises 1.0% and 1.1% respectively.

Total coal use in New York is expected to decline over the forecast period. Average annual decline in the Outlook Case is forecasted at 1.0% and total decline is projected at 19.5% over the forecast period. Coal use in the electric generation sector is forecasted to decline sharply from 265 tBtu in 2004 to 160 tBtu in 2005. After this slowdown, growth is predicted to rebound to 197 tBtu in 2021, as rising natural gas wellhead prices and nuclear power plant retirements are projected to cause increasing demand for coal-fired baseload capacity in the electric generation sector. Coal demand is forecasted to decline 1.3% annually in the Low Economic Growth Case and 0.7% annually in the High Economic Growth Case. The High Economic Growth Case favors

[8] The loss of load in New York City resulting from the terrorist attack on the World Trade Center is not factored into the forecast. This load is expected to be restored gradually during rebuilding efforts and completely restored once rebuilding is finished. Load is expected to be fully restored sometime in the early half of the forecast period.

coal burning in the electric generation sector. In that case, total coal use is projected to decline only 12.3% over the forecast period.

NEW YORK STATE ENERGY PRICES

Statewide average end-use electricity prices (including those of the New York Power Authority) are projected to decrease at an average annual rate of approximately 0.5% in constant 2000 dollars over the forecast period. An implicit assumption of the price forecasts is that New York will be able to meet it's energy demands during the forecast period. The MAPS electricity market model is used to analyze several scenarios including high demand. Should demand outstrip supply, prices would rise. Programs exist in the State designed to mitigate that problem. These emergency demand response and peak load reduction programs help mitigate price volatility, particularly at the time of peak demand. The Low and High Economic Growth Case price forecasts project that electricity prices will decrease an average of 0.7% and 0.3% per year, respectively, over the forecast period. In the Outlook Case, Statewide average natural gas prices for the residential sector are projected to decrease at an average annual rate of approximately 0.2% from 2000 to 2021. In the Low Economic Growth Case, the average prices for the residential sector are projected to decrease at an annual rate of 0.4%, while in the High Economic Growth Case, an average annual price decrease of 0.03% is projected.

The price to all natural gas users is forecasted to drop 10.4% over the forecast period, 0.5% annually. In the Low Economic Growth Case, the average prices are projected to decrease at an annual rate of 0.8%, while in the High Economic Growth Case, an average annual price decrease of 0.2% is projected. Home heating oil prices Statewide are projected to decrease for the residential sector by 16.0% over the forecast period. The Outlook Case, which projects moderate demand, predicts the smallest average price decline, about 0.8% per year. This is higher than the High Economic Growth Case, which predicts abundant supply and slackened residential demand, resulting in a 0.7% annual decrease in prices. The Statewide utility coal price is projected to decline at an average annual rate of approximately 0.7%, or a total of 14.4% over the forecast period. Both the Low and High Economic Growth Cases predict an average decline in coal price over the forecast period of 0.8% and 0.5% per year, respectively. Projected Statewide energy prices are shown in Table 4 in constant 2000 dollars.

Average prices for each fuel (shaded) are weighted by demand within their respective customer sectors.

Table 4

Energy Prices in New York State ($2000)							
	Actual	Outlook	Outlook	Average Annual Growth			Total Growth
	2000	2006	2021	2000-2006	2006-2021	2000-2021	2000-2021
Electricity, cents/kWh	10.7	9	9.6	-5.03%	0.41%	-0.51%	-10.13%
Residential, cents/kWh	13.4	11.7	12.1	-2.16%	0.19%	-0.49%	-9.78%
Commercial, cents/kWh	11.2	8.7	9.5	-4.03%	0.54%	-0.79%	-15.35%
Natural Gas, $/dt	6.95	6.42	6.23	-1.31%	0.20%	-0.52%	-10.36%
Residential, $/dt	9.59	9.96	9.14	0.65%	-0.57%	-0.23%	-4.71%
Petroleum, $/gal	1.24	1.09	1.12	-2.10%	0.18%	-0.48%	-9.54%
Home Heating Oil, cents/gal	152.56	116.51	128.22	-4.39%	0.64%	-0.82%	-15.96%
Motor Gasoline, $/gal	1.59	1.43	1.41	-1.76%	-0.10%	-0.58%	-11.42%
Electric Generation Residual Oil, $bbl	27.19	24.28	26.29	-1.87%	0.53%	-0.16%	-3.30%
Utility Coal, $/ton	39.11	36.33	33.46	-1.22%	-0.55%	-0.74%	-14.44%

FINDINGS AND CONCLUSIONS

- Demand and nominal prices for most fuels are forecast to increase at different rates over the forecast period; however, real prices (accounting for inflation) decline for most fuels over the forecast period.

- New York's aggregate demand for petroleum products is projected to rise moderately over the forecast period, with increases projected for motor gasoline and decreases for residential heating oil. Increased world demand is expected to exert upward pressure on prices, even given stable supplies. Over the forecast period, demand for motor gasoline is projected to increase 22.4%. Year 2000 prices were unusually high, $1.59 per gallon, so real prices are expected to drop 11.4% from this level, to $1.41 per gallon in 2021. Propane use rises 16.7% over the forecast period.

- Natural gas supply availability, being predominately domestic, is expected to be fairly stable. Natural gas prices rose sharply in 2000. This increase was due to tight natural gas supplies, both in production and storage. A result of this price

increase was greater U.S. exploration and drilling, increases in inventory levels, and hence, lower real prices over the forecast period. Demand growth will be strong in New York, with 37.0% growth over the forecast period. This is primarily due to a 61.0% increase in natural gas demand for electric power generation. Real natural gas prices are expected to decrease an average of 0.5% annually, from $6.95 per dekatherm in 2001 to $6.23 per dekatherm in 2021.

- Total electricity use in New York is expected to grow 22.9% over the forecast period, while prices in real terms decline. Real electricity prices are forecast to decline 10.1% over the forecast period due to increased competition among suppliers and lower fuel prices. Peak megawatt demand is forecast to grow at a slightly slower rate than total electricity requirements (21.1% versus 22.9%) over the forecast period.

- Coal demand is expected to decline, by a total of 19.5% over the forecast period. Customer coal prices decline over the forecast period along with mine-mouth coal prices. Productivity increases continue to result from technology enhancements, economies of scale, and better mine design. As a result, real utility coal prices are forecasted to decline 14.4% over the forecast period.

SECTION 3.2

ENERGY EFFICIENCY ASSESSMENT

INTRODUCTION

Using energy more efficiently can save money, help promote a cleaner environment, and increase energy security by reducing the State's use of energy and its reliance on imported sources of energy. New York is committed to supporting investments in energy efficiency as described throughout this section. The State's System Benefits Charge (SBC) public-benefits program is highly-regarded nationally. The Long Island Power Authority and New York Power Authority complete the Statewide effort by offering attractive energy efficiency programs to their customers. Several new, aggressive energy efficiency efforts compliment these existing programs. Governor Pataki's Executive Order 111 calls for State agencies and other State entities to reduce their energy use 35% by 2010, relative to 1990 levels. New York is also in the process of adopting more stringent Energy Conservation Construction Code amendments that would make the State's code one of the most progressive in the country.

This Energy Efficiency Assessment provides a history of the State's energy efficiency initiatives, descriptions of current program offerings with funding levels and achievements to date, and projected future funding levels and achievements for major energy efficiency initiatives. This section also discusses the benefits of energy efficiency, as well as the potential for, and the barriers to, further improvement. For the purposes of this assessment, energy efficiency is defined as providing permanent reductions in energy use while maintaining equal or greater quality of services.[1]

ENERGY EFFICIENCY IN NEW YORK STATE

This section describes the evolution of energy efficiency programs in New York, including funding levels for major efficiency initiatives over the past eleven years.

Evolution of Energy Efficiency Programs

The nature of the State's energy efficiency programs has changed markedly over

[1] This assessment does not include temporary load curtailment or price responsive load management activities, which are discussed in the Electricity Assessment, Section 3.4, of the State Energy Plan.

the past twenty years. The most significant early investments in energy efficiency programs occurred under the demand-side management (DSM) programs offered by the State's investor-owned utilities. In 1984, the New York State Public Service Commission (PSC) required investor-owned utilities (IOUs) to develop pilot DSM programs to improve energy efficiency and load management. At the PSC's direction, funding for these programs was initially set at approximately $25 million per year.

After a three-year period, the PSC determined that DSM programs represented a viable option for helping to meet future electricity needs in the State, and the IOUs were directed to develop annual and long-range plans for continuing and expanding such programs. During the period from 1987-1989, utility DSM programs were largely focused on load management. Then, regulatory actions in the early 1990s caused programs to shift toward energy efficiency. In 1992, IOU expenditures on DSM programs reached a peak of $286 million. At this point, program offerings were quite diverse, ranging from rebates for residential customers to financial incentives for installing high-efficiency measures in industrial facilities. In 1994, DSM expenditures began to decline in part due to the escalating effect of DSM spending on electricity rates, coupled with low prevailing energy prices. Large reserve margins and the economic recession were also factors. DSM expenditures continued to decline through 1996 until the PSC established New York's SBC program.

New York's SBC program was established in May 1996 by PSC Opinion No. 96-12[2] to fund public benefit programs during the State's transition to a competitive retail electricity market. The SBC is designed to fund public policy initiatives in areas not expected to be adequately addressed by competitive markets: energy efficiency (including peak load reduction), low-income energy affordability, research and development (R&D), and environmental monitoring and mitigation. SBC funding levels were originally established in individual electric utility settlement agreements[3] and funds were collected through a non-bypassable charge on electric utility transmission and distribution systems. The PSC capped SBC funding at one mill[4] per kilowatt-hour (kWh)

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[2] New York State Public Service Commission. Cases 94-E-0952 *et al.* In the Matter of Competitive Opportunities Regarding Electric Service, Opinion No. 96-12, *Opinion and Order Regarding Competitive Opportunities for Electric Service.* Issued and effective May 20, 1996.

[3] New York State Public Service Commission. Cases 94-E-0952 *et al.* In the Matter of Competitive Opportunities Regarding Electric Service, Opinion No. 98-3, *Opinion and Order Concerning System Benefits Charge Issues.* Issued and effective January 30, 1998.

[4] A mill is one tenth of one cent.

during the initial phase of transition, based upon 1995 utility expenditures for DSM programs. Total funding for the three-year SBC program was $234.3 million. The New York State Energy Research and Development Authority (NYSERDA) was designated as the administrator of the Statewide public benefits program, pursuant to a January 30, 1998 order by the PSC.[5] The SBC program began operation on July 1, 1998. The PSC allocated $172 million of SBC funds to NYSERDA, and the IOUs retained the remainder of this funding to meet existing obligations and to continue some low-income programs.

With the advent of the SBC, energy efficiency programs in New York made a transition from rebate-driven offerings to market development initiatives. The **New York Energy $mart℠** public benefits program, offered by NYSERDA, combines infrastructure development, awareness activities, and targeted incentive offerings in order to transform markets. Whereas the DSM programs were primarily based on one-time transactions or rebates to end-users, the SBC market development programs establish long-term relationships with participants and networks of trade allies in order to support sustained changes in markets and consumer behavior.

After two and one-half years of SBC program implementation and evaluation, the PSC directed that these programs be extended with increased funding. In its January 26, 2001 Order[6], the PSC extended SBC programs through June 30, 2006 and increased funding from $78.1 million to $150 million annually. Continuing the SBC programs is intended to help sustain momentum for the State's efforts to promote competitive markets for energy efficiency, offer low-income services, conduct research and development, protect the environment, and provide direct economic and environmental benefits to New Yorkers. Energy efficiency programs are also being recognized for their role in helping ensure electric system reliability during summer peak conditions.

The collective energy efficiency expenditures, including utility DSM, SBC, and other government programs, since 1990 are shown in Table 1. The total investment of these programs over the eleven-year period is more than $2.9 billion. Spending declined after DSM investments reached a high in 1992. The low reached in 1998 reflects the transition from the utility-sponsored programs to the SBC program. Since

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[5] New York State Public Service Commission. Cases 94-E-0952 *et al.* In the Matter of Competitive Opportunities Regarding Electric Service, Opinion No. 98-3, *Opinion and Order Concerning System Benefits Charge Issues.* Issued and effective January 30, 1998.

[6] New York State Public Service Commission. Case 94-E-0952. In the Matter of Competitive Opportunities Regarding Electric Service. *Order Continuing and Expanding the System Benefits Charge for Public Benefits Programs*. Issued and effective, January 26, 2001.

1998, spending has been on an upward trend as SBC programs and other energy efficiency programs (*e.g.*, the Long Island Power Authority's [LIPA] Clean Energy Initiative) began. The following section of this assessment provides more detailed summaries of key energy efficiency programs and their individual achievements.

Table 1: Energy Efficiency Spending in New York State: 1990-2001 ($Millions)

Year	IOU DSM/SBC Programs(1)	IOU HIECA(2)	NYSERDA Programs(3)	LIPA(4) Programs	NYPA(5) Programs	Other Efficiency Programs(6)	Total (7)
1990	$99	$19	$9.6	-----	$2	$94.5	$224.1
1991	$198	$18	$9.6	-----	$12	$61.5	$299.1
1992	$286	$18	$9.6	-----	$22	$49.9	$385.5
1993	$280	$15	$9.6	-----	$50	$69.8	$424.4
1994	$188	$11	$9.6	-----	$38	$80.7	$327.3
1995	$106	$10	$10.3	-----	$54	$69.0	$249.3
1996	$73	$5	$10.6	-----	$76	$49.6	$214.2
1997	$48	-----	$12.0	-----	$72	$44.8	$176.8
1998	$12.4	-----	$13.4	-----	$73	$28.2	$127.0
1999	$9.5	-----	$13.6	$2.9	$92	$30.8	$148.8
2000	$12.7	-----	$37.5	$14.6	$98	$42.0	$204.8
2001	$6.8	-----	$77.4	$23.9	$103	n/a	$211.1
Total(7)	$1,319.4	$96	$222.3	$41.5	$692	$620.8	$2,992

Spending, in many cases, is less than actual contracted or encumbered funds. Spending includes administration and overhead.
(1) Source: Department of Public Service.
(2) Home Insulation and Energy Conservation Act. Source: DPS.
(3) Includes energy efficiency and select low-income and research and development (R&D) SBC programs, federally-funded State Energy Programs, Clean Water/Clean Air Bond Act spending for hybrid-electric buses, and statutory R&D initiatives in the energy efficiency area. Source: NYSERDA.
(4) Long Island Power Authority. Clean Energy Initiative spending exclusive of peak load management and renewable programs. Source: LIPA.
(5) New York Power Authority. Source: NYPA.
(6) Includes the federally-funded Weatherization Assistance Program (Source: New York State Division of Housing and Community Renewal), and the portion of Petroleum Overcharge Restitution Act funds for energy efficiency programs not administered by NYPA (Source: NYSERDA).
(7) Totals may not sum due to rounding.
n/a = not available.

DESCRIPTION OF MAJOR ENERGY EFFICIENCY PROGRAMS

This section describes the achievements of several major energy efficiency programs delivered over the past eleven years and major energy efficiency programs currently offered.

Utility Demand Side Management and Public Benefit Programs

In response to industry restructuring in the late 1990s, utilities redirected their efforts from DSM programs to market development activities. Starting in 1998, continuing utility DSM efficiency programs were funded by the SBC.[7] Energy efficiency expenditures for utility DSM and SBC programs are shown in Table 2 along with actual and projected electricity and summer peak demand reductions achieved between 1990 and 2006.[8] The *italics* in Table 2 signify *projected* spending and achievements. Select utility energy efficiency activities are described in Table 3.

NYSERDA-Administered SBC Programs

The NYSERDA-administered **New York Energy $mart℠** SBC program commenced by order of the PSC on July 1, 1998, and will run through June 30, 2006. Table 4 shows spending and achievements from the first three years of the **New York Energy $mart℠** program (initial program) along with projected spending and achievements for the remaining five years (expanded program). The *italics* in Table 4 signify *projected* spending and achievements. The major **New York Energy $mart℠** commercial and industrial and residential energy efficiency programs are described in Tables 5 and 6, respectively. Results provided in Tables 5 and 6 are associated with funds awarded through June 2001, unless otherwise noted. For the most part, achievements provided in Tables 4, 5 and 6 include only those associated with direct program participants. The more widespread adoption of energy efficiency that is expected once markets are fully developed will lead to additional electricity and peak demand savings. In addition to the programs listed in Tables 5 and 6, **New York Energy $mart℠** also includes energy efficiency R&D projects focusing on innovative end-use energy-efficient and energy-saving technologies and systems applicable to New York markets.

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[7] Some utilities also retained SBC funding for low-income programs. These programs generally focus on arrearage reduction, and are not included in this discussion.

[8] Cumulative annual savings associated with pre-1990 spending are 157 GWh and 246 MW.

Table 2: Utility DSM/SBC Spending with Actual and Projected Achievements (1990-2006)

Year	Annual Spending (Millions)	Cumulative Annual Electric Reductions (GWh)	Cumulative Annual Peak Demand Reductions (Summer MW)
1990	$99.0	325	85
1991	$198.0	1,082	264
1992	$286.0	2,289	537
1993	$280.0	3,620	853
1994	$188.0	4,632	1,105
1995	$106.0	5,349	1,269
1996	$73.0	5,796	1,377
1997	$48.0	5,796(1)	1,377(1)
1998	$12.4	5,817(1)	1,382(1)
1999	$9.5	5,824(1)	1,382(1)
2000	$12.7	5,834(1)	1,382(1)
2001	$6.8	*5,834*	*1,382*
2002	*$5.2*	*5,834*	*1,382*
2003	*$5.3*	*5,519(2)*	*1,297(2)*
2004	*$5.4*	*4,772(2)*	*1,118(2)*
2005	*$5.4*	*3,575(2)*	*845(2)*
Jan/June 2006	*$2.6*	*2,254(2)*	*529(2)*
Total	*$1,343.3*	*74,152*	----

Sources: New York State Department of Public Service and New York State Public Service Commission. Case 94-E-0952 In the Matter of Competitive Opportunities Regarding Electric Service, *Order Addressing Petitions for Clarification and/or Rehearing and Adjusting SBC Budgets.* Issued and effective July 3, 2001.

(1) A large portion of spending since 1997 was directed to utility DSM bidding obligations. Savings for these projects were counted in prior years. Additional savings from utilities with the most significant achievements (Consolidated Edison Company of New York, Inc., New York State Electric and Gas Corporation and Niagara Mohawk Power Corporation) are included.
(2) Declining cumulative values shown in projections are due to an assumed 12-year measure lifetime.

Table 3: Select Utility Energy Efficiency Activities

Company Name	Program Name	Program Description
Central Hudson Gas & Electric Corporation	Residential Energy Solutions	Information on electric technologies, rebate program for high-efficiency heat pumps and central air conditioning, and leasing of high-efficiency electric water heaters.
	Commercial/Industrial (C/I) Energy Solutions	Services to assist C/I customers in using energy more efficiently (*e.g.*, low-cost financing, free on-site energy audits).
Consolidated Edison Company of New York, Inc.	Energy Saving Tips	Information for residential customers and tips on saving energy.
KeySpan Corporation	Home Energy Services	Heating and air conditioning services for residential customers.
	Energy Conservation Information	Includes Consumer Update newsletters with tips on saving natural gas in the home.
	C/I Services	Energy management for C/I customers.
	RD&D	Projects test combined heat and power systems that provide waste heat to power applications such as refrigeration system absorption chillers.
New York State Electric & Gas Corporation	Appliance Calculator	Residential customers can calculate annual energy use of different appliances on-line.
	Energy Profiler Online™	On-line C/I customer information on energy usage, including benchmarking information.
Niagara Mohawk Power Corporation	Energy & Your Home Home Energy Analysis	On-line energy analysis and energy saving practices for the home.
	Business Energy Analysis Business Technologies Facility Energy Information	On-line energy analysis and information on advanced end-use technologies.
Orange & Rockland Utilities, Inc.	Household Energy-Saving Tips	Tips for residential customers on saving energy.

Adapted from: Edison Electric Institute. *New York State EEI Member and Non-Member Residential/Commercial/Industrial Efficiency and Demand Response Programs for the Summer of 2001*. Updated May 30, 2001.

Table 4: NYSERDA-Administered SBC Energy Efficiency Spending with Projected and Actual Achievements (1998-2006)

Year	Annual Spending (Millions)	Cumulative Annual Electric Reductions (GWh) (3)	Cumulative Annual Peak Demand Reductions (Summer MW) (3)
1998	$1.2(1)	0	0
1999	$2.6(1)	81	17
2000	$26.3(1)	243	52
2001	$94.0(2)	399	106
2002	*$153.4(2)*	*1,183*	*348*
2003	*$115.2*	*1,772*	*440*
2004	*$115.2*	*2,198*	*481*
2005	*$115.0*	*2,623*	*622*
2006	*$135.8*	*3,156*	*856*
Total	*$758.7*	*11,655*	-----

Sources: ***New York Energy $mart SM*** evaluation and financial reports and the *System Benefits Charge Proposed Operating Plan for* ***New York Energy $mart SM*** *Programs (2001 - 2006)*, March 15, 2002.

Spending and achievements include Energy Efficiency (exclusive of peak load management), Low-Income, and energy efficiency and strategic R&D. Total spending is approximately $157.7 million for the initial SBC programs and $601 million for the expanded SBC programs. Spending for the expanded program includes $16.5 million in future interest earnings that the PSC has approved for use on energy efficiency programs.

(1) Due to the ramping up of the SBC programs, spending is significantly less than funds encumbered (contracted). Encumbered funds were $1.9 million in 1998, $30.8 million in 1999, $39.6 million in 2000, and $110.4 million in 2001. Cumulative encumbered funding by December 31, 2001 was $182.7 million.
(2) Expenditures from the initial and expanded SBC budgets are projected to occur in these years.
(3) Reductions reported here are for completed work under the identified subset of **New York Energy $mart SM** programs, and therefore, will differ from total reductions reported in the sources cited above.

Table 5: Major New York Energy $mart℠ Commercial and Industrial Energy Efficiency Programs

Program Name	SBC Budget(1) (Millions)	Program Description	Results/Status (for funds awarded through June 2001)
Commercial and Industrial Performance	$40.0	Fosters growth of the energy services industry through performance-based incentives to energy efficiency service providers. Leverages private capital investments in electric efficiency and demand saving measures.	$50 million awarded for 223 projects. Expected savings of 316 GWh and 70 MW.
New Construction	$17.1	Provides financial incentives to building owners and technical assistance to building designers in an effort to change standard building design and construction practices.	$28 million awarded for 509 projects saving 80 GWh and 29 MW.
Smart Equipment Choices	N/A	Provides financial incentives for the purchase and installation of cost-effective, high efficiency equipment (*i.e.*, lighting, motors, and HVAC).	Until 2001, this offer was part of New Construction.
Technical Assistance	$9.9	Provides cost-sharing of studies by qualified professionals to help end users identify efficiency improvements in their facilities. Services include energy audits, energy operations management, rate analysis and aggregation, and other services.	$9 million awarded to 789 projects with savings of 231 GWh, 62 MW and 3 TBtu of gas and oil.
Premium Efficiency Motors	$1.5	Designed to induce lasting structural change in the motors market. Offers incentives to participating vendors for the sale of Consortium for Energy Efficiency-qualified premium efficiency motors.	$1 million in total awards for 1,919 motors, with savings of 1.4 GWh and 0.3 MW.
Commercial HVAC	$1.7	Designed to increase availability, promotion and sale of energy-efficient HVAC products and services. Projects promote commissioning and purchase of high efficiency unitary HVAC.	The program recently began. The goal for electricity savings is 6 GWh.
Small Commercial Lighting	$3.8	Promotes effective, energy efficient lighting in small commercial spaces by offering incentives to contractors and multi-site end users. Also offers contractor training incentives.	The program recently began.
Loan Fund	$6.0	With more than 60 participating lenders, the Loan Fund offers a 4.5% reduction from lenders rates for energy efficiency improvements and renewable technology projects up to $500,000.	$2 million awarded for 289 loans to save 6.7 GWh and 1.5 MW.

Source: NYSERDA. ***New York Energy $mart℠*** *Program Evaluation and Status Report: Report to the System Benefits Charge Advisory Group, Initial Three-Year Program*. January 2002.
(1) Budgets are for the first three years. In some cases, awarded funding was allowed to exceed three-year budgets once the expanded SBC program was approved.

Table 6: Major New York Energy $mart℠ Residential and Low-Income Energy Efficiency Programs

Program Name	SBC Budget(1) (Millions)	Program Description	Results/Status (for funds awarded through June 2001)
Residential Appliances & Lighting and ENERGY STAR® Awareness	$19.0	Designed to increase awareness of ENERGY STAR® and sale of these products. The Residential Appliances & Lighting program works with retailers to improve promotion and sales while the ENERGY STAR® Awareness effort provides a multi-media campaign to increase consumer awareness, understanding, and purchases.	Increased consumer awareness (34% to 43%). Market share increases for ENERGY STAR® appliances (up 119%), lighting (up 114%), and home electronics (up 7%).
Keep Cool	$4.1	Designed to reduce peak demand. Residents and building owners turn in old room air conditioners (RACs) and receive $75 upon purchase of a new ENERGY STAR® RAC. Old RACs are recycled. In 2001, the Long Island Power Authority (LIPA) and New York Power Authority (NYPA) joined NYSERDA to offer an expanded program.	Nearly 41,000 RACs from NYSERDA, LIPA, and NYPA areas. Estimated savings are 8.7 GWh and 12 MW.(2)
ENERGY STAR® Homes	$2.4	Provides technical assistance and financial incentives encouraging participating builders to construct ENERGY STAR® Homes that use 30% less energy than the Model Energy Code.	The program enrolled 38 builders and five raters in its first two months.
Home Performance with ENERGY STAR®	$7.0	Will enhance the existing capacity for delivering energy efficiency services to one- to four-family residences. Consumer protection is fostered by training and qualifying building performance contractors, home energy raters, and contractors providing energy efficiency services.	The program is in its early stages. Fourteen contractors have been certified and 200 homes have received assessments.
Low Income Direct Installation Program	$9.9	Builds on the federal Weatherization Assistance Program to reduce low-income energy burdens. Offers energy efficiency measures (*i.e.*, lighting, refrigerators) and information on energy use and efficiency.	Applications for 9,279 units. Savings are estimated at 7.6 GWh and more than 1 MW.
Low-Income Assisted Housing Program	$3.8	Increase affordability of public housing for low-income residents by incorporating energy efficiency into the design, selection, and installation of equipment in the State's portfolio of publicly-assisted housing. Incentives write down the cost of high efficiency measures.	200 projects have entered the program and construction has commenced on 20 projects.

Source: NYSERDA. ***New York Energy $mart℠*** *Program Evaluation and Status Report: Report to the System Benefits Charge Advisory Group, Initial Three-Year Program.* January 2002.
(1) Budgets are for the first three years.
(2) Due to the seasonal nature of this program, results are presented through September 2001.

Public Power Energy Efficiency Programs

The Long Island Power Authority's Clean Energy Initiative. In May 1999, LIPA's Board of Trustees approved a five-year, $170 million Clean Energy Initiative. This initiative includes energy efficiency programs and research and development efforts. Table 7 depicts the spending and achievements of LIPA's key energy efficiency programs for 1999 through 2001, as well as projected spending and achievements for the remaining years of the initiative. The *italics* in Table 7 signify *projected* spending and achievements. These key energy efficiency programs are then summarized in Table 8.

Table 7: LIPA Clean Energy Initiative Actual and Projected Spending and Achievements for Energy Efficiency Programs (1999-2004)

Year	Annual Spending(1) (Millions)	Cumulative Annual Electric Reductions (GWh)	Cumulative Annual Peak Demand Reductions (Summer MW)
1999	$2.9	6.8	3.5
2000	$14.6	51.0	15.0
2001	$23.9	112.7	29.5
2002	*$21.5(2)*	*183.5*	*54.7*
2003	*$22.3(2)*	*261.9*	*79.2*
2004	*$12.5(2)*	*307.5*	*92.0*
TOTAL	*$97.7(2)*	*923.4*	-----

Source: LIPA, *Clean Energy Initiative Biennial Report*, June 2001.

(1) Spending on energy efficiency is only a portion of the total Clean Energy Initiative spending. Remaining funds earmarked for renewables and peak load management programs are not included.
(2) Projected spending is subject to change based on program evaluations and customer needs.

Table 8: Major LIPA Clean Energy Initiative Energy Efficiency Programs

Program Name	Yr. 2000 Spending (Millions)	Program Description	Yr. 2000 Select Results
Residential Lighting and Appliances	$5.8	Aims to increase ENERGY STAR® lighting and appliance sales through more than 200 participating retailers. Offers rebates and reduced costs for high efficiency measures.	More than 450,000 participants achieving savings of 32.3 GWh and 3.7 MW.
Residential HVAC Efficiency	$3.3	Customer incentives offset the incremental cost of high efficiency HVAC. Contractor incentives are provided for proper equipment sizing. Contractors are also trained in home safety, health, and comfort issues.	More than 8,000 participants, with electricity and demand savings of 3.7 GWh and 5.6 MW.
Residential Energy Affordability Partnership	$1.7	Works with federal WAP to provide free installation of cost-effective air sealing, insulation, HVAC repairs, lighting, and other measures to low-income customers.	Visited more than 2,800 dwellings with savings of 2.4 GWh and 0.2 MW.
Residential Information and Education	$0.4	Provides efficiency information through advertising, the LIPA website, energy audits, and other methods.	Savings of 2.6 GWh and 0.9 MW.
Commercial Construction	$1.0	Promotes the application of a broad range of energy-efficient electric technologies and design assistance. The program offers prescriptive, custom and whole-building components.	The 36 projects involved to date contribute 1.4 GWh and 0.2 MW of savings.
Regional Premium Efficiency Motors	$0.1	Offers customer incentives and information and technical assistance for customers, manufacturers, vendors, designers, and engineerings. Uses the Northeast Energy Efficiency Alliance's MotorUp program.	75 participants with savings of 0.1 GWh and 0.027 MW.
High-Efficiency Unitary HVAC	$0.2	Offers incentives for commercial central air conditioners and air and water source heat pumps. Uses the NEEP program concept.	Rebates for 110 units, with savings of 0.3 GWh and 0.18 MW.
Resource Conservation Manager Program	$0.1	Underwrites the salaries of resource conservation managers employed by schools and municipalities. With proper training, it is expected that these individuals will help end-users reduce resource use and costs.	Three RCM projects are underway.
Customer-Driven Efficiency	$0.4	Offers residential and commercial incentives, audits, and assistance for efficiency measures not covered by LIPA's other programs.	855 participants with savings of 1.4 GWh and 0.63 MW.

Sources: LIPA, *Clean Energy Initiative Biennial Report*, June 2001 and LIPA, *Clean Energy Initiative Annual Report 2000*.

New York Power Authority Energy Efficiency Programs. The New York Power Authority's (NYPA) Energy Services program began in 1990 as a service to NYPA's government customers in New York City and Westchester County. Since its inception, Energy Services has been expanded to serve State-operated facilities, public schools, community colleges, and county and municipal governments across the State. NYPA finances the identification, design, and installation costs for upgrades to energy-using equipment and recovers these costs by sharing in the resulting electric bill savings. The participants retain all the energy savings once NYPA's loan is repaid, usually within ten years or less. Table 9 shows actual and projected investments and results for NYPA's major energy efficiency programs. The *italics* in Table 9 signify *projections*. NYPA's major energy efficiency programs are described in Table 10. In addition to the efficiency programs listed in Table 10, NYPA is preparing to begin a combined heat and power program in 2002.

Table 9: NYPA Energy Efficiency Programs Actual and Projected Investment and Results (1990 - 2004)

Year	Annual Spending (Millions)	Cumulative Annual Electric Reductions (GWh)	Cumulative Annual Peak Demand Reductions (Summer MW)
1990	$2	1	0.6
1991	$12	22	5.6
1992	$22	66	18.6
1993	$50	152	37.6
1994	$38	233	56.6
1995	$54	286	69.6
1996	$76.0	360	86.6
1997	$72.0	465	111.6
1998	$73.0	556	130.6
1999	$92.0	607	139.6
2000	$98.0	667	149.6
2001	$103	750	171.0
2002	*$100*	*779*	*175.6*
2003	*$100*	*835*	*188.6*
2004	*$100*	*891*	*201.6*
TOTAL	*$992*	*6,670*	-----

Source: NYPA.

Table 10: Major NYPA Energy Efficiency Programs

Program Name	Spending (Millions)	Program Description	Select Results/Status
High Efficiency Lighting Program[1]	$312.2	Finances installation of efficient lighting, as well as motors, energy management systems, and sensors.	573.1 GWh and 118 MW.
Watt Busters[2]	$5.4	Provided home energy audits and weatherization to residential customers served by NYPA's municipal and cooperative system customers.	37.7 GWh and 15.4 MW.
Public Housing	$47.1	Replaces old refrigerators in New York City Housing Authority buildings with new units using half the energy and a more environmentally-benign refrigerant. The project has served as a model for more than 100 other public housing authorities and utilities.	70.0 GWh and 8.7 MW. NYPA projects 180,000 replace-ments by 2003.
New Construction[2]	$2.9	Provided rebates to public entities purchasing NYPA power for installation of high-efficiency lighting and motors in new facilities.	23.6 GWh and 4.3 MW.
Energy Services	$20.2	Provides audits and efficiency measures, including lighting, boilers, and motors, to public entities.	15.0 GWh and 4.3 MW.
Electro-technologies	$49.9	Provides NYPA customers with financing, technical services, and installation for energy-efficient electric technologies, such as chillers and water purification.	2.9 GWh and 3.1 MW.
Industrials Program	$6.8	Provides financing to NYPA's industrial customers for installation of energy efficiency improvements including lighting, HVAC, and motors.	6.7 GWh and 1 MW.
Energy Plus Oil Heat Rebate Program[2]	$6.9[4]	Provided nearly 38,300 rebates for the installation of new, high-efficiency residential oil-fired boilers, and warm-air furnaces.	4.4 million gallons of oil[4]
Non-Electric End Uses	$19.0	Assists public entities that purchase NYPA power in improving the efficiency of non-electric measures such as domestic water systems and boilers.	Reduced total energy budgets.
Clean Air for Schools	$74.1	Replaced coal-fired heating in public schools with new systems fired by oil or gas. This program was funded by the 1996 Clean Water/Clean Air Bond Act.	20,000 tons of green-house gases
Climate Controls	$5.3	Through funding from the New York City Board of Education, NYPA helps to improve air compressors, steam distribution, and thermostat controls in schools.	The program began in 1999.
Coal Pilots[3]	$14.0	Provided funds to replace New York City public school coal boilers with cleaner gas-fired equipment.	Assisted 12 schools.

Source: Data provided by NYPA with the exception of the Energy Plus Oil Heat Rebate Program.
All spending and results from program inception through October 2001.
(1) Includes County and Municipal, Long Island, Public Schools, Southeastern New York, and Statewide High Efficiency Lighting Programs.
(2) Program has concluded.
(3) Includes $5.5 million in Petroleum Overcharge Restitution (POCR) funding for two rounds prior to NYPA administration. NYPA received approximately $1.4 million to offer the third and final round of the program.
(4) Results include NYPA's program plus the two prior rounds.

Other Energy Efficiency Programs

This section discusses other energy efficiency initiatives including Executive and Legislative programs, federally-supported programs, such as the Weatherization Assistance Program (WAP) and State Energy Program (SEP), as well as statutory programs currently being administered by NYSERDA.

Governor Pataki's Executive Order 111. In June 2001, Governor Pataki signed Executive Order 111 aimed at improving the energy efficiency of all State agencies, departments, public benefit corporations, and public authorities. As required in the Order, all affected entities shall seek to achieve a 35% reduction in energy use in leased, operated, or owned buildings by 2010, relative to 1990 levels. Affected entities are directed to establish agency-wide reduction targets and schedules for reaching the targets. They must also establish peak electric demand reduction targets for 2005 and 2010. The Executive Order specifies the following practices for existing and new buildings, renovations, and procurement of products and vehicles:

- Existing buildings are required to implement energy efficiency practices with respect to operation and maintenance. Practices could include inspecting and recommissioning, re-tuning heating, ventilation, and air conditioning (HVAC) equipment, and striving to meet the ENERGY STAR® building criteria for energy performance and indoor air quality to the maximum extent practicable.

- New buildings or substantial renovations of existing buildings are required, to the maximum extent practicable, to follow guidelines for the construction of "Green Buildings" including guidelines set forth in Tax Law §19, which created the Green Buildings Tax Credit and the U.S. Green Buildings Council's LEED™ rating system. State agencies engaged in new construction shall achieve at least a 20% improvement in energy efficiency performance relative to levels required by the State's Energy Conservation Code (as amended). For substantial renovation, agencies shall achieve at least a 10% improvement.

- When procuring new products, State agencies are required to select ENERGY STAR® products. NYSERDA will adopt guidelines designating target energy efficiency levels for those products not included in the federal government's program.

- When procuring new vehicles, State agencies must obtain increasing percentages of alternative-fuel vehicles. By 2005, at least 50% of new light-duty vehicles acquired by each agency shall be alternatively fueled. By 2010, 100% must be alternatively fueled. For medium and heavy duty vehicles, State agencies must

implement strategies to reduce petroleum use and emissions, using alternative fuel vehicles wherever possible.

Although actual baseline energy usage is still being collected, the estimated annual 1989-1990 energy use for all of the State entities affected by Executive Order 111 was approximately 59 TBtu. With 2002 energy use estimated at about 53 TBtu for the affected entities, total reductions under Executive Order 111 are estimated at approximately 15 TBtu by 2010. The Executive Order specified that NYSERDA shall coordinate implementation. The Order also established an Advisory Council on State Energy Efficiency to assist NYSERDA in this role. NYSERDA has established a task force and is working with NYPA and LIPA to ensure that all agencies have access to the resources they need to establish energy use baselines and develop cost-effective strategies for reducing energy use. In December 2001, NYSERDA issued the *Executive Order No. 111 "Green and Clean" State Buildings and Vehicles Guidelines*. The Guidelines indicate how affected entities can go about improving energy efficiency in existing buildings, new buildings, leased buildings, and product and vehicle procurement. The Guidelines also discuss options for funding energy efficiency, including tax exempt financing, the SBC program, State EnVest, performance-based contracting, and funding available from U.S. Department of Energy solicitations.

New York State Energy Conservation Construction Code. The New York State Energy Conservation Construction Code (Energy Code), which became effective in 1979, sets minimum standards for the design and construction of all new buildings and the substantial renovation of existing buildings. The Energy Code has not been substantially revised since 1989, and it is generally recognized that a large portion of new construction and substantial renovation projects exceeds current Code requirements in terms of energy efficiency.[9] Therefore, the Energy Code is no longer stimulating the significant energy savings that it had in the past.

Since most of the building equipment covered by the Energy Code can last 20 to 30 years (*e.g.*, HVAC equipment, lighting systems, windows, and insulation materials), there is great opportunity to achieve lasting improvements in buildings through the Energy Code mechanism. New York is currently in the process of amending the Energy Code, including several enhancements such as adopting standards for National Electrical Manufacturers Association (NEMA) Standard ENERGY STAR®/TP-1 transformers,

[9] NYSERDA uses 5% above current Energy Code as standard practice, or the baseline, for New Construction and other programs. This reflects improvements in equipment since the current Energy Code standards were adopted.

adopting recommendations on building commissioning, and retaining higher building envelope requirements for electrically-heated homes. The Energy Code amendments are expected to lead to significant energy and cost savings, as well as environmental benefits. The Energy Code amendments will become effective during Summer 2002, placing New York's building energy codes among the most progressive in the country. The low- and high-end estimates for energy savings and emission reductions are provided in Table 11.

Table 11: Expected Annual Energy Savings and Air Emission Reductions from Energy Code Amendments

	Low Estimate	High Estimate
End-user electricity savings	276 GWh	444 GWh
Other fuel savings (including oil and natural gas)	3.0 TBtu	4.8 TBtu
Cost savings to building owners, operators and tenants (from reduced electricity and other fuels)	$50 million	$80 million
Approximate carbon dioxide (CO_2) emission reductions (from reduced electricity and other fuels)	330,000 tons	530,000 tons
Approximate nitrogen oxide (NO_x) emission reductions (from reduced electricity and other fuels)	370 tons	590 tons
Approximate sulfur dioxide (SO_2) emission reductions (from reduced electricity and other fuels)	580 tons	940 tons
Source: NYSERDA.		

Clean Water/Clean Air Bond Act. The 1996 Clean Water/Clean Air Bond Act included $55 million for clean-fueled vehicles and clean-fueled buses. The Clean-Fueled Bus Program, administered by NYSERDA, provides funds to State and local transit agencies, municipalities, and schools for up to 100% of the incremental cost of new alternative fuel buses and supporting infrastructure. A total of $25 million has been awarded in five rounds of the program. This funding will support the purchase of 529 alternative fuel buses including compressed natural gas (428), battery electric (8), and diesel hybrid-electric technology (93).

The hybrid-electric bus, promoted through the Clean-Fueled Bus Program, was developed under a NYSERDA Research and Development initiative. Electric and hybrid-electric technologies offer many benefits including significant fuel efficiency gains and the resultant reduction in emissions and dependence on imported oil. Efficiency improvements on the order of 25-30% have been achieved in New York City by switching to electric or hybrid-electric buses. These efficiency improvements are

largely the result of the regenerative braking system and the significant decrease in energy use during idling, especially in city traffic. More than $8.6 million (about one third) of the Clean-Fueled Bus Program funds awarded to date are for hybrid-electric buses. This funding will support 93 buses, all of which are expected to be on routes by about 2006. The 10 diesel hybrid-electric buses currently on routes in New York City are expected to save approximately 34,000 gallons of diesel fuel (representing approximately 4,900 MMBtu) annually. When all 93 buses are on routes, savings will increase to about 364,000 gallons (approximately 50,000 MMBtu) of diesel annually. For more information on clean fuels and technologies, refer to the Energy and Transportation issue report (Section 2.4).

New York State Alternative Fuel (Clean Fuel) Vehicle Tax Incentive. New York recently enacted tax incentive legislation for electric vehicles, clean-fuel vehicles, and clean-fuel vehicle refueling properties. Federal tax credits also exist for these technologies. The State tax incentive program applies to vehicles and refueling properties placed into service after January 1, 1998. The incentive period is set to expire on February 28, 2003. Eligible clean fuels include: natural gas, liquefied petroleum gas, hydrogen, and electricity.[10] The New York State tax credit for electric vehicles is equal to 50% of the incremental cost (up to a maximum of $5,000 per vehicle) of a comparably-sized and styled gasoline vehicle.

New York State Green Building Tax Credit. In an effort to promote green buildings in New York, the State approved a $25 million tax credit as part of the fiscal year 2000-2001 budget. The credit is intended to encourage building owners and developers to use advanced materials and technologies in building construction and renovation projects. Specific energy efficiency requirements stipulate that:

- Buildings being newly constructed may use no more than 65% of the energy allowed under the Energy Code; and
- Buildings being rehabilitated may use no more than 75% of the energy allowed under the Energy Code.

Eligible taxpayers include corporations, utilities, banks, insurance companies, and individuals. Eligible buildings include certain hotels, office buildings, and residential multifamily buildings.

[10] The incentive does not cover hybrid electric/gasoline powered vehicles.

Energy Efficiency Standards for State Purchasing. Legislation enacted in 2000[11] calls for minimum energy-efficiency standards for appliances and other products purchased by or for the State or any of its agencies. The law requires NYSERDA to design these standards, in consultation with the Office of General Services, to optimize cost-effective savings, while taking into account market availability. A minimum of 18 products and appliances have already been identified and regulations must be promulgated between April 2002 and April 2003. NYSERDA has issued a competitive solicitation and hired a contractor to assist with developing these standards.

Weatherization Assistance Program. The federally-funded Weatherization Assistance Program (WAP), administered by the New York State Division of Housing and Community Renewal (DHCR), weatherizes low-income residences in an effort to reduce energy consumption and minimize energy costs. Services provided are determined by an on-site energy audit that includes health and safety considerations. Between 1990 and 2000, more than $429 million was spent on weatherization measures. Cumulative annual energy savings in 2000 was approximately six TBtu. Cumulative energy savings from 1990 through 2000 amount to approximately 40 TBtu. The WAP is discussed in more detail in the issue report on New York's public benefit programs (Section 2.5).

NYSERDA-Administered State Energy Program. NYSERDA receives Federal grant funding from the U.S. Department of Energy to administer the State Energy Program (SEP). This program includes, but is not limited to, the following energy efficiency initiatives:

- Residential Technical Assistance (ResTech) helps improve the operation of multifamily buildings in New York by identifying and encouraging the implementation of cost-effective energy-efficiency measures. A variety of technical assistance services are provided, including computer-assisted building modeling, commissioning and implementation assistance. The first 18 studies completed by ResTech are expected to achieve average energy savings of approximately 277 MMBtu per year if all of the recommended measures are implemented. Since the recent expansion and extension of the **New York Energy $mart℠** program, ResTech is jointly funded by federal SEP and SBC funds.

[11] New York State Energy Law Article 5, Section 5-108-a.

- State EnVest enables energy-efficiency upgrades to State facilities using energy service contractors to design and install efficiency measures and energy-related capital improvements, and to develop performance contracts on behalf of the customer. The program is supported by third-party financing in the form of tax-exempt municipal leases, and project financing is arranged such that the annual costs will be less than the energy savings realized from the project. Through 2004, State EnVest is expected to result in $200 million in projects with $30 million in annual energy savings.

NYSERDA Statutory Energy Efficiency Research and Development. NYSERDA administers statutory funding for energy efficiency Research and Development in the following program areas:

- Buildings programs work with developers, designers, contractors, and building equipment manufacturers to develop and demonstrate innovative, energy-efficient products in the areas of lighting, heating, ventilation, air conditioning, and building controls.

- Industry programs assist businesses in developing, demonstrating, and commercializing energy-efficient technologies and long-term solutions to reducing energy costs. Examples of technologies targeted under this program include superconducting transformers, advanced cooling equipment, furnaces, and boilers.

- Transportation programs provide support to New York State firms for developing and commercializing advanced technologies. Examples include developing an electric postal van for the U.S. Postal Service, electric light-duty carrier route vehicles, and hybrid-electric city buses.

New York State Involvement in Regional and National Collaboratives

Many New York organizations involved in the energy field are members of regional or national collaboratives that promote energy efficiency. Getting involved in these collaborative efforts allows New York to leverage other member activities and benchmark best practices against others in the nation. Examples of New York's involvement in these regional and national collaboratives are described in the following paragraphs.

Consortium for Energy Efficiency. The Consortium for Energy Efficiency (CEE) has more than 50 member organizations that support its mission to promote the manufacture and purchase of energy-efficient products and services. CEE is a national, not-for-profit public benefit corporation with the goal of inducing lasting structural and behavioral change in the marketplace and increased adoption of energy efficient

technologies. In today's restructured utility markets, CEE provides a forum for the exhange of information and ideas. CEE also partners with manufacturers, retailers, and government agencies including the U.S. Environmental Protection Agency. New York members of CEE include LIPA, NYPA, and NYSERDA.

Northeast Energy Efficiency Partnerships. Northeast Energy Efficiency Partnerships, Inc. (NEEP) is a not-for-profit regional organization founded in 1996. NEEP aims to steadily increase energy efficiency levels in homes, buildings, and industries throughout the Northeast region of the United States. New York members of NEEP include the New York State Department of State (Codes Division) and NYSERDA. Both LIPA and NYSERDA coordinate their residential appliances, lighting, and HVAC programs and commercial motors program with NEEP.

ENERGY EFFICIENCY BENEFITS AND BARRIERS

Product and Service End-User Benefits

Benefits to the Commercial/Industrial Sector. In a time of increased business competition and tightening environmental regulations, energy efficiency can help the commercial and industrial sectors to reduce costs and emissions. Energy efficiency improvements often provide ancillary benefits including productivity improvements, increased production, better workplace conditions, and reduced maintenance and other costs. For example, an evaluation of energy-efficient lighting in retail applications found that new lighting stimulated significantly increased sales.[12]

Benefits to the Residential Sector. Residential customers throughout the State have the opportunity to implement energy efficiency improvements that reduce the amount of electricity, natural gas, and fuel oil consumed within single-family and multifamily residences. Significant reductions can often be achieved by implementing efficiency improvements to cooling systems and water and space heaters. However, savings can also accrue from upgrading to higher-efficiency appliances, lighting, and home electronics. The **New York Energy $mart℠** Home Performance with ENERGY STAR® program and other residential financing programs offer home energy assessments and reduced-rate loans to consumers in an effort to help identify and implement energy efficiency improvements that can be made in all of these areas. The Home Performance

[12] Over a five-month period, actual sales in one store exceeded expected sales by 35%. Cuttle, C. and Brandston, H. Evaluation of Retail Lighting, *Journal of the Illuminating Engineering Society.* Summer 1995.

with ENERGY STAR® program is expected to result in average electricity savings of more than 700 kWh per year for each participating single-family home. The electricity savings will lead to bill reductions of more than $80 per household each year.[13] Over the next five years, this program is expected to serve approximately 265,000 households. This equates to electricity savings of nearly 200 GWh annually and $22 million in bill reductions per year. Additional natural gas and oil savings are also expected to accrue from the Home Performance with ENERGY STAR® program, leading to further energy bill reductions for participants.

Benefits to the Low Income Sector. Most of the energy-efficiency programs that are offered to low-income customers in the State have as the primary goal improving the affordability of energy. Improvements in energy efficiency are a proven and effective means to increase affordability. Providing more affordable energy can reduce payment problems and the need for other assistance programs.

Overarching Societal Benefits

Energy efficiency improvements deliver direct benefits to the businesses and homes that implement them. Energy efficiency improvements also the have more far-reaching societal benefits described in the following section.

Cost Savings. The most obvious cost savings from energy efficiency improvements accrue directly to the facilities or households that implement them. Beyond this, however, there are also benefits to energy users in general. Benefits to energy users will accrue if energy providers are able to invest in energy efficiency and thus avoid more costly capital investments in new facilities. Energy efficiency is a proven component of a balanced approach to supply alternatives. A study currently being conducted by NYSERDA on the potential of energy efficiency will help to identify the value of various energy efficiency measures by geographic area. This study will be completed in July 2002.

Economic Development. Aside from the direct energy cost savings that result from efficiency improvements and reduced energy use, there are additional economic development benefits of energy efficiency. Every dollar that is saved when businesses or households operate more efficiently is funneled into other investments, such as products

[13] The bill reduction estimate assumes an average Statewide electricity rate of $0.12 per kWh for residential customers.

or services that might not have been purchased otherwise. For example, energy savings of 928 million kWh and 3.3 TBtu of gas and oil under the **New York Energy $mart℠** program are estimated to lead, both directly and indirectly, to the creation of more than 2,300 jobs in New York's service and retail trade sectors.[14] These jobs will be supported annually for as long as the implemented energy efficiency measures remain in effect. Energy efficiency goods and services sectors will also continue to grow in New York State as a result of higher demand for energy efficiency products and services (*e.g.* energy services companies, appliance retailers, contractors, manufacturers, and lenders). Existing businesses can become more profitable by offering energy efficiency as a value-added service to their clientele.

Environmental. Improvements in electric energy efficiency will ultimately reduce the amount of electricity that is required from generating facilities, including fossil-fuel plants. Reducing generation from such facilities leads to a concurrent reduction in environmental emissions, such as nitrogen oxides (NO_X), sulfur dioxide (SO_2), and carbon dioxide (CO_2), from those plants. Efficiency improvements in the use of natural gas and oil have similar effects. For instance, savings of 928 million kWh and 3.3 TBtu of natural gas and oil from the SBC programs administered by NYSERDA are expected to result in emission reductions of 865 of tons of NO_X, 1,490 tons of SO_2, and more than 616,000 tons of CO_2.[15] The CO_2 reductions alone are equivalent to removing more than 123,000 automobiles from New York's roadways for one year. Energy efficiency can also be used to ensure that the State stays within its summer ozone-season NO_X allowance budget. Beginning in 2003, New York's NO_X budget trading program will provide incentives to implement electric end-use efficiency projects by allocating about 3%, or approximately 1,200 tons, of the State's ozone-season NO_X allowance budget to eligible projects. A pilot program, under which 115 tons of NO_X allowances are available for end-use efficiency projects has been in place since 1999. Energy efficiency projects receive certification for tradeable emission allowances they achieve. These allowances can be bought and sold on the open market. The NO_x budget trading program provides a framework for the planned development of a carbon registry for early reductions credits and trading. Electricity customers in New York State have begun to

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[14] NYSERDA. ***New York Energy $mart℠*** *Program Evaluation and Status Report: Report to the System Benefits Charge Advisory Group, Initial Three-Year Program.* January 2002. These savings are expected from funds *awarded* through June 2001 and, therefore, do not match the savings presented earlier for installed and completed measures.

[15] NYSERDA. ***New York Energy $mart℠*** *Program Evaluation and Status Report: Report to the System Benefits Charge Advisory Group, Initial Three-Year Program.* January 2002. These savings are expected from funds *awarded* through June 2001 and, therefore, do not match the savings presented earlier for installed and completed measures.

receive a statement in their electric bills on the environmental attributes of the electricity they use. These environmental statements are the result of the New York Environmental Disclosure program established by the Public Service Commission and funded by the SBC. Efficiency improvements to gas and oil combustion equipment and appliances will also lead to a decrease in harmful pollutants released into the environment. Energy efficiency in the transportation sector, for instance, has the potential to decrease Btu use per vehicle mile traveled.

Fuel Diversity and Energy Security. Efficiency improvements can also be viewed as an alternative means to meet the growing demand for energy in New York. Increased energy efficiency, in effect, reduces the State's need for energy generated from coal, oil, natural gas, and other energy sources. By helping to reduce the State's need for imported energy, energy efficiency also has a role in increasing New York's self-sufficiency, improving energy security, and decreasing the outflow of dollars to pay for imported energy.

Energy Generation Facility Siting and Electric System Reliability. Energy efficiency improvements can also help ameliorate the immediate need to site new power generation, transmission, and distribution facilities. Energy efficiency and peak load reduction can be targeted geographically to address pressing supply and transmission constraints. Reliability initiatives in New York consider efficiency, demand reduction[16], and new facility siting alternatives, and ultimately select the balance that will result in lower costs to ratepayers.[17]

Barriers to Energy Efficiency

Through years of implementing DSM and SBC programs in New York, a wealth of knowledge has been amassed with respect to barriers preventing more widespread adoption of energy efficiency improvements by various sectors. Barriers are both monetary and non-monetary in nature. Table 12 summarizes barriers found to be important through recent market research.

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[16] Demand response programs are discussed in the Electricity Assessment, Section 3.4.

[17] A recent study found that many market transformation programs cost the sponsors less than $0.01/kWh saved. (Nadel, and Latham. 1998. *The Role of Market Transformation Strategies in Achieving a More Sustainable Energy Future*. Washington, DC: American Council for an Energy-Efficient Economy).

The barriers listed in Table 12 generally apply to the commercial, industrial, and residential sectors. Several of these barriers also apply to the low-income sector. Although programs exist to help this under-served population, there are still barriers to their participation including income level (the working poor may have higher incomes and not be eligible) and lack of awareness of programs offered. Barriers faced by the low-income and under-served populations are discussed in more detail in the issue report on public benefits (Section 2.5).

Table 12: List of Key Barriers to Energy Efficiency

Low awareness and understanding of energy efficiency products and services
Higher initial cost to purchase energy efficiency products and services
Perceived or actual higher costs for maintaining energy efficient products or equipment
Lack of infrastructure of qualified energy efficiency service professionals
Low stocking, promotion, and availability of energy efficiency products and services
Lack of credible information on the savings that can accrue from energy efficiency products and services
Reluctance to try new technologies
Perception of poor performance of energy efficient products
Perceived or actual risk associated with new energy efficiency products and services
Energy efficiency conflicts with other important product design criteria

STATEWIDE ACHIEVEMENTS AND ENERGY EFFICIENCY POTENTIAL

Statewide Achievements Since 1990

Between 1990 and 2001, cumulative savings of 57,256 GWh of electricity and 1,688 MW of summer peak demand have been achieved by the major programs discussed in this assessment. Cumulative annual savings in 2001 were 7,095 GWh, or about 5.2% of the approximately 137,000 GWh of electricity sales to ultimate consumers during that year. Cumulative summer peak demand reductions in 2001 were 1,688 MW, or about 5.4% of the 30,982 MW peak that occurred during that summer. Table 13 provides a compilation of these savings as presented in earlier tables of this assessment. Additional natural gas and oil savings have also resulted from these programs. For example, the Weatherization Assistance Program reports about 40 TBtu of cumulative savings from 1990 through 2000. Additional cumulative diesel savings of 9,300 MMBtu have accrued from the Clean-Fueled Bus Program between about 1999 and 2001. Despite these

accomplishments, there are significant remaining opportunities to improve energy efficiency in the State.

Table 13: Statewide Cumulative Electric and Summer Peak Demand Reductions (1990 - 2001)

	IOU DSM/SBC		NYSERDA SBC		LIPA		NYPA		TOTAL[1]	
Year	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW
1990	325	85	---	---	---	---	1	0.6	326	86
1991	1,082	264	---	---	---	---	22	5.6	1,104	270
1992	2,289	537	---	---	---	---	66	18.6	2,355	556
1993	3,620	853	---	---	---	---	152	37.6	3,772	891
1994	4,632	1,105	---	---	---	---	233	56.6	4,865	1,162
1995	5,349	1,269	---	---	---	---	286	69.6	5,635	1,339
1996	5,796	1,377	---	---	---	---	360	86.6	6,156	1,464
1997	5,796[2]	1,377[2]	---	---	---	---	465	111.6	6,261	1,489
1998	5,817[2]	1,382[2]	---	---	---	---	556	130.6	6,373	1,512
1999	5,824[2]	1,382[2]	81	17	6.8	3.5	607	139.6	6,519	1,542
2000	5,834[2]	1,382[2]	243	52	51.0	15	667	149.6	6,795	1,598
2001	*5,834*[2]	*1,382*[2]	399	106	112.7	29.5	750	171.0	7,095	1,688
Total[1]	52,198	-----	723	-----	170.5	-----	4,165	-----	57,256	-----

Italics signify projections where actual values were not available.
(1) Totals may not sum due to rounding.
(2) A large portion of utility spending since 1997 went to meet obligations on existing DSM bidding projects. The savings for these projects were counted in prior years. Additional savings, which are expected to accrue from utility SBC programs, are included for Consolidated Edison, New York State Electric and Gas and Niagara Mohawk Power Corporation, as these utilities have the most significant achievements for those years.

The electricity, natural gas, and oil saved over the past 11 years has produced significant environmental and economic benefits. Table 14 shows the estimated emission reductions and job creation resulting from these savings.

Table 14: Cumulative Air Quality and Economic Benefits from Statewide Energy Savings (1990 - 2001)

Estimated Emission Reductions (from electric savings)	42,900 tons NO_X
	86,500 tons SO_2
	25 million tons CO_2
Estimated Emission Reductions (from gas and oil savings)	2,000 tons NO_X
	840 tons SO_2
	2.5 million tons CO_2
Total Estimated Emission Reductions (from electric, gas and oil savings)	44,900 tons NO_X
	87,340 tons SO_2
	27.5 million tons CO_2
Cars Equivalent for CO_2 Emission Reductions	5.5 million cars removed from the road for one year
Estimated Jobs	15,000
Source: NYSERDA.	

Future Energy Efficiency Potential

New York's Technical, Economic and Achievable Energy Efficiency Potential

In the last decade, a great deal has changed in terms of available energy efficiency equipment and the base-case electricity use in the State's building stock. In October 2001, NYSERDA issued a Request for Proposals (RFP 628-01) to procure contractor assistance in updating and evaluating the current status of, and potential for, energy efficiency in New York. Major tasks for this study include:

- Determining the list of individual and bundled measures to be analyzed;
- Establishing the base case level of technology and associated electricity use in the State's current building stock;
- Evaluating potential savings in electricity use and peak demand resulting from implementing the efficiency measures;
- Determining the technical, economic, and achievable market potential of these technologies;

- Determining the cost of saved energy and the benefit/cost ratio for each measure; and

- Ranking energy efficiency measures based on the above analysis, along with the technical, institutional, policy, and market barriers.

Although the study will be completed in July 2002, preliminary results from the analysis of technical potential are available. The technical potential is defined as the upper limit theoretically possible without regard for cost, market barriers or market acceptability. The preliminary estimates of technical potential are net of achievements to date. The preliminary technical potential for achieving electricity and summer and winter peak demand reductions in the commercial, industrial, and residential sectors is shown in Table 15 for the year 2022. It should be noted that only a small fraction of the technical potential will be economically feasible, and only a portion of the economic potential will be achievable for a variety of reasons. Specific sub-sectors and measures with the highest technical potential are discussed in the following text.

Table 15: Preliminary Technical Potential Results by Sector for 2022

Sector	GWh	Summer Peak MW	Winter Peak MW
Commercial	38,826	11,891	5,959
Residential	23,939	9,526	5,296
Industrial	8,227	1,351	1,273
Total	70,992	22,768	12,528

For existing commercial buildings, lighting, cooling, and refrigeration contribute the most to the preliminary electricity savings technical potential. Cooling and lighting have the largest impact on summer peak demand reduction in existing commercial buildings. For commercial new construction, whole building design is, by far, the largest contributor to the preliminary technical potential for electricity and summer peak demand reduction. In the residential sector, the single largest contributor to preliminary technical electricity reduction potential is lighting. Cooling is the most significant end use in the residential sector in terms of reducing summer peak demand. For the industrial sector, chemical manufacturing and primary metal manufacturing represent the largest portions of the preliminary total technical potential for electricity and summer peak demand reductions.

Potential for Combined Heat and Power

Another initiative currently underway will evaluate and quantify the aggregate energy and economic potential for a wide range of combined heat and power (CHP) technologies in New York's commercial, institutional, and industrial sectors. The project will include analysis of the regulatory, legal, and institutional barriers to CHP, and will develop policy options and market strategies that could be implemented to accelerate market adoption of CHP. The study is being conducted by Energy Nexus Group and the Pace Energy Project. Results will be available soon.

FINDINGS AND CONCLUSIONS

This information and analysis presented in this assessment leads to the following findings and conclusions:

- Over the past decade, energy efficiency programs in New York have evolved in terms of their depth, breadth, and focus. The State now offers a diverse portfolio of programs that is designed to better capture available energy efficiency potential where past efforts could not.

- Since 1990, the State has spent more than $2.9 billion on energy efficiency programs, even while total annual spending declined from a high in the early 1990s of more than $400 million per year. Annual energy efficiency spending has been increased through 2006 due to the continuation and expansion of the State's System Benefits Charge (SBC) program, and the anticipated spending of NYPA and LIPA on public benefits programs.

- Between 1990 and 2001, the State's major energy efficiency programs have saved 57,256 GWh of electricity and have reduced summer peak demand by nearly 1,700 MW. Cumulative annual savings in 2001 were 7,095 GWh[18], or about 5.2% of the 137,000 GWh of electricity sales to ultimate consumers in that year. Cumulative summer peak demand reductions in 2001 were 1,688 MW[19], or about 5.4%, of the 30,982 MW peak that occurred during that summer. Natural gas and oil savings of approximately 40 TBtu have also been achieved over this period.

- The cumulative total electricity savings over the period from 1990 to 2001 are estimated to have led to emission reductions of nearly 43,000 tons of NO_X, 86,500

[18] The 7,095 GWh saved in 2001 is enough electricity to power approximately one million homes for a period of one year.

[19] The 1,688 MW saved is equal to the demand of approximately 1.6 million homes.

tons of SO_2[20], and 25 million tons of CO_2[21]. Cumulative natural gas and oil savings add an additional 2,000 tons of NO_X, 840 tons of SO_2, and 2.5 million tons of CO_2 reductions. Approximately 15,000 jobs were created or sustained as a result of these programs. These jobs will be sustained for the life of the energy efficiency equipment installed.

[20] The reduction in SO_2 and NO_X emissions is equivalent to shutting down about 1,000 MW of coal-fired electricity generation for one year.

[21] The 25 million tons of avoided CO_2 emissions is equivalent to removing approximately five million cars from the road for one year.

SECTION 3.3

RENEWABLE ENERGY ASSESSMENT

INTRODUCTION

Renewable energy is defined as energy from resources that are not depletable or are naturally replenished when used at sustainable levels. Renewable energy resources included here are hydropower, solar, wind, biomass, ocean, and landfill gas. In addition to these renewable resources, fuel cell technology is included because fuel cells provide potentially significant, long-run environmental and economic benefits to New York, can be powered with renewable energy, need support for commercialization, and have market barriers similar to barriers for renewable energy development.[1]

BENEFITS OF RENEWABLE ENERGY

Use of renewable energy provides a number of benefits. These can be broadly defined as:

- Increased energy diversity and security;
- Reduction in air emissions (particulates, NO_x, SO_x, greenhouse gases);
- Economic development opportunities; and
- Distributed generation.

Dependence on a limited number of energy resources can lead to greater potential for fuel supply interruptions, greater price volatility, and ultimately affect energy and economic security. Energy from renewable resources, such as wind and solar, is not fuel-dependent, and therefore, is not subject to the effects of natural and artificial fuel supply constraints.

Fossil-fueled electric generating plants are responsible for approximately one-third of nitrogen oxide (NO_x) emissions, two-thirds of sulfur dioxide (SO_2) emissions, and one-quarter of carbon dioxide (CO_2) emissions, nationally. In New York,

[1] Characterizations of selected renewable technologies and technical potential in New York are presented at the end of this section.

each megawatt-hour (MWh) of electricity generation, given the State's current mix of generation sources, produces 1.5 pounds of NO_x emissions, 3 pounds of SO_2 emissions, and 882 pounds of CO_2 emissions, annually. Power generation using renewable energy resources, such as wind, results in no air, water, or waste impacts.[2] Combustion of fossil fuels results in the release of CO_2, a significant contributor to global warming. Methane, the main energy component of landfill gas, is a particularly potent greenhouse gas, having roughly 21 times the global-warming effects of carbon dioxide. In many parts of the country, cities and counties are using landfill gas to produce electricity, heat, or steam for industrial use. These projects consume gases that, if not collected, could pose serious odor, safety, and environmental hazards if allowed to escape into the atmosphere.

In-State manufacturing of renewable energy equipment, such as photovoltaic (PV) systems and components, could lead to new industries with high export potential, leading to job creation. Deployment of renewable energy technologies can also lead to new jobs. For example, production of electricity from biomass requires labor to maintain the equipment and to grow, harvest, and transport the fuel. From the point of view of the State economy, much of the revenue for manufacturing, installing, fueling, and operating renewable power equipment can be retained instead of leaving the State to pay for imported fuels.

A number of benefits result from onsite power generation using renewable technologies. These include:

- Reduced customer electricity load and demand charges;
- Increased electricity system reliability;
- Avoided investments in transmission and distribution infrastructure;
- Waste heat recovery and avoided transmission losses; and
- Availability of power in remote locations.

The following benefits are specific to individual technologies:

- Fuel cells improve power quality for industrial processes;

[2] No energy source is completely environmentally benign. For example, potential wind energy impacts are aesthetics, noise, and communication interference, to name a few.

- Electricity from wind can help meet winter electricity demand peaks; and
- PV can be used to meet peak electricity demand during hot sunny days by generating power to meet air conditioning loads.

BARRIERS TO RENEWABLE ENERGY DEVELOPMENT

The more common barriers to the development and widespread use of renewable energy technologies can be broadly categorized as:

- Price-related (premium);
- Infrastructure-related (lack of infrastructure for the manufacture, sales, and service);
- Educational (lack of customer familiarity with, and acceptance of, renewable energy resources).

Currently, using renewable energy technologies to produce electricity is more expensive than producing electricity from fossil fuels. For bulk power producers, higher costs results in increased project risk and raises the cost of financing. For onsite generation, the low cost of grid-connected power results in long payback periods for renewable energy systems. However, although renewable energy is more expensive to produce and purchase compared to energy from fossil fuels, its use results in a number of benefits that are not easily quantifiable but are important to the State. These benefits include avoidance of air pollutants from fossil fuel combustion and economic benefits arising from electricity price-hedging provided by renewable energy.

Developing renewable energy resources in New York will take some time, requiring the development of new industry infrastructures that include a workforce skilled in renewable technologies, renewable energy suppliers, and customer demand for renewable energy. With onsite generation, there is also the need to develop streamlined interconnection, siting, and permitting procedures.

The public's limited understanding of renewable energy technologies is another barrier to development of renewable energy. Customer education and successful demonstrations of renewable energy systems will be important to reducing perceived risks and increasing public acceptance.

RENEWABLE ENERGY USE IN NEW YORK

New York's primary energy use is presented in Table 1. Primary use includes electricity generation and energy use in the transportation, residential, industrial, and commercial sectors. Compared to the Unites States as a whole, New York uses a higher percentage of hydroelectric power and a substantially smaller percentage of coal.

Table 1: Primary Energy Use (Trillion Btu) in 1999 in New York and in the U.S.

	New York	United States
Petroleum	1,653 (38.6%)	37,960 (39.7%)
Natural Gas	1,251 (29.2%)	22,294 (23.3%)
Coal	188 (4.4%)	20,498 (21.4%)
Nuclear	393 (9.2%)	7,736 (8.1%)
Hydroelectric Power	265 (6.2%)	3,449 (3.6%)
Wood and Waste	174 (4.1%)	3,101 (3.2%)
Other (includes electricity generated from geothermal, wind, photovoltaic, and solar thermal energy)	1 (0%)	493 (0.5%)

Source: U.S. DOE. *State Energy Data Report:* 1999.

New York's grid-connected electricity generation capacity from renewable sources is shown in Table 2. The total capacity of currently operating sites is approximately 4,577 MW, of which 97% is from conventional hydropower. Two large projects represent 75% of the conventional hydropower in New York. The first of these projects is the 2,160 MW Niagara Power Project which uses water diverted from the Niagara River to produce electricity. The second is the 912 MW St. Lawrence-Franklin D. Roosevelt Power Project which spans the U.S.-Canadian border near Massena, New York. In addition, there are over 340 small hydropower projects throughout the State with a median size of 1.2 MW.

Table 2: Contribution of Renewable Energy Sources to New York State Electricity Supply

	Size Range (kW per Site)	No. of Installations	Median Size (kW)	Capacity (MW)	% of total
Hydroelectricity (excluding pumped storage)†	10 to 2,550,000	347	1,236	4,442.7	97.1%
Wood and Wood Waste†	300 to 19,800	4	9,625	38.5	0.8%
Agricultural Residue‡	3 to 150	4	65	0.3	0.0%
Landfill Gas§	1,000 to 5,500	19	2,000	46.0	1.0%
PV‡	.3 to 300	47	7.7	1.2	0.0%
Wind†	1 - 11,000	27	4.5	48.3	1.1%
Total				4,577.0	100.0%

†Source: New York State Independent System Operator. *2001 Load and Capacity Data*. 2001.
‡Source: National Renewable Energy Laboratory. *REPiS: The Renewable Electric Plant Information System.* 1999.
§Source: NYSERDA. *Internal Working Survey of Landfill Gas-to-Energy Projects in New York State*. 2001.

U.S. DEPARTMENT OF ENERGY NATIONAL FORECASTS

Forecast of U.S. Grid-Connected Electricity Generation From Renewables

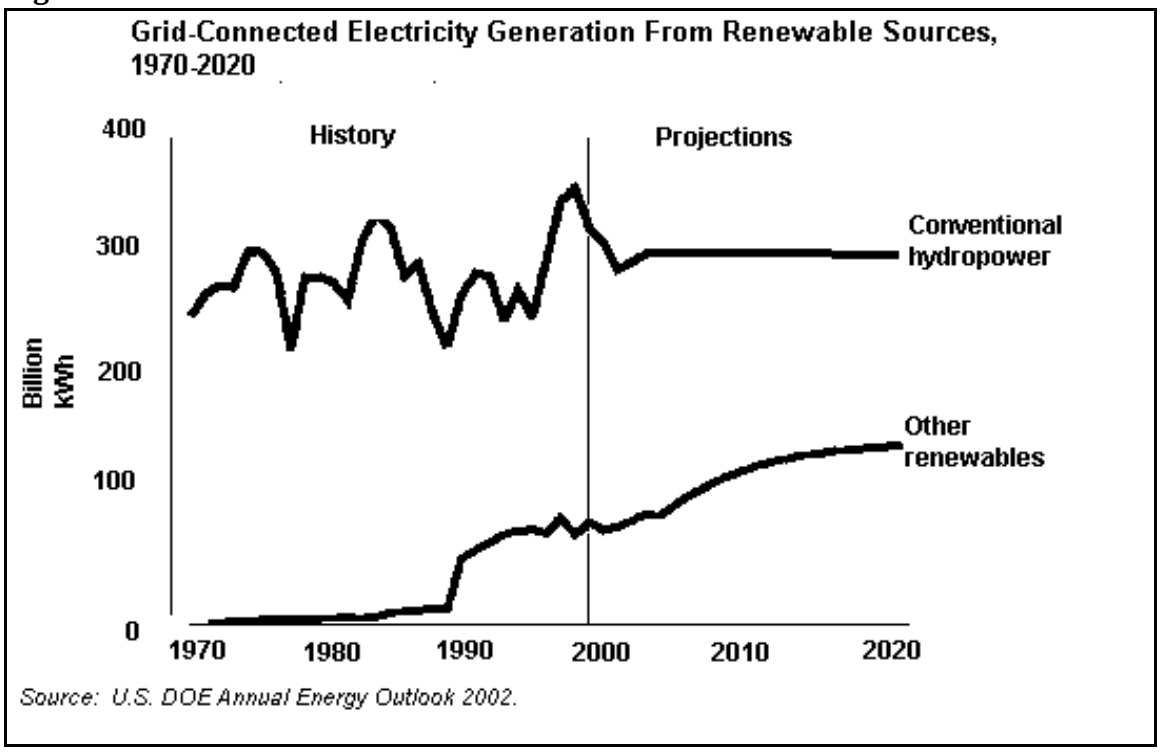
As shown in Figure 1, under the reference case scenario in the Annual Energy Outlook 2002 (AEO2002), during the 20-year forecast:

- The combined U. S. generation from conventional hydropower and other renewables is expected to increase from 357 billion kWh in 2000 (9% of the total) to 464 billion kWh (9%) in 2020.

- Environmental and other requirements are projected to limit U.S. conventional hydroelectric generation to 304 billion kWh in 2020, or 6% of the total electricity supply.

- Generation from nonhydropower renewable energy sources is projected to increase from 81 billion kWh in 2000 (2% of U.S. electricity supply) to 160 billion kWh in 2020 (3% of U.S. electricity supply).

Figure 1



The following are additional projections contained in AEO 2002:

- U.S. electricity generation from biomass, including cogeneration and cofiring with coal, is projected to increase from 38 billion kWh in 2000 to 64 billion kWh (1% of total electricity supply) in 2020. Biomass is the largest source of nonhydroelectric renewable generation in the forecast.

- Total U.S. installed wind capacity is expected to have reached 4,000 MW in 2001 and is projected to reach 9,000 MW in 2020. Generation from the wind plants, many of which are expected to be built in response to State mandates, is projected to increase from 10 billion kWh in 2001 to 24 billion kWh (less than 1% of total electricity supply) in 2020.

- U.S. landfill gas capacity is projected to grow by more than 1,000 MW.

- Solar technologies are not expected to make significant contributions to the U.S. electricity supplies through 2020. In total, central-station PV capacity and other grid-connected solar generators at customer sites are projected to provide 0.05% of total electricity generation in 2020.

RENEWABLE ENERGY PROGRAMS

National Initiatives

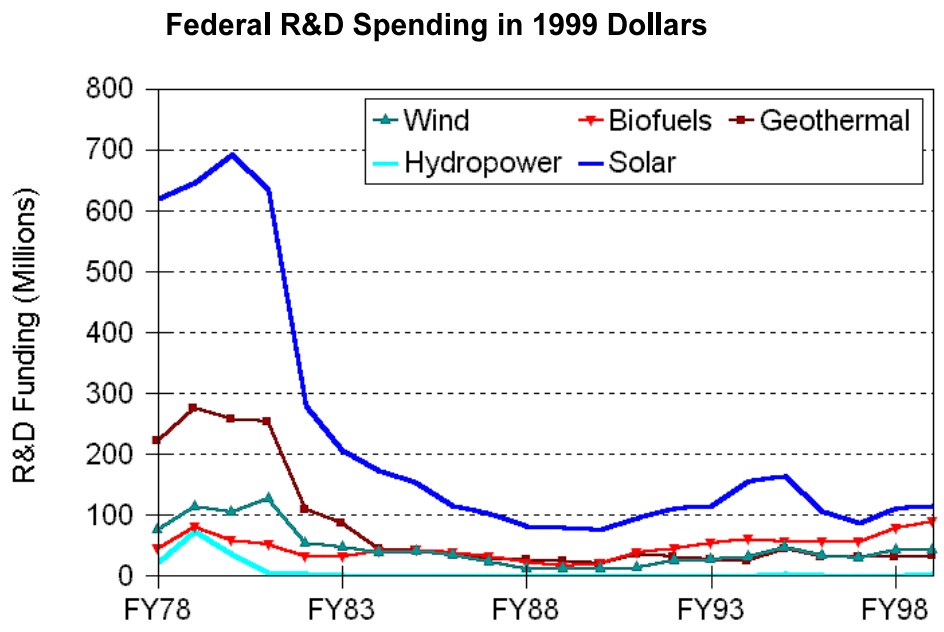
Public Utility Regulatory Policies Act (PURPA). After the 1973 oil crisis, changes in federal policy spurred the development of renewable technologies other than hydropower, the largest source of renewable power in the U.S. In 1978, Congress passed PURPA, which required utilities to purchase electricity from qualifying small power producers. Some states, particularly California and those in the Northeast, required utilities to sign contracts for purchase of electricity from renewable sources whenever electricity from those sources was expected to be less expensive over the long term than electricity from traditional sources. Over 12,000 MW of nonhydroelectric renewable generation capacity came on line under PURPA. During this time, the cost of renewable technologies decreased. Wind turbine costs, for example, decreased by more than 80%.

Financial Incentives. Federal financial incentives for renewable energy include tax credits and production incentive payments. The Energy Policy Act of 1992 established a permanent 10% business energy tax credit for investments in solar and geothermal equipment. As of 1999, new electricity generating facilities that use wind, biomass crops grown for energy, or poultry litter were eligible to receive a production tax credit of 1.5¢ per kWh (in 1992 dollars, adjusted for inflation) for 10 years. This credit expired on January 1, 2002. In March 2002, the U.S. Congress and President Bush extended the tax credit.[3] It will apply retroactively to installations placed in service since the beginning of 2002 and extend through the end of 2003.

Federal Research & Development. As shown in Figure 2, the U.S. Department of Energy (U.S. DOE) has historically provided more financing for solar (including solar thermal, passive solar, and photovoltaic) R&D efforts than for other renewable energy resources. However, funding for 1999 R&D spending for biomass energy systems (including both electric and transportation applications) increased by 64% compared to 1997. More than 35% of biomass energy systems R&D was used for ethanol-related projects.

[3] Senate action is anticipated.

Figure 2



Source: *U.S. DOE. Renewable Energy 2000 Issues and Trends. 2001.*

U.S. DOE's interest in ethanol can be traced to the Clean Air Act Amendments (CAAA) of 1990, which directed regions in severe non-attainment status for ground-level ozone to use oxygenated gasoline. Currently, there are two primary options for meeting the oxygen requirement. Ethanol, widely used by fuel manufactures in the Midwest, is made from corn and other biomass. The second option, methyl tertiary butyl ether (MTBE), is a petroleum-derived oxygenate. Approximately 25% of the gasoline sold in the U.S. today contains MTBE. However, as a result of surface and groundwater contamination, 13 states, including New York, have moved to discontinue the use of MTBE.

State Initiatives

State Incentives, Policies, and Programs. The Database of State Incentives for Renewable Energy (DSIRE), established in 1995, is an ongoing project to summarize state incentives, programs, and policies regarding renewable energy.[4] The project is funded by the U.S. DOE's Office of Power Technologies and is managed by the North

[4] www.dsireusa.org

Carolina Solar Center on behalf of the Interstate Renewable Energy Council. Selected DSIRE programs and policies are presented in Table A at the end of this section. As of October 2001, the database showed that many states have adopted laws in support of renewable energy. For example, 35 states have adopted net metering regulation, 15 states provide corporate tax incentives, and 13 states provide personal income tax incentives. Environmental Disclosure Rules, requiring load serving entities (LSE) to provide their customers with information on the fuel mix and the resulting emissions from the electricity supplied by the LSE, have been adopted by 18 states.

Renewable Portfolio Standards (RPS). Thirteen states - Arizona, Connecticut, Hawaii, Iowa, Maine, Massachusetts, Minnesota, Nevada, New Jersey, New Mexico, Pennsylvania, Texas, and Wisconsin - have adopted RPS mandates. An RPS establishes the requirement that a percentage of a state's electricity be generated from renewable resources. It typically defines the types of renewable resources that qualify and provides a schedule for reaching the desired goals. In addition, some programs establish a renewable credit trading program in which electric generators can either produce the required percentage of electricity from renewable sources or choose to purchase renewable credits from a generator with excess renewable generation.

System Benefits Charge Funds (SBC). Between 1998 and 2012, approximately $3.5 billion will be collected for renewable energy development by 14 states with SBC funds.[5] The average annual funding is $233 million over the next decade. In comparison, the federal fiscal year 2001 renewable energy budget was $376 million. Except for California, Connecticut, Illinois, Montana, New York, Pennsylvania, Rhode Island, and Wisconsin, states still are in the early stages of obligating SBC funds allocated for renewable energy. The most popular program elements to date are financial incentives for large-scale renewable generation projects, customer-sited distributed generation programs, and renewable energy marketing (*i.e.*, efforts to develop a market with multiple energy suppliers providing energy generated from renewable sources).

RENEWABLE ENERGY SUPPORT ACTIVITIES IN NEW YORK

New York has developed a number of initiatives designed to increase the use of renewable energy. As a result of the restructuring of the electricity market, electricity customers can choose to use an energy supplier that provides renewable power. Furthermore, the decision to switch suppliers can now be made based on information

[5] Lawrence Berkeley National Laboratory. *Clean Energy Funds: An Overview of State Support for Renewable Energy*. 2001.

provided by environmental disclosure labels. In addition, the State has allocated System Benefits Charge funding, administered by NYSERDA, to promote awareness and development of renewable energy. Executive Order 111 furthers the market development process by encouraging the use of long-term contracts that will be used to procure power for State agencies. The New York Power Authority (NYPA) and the Long Island Power Authority (LIPA) will also purchase renewable electricity, further supporting market development.

New York State Energy Research & Development Authority

Between July 1998 and June 2001, NYSERDA, the administrator of New York's public benefits program, invested over $14 million in renewable energy programs. The programs provided financial incentives for wind, PV, and biomass. For the period July 2001 to July 2006, NYSERDA will invest over $77.5 million of SBC funds to develop renewable energy in the State. Funding allocations and goals of the renewable program are shown in Table 3. The program will target both customer-sited renewable energy and wholesale market development.

Table 3: 2001-2006 New York System Benefits Charge Funding for Renewable Energy

	Funds allocated	Goals
End-use renewable market development (PV, small wind, small biomass)	$24 million	• Provide training for individuals involved in designing, installing, and inspecting renewable technology systems • Educate the marketplace on use and value of renewable energy • Ensure reliability of renewable technology system installations
Wholesale renewable market development (large wind, biomass, low-impact hydro)	$46 million	Develop wholesale market through: • Green marketing incentives • Renewable energy credit trading program • Green power auctions
Various uses	$7.5 million	
Total	$77.5 million	

The following are some of the renewable projects that NYSERDA has funded over the past three years:

Wind. NYSERDA-sponsored efforts to promote wind power in New York include:

- Site Development: NYSERDA is speeding up wind development in the State by sharing the cost of site development. These costs include those associated with locating desirable sites, collecting site-specific wind data, and conducting preliminary environmental impact reviews.

- Wind Map: NYSERDA has developed a wind map of New York that shows wind resource characteristics at three representative heights above the ground. The map is being used by developers interested in installing wind systems in the State.

- Wind Forecasting: With NYSERDA's assistance, a New York company is creating a wind forecasting model with the ability to predict wind speeds with useful accuracy at any location up to 48 hours in advance. Forecasting ability may increase the value of the energy produced by wind power plants.

- Wind Farms: By the end of 2001, NYSERDA had supported the construction and operation of 41.5 MW of in-State wind energy generation.[6] NYSERDA provided $2 million in funding to the Madison Wind Power Project, located in Madison County, which became operational in October 2000. NYSERDA provided $5 million in funding to another Madison County wind project in Fenner, about 25 miles east of Syracuse. This 30 MW facility began operating in November 2001. NYSERDA expects to have supported over 210 MW of installed wind capacity by 2006.

- Small Wind: NYSERDA is supporting small wind installations under 100 kW for the agriculture, municipal, and commercial sectors.

- Transmission Access Study: NYSERDA is co-funding a study to investigate and evaluate transmission solutions for interconnecting wind power plants. The study will address permits required for installing transmission lines, interconnection procedures, contractual arrangements with transmission owners, and transmission and capacity pricing options.

Building-Integrated PV Program. To foster installation of PV on commercial, industrial, and institutional buildings, NYSERDA is supporting projects that demonstrate innovative PV technologies and applications. The objectives of the program are to:

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[6] Another 6.6 MW wind facility, constructed by the Niagara Mohawk Power Company using SBC funds, is located in Wethersfield, Wyoming County.

- Familiarize mainstream architects, builders, and developers with PV-integrated building design;
- Demonstrate the long-term performance and reliability of building-integrated PV systems;
- Document installation and operating costs of building-integrated PV systems;
- Lower customer's net cost; and
- Reduce other barriers to the installation of building-integrated PV systems.

Residential PV Program. The goal of the residential PV program is to stimulate the residential PV market in New York. Near-term objectives of the program are: (1) to demonstrate the safety and reliability of grid-connected residential PV systems; (2) to reduce barriers to installing PV systems; and (3) to build market demand for residential PV.

Solar Energy Center at SUNY Farmingdale. This Nassau County campus is the site of one of the largest PV systems on Long Island. Over the past decade, NYSERDA has provided over $1 million in funding and technical assistance to install and maintain the 92-kW system.

Solar Electric and Wind Product Development. This program aims to develop in-State manufacturing capabilities for solar-electric and wind products to meet the growing State and worldwide demand for renewable energy. The program solicits proposals for solar electric and wind devices that will be manufactured in New York. The program targets technologies that will be commercialized within five years. Between 1996 and 1999, NYSERDA awarded $4.2 million to 14 companies to develop 18 products.

Fuel Cells.[7] Beginning in 1992, NYSERDA began partnering in Proton Exchange Membrane (PEM) fuel cell technology development with several New York companies including Mechanical Technology Incorporated (predecessor of Plug Power, LLC). Between 1992 and 1997, NYSERDA invested over $3 million in fuel cell development and demonstrations including projects that developed a 50-kW PEM fuel cell for passenger cars. Cooperating with the New York Power Authority (NYPA), NYSERDA also helped demonstrate a 200-kW phosphoric acid fuel cell operating on bio-gas from a

[7] Although some fuel cells use fossil fuel as energy, fuel cell technology has been included in this assessmement due to its environmental benefits and potential to use bio-gas as a fuel source.

wastewater treatment plant in Yonkers, Westchester County. These early projects helped document the environmental benefits of fuel cells.

Currently, NYSERDA is administering a $6 million project, funded by the Clean Air/Clean Water Bond Act, to demonstrate 50 7-kW PEM fuel cells at 10 sites owned by the State. The fuel cells are manufactured by Plug Power, LLC in Latham, New York. Other anticipated NYSERDA fuel cell projects include:

- Installation and demonstration of a 250-kW fuel cell at Brookhaven National Laboratory on Long Island;
- Implementation of test fuel cells at a remote telecommunications site with a 5 kW load;
- A project to identify processes and issues surrounding installation of fuel cells for residential applications, including grid interconnection approval, site selection, site preparation, and operation and maintenance; and
- A project to develop a low cost, integrated manufacturing process for fuel cells.

Biomass. NYSERDA has historically supported biomass as a fuel supply and is currently involved in the following areas:

- Agricultural Sector: NYSERDA has current commitments for over $3.1 million[8] to fund 18 projects that will use anaerobic digester gas from farm wastes for co-generated electricity and heat. The total installed capacity from these projects will be approximately 1.6 MW.
- Willow Development: Since 1996, NYSERDA has been partnering with the Salix Consortium to spur the commercial harvesting of willows to be used as a sustainably-managed fuel source. NYSERDA has invested $1.4 million[9] in this project. Approximately 500 acres of willow have been planted to date, with enough biomass to generate about .75 MW of electricity. Co-firing of the first commercially harvested willow is planned for Summer 2002 at the Dunkirk power plant in Western New York.

[8] Total project cost is $8.8 million.

[9] Total project cost is $14.8 million.

- Since 1999, NYSERDA has invested $850,000[10] in projects that seek to reduce dependence on petroleum by substituting bioresources for petroleum-based products, components, or processes. Examples of projects include improved enzyme production technology, bio-pesticides, polymers, and gasification of willow feedstock.

Other Incentives. Several of NYSERDA's energy efficiency programs, funded by SBC, provide incentives to end-users for renewable technologies:

- Commercial/Industrial New Construction Program: The program provides incentives of up to $300,000 per project for design and installation of building-integrated PV and advanced solar and daylighting technologies. Advanced solar technologies include thermal storage systems, solar preheating systems, and flat plate solar collectors. Incentives are capped at 70% of the incremental cost of the design and installation.

- Loan Fund Program: This program provides loans for renewable energy systems. The interest rate is reduced by 4.5% below the lender's usual rate.

Long Island Power Authority (LIPA)

LIPA is providing support for various renewable technologies through its Clean Energy Initiative. The implementation status of the renewable energy programs was released in June 2001. The following are a few highlights:

Solar/Photovoltaics.

- Through the Solar Pioneer Program, LIPA is offering residential homeowners and small commercial customers a $3.00/watt rebate for grid-connected systems, with a maximum rebate of $15,000 per installation. The program also provides a LIPA-subsidized 6% loan to finance PV systems. As of December 2001, 14 PV systems had been installed.

- LIPA is participating in the Million Solar Roofs Initiative and has committed to install 10,000 solar roofs on Long Island by the year 2010. To support this goal, LIPA is working to develop a certification process for PV installers.

- LIPA helped establish the Farmingdale Solar Energy Center at SUNY Farmingdale and is providing 70% co-funding for public information seminars and three-day workshops for electricians interested in installing PV systems.

[10] The total project cost is $2.3 million.

- LIPA installed a 20-kW grid-parallel Atlantis Energy Sunslate PV system (consisting of individual roof tiles each having a PV cell) and a geothermal heat pump system at the newly renovated New York State Nature Center located at Jones Beach State Park.

- LIPA installed a 15.5-kW PV system at the New York Institute of Technology. The 48 roof-mounted solar panels use inverters to convert the DC power to AC power. Extensive weather-monitoring equipment installed at the site provides information on electricity production during varying environmental conditions (*e.g.*, wind speed and temperature).

  Wind Energy.

- Wind feasibility studies have been proposed in the Towns of Babylon, Hempstead, and Brookhaven. In Babylon, a contractor was engaged to conduct meteorological studies as well as the environmental and economic feasibility of siting wind turbines at the former Babylon landfill. In Hempstead, the Phase I analysis examined potential sites for wind generation within the Town including the former Oceanside and Merrick landfills, and two sites in the Point Lookout area. In Brookhaven, a site inspection was conducted at the landfill in preparation of a written proposal for a feasibility study on the installation of wind turbines and/or solar panels at the closed portion of the landfill site.

New York Power Authority

NYPA is actively engaged in efforts to preserve and protect the renewable power generated by New York's two largest hydroelectric projects. The St. Lawrence-FDR project has been operating with original equipment in the project powerhouse since 1958. The turbines will reach the end of their design life within the next 15 years and other equipment will require renovation or replacement in that time period. To address these concerns, NYPA, in1998, initiated a $254 million program to extend the life and modernize the generation equipment at St. Lawrence-FDR. Modernizing the first of the sixteen turbines has been completed and work on all the turbines is planned to be completed by 2013. Furthermore, the federal license for St. Lawrence-FDR expires in 2003. NYPA submitted an application for a new 50-year license to the Federal Energy Regulatory Commission (FERC) in October 2001.

The Niagara Power Project, which first generated power in 1961, includes the Robert Moses Niagara Power Plant. NYPA is upgrading and modernizing the 13

turbines at the Moses plant. The upgrade of eight units has been completed. The $293 million program, scheduled to be completed by 2006, will permit increased power production during periods of peak demand, but will not increase the project's overall output. The federal license for the Moses plant expires in 2007 and preliminary work on relicensing has begun.

In addition to hydroelectricity provided by the Niagara Power Project, the St. Lawrence-FDR Power Project, and five small hydropower projects across the State, NYPA is supporting a wide range of renewable energy technologies. For example,

- As of 2001, NYPA had installed over 576 kW of PV at various municipalities at a cost of about $4.9 million.
- NYPA completed four fuel cell projects totaling 800 kW at a cost of $3.2 million.
- NYPA is currently working on a project to install eight more 200-kW fuel cells at wastewater facilities in New York City at a cost of $14 million. These fuel cells are part of an effort to offset the emissions from the Authority's PowerNow! gas turbine plants constructed in 2000 - 2001.

NYPA's plans for 2002 - 2004 include the following renewable energy technologies:

- Anaerobic digester gas fuel cells;
- Other fuel cells and microturbines;
- Landfill gas-to-electricity;
- PV; and
- Wind power.

Legislative and Regulatory Initiatives

Executive Order 111. Governor Pataki's Executive Order 111, issued in 2001, directs State agencies and other affected entities to seek to increase their purchase of energy generated from specific renewable technologies to meet 10% of their energy requirements by 2005, and to increase that share to 20% by 2010. The specified renewable technologies are: wind, solar thermal, PV, sustainably-managed biomass, tidal, geothermal, methane waste, and fuel cells. NYSERDA, working with State agency

representatives, have developed guidelines for implementation.[11]

The guidelines recommended that an existing agency or authority should serve as the central procurement agent to contract for the power and perform accounting and billing services for the State agencies. Use of a central procurement agent will reduce the likelihood of agencies competing against each other for renewable power, and ensure lower costs. Once the procurement agent is selected, the working group will work to address other critical issues related to renewable power requirements of the Order on an as-needed basis, including issues related to onsite generation of renewable electricity.

Net Metering Law. New York's net metering law (The Solar Choice Act of 1997, L. 1997, Ch. 339), allows residential electricity customers to offset their electricity use with power they send into the grid using PV equipment owned by the customer. New York's net metering legislation includes a 25% tax credit for the purchase and installation cost of a qualifying PV system, not to exceed $3,750. The maximum capacity allowed per customer is 10 kW. The law requires each utility to connect residentially-operated PV facilities until such connected power equals at least 0.1% of that utility's 1996 peak demand. Based on the 1997 filings made by the New York investor-owned utilities, total net metering capacity allowed under the law will be 23.4 MW. The capacity limit will be reviewed by the New York State Public Service Commission (PSC) in 2005 to determine whether it should be increased.

The PSC has developed uniform interconnection rules for net-metered systems. Systems must use type-tested inverters to be approved for interconnection. To date, 23 systems have been interconnected, representing total installed capacity of 48 kW. Another 16 systems representing 43 kW of installed capacity are in progress and another 8 systems representing 23 kW are in the application phase.[12]

New York Environmental Disclosure Program. The PSC now requires electricity providers throughout the State to include "environmental disclosure labeling" information in electricity bills at least twice during every twelve-month period. The label provides information on the mix of fuels used to generate the electricity sold by the customer's electricity supplier over a twelve-month period. Customers will see the percentage of their power that is coming from the following fuel sources: biomass, coal,

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[11] NYSERDA. *Executive Order No. 111 "Green and Clean" State Buildings and Vehicles Guidelines.* December, 2001.

[12] Source: New York State Department of Public Service (DPS).

natural gas, oil, hydropower, nuclear, solar, solid waste, and wind. In addition, the label will provide information on the emissions of three air pollutants associated with the electricity sold by the customer's supplier, comparing them to the statewide average for the given time period. All investor-owned electric utilities and energy services companies (ESCOs) providing retail electricity, as well as those municipal or cooperative electric utilities subject to PSC jurisdiction, are required to provide the environmental disclosure label. Environmental disclosure is likely to encourage electricity generators to provide more power from renewable resources.

Solar Easements. New York's real property law provides property owners the ability to create an easement for the purpose of preserving the exposure of a solar energy device. Any easement obtained in writing is subject to the same conveyance and instrument recording requirements as any other easements. New York General City codes allow local zoning boards to create rules regarding solar access.

Green Buildings Tax Credit. The Green Buildings Tax Credit Law, enacted in May 2000, contains provisions for fuel cells and PV arrays.[13] The law applies to property placed in service or that has received a final certificate of occupancy on or after January 1, 2001. An eligibility certificate from an architect or professional engineer, certifying that the building space remains green, is required annually.

The fuel cell component provides a 30% credit (6% per year over 5 years) for the capitalized cost of each fuel cell. The fuel cell must be serving green space and must use a qualifying alternative energy source. There is a cap of $1,000/kW of direct-current (DC)-rated capacity.

The PV component provides a 100% credit (20% per year over 5 years) for the incremental cost of building-integrated PV modules and a 25% credit (5% per year over 5 years) for the incremental cost of non-building-integrated PV modules. The system must be serving green space to qualify. There is a cap of $3/Watt of DC-rated capacity of the system.

[13] http://www.dec.state.ny.us.

TECHNOLOGY CHARACTERIZATIONS AND ESTIMATES OF TECHNICAL POTENTIAL

In October 2001, NYSERDA initiated a renewable technology and resource assessment. The primary purpose of this assessment is to address the potential role of renewable energy resources in the State's energy future. This assessment will estimate the technical, economic, and achievable potential for the following renewable energy technologies: windpower, hydropower, biomass, landfill gas, PV, low temperature solar thermal, and fuel cells. Brief technology characterizations for these technologies and for ocean and passive solar are presented here. Preliminary estimates of technical potential in 2022 for windpower, hydropower, biomass, landfill gas, PV, low temperature solar thermal, and fuel cells, are also presented. Shown are potential generation (MWh), potential installed capacity (MW) based on the rated capacity of the equipment, and potential capacity coincident with summer and winter peaks. In the final report, expected to be released in Summer 2002, additional information on the methods and assumption used for the technical potential assessment will be provided along with more detailed technology characterizations and estimates of economic and achievable potential for the various technologies in 2007, 2012, and 2022.

Technical potential for renewable electricity technologies was defined as the upper limit of renewable electricity production and capacity that could be brought on-line over the next 20 years, without regard to cost, market acceptability, or policy constraints. Estimates of technical potential take into account availability of a renewable resource for electricity production and the availability of technology. Because the estimates of technical potential are not bound by cost, market, or policy constraints, they are not projections of anticipated market development. Rather, they represent an upper bound of what New York could theoretically attain from the renewable resource and technology combinations that were assessed for the on-going study. The portion of technical potential that could actually be achieved in New York will vary by renewable resource, depending on a variety of factors. Based on past experiences and studies, estimates of achievable potential are expected to fall in the range of 10% to 50% of technical potential estimates.

Windpower Characterization

During the 1980s, the wind industry attracted more than $2 billion of private capital, supporting the advances that made wind turbine systems economically viable. The life cycle cost of energy has decreased from more than 25 cents per kWh to the

current range of 4 to 6 cents per kWh. During the 1990s, wind was the fastest-growing power source worldwide, with an average annual growth rate of 22.6%.

Wind Farms. Wind farms consist of 10 to 50 turbines in the 1 to 3 MW range that are connected to the electricity grid. Installed costs of wind farms, the lowest of the configuration types, occur in the range of $900/kW to $1200/kW. Still, wind farm development is an extremely capital-intensive undertaking, typically requiring partnerships that include state and federal agencies, utilities, and investment firms.

Cluster Installations. Cluster installations consist of two to 10 turbines connected to the grid. Turbine size ranges between 600 kW and 1.5 MW. The installed capital cost of clusters fall in the range of $1,200/kW to $1,500/kW – considerably higher than for wind farm installations. Compared to wind farms, cluster installations require less geographic area. They may also be more applicable for locations with limited transmission capacity because cluster installations can be connected to the grid at a lower voltage compared to wind farms.

Small Wind Systems. This category of wind systems are used in light industrial applications, on farms, in villages, and at remote sites. This class includes machines with power ratings typically in the 1 kW to 300 kW range. They most often are in remote locations and may or may not be grid-connected.

Because of their small size and individual nature, installed costs for small wind turbines are in the range of $1,500/kW to $6,000/kW. However, these machines, whether interconnected with the grid or not, have a high degree of siting flexibility and are available off-the-shelf.

Offshore Wind Installations. Offshore wind installations, yet untested in the U.S., are becoming an increasingly attractive option for wind energy production due to the concentration of population in coastal areas. Offshore installations are similar to wind farm configurations in that they generally consist of 10 to 50 utility-scale machines of 1 to 3 MW each. Long Island, with its higher-than-average energy costs and generous wind resources off its southern shores, represents a prime location for offshore wind energy development within the next two decades. The installed capacity technical potential for offshore wind off Long Island has been estimated to be 5,200 MW. However, permitting, aesthetics, and transmission issues pose potential barriers to such development in this area. The Great Lakes region may pose fewer permitting and interconnection issues by virtue of it being an area focused less on recreation than Long Island. Calculations

considering wind resources and water depth restrictions show that there are approximately 2,500 MW of installed capacity technical potential off New York's Great Lakes shores, primarily on Lake Erie.

Windpower Technical Potential in New York

Four wind energy configurations were analyzed for their technical potential in 2022: wind farm installations, cluster installations, small wind installations, and offshore installations. The preliminary results are presented in Table 4.

Table 4: Technical Potential for Windpower in 2022

	Generation (MWh)	Installed Capacity (MW)	Summer Peak Capacity (MW)	Winter Peak Capacity (MW)
Wind Farms	11,039,289	4,190	796	1,886
Cluster Installations	6,555,986	2,514	478	1,131
Small Wind	310,036	225	25	48
Offshore	28,038,004	10,100[§]	1,919	4,545
Total	45,943,314	17,029	3,218	7,610

[§]This represents the capacity off Long Island's shores and the Great Lakes region assuming that turbine size increases from the currently-available 2 MW to 5 MW.

A number of factors constrain the full exploitation of the wind's energy. Listed below are the major constraints considered in the development of technical potential values:

- Land availability and land-use patterns;
- Surface topography;
- Offshore conditions;
- Infrastructure constraints;
- Environmental constraints;
- Wind turbine capacity factor;
- Wind turbine availability; and
- Grid availability.

Hydropower Characterization

There are two types of conventional hydropower:

- Run-of-river hydropower is electricity generated at dams where the amount of water discharged from the station is equal to inflow. At such stations, the amount of electricity able to be produced at any one time is primarily determined by the amount of water naturally available. As such, output from these stations cannot be predicted with precision.

- Store-and-release hydropower plants are able to generate electricity, within seasonal limits of precipitation, largely on demand. As such, output from these stations can be predicted with greater precision. They also have the advantage of being able to be brought into service very quickly, and are used typically to serve peak demand.

In the past decade, hydroelectric capacity has been stagnant. This is largely attributable to the extensive legal and regulatory obstacles that characterize the hydroelectric industry. Therefore, the potential for future growth in the industry depends largely on the ability to implement public policies that eliminate or overcome these institutional obstacles.

The National Hydropower Association reports that from 1986 to 2001, some 246 projects were relicensed, resulting in an average U.S. annual hydroelectricity production loss of 4.23%. The challenge of relicensing will be felt in New York State as 83% of the State's hydroelectric capacity begin relicensing within the next 18 years. A list of these facilities is presented in Table B at the end of this section. In addition to those listed, 3 sites entered relicensing in 2000 and 2001, and ten sites which began relicensing in 1993 remain unsettled.

Hydroelectric power has the advantage that, once constructed, there is no fuel cost and therefore, minimum operating costs. For this reason, it is not unusual to find hydroelectric stations serving a significant portion of the onsite electrical load at energy-intensive industrial locations such as paper mills.

The environmental impacts of hydroelectric power include:

- Fish mortality, primarily associated with passage through a turbine;

- Obstacles to the passage of migratory fish;

- Reduced water quality, typically associated with reduced dissolved oxygen concentrations;

- Aquatic habitat impacts, related both to fluctuating river flows and to the creation of bypassed river reaches; and

- Recreational impacts, particularly for white water boaters.

Sources of new hydropower capacity include the following categories of sites:

Repowering at Existing Hydroelectric Sites. This category, which involves upgrading existing equipment already installed and operating, generally results in the least environmental impact.

Installation of Additional Capacity at Existing Hydropower Stations. Many hydroelectric stations may have been built to serve particular loads, and were thus, not built to maximize potential output.

Installation of Hydroelectric Capacity at Existing Dams Used for Other Purposes. There are far more dams in the U.S. and in New York than there are hydroelectric stations. Many dams exist for other purposes including flood control, water supply, recreation, and irrigation. Adding hydroelectric capacity to existing dams saves the expense of dam construction and avoids the environmental and social impact which may result from new dam construction and impoundments. The National Hydropower Association reports that hydropower is installed at less than 3% of the 75,187 existing dams in the U.S.

Construction of New Dams for Hydroelectric Purposes. This category represents the type of hydroelectric project with the largest potential environmental impact. While the electricity benefits of these projects may be substantial, the likelihood of them being permitted is very small.

Hydropower Technical Potential in New York

Preliminary estimates of hydropower technical potential in 2022 is presented in Table 5.

Table 5: Technical Potential for Hydropower in 2022

	Generation (MWh)	Installed Capacity (MW)	Summer Peak Capacity (MW)	Winter Peak Capacity (MW)
Repowering, Modernization, & Upgrade	715,434	408	147	192
Expanded Capacity at Existing Hydro Stations	1,571,303	286	103	134
New Capacity at Existing Dam sites	2,476,844	754	271	354
New Capacity at New Dam Sites	5,501,165	1,079	388	507
Existing as of 2002[§]	20,894,146	4,620	1,663	2,171
Total	31,158,892	7,147	2,572	3,358

[§] Does not include pumped storage.

Theoretically, any site with flowing water and an elevation differential could be appropriate for construction of a new dam and installation of hydroelectric generating equipment. However, in practice, other physical constraints operate, including proximity to load and availability of electric transmission capability. Identification of plausible sites for expansion and new development were based on resource potential studies by FERC and the U.S. Army Corps of Engineers.

Biopower Characterization

The term biomass includes a wide-variety of closed-loop and open-loop organic energy resources. Closed-loop resources, which can be either woody (*e.g.*, hybrid poplar or willow) or herbaceous (*e.g.*, switchgrass), are those that are grown exclusively for the purpose of being consumed as an energy feedstock. Open-loop resources are typically either woody residues produced as byproducts in the wood processing industry or are clean woody waste materials intercepted from the municipal solid waste stream. A list of biomass resources is provided in Table 6.

Table 6: Biomass Energy Resources

Biomass Resource Class	Definition
Mill Residues	Wood residues produced in the primary and secondary wood products industries.
Silviculture (Forest harvesting) Residues	Wood residues produced from commercial logging and forest harvesting activities.
Silviculture (other than residues)	Wood, other than residues, from forest harvesting activities that could potentially be used for biopower (e.g., net annual growth).
Site Conversion Residues	Wood residues produced when forested lands are converted for other uses (e.g., for agriculture, roads, etc.).
Woody Yard Trimmings	Woody materials from yard trimming activities.
Construction & Demolition (C&D) Residues	The clean and available wood portion of the C&D waste stream.
Pallets and Other Waste Wood	Pallets, containers, discarded wood consumer products, scrap lumber (other than from construction and demolition).
Agricultural Residues	Corn stover and wheat straw residues.
Bio-energy Crops	Woody or herbaceous crops grown specifically for the solar energy stored during photosynthesis.
Cattle Manure, Poultry Litter, Hog Manure	Various on-farm animal manures that could be collected to reduce greenhouse gas emissions and to reduce pollution from agricultural runoff.
Wastewater Methane	Methane collected during the digestion of wastewater under methanogenic conditions.

A variety of technology types and scales can be used to produce electricity from biomass. In some cases, a particular biomass resource is more suitable for conversion to electricity using a particular technology. The main types of biopower technologies, their corresponding market applicability, and the types of feedstocks most frequently used with the technology are presented in Table 7.

Four technologies from Table 7 were selected for analysis. The guiding principle used in selecting the technologies was whether or not a given technology could have a significant impact on electricity markets within 20 years.

Table 7: Biopower Technologies

Technology	Electricity Markets	Potential Feedstocks
Customer-Sited Biomass Combined Heat and Power (CHP)	Primarily end-use, could involve sale into wholesale markets	Mill residues
Cofiring w/Coal	Wholesale	All, except manures and wastewater methane
Gasification	Wholesale or end-use	All, except wastewater methane. Most-likely to use C&D wood.
Direct-Fire, Stand-Alone	Wholesale	All, except manures and wastewater methane
Cofiring Gasified Biomass with Natural Gas or Coal	Wholesale	All, except manures
Small, Modular Biopower	End-use, could involve sale to wholesale markets	All
Bioliquids-to-Power	Wholesale or end-use	All, except manures and wastewater methane
Animal Manure Digesters	End-use, could involve sale to wholesale markets	Only manures
Wastewater Methane Combustion	Primarily end-use, could involve sale to wholesale markets	Wastewater methane only

Cofiring Biomass with Coal. Biomass can be combusted in a coal boiler, directly displacing a portion of the coal fed to the boiler. Typical application is central-station electricity production. Biomass can be blended with coal on the coal-pile (mixed feed) or injected via a separate biomass transfer system. Currently, there are 10.7 MW of active cofiring capacity at Greenidge Station along with an additional (previously active but currently unused) 11 MW of cofiring capacity at two other plants, Hickling Station and Jennison Station. The biomass handling equipment at Greenidge Station was recently upgraded, suggesting that cofiring there will continue. A 10-MW system was installed at Dunkirk Station and is currently awaiting approval for pre-commercial demonstration testing.

Biomass Gasification. Gasification of biomass prior to combustion improves emissions characteristics of biomass compared to direct-fire technology and biomass combined heat and power (CHP) applications. Biomass gasification is an emerging technology. Only a few gasifiers are in operation in the U.S. and there are no gasifiers operating in New York.

Customer-Sited Biomass CHP. The typical scale of this technology is 1 - 30 MW. CHP systems produce both heat (for steam) and electricity from biomass residues, increasing the efficiency of the biomass resource. The technology is typically employed at wood processing facilities (especially in the pulp and paper industry) that have large electricity and steam needs and a captive supply of biomass residues. Opportunities also exist in some food products manufacturing facilities. Biomass CHP is often an end-use application, but electricity can be sold into the wholesale market. The technology is well-developed and economical. In New York, there are two mills that employ biomass CHP. These mills represent 67.6 MW of CHP electric generation capacity.

Direct-Fire, Stand-Alone Wood-Fired Power Plants. The typical scale of this technology is 1-50 MW. The technology consists of combustion of wood fuel directly to produce power which is sold in the wholesale market. Efficiency is typically low (17 to 24%) relative to most other types of power plants. Technology is in widespread use in the U.S. In New York, five direct-fire, stand-alone wood-fired power plants were constructed beginning in the early 1970s. The capacity of these plants totals 41.8 MW. In 2001, only two direct-fire biomass plants were in operation, an 18-MW plant in Chateaugay and a 21-MW plant in Lyonsdale.

Biopower Technical Potential in New York

Preliminary estimates of biopower technical potential in 2022 are presented in Table 8.

Table 8: Technical Potential for Biopower in 2022

	Generation (MWh)	Installed Capacity (MW)	Summer Peak Capacity (MW)	Winter Peak Capacity (MW)
Cofiring with Coal	4,347,051	652	641	652
Gasification	1,207,447	172	169	172
CHP	918,453	173	121	123
Direct-Fire	259,646	39	38	39
Total	6,732,597	1,036	969	986

The following assumptions and limiting factors were used in developing the technical potential for biopower:

- Biomass used for purposes other than electricity (e.g. for wood products, animal bedding, and landscaping mulch) were excluded as being potentially available for fuel to generate electricity.

- The amount of fuel potentially available from forest harvesting is limited to the amount of biomass produced from net annual growth in the forest. This assumptions ensures that fuel is available on a sustainable basis.

- Of the biomass potentially available from construction and demolition (C&D), only the portion that is expected to be clean enough for use as fuel is considered as potential feedstock.

- Specific biopower technologies and scales are matched with specific biomass feedstocks. CHP was assumed to largely use mill residues. Gasification was assumed to largely use clean wood from C&D waste.

- The use of direct-fire burning was assumed not to grow beyond capacity in place as of 2002.

- Biomass CHP applications in wood processing facilities were assumed to increase in the next 20 years.

- The technical potential for cofiring was capped at 15% of coal-fired plant output.

Landfill Gas-to-Electricity Characterization

Landfill gas (LFG) is a product of natural decomposition of organic waste materials in an anaerobic (without oxygen) environment. This environment, formed as a result of daily trash deposition combined with the covering placed over the municipal solid waste (MSW) to prevent windblown litter, leads to microbial activity and the formation of landfill gas. Landfill gas is generally composed of about 50 percent methane and 50 percent carbon dioxide, with trace amounts of a variety of non-methane organic compounds (NMOC) in the parts per million range. LFG has approximately one-half the heating value of a typical natural gas and is considered to be a medium-Btu fuel.

Medium-Btu gas can be collected from landfills and used in applications such as boilers or for cofiring. The direct use of LFG as a medium-Btu fuel is the most efficient use of landfill gas but is seldom practiced because customers are not usually located near landfills. Landfill gas can also be cleaned and made into a high-Btu fuel that can be used

to produce ethanol, methanol, high grade carbon dioxide for greenhouses, pipeline quality gas for commercial sale, liquified natural gas (LNG) for vehicle fuel, and compressed landfill gas (CLG). At Fresh Kills Landfill, a large facility located on Staten Island, high quality gas is being produced and sold to the local gas utility.

Technologies that produce electric power from landfill gas can be categorized as (1) large systems using combustion turbines or steam and combined cycle generation systems, (2) internal combustion engines, (3) microturbines, and (4) fuel cells.

Large Systems.

- Combustion Turbines. Combustion turbines are prime mover devices that combust LFG directly in the turbine. Turbines are available for LFG applications in 3 MW and 5 MW sizes from one major manufacturer. This size range of combustion turbine has been commercially available for some time and is used in numerous LFG applications.

- Steam and Combined Cycle Generation Systems. In selected situations, heat recovery steam generators (HRSG) are added to combustion turbine installations to improve fuel efficiency and generate additional power. Usually, the captured steam is run through a steam turbine-generator for secondary power generation (referred to as "combined cycle").

Internal Combustion (I/C) Engines. I/C engines are widely available in sizes ranging from 200 kW to around 1.2 MW for LFG applications. These engines are commercially available, cost-effective, and reliable.

Microturbines. Microturbines are a small combustion turbine recently offered for LFG applications in the 30 to 80 kW range. Four to six units can be combined to total 300 to 500 kW of installed capacity. The use of microturbines for LFG-to-electricity can be considered commercially established, but long-term reliability has not been confirmed yet (since the technology is new). Concerns exist about the lower quality of LFG (compared to natural gas) and the possible build-up over time of trace compounds (such as siloxanes) on turbine blades.

Fuel Cells. Fuel cells in the 100 to 200 kW size range are being pilot-tested at a few landfills. There are no commercial installations of fuel cells that use LFG as feedstock. The primary barrier to increased use of LFG with fuel cells is the cost required

to pre-treat the gas to remove sulfides and other trace compounds that could damage the fuel cell. Due to the high cost of pretreating the gas, fuel cells were not included in the technical potential assessment.

LFG-to-Electricity Technical Potential in New York

Preliminary estimates of the technical potential for selected LFG applications are presented in Table 9.

Table 9: Technical Potential LFG-to-Electricity in 2022

	Generation (MWh)	Installed Capacity (MW)	Summer Peak Capacity (MW)	Winter Peak Capacity (MW)
Large Systems	158,469	19	19	19
Internal Combustion Engines	862,071	104	104	104
Microturbines	98,885	12	12	12
Total	1,119,425	135	135	135

Technical potential for landfill gas-to-electricity (LFGE) is based on the amount of landfill gas expected to be generated at major municipal solid waste landfills in New York. The technical potential represents the amount of electricity theoretically possible from the landfills and includes existing LFG-to-electricity facilities, expansion at some existing facilities, and projected new facilities. Data from the New York State Department of Environmental Conservation (DEC) on projections of future landfilling were used to estimate landfill gas generation.

The following assumptions and limiting factors were applied in developing the technical potential for LFG-to-electricity:

- The amount of municipal solid waste (MSW) generated in New York is projected to remain fairly constant. The amount MSW landfilled is projected to increase slightly from the amount landfilled in 2002.

- Combustion turbines and steam/combined cycle systems in the range of 3 to 15 MW are projected to recover 20% of the landfill gas.

- Internal combustion engines in the range of 400 kW to 5 MW are projected to recover 68% of the landfill gas.

- Microturbines in the range of 30 kW to 600 kW are projected to recover 12% of the landfill gas.

PV Characterization

Currently, the largest world-wide market for PV is the off-grid market, which takes advantage of PV's ability to function as a complete stand-alone electrical system. PV requires capital investment in the range of $5 to $12 per Watt, but initial costs are offset by low operating costs. The 20-year life-cycle cost rangesfrom 20¢ to 50¢ per kWh. A home installation may need 2 to 5 KW of power, and at $12 per Watt, the cost ranges from $24,000 to $60,000. However, combined with the high cost of a rural distribution line and lower land costs in remote areas, PV may be an economic alternative to grid-connected power in some locations.

Four PV application categories were examined for technical potential: (1) residential PV, (2) commercial and industrial (C/I) PV with solar load controller, (3) C/I PV without solar load controller, and (4) building-integrated PV. Solar load control is an approach to maximize the peak shaving capacity of PV systems by matching electricity demand to PV output. For example, building cooling set-points can be controlled to match demand to PV output.

Technical Potential for Photovoltaics In New York

Preliminary estimates of PV technical potential in 2022 are presented in Table 10.

The market development and application of solar technologies will be greatly affected by cost factors that are not considered in the estimation of technical potential. The primary factor underlying the technical potential was the availability of sites. Solar technologies are best suited for generation near points of electricity use. Therefore, deployable spaces were used as an upper limit for technology deployment. These spaces included roofs, facades, parking lots, and exclusion zones.

Table 10: Technical Potential for PV in 2022

	Generation (MWh)	Installed Capacity (MW)	Summer Peak Capacity (MW)	Winter Peak Capacity (MW)
Residential PV	23,802,520	15,080	2,275	555
C&I PV w/Solar Load Controller	17,036,362	10,275	5,155	687
C&I PV w/o Solar Load Controller	11,357,575	6,850	1,084	202
C&I Building-Integrated PV	850,297	796	41	35
Total	53,046,753	33,001	8,555	1,479

Without storage capability, PV output is not available to meet certain loads, such as nighttime demands or winter heating loads. PV is an excellent match for peak summer loads which are driven by cooling demands. However, as PV generation increases to represent a larger fraction (*e.g.*, greater than 20%) of total system demand, PV's effective capacity (*i.e.*, capacity to meet system peak demand), is reduced because PV will be used to power more of the non-cooling portion of the peak load.

Low Temperature[14] Solar Thermal Characterization

Solar Hot Water. Solar heat can be used to displace electricity used for water heating. Solar hot water systems can serve the domestic hot water loads of residential buildings, commercial and school buildings, and provide service hot water or process hot water for industrial sites. Single-family residential solar hot water system packages are available from several vendors. Larger systems require site-specific installations.

Solar Absorption Cooling. Solar heat can be used to displace electricity used for cooling. Absorption cooling devices use a heat source, such as natural gas or a large solar collector, to evaporate the already-pressurized refrigerant from an absorbent/refrigerant mixture. Condensation of vapors provides the same cooling effect as that provided by mechanical cooling systems. Although absorption coolers require electricity for pumping the refrigerant, the amount is very small compared to that

[14] High-temperature solar thermal applications are not applicable for New York due to low solar insolation values.

consumed by a compressor in a conventional electric air conditioner or refrigerator. Systems are typically sized to carry the full air conditioning load during sunny periods.

Solar Ventilation Air Heating. Solar heat can be used to displace electricity used for heating ventilation air.

Technical Potential for Low-Temperature Solar Thermal in New York

Preliminary estimates of the technical potential for low-temperature solar applications in 2022 is provided in Table 11.

Table 11: Technical Potential for Low-Temperature Solar in 2022

	Generation (MWh)	Installed Capacity (MW)	Summer Peak Capacity (MW)	Winter Peak Capacity (MW)
Residential Domestic Hot Water	1,435,521	849	218	104
Commercial Domestic Hot Water	781,762	463	119	57
C&I Air Preheating	216,875	445	0	69
Solar Absorption Cooling	4,022,362	6,205	2,975	0
Total	6,456,520	7,962	3,331	230

The factors underlying the technical potential are solar resource and suitable available space. For the solar thermal technologies, the technical potential cannot exceed the electric energy consumption that will be displaced by the solar technologies.

Fuel Cells Characterization

A fuel cell generates electricity through an electrochemical reaction that requires an external source of hydrogen, either from a hydrogen storage system or an integral reactor that produces hydrogen from hydrocarbon fuels, such as natural gas or methanol. Since fuel cells employ a chemical process instead of a combustion process, air emissions are typically much lower than those from combustion technologies. A variety of fuels can be used for fuel cells.

Most stationary[15] fuel cell systems will be installed with heat recovery for creating hot water or steam. A CHP fuel cell system offers the inherent environmental benefits of fuel cells along with much higher overall efficiencies obtained by using the heat output of the system. Despite these benefits, fuel cell CHP remains an underutilized technology hindered by a number of barriers which can be summarized as: (1) permitting systems that are complex, time consuming, and varied, (2) difficult interconnection arrangements with utilities; and (3) depreciation schedules that do not reflect the true life of fuel cells and other CHP assets.

There are several different types of fuel cells, each believed to have advantages over the other types in specific applications:

- Molten Carbonate (MOFC). This type of fuel cell offers a very high fuel-to-electricity efficiency and can also use fossil fuels. They operate at very high temperatures (1,200 Fahrenheit) and therefore cannot be used in small scale applications. This type of fuel cell is considered viable for increasing the efficiency of electricity production at large-scale power plants.

- Phosphoric Acid Fuel Cells (PAFC). These fuel cells, which use phosphoric acid as an electrolyte, is the most commercially researched and developed type of fuel cell. They tend to be heavy, making them less suitable for use in small automobiles. However, they can potentially be used in buses, other fleet vehicles, and trains.

- Proton Exchange Membrane (PEM): PEM fuel cells, designed to function at fairly low temperatures (200º Fahrenheit), are the most promising fuel cells for use in automobiles due to their ability to shift their power output on demand. Also, they can start-up very quickly, making them ideal for use in small devices and electronic applications.

- Solid Oxide Fuel Cells (SOFC). This technology can be operated at high enough temperatures to eliminate the use of a fuel reformer. The higher operating temperatures and higher electrical efficiency (40-50%) of this type of fuel cell will make it an attractive electricity and heat generating option once initial manufacturing difficulties are overcome.

The following two technologies represent recent developments in fuel cell technology:

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[15] Non-stationary fuel cells are those used for transportation.

- Direct Methanol Fuel Cells. In direct methanol fuel cells, the hydrogen is derived directly from the methanol, eliminating the need to store hydrogen.

- Regenerative Fuel Cells. These fuel cells use water as a fuel. The water is split using solar energy to produce hydrogen and oxygen which are used to create a current that can power an automobile or other objects. Water and heat are generated as by-products. The water, however, can be recycled and reused in the fuel cell to generate more electricity.

Technical Potential for Fuel Cells in New York State

Preliminary estimates of the technical potential for fuel cells in 2022 is presented in Table 12.

Table 12: Technical Potential for Fuel Cells in 2022

	Generation (MWh)	Installed Capacity (MW)	Summer Peak Capacity (MW)	Winter Peak Capacity (MW)
Proton Exchange Membrane	3,327,301	649	431	469
Phosphoric Acid	6,504,194	784	786	786
Solid Oxide	7,709,599	929	932	932
Molten Carbonate	20,711,931	2,495	2,503	2,503
Total	38,253,024	4,857	4,653	4,691

The following assumptions were applied to the technical potential estimates for fuel cells:

- For phosphoric acid fuel cells, technical potential is estimated to be 20% of the electric energy consumption of the applicable sectors.

- For solid oxide fuel cells, the technical potential is estimated to be 50% of the electric energy consumption of the applicable sectors.

- For molten carbonate fuel cells, the technical potential is estimated to be 40% of the electric energy consumption of the applicable sectors.

Passive Solar Characterization[16]

Passive solar refers to the use of the sun's energy without installing mechanical devices. Buildings designed for passive solar incorporate design features such as large south-facing windows and building materials that absorb and slowly release the sun's heat. The three type of passive applications are:

Passive Solar Heating. The simplest passive design is the direct gain system in which the sun shines directly into a building, thereby providing heat. The sun's heat is stored by the building's inherent thermal mass in materials such as concrete, stone floor slabs, or masonry partitions that hold and slowly release heat. Incorporating passive solar designs can reduce heating bills as much as 50%.

Passive Solar Cooling. Many passive solar designs include natural ventilation for cooling. By installing casement or other operable windows for passive solar gain and adding vertical panels, called "wing walls," perpendicular to the wall on the windward side of the house, the natural breeze in the interior is accelerated. Another passive solar cooling device is the thermal chimney, which can be designed like a smoke chimney to vent hot air from the house through the roof.

Daylighting. Daylighting is using natural sunlight to light a building interior. In addition to south-facing windows and skylights, clerestory windows, which are rows of windows near the roofline, can let light into north-facing rooms and upper levels. An open floor plan allows the light to reach throughout the building. Daylighting in businesses and commercial buildings can result in substantial savings on electric bills. Furthermore, natural light provides high-quality lighting that can improve productivity and health. Studies have shown that daylighting in schools can improve student grades and attendance.

[16] This application is not included in the on-going renewable energy potential study.

Ocean Power Characterization[17]

Ocean energy is available from tides, waves, and surface heat. Areas with dramatic tidal changes within a bay offer the best potential for tidal power (such as the Bay of Fundy, Canada and Britain's Severn Estuary). Despite a relatively small ocean shore line, Long Island may possess the potential for ocean power. Seawater has a higher density than air so that currents of 5-8 knots can generate as much energy as winds of much higher velocity. As of September 2001, the Connecticut Clean Energy Fund was investigating the south shore of Long Island as a potential site for a Connecticut firm to build a tidal power station.

In 2001, the Connecticut Clean Energy Fund and the Massachusetts Renewable Energy Trust conducted a study to examine the wave energy potential in the area between Portland, Maine and New York City. The report stated that although New York does not have the geographics necessary for wave energy devices developed for the Atlantic coasts of Europe, wave energy technology originating in Japan may be suitable for Southern New England due to the similarity in their geographic positions relative to storm tracks.

FINDINGS AND CONCLUSIONS

- The State has abundant untapped renewable energy resource potential for additional wind, solar, and biomass, as well as more efficient hydropower at existing dams.

- Higher prices for renewable energy will continue to be a barrier to widespread adoption of renewable energy technologies. To foster greater investment in renewable energy-based distributed generation technologies, interconnection rules need to be monitored and periodically reevaluated with the goal of easing interconnections without compromising reliability and system protection, and stand-by rates need to be fair and equitable.

- The cost of renewable energy technologies will continue to be dependent on national and global renewable market development activities. Commercialization efforts, and hence, product prices are currently driven by national and worldwide

[17] This technology is not included in the on-going renewable energy potential study.

demand for renewable energy. As a consequence, it is important for the State to collaborate with other states and the Federal government to develop policies that support renewable energy technology and industry development.

- The State is making significant progress compared to other states in the promotion of renewable energy. By November 2001, New York had 48 megawatts of installed wind capacity, the highest capacity in any Northeastern state. The State is continuing to build a sustainable renewable energy industry by promoting growth in consumer demand, supporting consumer education, constructing and operating renewable energy facilities, and reducing regulatory barriers that might hinder greater development of renewable energy resources in the State.

- The State's continued support for renewable energy is necessary to increase consumer interest, advance the development of renewable energy technologies, and achieve widespread commercialization and use.

Table A: Summary of Selected State-Level Renewable Energy Initiatives

Initiative	Description	Number of States Providing Incentive	Available in New York
Corporate Tax Incentives	Allow corporations to receive credits or deductions ranging from 10% to 35% against the cost of renewable energy equipment.	15	Yes
Personal Income Tax Incentives	Tax credits or deductions to cover the expense of purchasing and installing renewable energy equipment.	13	Yes
Property Tax Provisions	Provides that the added-value of the renewable device to be excluded from the valuation of the property for taxation purposes.	15	No
Sales Tax Incentives	Exemption from the state sales tax for the cost of renewable energy equipment.	14	Yes
Contractor Licensing	Licensing of renewable energy contractors	12	No
Equipment Certifications	Statutes requiring renewable energy equipment to meet certain standards	12	No
Environmental Disclosure Rules	Requirement that utilities provide their customers with information on fuel mix and emissions statistics.	18	Yes, as of Dec. 2001
Line Extension Analysis	Requires utilities to provide their customers with information on on-site renewable options when a line-extension is requested.	5	Yes
Net Metering Rules	For those consumers who have their own electricity generating units, net metering allows customer to use the excess generation to offset electricity that would have been purchased at the retail rate.	35	Yes
Solar and Wind Access Laws	Statutes providing for solar or wind easement rights.	33	Yes
Source: Database of State Incentives for Renewable Energy (DSIRE).			

Table B: Hydroelectric Relicensing Schedule in New York State

License Expiration Date	Project Name	Owner	County	River	KW
1/31/02	Raquette	Orion	St. Lawrence	Raquette	101,250
10/31/02	Fowler #7	HDG	St. Lawrence	Oswegatchie	900
12/31/02	Hailesboro #4	HDG	St. Lawrence	Oswegatchie	1,490
11/1/02	Rainbow Falls	NYSEG	Clinton	Ausable	2,640
2/28/03	Keuka	NYSEG	Steuben	Mud Creek	2,000
10/31/03	St Lawrence-FDR	NYPA	St. Lawrence	St. Lawrence	912,000
1/31/04	Newton Falls	Newton Falls,	St. Lawrence	Oswegatchie	2,220
8/31/05	Stuyvesant Falls	Orion	Columbia	Kinderhook	2,800
10/31/05	Piercefield	Orion	St. Lawrence	Raquette	2,700
4/12/06	Saranac	NYSEG	Clinton	Saranac	38,950
11/30/06	North Fork	Orion	Franklin	Salmon	1,000
8/31/07	Robert Moses	NYPA	Niagara	Niagara	2,755,000
3/2/11	Green Hydro	Orion	Albany	Hudson	6,000
3/31/12	Natural Dam	Fonda Group	St. Lawrence	Oswegatchie	1,020
5/31/12	Emeryville	Hampshire	St. Lawrence	Oswegatchie	3,540
12/31/12	Oswegatchie	Orion	St. Lawrence	Oswegatchie	28,471
6/30/15	Chasm	Orion	Franklin	Salmon	3,350
2/28/19	Colliersville	HDG	Otsego	N. Br.	1,450
4/30/19	Blenheim Gilboa	NYPA	Schoharie	Schoharie Cr	1,000,000
9/30/19	Lower Beaver Falls	Beaver Falls	Lewis	Beaver	1,000
3/31/20	Granby	Orion	Oswego	Oswego	10,000
				TOTAL	4,877,781

SECTION 3.4

ELECTRICITY RESOURCE ASSESSMENT

INTRODUCTION

This Electricity Resource Assessment evaluates the electric system infrastructure in New York State within the context of changes occurring in the structure of the industry. The Assessment begins with a review of the status of retail and wholesale competition in the State. It then assesses the current electricity system infrastructure and the impacts of various system changes that may be postulated for the planning period. This Assessment does not suggest that any of the scenarios studied will, in fact, occur, or are necessarily preferred, but they do represent a reasonable set of possible futures that provide a setting for analysis and policy making. Finally, the Assessment includes a description of how retail prices and loads might change over the planning period.

STATUS OF COMPETITIVE ELECTRIC MARKETS

New York State Retail Market

Customer Choice Programs. The State's retail electric industry is open to customer choice of energy service providers. Changes in the electric market allow customers in nearly all areas of the State to choose their supplier of electricity, while the delivery of electricity to homes and businesses remains the function of the local utility. The transition toward retail competition has been evolving for several years, and further evolution will occur. Most experts in energy policy agree that competition can produce innovations and bring forth technologies and new services that will result in customer benefits.

According to the Center for the Advancement of Energy Markets (CAEM), an independent, nonprofit group in Washington, DC, New York has consistently ranked among the top states in its efforts to restructure the electric industry.[1] Among the 22 attributes where New York scored high are the following: overall competition plan; percentage of customers eligible; safeguards to prevent utility/affiliate favoritism; competitive metering and billing choices; generation market structure; treatment of stranded costs; customer education programs; appropriateness of default rates; and distributed generation interconnection policies. The percentage of load switched so far to

[1] Other states ranked high by the Center include Pennsylvania, Texas, and Maine.

competitive suppliers is about 19%, which is relatively high compared to other states (currently, the third highest).

Customer Participation. Based on customer awareness surveys conducted annually by the Department of Public Service (DPS), about 60% of the State's electric consumers are now aware of electric competition. Overall, 5% of customers, representing nearly 20% of load, had switched from their local utilities to retail service providers as of the end of 2001. Significantly, however, over 25% of the load in the non-residential sector, but only 5% of the residential load, had switched as of that date, as shown in Table 1.

Table 1

RETAIL ACCESS PENETRATION IN NEW YORK STATE, DECEMBER 31, 2001			
Service Area	**Number of Participants Currently Switched**	**Percent of Participants Switched**	**Percent of Electric Energy Load Switched**
Statewide	**349,227**	**4.8%**	**16.6%**
Residential	295,865	4.6%	4.8%
Non-Residential	53,362	5.9%	23.4%
Central Hudson	**224**	**0.1%**	**0.1%**
Residential	122	0.1%	0.1%
Non-Residential	102	0.2%	0.1%
Con Edison	**151,050**	**5.0%**	**25.5%**
Residential	132,140	5.1%	5.7%
Non-Residential	18,910	4.5%	34.2%
NYSEG	**29,406**	**3.4%**	**15.9%**
Residential	21,783	2.9%	4.0%
Non-Residential	7,623	7.1%	27.4%
Niagara Mohawk	**49,452**	**3.2%**	**10.9%**
Residential	40,171	2.9%	1.8%
Non-Residential	9,281	5.9%	15.5%
O&R	**42,577**	**20.4%**	**25.6%**
Residential	37,076	20.6%	22.0%
Non-Residential	5,501	19.0%	27.6%
RG&E	**38,492**	**12.1%**	**27.8%**
Residential	30,829	10.7%	11.7%
Non-Residential	7,663	25.3%	38.0%
LIPA	**38,026**	**3.5%**	**5.4%**
Residential	33,744	3.5%	3.9%
Non-Residential	4,282	3.8%	6.7%

Three utility retail access programs have had substantially better participation than the others: Orange and Rockland (O&R) (26% of the load and 20% of customers have switched); Rochester Gas & Electric Corporation (RG&E) (28% of the load and 12% of customers have switched); and Con Edison (26% of the load and about 5% of the

customers have switched). The switches in the RG&E and Con Edison territories were primarily among nonresidential customers, where customer savings would likely be greater and costs for energy service companies (ESCOs) to serve them might be less, both due to economies of scale. The O&R program, in contrast, has been highly successful with regard to switches of residential customers (22% of residential load has switched). The success for O&R might be particularly attributable to its consolidated billing for ESCOs. O&R has also reduced barriers to customer switching through its "Switch n' Save Program" where retail access customers that contact O&R are provided opportunities to switch to ESCOs and are guaranteed 7% savings for two months. Another important element might be that ESCOs in O&R's territory have conducted aggressive marketing campaigns, including telemarketing campaigns, direct mailings to customers, and door-to-door marketing.

Con Edison also has historically offered a consolidated billing option for ESCOs to use, albeit one in which the ESCO instead of the utility issues the consolidated bills.[2] Con Edison's version of consolidated billing, however, has proved to be somewhat more difficult and costly to implement than most ESCOs have been willing to accept. While there are significantly more residential customers enrolled in Con Edison's program than in any of the other utility programs, they represent only 5% of the company's residential customers, in contrast to the 20% of residential customers switched in O&R's program.

Marketer Participation. There are 26 ESCOs currently selling electricity to retail customers in New York State, including five that are affiliates of incumbent utilities (15 of the 26 provide service in Con Edison's service area). Several of the ESCOs tend to dominate in some service areas, while only one ESCO currently serves customers in RG&E's area, and only two serve customers in Central Hudson Gas and Electric's (Central Hudson) territory. Further, some of the ESCOs limit their services to specific customer classes, with some providing no service for residential consumers. Clearly, the ESCO interest and activity in the State is not evenly dispersed.

Improvement Opportunities. Retail competition stakeholders report that obstacles to switching to retail access for customers (especially residential and small business customers) and obstacles to ESCO participation are numerous. Specifically, these perceived obstacles include: utility rates that are not fully or properly unbundled; the lack of consolidated billing availability throughout the State; high financial security requirements; the volatility of the wholesale market; the continuation of utilities in some competitive functions; and the small size of the available profit margins. Many of these

[2] RG&E also offers a consolidated bill through its "Single Retailer Model" where the ESCOS provide customers with, and bill for, both commodity and delivery service.

barriers are being encountered in other states. Discussed below are initiatives underway in New York to address each of these concerns.

State Policies and Programs to Enhance Retail Electricity Competition.[3] The State has taken a number of actions to promote competition in retail electricity markets. The Public Service Commission (PSC) has opened electric metering in the regulated utility service areas to competition by ESCOs, competitive meter service providers (MSPs), and meter data service providers (MDSP). Moreover, billing will be open fully to competition as soon as the PSC completes work on Electronic Data Interchange (EDI) standards. Uniform Business Practices have been adopted to govern interactions between utilities and competitive suppliers, and modifications are being considered as the need arises. One of the more significant barriers to retail competition has been the fixed backout credits for commodity service provided by competitors that were incorporated into the rate and restructuring agreements of several utilities. The PSC has since directed that the fixed credits be replaced by market-based credits. Identified below are some of the other initiatives and programs that are now underway to enhance retail electricity competition.

- **Competitive Retail Electric Markets Case.**[4] On March 21, 2000, the PSC instituted a proceeding to consider the next steps that should be taken to develop retail energy competition further, including the future role of regulated utilities in providing the energy commodity and other competitive or potentially competitive services. Also being examined are the utilities' future roles with respect to various public benefit programs (*e.g.*, low-income assistance, energy efficiency, research and development) and the utilities' responsibilities as providers of last resort (POLR). The PSC directed that a collaborative process be undertaken to examine these issues, that comprehensive public input be sought, and that a complete range of policy options be delivered in either a consensus report by the parties or a recommended decision.

  On July 13, 2001, the Administrative Law Judges assigned to this case issued a recommended decision (RD). At issue are the future role of the regulated energy utilities in the end-state competitive markets, the actions needed during the transition to foster the development of such markets, and the future of system benefits programs. The RD recommends that the Commission first adopt three

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[3] The discussion in this section relates primarily to policies and programs authorized by the PSC for the regulated utilities. The Long Island Power Authority is also considering initiatives to enhance its retail access program.

[4] Case 00-M-0504, Proceeding on Motion of Commission Regarding Providing Last Resort Responsibilities, the Role of Utilities in Competitive Markets, and Fostering the Development of Retail Competition Opportunities.

overarching goals or principles to be used in guiding the development of competitive markets and to serve as a basis for determining an appropriate long range or end-state competitive model. Those goals are as follows:

1. The provision of safe, adequate, and reliable gas and electric service at just and reasonable rates should be the primary goal, with priority over others.

2. Where possible, all services and products should be provided by competitive markets and not by regulated utilities.

3. The regulation of rates, services, and competitive market activities should be appropriate for the status of the transition (with greater scrutiny being exercised at the outset, and less as the dominant players lose the ability to exercise market power) and for the status of the service provider (with greater scrutiny being exercised over those with greater market power).

Based on these principles, the RD recommends that the PSC adopt as its end-state vision of the competitive markets one in which the utilities no longer provide gas and electric commodity service and are removed from any other market that becomes workably competitive. Before any utility is removed from any market, however, certain preconditions should be met, including a determination that the wholesale and retail markets are operating without the exercise of market power. As a general matter, the judges recommended that a utility not be removed from any market until multiple suppliers offering a variety of products are available for the entire customer class throughout the utility's service territory. The PSC is now considering the case.

- **Unbundling.**[5] For retail competition to proceed effectively, utility rates must be unbundled[6] appropriately to identify costs that can be avoided through the transfer of functions to competitive suppliers. By Order issued March 29, 2001, the PSC instituted a formal "unbundling track" as an extension of the Competitive Markets Case for the explicit purpose of establishing guidelines and principles for the utilities to follow in conducting updated cost of service studies. Those studies will eventually result in the establishment of fully unbundled, cost-based rates for electricity and gas services. The jurisdictional utilities have subsequently filed embedded cost studies and will subsequently file tariff amendments that provide unbundled rates.[7]

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[5] Case 00-M-0504, SUPRA, Order Directing Expedited Consideration of Rate Unbundling.

[6] Unbundling is the disaggregation of the utility rate into its components.

[7] Case 00-M-0504, SUPRA, Order Directing Filing of Embedded Cost Studies.

- **Electronic Data Interchange.**[8] The accurate and timely interchange of information is necessary for retail competition to proceed effectively. In an Order issued April 12, 2000, the PSC required that Electronic Data Interchange (EDI) systems[9] be implemented statewide to facilitate the exchange of retail access data between ESCOs and utilities.

- **Uniform Business Practices.**[10] Most of the participants in retail competition have recognized the need for standardization of business practices among the utility service areas. The PSC, consequently, put in place a set of business practices that most of the participants in retail access in New York State must follow. Utilities, ESCOs, and regulators from across the nation undertook a similar effort during 2000 to create uniform business practices for the entire country. Staff of the PSC assumed a leadership role, participating in a lengthy series of meetings held throughout the country that culminated in a national document for retail access business practices and competitive metering. The PSC is now in the process of harmonizing New York's business practices with the national consensus document. The PSC has also indicated that it will revisit the practices from time-to-time as more experience is gained.

- **Competitive Billing.**[11] Consumers have expressed a strong preference for the convenience of a single or consolidated bill for their utility services rather than having to pay separate bills for each service received. This preference, coupled with the PSC's commitment to push for competition wherever practicable, led the PSC on March 22, 2000, to order the major electric and gas utilities to file tariff amendments to accommodate the wishes of retail access customers who prefer to receive single bills from either their utility company or from their ESCO. Then, on April 25, 2001, the PSC adopted a set of uniform billing and payment processing practices to be incorporated into the utility tariffs, operating procedures, and billing service agreements of the large electric and gas distribution utilities in the State. The practices were based on recommendations of a national working group, as well as practices developed individually by the utilities and feedback from interested parties. The PSC also adopted individual billing backout credits[12] and billing service charges representing prices that

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[8] Case 98-M-0667, In the Matter of Electronic Data Exchange.

[9] EDI is the computer-to-computer exchange of routine business information in a standard form. In a retail access environment, examples of "routine" transactions include switching customers from one supplier to another and the exchange of customer history, usage, and billing data.

[10] Case 98-M-1343, In the Matter of Retail Access Business Practices.

[11] Case 99-M-0631, In the Matter of Customer Billing Arrangements.

[12] "Backout credits" are the amounts by which utility charges for a service are to be reduced as customers procure that service from competitors instead of from the utility. These amounts are "backed out" of the utility charges.

utilities could charge ESCOs if they were asked by ESCOs to issue the consolidated bills.

- **Competitive Metering.**[13] Metering and metering services represent potentially competitive activities that historically have been performed only by utilities. On June 16 and September 15, 1999, the PSC issued Orders requiring that competitive metering services be made available for about 40,000 large New York State customers with peak demands of at least 50 kW. It also directed utilities to unbundle metering and provide a backout credit to participating customers. The tariffs have now been approved, and five competitive entities have so far received approval as MDSP in New York State.

- **Environmental Labeling.**[14] ESCOs are able to differentiate the commodities or products they offer according to the sources of their generation, which should further enhance retail competition. Opinion 98-19, issued December 15, 1998, approved an environmental disclosure mechanism that will provide customers with verified data on the fuel mix sources and average emissions rates for the generation sources that their suppliers have used to meet their energy supply requirements. The first environmental labels were included in customer bills in early 2002.

- **Photovoltaic Law and Net Metering.** In August of 1997, the New York State Legislature amended the Public Service Law to add a new Section 66-j requiring utilities to provide for net metering of residential photovoltaic (PV) systems with a generating capacity of 10 kW or less. Subsequently, in February 1998, the PSC instituted uniform interconnection standards for these systems and ordered the utilities to file tariffs implementing the requirements of the statute. Through other legislation, customers can also obtain tax credits for a portion of the cost of installing PV systems.

- **Distributed Generation.** Distributed generation, including combined heat and power (CHP) applications, offers customers the promise of increased electric reliability, power quality, efficiency, and affordability, while potentially reducing supply and distribution costs. NYSERDA, the PSC, and the U.S. Department of Energy hosted a CHP workshop in Albany in 2001 for the purpose of providing a perspective on the economic and environmental benefits of the concurrent production of electrical and thermal energy, and identifying the barriers the CHP industry faces. Key governmental and private sector officials participated in the workshop. The PSC also extended and expanded the system benefits charge (SBC) in 2001, providing funding of $67 million over the next five years to

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[13] Case 94-E-0952, Competitive Opportunities Regarding Electronic Service, Order Providing for Competitive Metering.

[14] Case 94-E-0952, SUPRA, Opinion and Order Adopting Environmental Disclosure Requirements and Establishing a Tracking Mechanism.

improve the viability of distributed generation and CHP as economic energy options in New York State. The PSC's proceeding to investigate generic principles for designing equitable stand-by service delivery rates for customers with interconnected generation facilities has recently concluded. The decision approved a protocol for special "standby rates." Such rates will apply to distributed generation customers who remain connected to their local utility system for backup power. The guidelines rely on a more cost-based approach to charging for delivery service than rates that had previously applied to standby customers.

In a related proceeding, the PSC authorized a three-year distributed generation pilot program to begin in 2001. Its purpose is to provide for the objective and timely consideration of distributed generation projects as a resource in the delivery system planning processes. The decision establishes a process for utilities to award a set number of contracts for distributed generation projects that could take the place of delivery system construction.

- **Interconnection Standards.** In December 1999, the PSC issued Standard Interconnection Requirements to streamline and facilitate the process for the installation of distributed generation of 300 kW or less operating in parallel with radial distribution systems. The standards were formally revised in November 2000 and another revision is planned for the near future. Contained in the standards is a "type testing" procedure to allow manufacturers to submit their equipment for testing. This will classify equipment as utility grade and thus acceptable for use at the grid interface point. Several units have now been listed as type tested, most of which are inverters for use in photovoltaic systems. It is intended that the standards promote an increase in on-site generation through a simple, quick, and well-defined application process and allow applicants to purchase units from the list of "type tested" equipment.

  Standardized interconnection requirements within network systems and for facilities greater than 300 kW are more problematic due to the technical issues they pose. PSC Staff is monitoring efforts at the national level to establish and standardize interconnection requirements for these types of facilities.

- **Public Outreach and Education.** The PSC's statewide public education program, "**Your Energy. . .Your Choice**", is a key element in the Commission's efforts to introduce retail competition. The goal of the program is to establish and maintain a high level of awareness and understanding so that consumers can make an affirmative decision regarding the new choices available to them.

  The program has used most of the communication tools available and has delivered its message through: (1) an aggressive PSC staff-directed program integrating a broad-based media campaign with a wide variety of grass roots educational initiatives; and (2) a concerted effort to encourage active utility customer education programs. Particularly important to these efforts have been

numerous partnerships, combining the efforts of State and local government agencies, utilities, energy service companies, business and consumer groups, and other service providers.

The PSC has also conducted annual surveys of residential and business customers to monitor awareness, understanding, attitudes, and informational needs. General awareness of retail competition has remained fairly steady at approximately 60% of those surveyed, but an equal percentage implies that they do not yet have enough information on which to make a choice. Despite the continuing need for more information, most consumers believe they will benefit from competition.

In summary, important steps have been taken and the mechanisms have been established to support greater retail choice in New York State. As new supplies of electricity become available in 2004 and 2005, as is now projected, and as the initiatives discussed above progress, competition should become more viable for both customers and ESCOs.

New York State Wholesale Market

The Transition. In the mid-1990s, New York State developed a framework for restructuring the wholesale electric market. In the restructuring plans developed by the individual utilities, the utilities agreed to divest most of their generating stations, selling them through an auction process. The parties also agreed to create an Independent System Operator (ISO) to supersede the then-existing New York Power Pool. The ISO would be a not-for-profit organization with responsibility for administering the State's wholesale energy markets and operating the State's high-voltage electric transmission system, in accordance with reliability standards adopted by the New York State Reliability Council (NYSRC). The Federal Energy Regulatory Commission (FERC) eventually approved these proposals, with modifications, and on December 1, 1999, the New York Independent System Operator (NYISO) officially began operations.

In 2000, Staff from the DPS interviewed parties that deal routinely with the NYISO, reviewed the NYISO's operations, and subsequently developed a series of recommendations to help the NYISO operate more efficiently and effectively. The NYISO has implemented many of the recommendations and is developing solutions for other identified problems as well.

The first two years of operation of the competitive wholesale market in New York State were marked by sharp increases in the prices of fuel and tight supply conditions in some regions of the State, largely resulting from transmission congestion and a lack of construction of new generation in the previous years, and an unanticipated increase in

demand (during this time, New York's economy was expanding rapidly). In response to these developments, the State, in cooperation with the utilities and other interested parties, encouraged the following to lower wholesale prices: adding new generation, upgrading transmission capacity, using energy more efficiently, enhancing customers' ability to respond to price changes, and improving the efficiency of NYISO operations.

Controlling Market Power. Market power is the ability of a single firm, or a group of firms acting jointly, to raise prices or restrict output beyond levels that would be expected if the market were fully competitive. To prevent the exercise of market power, the State has encouraged ownership of generation by multiple organizations, and the utilities have now sold most of their generating stations. The PSC examines new power plant proposals and merger petitions for potential market power issues. The Hierfandahl-Hirschman Index (or HHI), which measures the concentration of players in an industry, is one tool used to measure market power (scores over 1,000 are considered to be a potential problem; scores of over 1,800 are considered to be a potentially serious problem). New York's wholesale electric market's HHI value is less than 1,000 (for the entire State as a single theoretical market), which reflects the existence of acceptable competition potential. New York, however, does have pockets where concentration of ownership is an issue, either on a geographic or temporal basis. This is especially true in the New York City area. Consequently, the NYISO established specific in-City market power mitigation rules that govern the New York City electricity generators. These rules attempt to prevent generation owners in New York City from taking advantage of the limits on transmission of outside power into the metropolitan areas to exert market power on wholesale electricity markets.

The NYISO has also developed automated procedures (Automated Mitigation Procedures, or AMP) to prevent market abuse during times when day-ahead energy prices rise above $150/MWh. At such times, suppliers' bids are automatically reviewed to determine whether they are $100 or 300% higher than an energy reference price[15] and, in addition, the inflated bids could cause a price impact of $100 or more. While the AMP mechanism does not eliminate price spikes due to shortages, it mitigates attempts to inflate bids and exert undue market influence.[16]

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[15] Reference prices are computed based on the lower of the mean or median of the previous 90 days of accepted bids and are adjusted for fuel price changes. In instances where the AMP determines that a unit is economically withholding electricity in the day-ahead market, the unit's bid price is subject to being changed to its day-ahead reference price.

[16] A recent NYISO filing with FERC is intended to expand the application of the in-city mitigaton rules to more New York City generators and to the real-time market for New York City and make them more consistent with the rules for the rest of the State.

Wholesale Prices.[17] In New York State, electricity demand is greatest during the summer as customers rely on electrical air conditioning equipment for cooling. When demand is lower during other times of the year, only the most efficient, and thus cheapest to operate, electicity generators will typically be used. As demand increases, less efficient, and thus more expensive to operate, generators will then be required. The result is that, on average, wholesale prices will typically be greatest during the summer months. On an hourly basis, the highest peak prices can be expected at certain hours in the summer.

Prior to the December 1999 start-up date for the NYISO, and the power exchange operated by the NYISO, the wholesale electricity market consisted generally of bilateral contracts of varying lengths. The wholesale prices set by these contracts were not posted in any one place, were sometimes confidential, and were not easy to interpret or compare, especially if the contracts included delivery or other services. In addition, most of the electricity generation in New York State was owned by the utility companies or the New York Power Authority (NYPA) and supplied directly to customers at the utilities' regulated rates, which did not necessarily represent true wholesale market costs. As such, there were no formalized wholesale clearing prices to compare with the wholesale prices now available. However, it is intuitive that, because of the sudden increase in the price of natural gas used by many generators and the unavailability of the Indian Point 2 nuclear power plant, the wholesale spot market energy prices in the summer of 2000 were significantly higher than would likely have been visible if a power exchange had existed in prior years. Consequently, while the year 2000 wholesale energy prices may not have been typical, they are the only factual data available to use as a starting point for an analysis of future trends. As will be shown below, wholesale electric energy prices have decreased from the higher year 2000 levels, and the projections of this State Energy Plan are that they will continue to decrease.

Wholesale spot market prices for summer 2001, on average, decreased compared with the summer of 2000 in the New York City and Capital District areas, but increased in the western part of the State, as shown in Table 2.

[17] The data presented here is for wholesale spot prices in New York State. Transition contracts and other bilateral wholesale contracts are not presented. The intent of this section is to show trends in the spot market.

Table 2

WHOLESALE ENERGY PRICE CHANGES IN NEW YORK STATE			
Region	**Summer 2000**	**Summer 2001**	**% Change**
New York City	$57.6/MWH	$52.6/MWH	9% decrease
Capital District	$54.0/MWH	$45.2/MWH	17% decrease
Western NY	$32.5/MWH	$39.1/MWH	19% increase

DPS Staff have analyzed these data to determine the extent to which these changes are due to fuel prices, changes in load level, or the availability of generation. Differences between the conditions present for the two summers that caused price decreases in the New York City and Capital District areas were: a decrease in natural gas prices (17% decrease on average); the availability of generation from Indian Point 2 nuclear plant during the summer of 2001 after being unavailable the previous summer; the addition of about 450 MW of gas turbines installed by NYPA for the summer of 2001; an increase in the rating of LIPA's cross-sound cable to Long Island; and implementation of demand reduction programs during the summer of 2001. Increases in the Western New York area were generally due to two factors: increased loads caused by hotter weather, which resulted in fewer than normal hours in which low-cost coal generation set energy prices; and fewer hours in 2001, as compared with 2000, in which the transmission constraints depressed Western New York prices.[18] The result, as can be seen from the data above, was that the difference in wholesale prices between Western New York and the Capital District area narrowed between 2000 and 2001 (lowering the Capital area prices and increasing the Western New York area prices).

While no one can accurately predict wholesale electricity prices over the planning period, use of a production simulation model can provide some insights. Based on the assumptions and the "Forecast" described later in this Assessment, this Plan forecasts that the running cost of electricity generation statewide should generally decline in real terms as new generation is added during the planning period, which should similarly influence wholesale prices. Table 21, provided later in this Assessment, shows the relative wholesale electricity real price changes one might expect over the planning period, relative to 2002.

[18] Transmission constraints often limit west-to-east energy flows across New York, reducing Western New York prices while increasing Eastern New York prices. NYPA's installation of the first phase of its convertible static compensator (CSC), a flexible alternating current transmission system (FACTS) at its Clark Energy Center in Marcy, reduced the constraint. Completion of the second phase in 2002 will further ease the constraint.

Market Rules and Procedures. Participants in New York's wholesale electric market have identified a number of inefficiencies resulting from the way rules and procedures had been written and from less than optimal software implementation. The NYISO and other parties have been working to correct these problems. For example, the NYISO began offering virtual bidding in November 2001. Virtual bidding gives marketers that do not have physical generation or load in New York the ability to buy and sell energy on the NYISO's spot markets. This practice is expected to increase trading and bring market prices closer together.

Among the more intractable problems identified so far are "seams issues," which refer to problems created by differences in the scheduling and dispatch rules between neighboring ISOs. Some generators took advantage of these discrepancies to increase their profits. The most egregious of these problems, however, have now been corrected.

Having separate, adjoining ISO territories, as is now the case, can also lead to inefficiencies in each ISO's internal scheduling. For example, in some cases, due to loop flows of electricity, the best solution to a congestion problem would be to start up or adjust the schedule of a generator in an adjoining ISO territory. The ISOs in the Northeast have been investigating methods to more cooperatively to deal with this type of situation.

FERC has also suggested that competitive market efficiencies might be enhanced if markets could be combined to eliminate the seams. Further centralized scheduling of transactions, and the ability to share reserves among ISOs, have the potential to make the electrical systems operate more efficiently. Consequently, in July 2001, FERC issued an Order to begin a process to develop a single Northeast Regional Transmission Organization that would include the New York, New England, and the Pennsylvania-New Jersey-Maryland (PJM) ISOs. The ISOs, the states, and interested parties thereafter began to evaluate options to respond to the FERC Order.

New York State supports FERC's attempt to establish a regional common market in the Northeastern United States to run the daily power markets and oversee the flow of electricity. While states in the Northeast have previously been working to resolve "seams" issues that inhibit economic exchanges of power, the FERC Order should expedite that process and hasten the resolution of those issues. Over time, the regional common market approach will strengthen the reliability of the system, promote better transmission planning, and result in wholesale prices for electricity that reflect the most efficient operations.

A well-functioning regional common market should include in its planning process ample opportunities for market-based generation and transmission projects but should allow the regional common market flexibility to provide the proper incentives to implement cost-based transmission solutions necessary to ensure system reliability. Consumers will benefit from enhanced competition that would result from larger markets, but the pursuit of savings cannot come at a cost of degraded reliability. Maintaining reliability standards must be the highest priority.

In the process to develop a Northeast regional common market, New York State proposes that certain principles be established. Those principles include:

- System reliability is a paramount concern for state regulators. The new system must be designed to incorporate local requirements and to ensure that short-term economic pressures do not shortchange the reliable operation of the system. Until a more optimal system is developed, the current configuration of three physical control areas should be maintained.

- Consumers must be protected through effective market monitoring and mitigation in those areas where competition is inadequate.

- A body fully empowered to act by the regions should quickly work to identify the "best practices" of these markets so that uniform, regional rules can be in place as quickly as possible, consistent with the need for a safe and reliable transition.

- The work to pursue efficient commerce across the Northeast, which began in 1999, must continue during the transition to a regional common market.

- There should be a single, independent governing body that provides mechanisms for effective input from all of the stakeholders while maintaining the independence to act in the public interest.

- State regulators should have a meaningful role in the development and operation of a regional common market that reflects their responsibilities in siting of generation and transmission resources, local reliability, market monitoring, and protection of consumer interests.

In January 2002, the New York and the New England ISOs announced their intent to file a petition at FERC to form a common market for the two regions (*i.e.*, without PJM). If a regional common market that encompasses the entire northeast region, as FERC had originally proposed, is not possible, the Planning Board believes that approval of a New York/New England ISO should be predicated on the adoption of a regional energy market throughout the northeast region, including PJM.

Expected Resources. As previously noted, wholesale electrictiy prices should decline in real terms as new resources are added to the system. Below is a discussion of the various options available for adding new resources.[19]

- **Article X Projects.** Major electric generating facilities of 80 MW or greater must be authorized by the New York State Board on Electric Generation Siting and the Environment (Siting Board) under Article X of the Public Service Law. The first Article X proceeding began in 1998 with the filing of an application for the Athens Generating Plant. As of May 1, 2002, 24 Article X power plant projects have been announced formally, for a total of over 15,000 MW (see Table 3).

  Article X Siting Boards have approved seven projects that could add a net total of 3,626 MW to the New York system.[20] Decisions on the other projects should occur in 2002 and 2003, and one or more of the certified projects could be completed as early as 2003. Most of the other projects, those approved and those currently under active review, if carried forward, could become operational in the 2004 to 2006 time frame (but some delays or additional cancellations could occur if the developers consider market or financing conditions to be unfavorable).[21]

  The Article X power plant siting law remains in effect until January 1, 2003. As noted in the "Promoting Energy Industry Competition" issue paper (Section 2.1 of this Energy Plan), the Planning Board recommends that the Law be extended.

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[19] The NYISO requires that load serving entities (LSEs) provide a schedule of resources sufficient to meet their load and reserve requirements or, in the event that LSEs don't procure adequate resources, make deficiency payments. These requirements are intended to ensure that generation resources will be available when needed. The NYISO is reviewing its procedures to ensure that they provide the necessary incentives for electricity resources to be available when needed.

[20] One of the seven projects has recently been cancelled, leaving the remaining six projects at 3,626 MW.

[21] Some delays and cancellations have recently been announced.

Table 3

ARTICLE X PROJECT STATUS (5/1/02)				
			Projected	
Project	**Location**	**Capacity**	**Earliest Service**	**Status**
Applications Filed				
East River	Manhattan	360 MW*	4 Q 2004	Certified
Ravenswood	Queens	250 MW	4 Q 2003	Certified
Athens	Greene Cty.	1,080 MW	3 Q 2003	Certified
Heritage	Oswego Cty.	800 MW	Cancelled	Certified
Astoria	Queens	1,000 MW	3 Q 2005	Certified
Bowline	Rockland Cty.	750 MW	3 Q 2005	Certified
Bethlehem	Albany Cty.	750 MW**	3 Q 2004	Certified
Poletti	Queens	500 MW	3 Q 2004	Hearings Complete
Brookhaven	Suffolk CTY.	580 MW	2004	Hearings Complete
Wawayanda	Orange CTY.	540 MW	2004	Hearings
Orion Astoria	Queens	1,816 MW***	2007	Hearings
Ramapo	Rockland Cty.	1,100 MW	2 Q 2004	Hearings
Kings Park	Suffolk Cty.	300 MW	3 Q 2004	Hearings
Spagnoli Road	Suffolk Cty.	250 MW	2004	Hearings
Glenville	Schenectady Cty.	520 MW	2 Q 2005	Hearings
Besicorp	Rensselaer Cty.	510 MW	3 Q 2004	Application Stage
Sunset	Brooklyn	520 MW	Unknown	Application Stage
Torne Valley	Rockland Cty.	827 MW	Unknown	Withdrawn
Pre-Application Reports Filed				
Grassy Point	Rockland Cty.	550 MW	Unknown	Inactive
Twin Tier	Tioga Cty.	520 MW	Unknown	Inactive
Preliminary Pre-Application Scoping Statements Filed				
Indian Pt Peaking	Westchester	330 MW	2004	Scoping Statement
TransGas	Brooklyn	1,100 MW	Unknown	Scoping Statement
Caithness	Suffolk Cty.	750 MW	Unknown	Inactive
Oak Point	Bronx	1,075 MW	Unknown	Inactive

Notes:
*less 164 MW replaced yields 196 MW net increase
**less 400 MW replaced yields 350 MW net increase
***less 1,254 MW replaced yields 562 MW net increase

- **Non-Article X Supply Options.** In the near term (2002 and 2003), until new base load combined-cycle generation comes into service, the State will rely primarily on additional simple-cycle gas turbine generation under 80 MW (and demand reduction programs, as discussed below) to satisfy incremental peak load growth in transmission-constrained areas of the State. Most of the immediate need for generation capacity is on Long Island.

  In September 2000, the DPS established the Pricing and Reliability Task Force (P&R Task Force) to ensure that our State will have reliable supplies of electricity at reasonable prices. The P&R Task Force consists of three specialized teams – the Independent System Operator (ISO) Pricing Team, the Demand and Supply Team, and the Article X Team.

  The Demand and Supply Team's responsibility is to ensure that adequate supplies of electricity will be available until significant new base load generation can be built. The program's focus to meet the 2001 summer peak was satisfied by new generation resources in New York City, including NYPA's installation of approximately 450 MW of small gas turbine capability (less than 80 MW at a given site) in New York City and on Long Island. In addition, peak demand was reduced through the ISO's Demand Reduction response programs. These programs enabled the State to operate during the summer of 2001 without blackouts or brownouts. They also helped to hold down wholesale electricity prices in the State.

  A similar demand and supply initiative is underway to meet the State's reliability requirements for the summer of 2002. To meet 2002 summer peak demand, DPS Staff is working with LIPA, other State agencies, and power developers to facilitate the installation of small electric generation units in the State, primarily on Long Island, and to continue to enhance demand reduction programs.

  Distributed generation and renewable energy resources are also being added to the State's generation energy mix. As noted previously in the "New York State Retail Market" discussion, the State has developed initiatives and incentives to encourage the development of these technologies, has developed interconnection standards for distributed generation, has established guidelines for standby rates for on-site generators, and has required all transmission and distribution owners to include distributed generation in their delivery system planning evaluations.

  With respect to renewable technologies, Governor Pataki has required all State agencies to obtain at least 10% of their power requirements from renewable resources by the year 2005 and 20% by the year 2010. NYSERDA has funded significant research and development work in the area of fuel cells, photovoltaic, wind power, biomass, and other renewable technologies. While such facilities currently make up only a small portion of New York's generation capacity, more will certainly be installed over time. As indicated in Section 1.3 of this Energy

Plan, the Planning Board expects, based on initiatives described in the Plan, the use of renewable energy in the State to increase by 50% by 2020 (from 10% of statewide primary energy use to 15%). Some portion of this increase will certainly occur in the electricity sector.

- **Demand Reduction Options.** In March 2001, the PSC directed the major electric utilities to implement the NYISO's Emergency Demand Response Program (EDRP) and the Day-Ahead Demand Response Program (DADRP). These programs were developed to reduce demand for electricity, to improve overall reliability, and to moderate electricity prices throughout New York State with special emphasis on New York City. The PSC also directed all of the major electric utilities to submit plans to implement their own customer-incentive programs to reduce peak demand, expand the available supply of electricity, and moderate the price of wholesale electricity in the State. The PSC subsequently approved tariff changes implementing the NYISO programs, as well as utility specific programs. These actions allowed utility supply customers, in addition to ESCO customers, to take advantage of new demand reduction programs offered by the NYISO and the utilities. By the end of August of 2001, approximately 680 MW of demand reduction had registered in the NYISO's EDRP, which provided peak demand reductions of 456 MW (per NYISO's 12/4/01 Status Report to FERC in Docket ERR01-3001-000). The NYISO's DADRP similarly provided opportunity for relief during the 2001 summer. There were approximately 171 MW of potential demand reductions registered in the NYISO's DADRP, of which 25 MW of reduction was provided. In addition, the Systems Benefits Charge programs implemented by NYSERDA reduced demand by about 90 MW (these SBC programs enabled a large number of New York energy users to participate in the NYISO and utility programs). Further savings resulted from public appeals, plans developed to reduce the use of electricity by State government facilities during peak periods, LIPA and NYPA initiatives and other utility programs. Overall, statewide demand reductions during the summer of 2001 were approximately 1,665 MW. The PSC also required utilities to prepare detailed public awareness plans describing each company's steps to raise awareness and educate customers regarding the load and capacity situation and outlining actions consumers can take to control their energy use. Particular emphasis was directed toward the business community because that is where the greatest results might be expected in the shortest amount of time.

- **Transmission Options.** Transmission additions and modifications can also impact the wholesale market. The installation of the flexible alternating current transmission system equipment at Marcy, mentioned previously in this Assessment, has already resulted in reduction of transmission constraints. Other such installations might be considered in the future where justified.

  Where new generation is being installed, new lines or interconnections are needed, but new merchant lines from other areas are also being considered.

Currently, only one such project, the Transenergie Cross-Sound Line from Connecticut to Long Island, has been authorized by New York State, but several more are being considered (See the "Transmission" section later in this Assessment).

- **State Actions Option.** There are various mechanisms available to provide a safety net in the event market forces do not provide sufficient demand reduction and supply resources in a timely and effective manner. For example, the Public Service Law authorizes the PSC to direct the utilities to use a variety of means to meet the needs of their customers. NYPA and LIPA, as State Authorities, are also authorized to initiate programs or call for additional resources, as they have both done during the past two years. While these State options remain available, the State will use them only if necessary to protect the public, the environment, and the industry.

STATUS OF UTILITY STRUCTURES/MERGERS

Since 1994, most of the major electric and gas utility companies in New York State have been allowed to enter into holding company structures. This permission was granted as part of the proceedings conducted to open the electric business to competition. These cases also produced extended rate plans wherein rates were either frozen or decreased over several years.

The PSC's policy toward mergers and acquisitions, consistent with the controlling statute, has long been that the merger must be determined to be in the public interest before it can be approved. In past mergers, this has generally meant that the ratepayer must be held harmless in the transaction and also that they should share in any synergy savings resulting from the merger.

The first merger between major electric utilities in New York since the 1940s occurred in 1997. In this transaction, Con Edison acquired Orange & Rockland. As part of the regulatory approval, the rates in the Orange & Rockland service territory were reduced and the company was required to refrain from requesting new rates for an additional two years beyond what it had previously accepted as part of its restructuring plans. Orange & Rockland and Con Edison's gas rates were reduced. Cost savings attributable to Con Edison's electric and steam operation, however, were deferred until the next rate proceeding.

Recently, two additional mergers involving New York electric and gas companies were announced. In September 2000, Niagara Mohawk Holdings, the parent of Niagara Mohawk Power Corporation, entered into a merger agreement with National Grid,

whereby it would become a wholly owned subsidiary of National Grid. National Grid's principal subsidiary, The National Grid Company, PLC., owns and operates the high voltage transmission system in England and Wales. National Grid, through another subsidiary, National Grid USA, also has substantial transmission and distribution operations in the United States following its acquisitions of New England Electric System and Eastern Utilities Associates in early 2000.

The combination of Niagara Mohawk and National Grid more than doubles the size of National Grid's US operations with an electric customer base of approximately 3.3 million. On November 28, 2001, the merger received PSC approval. The Securities and Exchange Commission granted its approval January 16, 2002, and the merger was completed on January 31, 2002.

The merger conditions adopted by the PSC include a reduction in Niagara Mohawk's annual electricity delivery rates of about $152 million (approximately 8%). For a residential customer receiving both delivery and supply from Niagara Mohawk, the proposed 8% delivery rate reduction will result in an overall bill reduction of about 4.6%, on average, based on the current supply price of electricity.

Further, the lower electricity delivery rates will be stabilized under the merger plan for 10 years, subject to limited re-openers and adjustments for external events, such as changes in statutory, tax, or accounting requirements of extraordinary events. The supply costs of electricity provided by the utility to residential and small commercial customers will be stabilized through contracts that hedge the price of electricity.

Other conditions of the merger include the extension of a gas delivery rate freeze, originally approved in 1996, through December 31, 2004, and expansion of gas and electric low-income customer services through the creation of a low-income rate discount program for qualifying customers. Economic development will be encouraged by providing discounts, incentives, and other programs to small commercial and industrial customers designed to attract, expand, and retain businesses in Niagara Mohawk's area. National Grid will also implement a program to encourage marketing of renewable energy, and will modify its practices and rules to facilitate development of distributed generation. A comprehensive service quality assurance program will be established to ensure that Niagara Mohawk maintains quality customer service and service reliability. The rights of Niagara Mohawk's union employees will be preserved under the merger and the rights of the union to represent employees in future negotiations will be recognized. Under the Joint Proposal, all existing, legal, contractual protections of retiree's current pension and benefit programs remain in place.

On February 27, 2002, the PSC issued an order approving the merger of RGS Energy Group, Inc. (parent of Rochester Gas and Electric Corporation), and Energy East Corporation (parent of New York State Electric & Gas Corporation). The merger awaits Securities and Exchange Commission approval. The combined company will be one of the largest, most diversified energy providers in the Northeast, serving nearly 3 million customers, including approximately 1.8 million electricity customers, almost one million natural gas customers, and approximately 200,000 other retail energy customers. The combined company will have annual revenues of approximately $5 billion and nearly $10 billion in assets. Together, Energy East and RGS Energy, through their operating subsidiaries, will serve half of upstate New York. By combining with RGS Energy, Energy East also strengthens their overall presence in the Northeast.

The merger is expected to generate annual cost savings of approximately $50 million, largely from the joint management of Energy East and RGS Energy subsidiaries in areas such as procurement, information systems, and other administrative and general areas. Net merger savings for the five-year period 2002-2006 were allocated among the various operating companies involved in the merger. NYSEG Electric: $75 million; NYSEG Gas: $32 million; RG&E Electric: $29 million; RG&E Gas: $29 million for total net merger savings of $165 million. The companies and ratepayers share the merger savings equally. The merger conditions adopted by the Commission include a reduction in NYSEG's annual delivery rates of about $205 million that commenced in March 2002. RG&E's rates will be settled in its current rate case. In addition to approving the merger, the PSC Order accepted the savings estimate from synergies expected to result from the merger, together with the costs to achieve those savings, for the period of five years following the anticipated closing of the merger. The PSC approved rules of conduct, which include relationships and transactions between operating companies, their affiliates, and third parties. No layoffs are planned as a result of the combination. Both companies have on-going cost reduction programs and, historically, have used reduced hiring and attrition to minimize any workforce effects. NYSEG will continue to offer economic development discounts of $8 million annually. Outreach and education initiatives will continue and the company will continue to comply with its Service Quality and Reliability Requirements.

STATUS OF ELECTRICITY INFRASTRUCTURES

Transmission

The 2001 Load & Capacity Report submitted by the NYISO to the New York State Energy Planning Board indicates that there are 10,805 miles of transmission

facilities in New York State. That report is available on the NYISO website (www.NYISO.org).

These facilities are generally adequate to provide reliable electric system operations now and in the immediate future, but local transmission reinforcements may become necessary in the New York City and Long Island areas. In addition, there are system constraints that limit the amount of electric power that can be transmitted between regions within the State. In particular, there are limitations on the amount of power that can be moved from upstate to downstate, and into either New York City or onto Long Island from surrounding areas. Because the system is operated in a manner that these constraints are not violated, reliability is not jeopardized; but there are economic impacts as evidenced by the normally higher prices in downstate regions compared to upstate/western areas.

New York's existing transmission system facilities, delineated by voltage class and circuit miles, are shown in Table 4. The transmission system limits within New York State at designated internal interfaces points are shown in Table 5.[22]

Table 4

EXISTING TRANSMISSION LINE VOLTAGES (kV) AND CIRCUIT MILES						
Voltage	115 kV	138 kV	230 kV	345 kV	500 kV	765 kV
Miles	6,023	711	1,090	2,660	5	314

Table 5

MAJOR INTERFACE LIMITS	
CENTRAL EAST	3,100 MW
DYSINGER EAST	2,850 MW
TOTAL EAST	6,500 MW
UPNY CONED	5,100 MW
WEST CENTRAL	2,350 MW
SPRBROOK/DUN SOUTH	4,700 MW

[22] Data taken from NYISO 2001 Load and Capacity Report. An "Interface Limit" defines the amount of power that may be transferred from one geopgraphical area to another through all the transmission lines between those two areas. The NYISO has defined several of these "interfaces" and determined the amount of power that may flow across them from one area to another without violating reliability criteria.

While the 2001 Load & Capacity Report mentioned only one new transmission line (a direct current line from Connecticut to Long Island) and the re-building of one 69-kV line to 138-kV operation (near Middletown), various other transmission projects are in the planning stages. While some of these lines would be for the sole purpose of connecting a new generator to the existing transmission system, others are proposed by developers as merchant transmission lines that could provide new links to New York from New Jersey and other areas, including locations in the Canadian Maritime Provinces. Studies of the impact of such facilities on the New York State and Northeast transmission grids are performed by power system engineers and reviewed by the NYISO for acceptability. After approvals are obtained following the NYISO procedures, developers can apply to the PSC for approval under Article VII of the Public Service Law. Whether or not such lines are built will depend in large part on assessments of the likely economic opportunities associated with such ventures and on the engineering and environmental reviews necessary under Article VII. The Article VII process continues to be an effective mechanism for ensuring that such projects are compatible with the environment and meet public needs.

New York State is electrically connected with surrounding states (Pennsylvania, New Jersey, Connecticut, Massachusetts, Vermont) and Canadian provinces (Ontario and Quebec). Because peak loads occur in winter in Quebec and to a lesser extent in Ontario, and in summer in New York State (and New England and PA-NJ), significant amounts of power frequently flow from Canada to New York in the summer and in the opposite direction in the winter. There are frequently significant power flows between New York and PA-NJ for a variety of reasons, including economic transactions (in both directions) and local area support (in both directions). Lesser amounts of power move back and forth with New England for those same purposes. Depending on the construction of new generating plants and new transmission lines in parts of the Northeast, changes in rules set by the FERC, and the possible development of a Northeast regional common market (under FERC orders/approvals), it is likely that New York State will see increasing amounts of power transfers across its borders. Such increases would undoubtedly produce economic benefits and should maintain or increase levels of reliability throughout the Northeast region. Table 6 provides information from the 2001 Load & Capacity Report on transmission capabilities between New York and its neighbors.

Table 6

INTERPOOL TRANSFER CAPABILITIES	
OH-NYISO	2,325 MW
NYISO-OH	1,300 MW
PJM-NYISO	3,150 MW
NYISO-PJM	325 MW
NEPOOL-NYISO	1,600 MW
NYISO-NEPOOL	1,425 MW
HQ-NYISO	2,470 MW
NYISO-HQ	1,000 MW

Efforts are underway to examine ways to increase the transfer capabilities both within New York State and with its neighbors. For example, NYPA has installed the Convertible Static Compensator (CSC), one of the world's most advanced transmission control devices, at its Clark Energy Center in Marcy (Oneida County). Completion of the first phase of the project in 2001 increased transmission capacity by 60 megawatts on the heavily used lines between Utica and Albany and by 110 megawatts to all of eastern New York. When fully operational in 2002, the CSC is expected to permit total increases, including those already achieved, of 120 megawatts on the Utica-Albany lines and 240 megawatts to all of eastern New York. NYPA is investing $35 million in the CSC, with additional funding for the $48 million project from EPRI (the electricity industry's science and technology development organization), Siemens Transmission and Distribution, and about 30 electric utilities and independent system operators in the U.S., Canada, and New Zealand. The CSC is the latest in a series of transmission control technologies known as FACTS (Flexible Alternating Current Transmission Systems) that have been developed by EPRI in cooperation with several electric utilities, including NYPA.

Other efforts are underway to examine existing transmission lines and identify those that are good candidates for the replacement of limiting elements that could increase their ratings. Because numerous in-state transfer limits are in a linear path from upstate to downstate, reinforcement of a single transmission interface may provide only marginal benefit because the next interface on that path will become the next most limiting element for power transfers. Therefore, to move more power from upstate to downstate could require reinforcements over most of the path, not just reinforcing a single weakest link.

Electricity Generation[23]

The landscape of electric power generation in New York State, and the country as a whole, has shifted dramatically in recent years - from a preponderance of generation owned by investor-owned utilities to the present situation where most of the generation in the State is privately owned. Generators now compete directly with each other to supply power. Those generators with access to inexpensive fuels and low cost, efficient technology will compete successfully. Older, inefficient technologies will likely be driven out of the market.

New York has moved from an energy sector that was heavily dependent on coal and oil to a sector that is becoming increasingly dependent on natural gas. Almost all of the new generation proposed to be built in New York State is to be fired with natural gas. In addition, air quality requirements are reducing the operation of existing coal and oil facilities and leading to the retirement of some coal and oil plants. Most of the new combined-cycle gas-fired power plants can achieve efficiencies of greater than 50%, as compared to approximately 33% for existing generation. In some applications, older gas and oil-fired steam plants may be repowered into more efficient combined-cycle plants. While these higher efficiencies can mitigate, to some degree, the excessive demand for natural gas, a significant increase in the use of natural gas for electricity generation can still be expected.

The "capacity mix," by fuel type, that was available in 2000 in New York State is shown in Table 7.[24] Table 8 indicates the "energy mix" by the types of fuels that were used for generation in 2000. As indicated by the tables, both the capacity and energy mixes are distributed primarily among facilities that burn fossil fuels (*e.g.*, natural gas and coal), use the energy from moving water (hydropower generation), or use the energy from fission of uranium (nuclear generation).

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[23] The status and expectations for additional generation were presented above in the "New York State Wholesale Market" section of this Electricity Resource Assessment.

[24] The current "capacity mix" is not significantly different than the 2000 capacity mix.

Table 7

FUEL MIX BASED ON CAPACITY OF NYS INSTALLED UNITS IN % OF TOTAL	
Generators (by Fuel Used)	**2000**
Natural Gas	12%
Oil	11%
Natural Gas/Oil[25]	35%
Coal	11%
Nuclear	14%
Hydropower	15.5%
Other	1.5%
TOTAL	100%

Table 8

FUEL MIX BASED ON ENERGY PRODUCED FOR THE NEW YORK ELECTRICITY SYSTEM In % of Total	
Generation Fuel Used	**2000**
Natural Gas	25.0%
Oil	9.8%
Coal	15.7%
Nuclear	20.1%
Hydropower	15.5%
Other	2.0%
Net Imports	11.9%
TOTAL	100.0%

Other types of generation (*e.g.*, using wind, biomass, or wood), while not providing a large portion of the generation today, are important and will likely expand over time, especially if the goals and recommendations of this State Energy Plan are met.

[25] The natural gas/oil generating units are facilities that are capable of burning either natural gas or oil. Generally, these units will burn natural gas as the dominant fuel.

Fossil Fueled Generation (Natural Gas, Oil, and Coal). In the year 2000, about 79,000 GWh of electricity, or slightly more than 50% of the electricity used in New York State, was produced by fossil fuel-fired generating plants in the State. On a statewide basis, 25 % came from natural gas, 15.7 % from coal and 9.8 % from oil. Over the last 20 years, natural gas usage more than doubled due to price, availability, and environmental considerations. By the year 2020, the State's dependence on natural gas for electric generation could increase to almost 40%.

The changing picture of the State's fuel generation mix can be traced back to the political, environmental, and economic events of the 1970s. In 1970, the federal government enacted the Clean Air Act (CAA), which set National Ambient Air Quality Standards (NAAQS) for the states. As part of this Act, the Federal Environmental Protection Agency (EPA) was established. The U.S. EPA subsequently required the states to prepare State Implementation Plans (SIP) to achieve and maintain the NAAQS. In response, the New York SIP set emission standards for all air pollution sources. For sulfur dioxide emissions, the standard translated into a limit of 0.3% sulfur content in the fuel for power plants burning oil in New York City and Nassau County. This new limit had a significant cost impact for downstate electric customers. The oil embargo of 1973 exacerbated this condition. Moreover, power plants in New York City were prohibited from burning coal in their boilers.

Also in the early 1970s, New York State enacted the Article VIII statute, which required all utilities planning generation additions to file siting applications with the New York Siting Board. These applications were adjudicated in proceedings that attempted to balance the need for the power plants against the plants' environmental impacts. Because of the oil embargo and the uncertainty surrounding the availability of low cost oil, as well as the unavailability of natural gas for newly installed power plants, all applications filed were for nuclear or coal generation. Only one power plant was sited under the Article VIII legislation - the 650 MW Somerset coal plant went into service in 1984. That plant was required by the Siting Board to have sulfur dioxide scrubbers to ensure compliance with the Clean Air Act emission standards.

Just prior to the implementation of the Article VIII legislation, many electric utilities began the process of constructing major steam electric generating facilities and/or applying for the environmental permits required at that time, which resulted in their being exempt from the requirements of Article VIII. These facilities involved approximately 8,500 MW of oil-fired and nuclear generation (Bowline, Roseton, Oswego, Poletti, Northport, Indian Point 2 and 3, and Fitzpatrick). Most of these plants went into service by 1977. Also exempt from the provisions of Article VIII was the Nine

Mile 2 nuclear plant, which went into service in 1988. All of this generation was planned to deal with the power shortages of the early 1970s, which were characterized by frequent brownouts, particularly downstate.

In addition, during the early 1970s, Con Edison and the Long Island Lighting Company (LILCO) installed over 2,000 MW of peaking gas turbines to ameliorate the capacity shortage. Thus, most of the generation that went into service prior to 1985 was planned before the enactment of the Article VIII legislation.

Other watershed events took place in 1978, when the U.S. Congress passed the following legislation:

1. The Public Utility Regulatory Policy Act (PURPA), which required utilities to purchase the electric output of qualified generation facilities at the utilities' projected long run avoided costs;

2. The Power Plant and Industrial Use Fuel Act, which restricted the use of natural gas in boilers. This Act prevented natural gas from being an option for new power plants at the time; and

3. The Natural Gas Policy Act, which focused on a phased-in deregulation of prices of natural gas at the wellhead.

In essence, items 2 and 3 above delayed the effective implementation of PURPA until 1985. By that time, the Power plant and Industrial Fuel Use Act had been rescinded and natural gas prices at the wellhead were completely deregulated. The result, commonly referred to as the "gas bubble", was to make gas available and economic to power plant developers.

With a plentiful gas supply at low prices, New York State saw the emergence of independent power producers (IPPs) who took advantage of the PURPA legislation and subsequent related State legislation. The IPP capacity added from 1985 to the present is slightly over 5,000 MW, with approximately 4,300 MW dependent on natural gas.

In 1992, the State enacted the Article X siting law as the successor to the Article VIII siting statute. Like the Article VIII law, the Article X law requires a thorough environmental assessment. In addition, it requires a determination that the facility will be reasonably consistent with the State's most recent long-range planning objectives and strategies and that it was selected according to an approved procurement process.

With the availability of natural gas, coupled with the development of high efficiency combined cycle technology and the restructuring of the electricity industry, new organizations devoted primarily to development of generation facilities emerged. The first application submitted by such an organization in New York State for approval under Article X was for the 1,080 MW combined cycle power plants now under construction in Athens, New York. The pre-application report was received in late 1997, and the plant and site were certified in June 15, 2000. Construction is now well underway for service in 2003 or 2004. Including the Athens filing, 23 power plant projects subject to Article X have been announced formally, for a total of over 15,000 MW of potential electricity generation capacity. Some of these projects, however, are on hold, some have been abandoned, and decisions to drop others could occur.

Because of recent, large increases in load, reserve generating capacity necessary to ensure reliable operation of the electric system, especially in the New York City and Long Island areas, were projected to be below acceptable levels. Consequently, the New York Power Authority installed about 450 MW of gas turbines at various sites in New York City and on Long Island for 2001. Similarly, LIPA has arranged for the installation of approximately 400 MW of additional gas turbine capacity for the summer of 2002.

Nuclear Generation. Nuclear power plants are a significant contributor to the generation of electricity in New York State. In 2000, about 31,500 GWh of electricity, or more than 20% of electricity used in New York State, was produced by the six operating nuclear power plants in the State. Nuclear power was second only to natural gas (25%) in terms of the relative contribution to electricity production (see Tables 7 and 8 above). Over the last 10 years, nuclear power's contribution to meeting New York's electricity needs ranged from a low of 16% in 1992, to a high of 23%, in 1996 and again in 1999. Nuclear power plants also provide about 5,000 MW of summer electricity generating capacity, which represented nearly 14% of the in-State summer capacity in 2000.

The analysis provided later in this Assessment with regard to nuclear generation facilities suggest that the closure or loss of the State's existing nuclear-powered electric generating capacity would likely result in increased energy prices, increased dependence on fossil fuels, and an increase in emissions of greenhouse gases, acid rain precursers and particulates, and an increase in the need for additional resources to overcome decreased system reliability.

Table 9 provides basic information on each of the six operating nuclear power plants in New York State.

Regulation and Oversight. Nuclear power plants are primarily regulated by the U.S. Nuclear Regulatory Commission (NRC), for purposes of protecting public health and safety, and the environment. The New York State Department of Health (DOH) routinely monitors the environment around the nuclear power plants, including milk, water, soil, vegetation, air samples, direct radiation, and milk produced by nearby dairy cows. The New York State Department of Environmental Conservation (DEC) regulates most non-radiological emissions from the nuclear power plants in the State (*e.g.*, State Pollution Discharge Elimination System, Air Permits, RCRA).

Table 9

Operating Nuclear Power Plants in New York State[1]					
Name	**Type**	**Owner/ Operator**	**Size (MWh)**	**Date of Initial Commercial Operation**	**Date of License Expiration**
Indian Point 2	PWR	Entergy Nuclear Opeations, Inc.	951	1974	2013
Indian Point 3	PWR	Entergy Nuclear Opeations, Inc.	965	1976	2015
James A. FitzPatrick	BWR	Entergy Nuclear Opeations, Inc.	813	1975	2014
Nine Mile Point 1	BWR	Constellation Nuclear, LLC	565	1969	2009
Nine Mile Point 2	BWR	Constellation Nuclear, LLC. LIPA also owns 18%.	1,142	1988	2026
R.E. Ginna	PWR	Rochester Gas and Electric	480	1970	2009

[1]Information obtained from United States Nuclear Regulatory Commission (NRC) Information Digest,

The PSC has historically regulated nuclear power plants in terms of their participation in New York's electricity system, primarily through regulation of utility rates and operations. However, since the issuance of the last Energy Plan in 1998, five of the six operating nuclear power plants in New York State have been sold to non-utility electricity generating companies and now participate in the competitive wholesale electricity market.

Relicensing.[26] The Atomic Energy Act and NRC regulations limit commercial nuclear power plant licenses to an initial 40-year term but also permit such licenses to be renewed. As plants have begun to approach the expiration of their initial licenses, the NRC established the regulatory requirements (10 CFR Part 54) and associated review process for extending licenses for an additional 20 years. Such license extensions are predicated on a finding by the NRC that the particular plant seeking extension can and will continue to operate in a manner that fully protects public health and safety, and the environment. The review process includes extensive opportunities for public participation.

As of the preparation of this Assessment, eight of the 103 operating nuclear power plants in the United States had already received license extensions and several more have initiated the process to obtain such extensions. The Nuclear Energy Institute, a nuclear industry trade organization, has stated that virtually all operating U.S. nuclear plants will eventually apply for license extension. Table 9 includes both the date of initial operation and the current date of license expiration for New York's nuclear power plants. RG&E initiated discussions with the NRC in March 2002 regarding the potential relicensing of its Ginna nuclear power plant.

Waste Generated by Nuclear Power Plants. During normal operations, nuclear power plants produce radioactive waste products that require special handling and disposal, including low-level radioactive waste and spent nuclear fuel. Low-level radioactive waste includes items that have become contaminated with radioactive material or have become radioactive through exposure to the nuclear reaction process. This waste typically consists of mildly radioactive or contaminated protective clothing, rags, filters, reactor water treatment residues, equipment and tools. However, it can also include highly radioactive reactor components. Low-level radioactive waste is typically stored on-site by licensees until sufficient quantities are accumulated for shipment to a waste processor or an approved low-level radioactive waste disposal site. There are currently two low-level radioactive waste disposal facilities in the U.S. that accept waste from New York's nuclear power plants: the Chem-Nuclear facility in South Carolina; and the Envirocare facility in Utah. The South Carolina facility is the host disposal site for the Atlantic Interstate Low-Level Radioactive Waste Compact, whose other members are Connecticut and New Jersey. As part of the terms of the Compact, access to the

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[26] In formulating a Reference Resource Scenario for this Electricity Resource Assessment, it was assumed that all operating nuclear power plants in New York would continue to operate during the full 20-year energy planning period. In a separate analysis, the potential closing of those plants at the end of their initial license periods, and the impact such closing would have on the State's projected electricity generating capacity reserves is presented later in this Assessment.

Compact's disposal site by low-level radioactive waste generators located in non-compact-member states, including New York, is being phased out and will cease in 2008. The Envirocare facility essentially operates as a commercial disposal facility but cannot currently accept the full spectrum of low-level radioactive waste generated by nuclear power plants.

Spent nuclear fuel is used fuel from a nuclear reactor that is no longer efficient in creating electricity. However, it is still thermally hot, highly radioactive, and must be handled and stored with care. At power plant sites, spent fuel is generally stored in large water-filled pools. Under the provisions of the Nuclear Waste Policy Act of 1982, as amended, the U.S. Department of Energy (DOE) has the responsibility for developing permanent disposal capacity for spent fuel. The Act further specifies that spent fuel will be disposed of in a deep geologic repository and directs DOE to evaluate Yucca Mountain, Nevada as a possible site for such a repository. DOE has been studying the Yucca Mountain site for about 20 years to determine whether it is scientifically suitable for use as an underground repository. Based on the findings and recommendations from DOE, President Bush recently declared that the site is suitable and approved DOE's proceeding with site development. The Governor of Nevada subsequently exercised that State's right, as provided by the Nuclear Waste Policy Act, to veto the President's declaration and the matter is now before Congress which has the authority to override Nevada's veto.

While the Act required DOE to begin accepting spent fuel from commercial nuclear power plants in 1998, DOE has yet to establish the capability to receive spent fuel, either for storage or disposal, and is not expected to be able to accept spent fuel until at least 2010.

As the storage capacity of the nuclear power plant spent fuel pools is reached, plant operators have turned to dry cask storage. These casks are typically steel cylinders that are either welded or bolted closed, providing a leak-tight containment for the spent fuel. Each cylinder is surrounded by additional steel, concrete, or other material to provide radiation shielding for workers and members of the public. The filled casks are usually stored in an open area of the plant site on a concrete pad. Some of the cask designs can be used for both storage and later transportation to an off-site storage facility or permanent repository. Twenty nuclear plant stations around the country have been approved to implement dry cask storage. The FitzPatrick nuclear plant was the first New York plant to utilize dry cask storage. It began moving spent fuel to dry casks in the Spring of 2002 in order to provide sufficient pool capacity for its next refueling, scheduled for the Fall of 2002.

Security. The NRC requires nuclear power plant operators to maintain comprehensive physical protection systems (10 CFR Part 73) including, but not limited to: (1) an armed security force; (2) controlled access; (3) continuous site surveillance; and (4) redundant off-site communications. The NRC regularly inspects and tests such security capabilities. In addition, all New York plants have existing arrangements with the New York State Police and/or local law enforcement agencies to assist on-site security forces when necessary.

Following the September 11, 2001 terrorist attacks on the United States, the NRC ordered all nuclear plants operators to bring their facilities to the highest level of readiness. The NRC has been working closely with plant operators to determine the most appropriate and effective security enhancements and recently codified the actions it expects plant operators to pursue in a generic order issued to all nuclear power plants.

On October 12, 2001, Governor Pataki directed that National Guard troops be used to augment security at New York's nuclear power plants. In addition, the new New York State Office of Public Security, discussed in Section 1 of the Energy Plan, with the assistance of the Federal Bureau of Investigation, conducted an assessment of security at the Indian Point nuclear power plants. That assessment, completed in December 2001, concluded that security at Indian Point is robust and recommended a number of measures that are now being taken to make security even stronger. The NRC is also conducting its own security reviews of all nuclear power plant sites in the country. Additionally, on February 25, 2002, the NRC issued an Order to all nuclear power plant operators to implement additional security measures. Full implementation is to be completed no later than August 31, 2002.

Emergency Preparedness. The NRC and the Federal Emergency Management Agency (FEMA) have established comprehensive emergency preparedness requirements for nuclear power plants which include close coordination between the plant operators and local and state government emergency response organizations. Since 1980, each operator of a commercial nuclear power plant in the United States has been required to have both an on-site and off-site emergency response plan as a condition for obtaining and maintaining a license to operate the plant. On-site emergency response plans are approved by the NRC. Off-site plans (which are closely coordinated with the utility's on-site emergency response plan) are evaluated by FEMA and the results are provided to the NRC. The State participates in emergency drills for these plans, as do all the affected counties. Such drills are evaluated by NRC and FEMA, which agencies have approved the emergency plans for all of the nuclear power plants in the State.

The New York State Emergency Management Office (SEMO) and DOH serve as the lead State agencies for nuclear power plant radiological emergency preparedness. In light of the September 11, 2001 terrorist attacks on the United States, the State requested NRC and FEMA to conduct a comprehensive review of federal planning standards and regulations for emergency plans at nuclear power plants.

Hydropower Generation. See Section 3.3 "Renewable Energy Assessment" for a discussion of hydropower generation. As can be seen by Tables 7 and 8 above, about 15% of the installed capacity in the State was hydropower, and about 15.5% of the energy produced during 2000 was from hydropower facilities. These facilities are an important element of the State's generation mix and are beneficial in providing for a diverse energy mix. Their operation should be continued and, where practicable, expanded.

Other Generation. As shown in Tables 7 and 8, these "Other" forms of generation facilities (which include both renewable and non-renewable facilities that are not conveniently grouped in the previous categories, *e.g.*, wind, biomass, muncipal waste) made up only about 1.5% of the State's capacity infrastructure and provided only about 2.0% of the State's electric energy needs in 2000. Such facilities, which could proliferate over the planning period, particularly if the goals and strategies suggested in this Energy Plan are met, should provide the State with an important contribution in maintaining a balanced, diverse energy mix, a cleaner environment, and a healthy economy.

The greatest contributors to the "Other" generation category currently are municipal waste-to-energy facilities. These are facilities that incinerate municipal solid waste to convert water to steam, which is then typically used in conjuction with a turbine to generate electric power. Incineration technology is relatively mature, and dramatic advancements in technology are unlikely. Of future interest, however, is anaerobic digestion technology, which produces methane from the municipal waste to generate electric power, as opposed to burning the waste to obtain the power. While attempts have been made in the U.S. to develop anaerobic digestion, various obstacles to commercialization still exist.

During the U.S. EPA and NYS DEC Air and Solid Waste permitting processes for waste-to-energy facilities, no significant, unresolvable issues have been identified. Federal standards have reduced the potential for air impacts, and DOH has repeatedly conducted health assessments to ensure the public health is not at risk.

There are ten waste-to-energy facilities operating currently in New York, all of which became operational prior to 1994. In 2000, these facilities in New York represented 260 MW of installed capacity (231 MW net capacity). The facilities sold over 1.9 million MWh of electricity in 2000, representing about 1.4% of electricity sold in New York.

SYSTEM OPERATIONS

The NYISO has the responsibility for the reliable and lowest cost operation of the New York State power system. The NYISO operates the system according to rules and procedures approved by the FERC, which allow it to receive bids from generators and loads and to schedule generators according to the lowest cost combination for the State. This least cost scheduling is done both for a day-ahead commitment of generators and for the real time operation of the system within the constraints of maintaining system reliability at all times.

The NYISO continuously coordinates its operations with each of its neighboring control areas, including New England, PJM (Pennsylvania, New Jersey, Maryland), Quebec, and Ontario. Power flows are scheduled in advance to accommodate economically desirable transactions, and adjustments are made in real time to maintain reliability.

Reliability criteria for the operation of the New York State system are developed and monitored by the New York State Reliability Council. This organization has representatives from each of the transmission owning utilities, other market participants, and independent members. Each of the reliability rules, including local reliability rules, must be approved by this Council, which also has the responsibility for determining the statewide installed generation reserve margin necessary to meet generally accepted reliability criteria.

INFRASTRUCTURE SECURITY

Governor Pataki created the Office of Public Security in October 2001. That office is charged with developing a comprehensive statewide anti-terrorism strategy, including an assessment of the vulnerability of critical infrastructures to terrorist attack. That vulnerability assessment will include nuclear and other power plants, telecommunication systems, gas pipelines, and water systems. Strategies designed to protect these facilities from attack are being developed, and the plans will be augmented to provide rapid restoration of utility service in the event of terrorist attack.

Concurrently, the DPS established the Security Assessment Team to assess regulated utility efforts to maintain system reliability and security. This team is coordinating its activities with the Office of Public Security and appropriate federal agencies. The objective of the Department's team is to analyze each utility's security plans, policies, and procedures relating to the vulnerability and protection of critical utility operational and administrative facilities. The team will also be reviewing longer-term security plans and strategies, and the utilities' abilities to accomplish timely restoration, especially in the presence of biological and chemical agents.

ELECTRICITY LOAD AND RETAIL PRICE FORECASTS

Approach

The long-range forecasts (*i.e.*, through 2021) of electricity demand and retail prices were developed from forecasts prepared by the Department of Energy's Energy Information Administration (EIA) and captured in its *Annual Energy Outlook 2002 (AEO 2002)*. New York electricity demand forecasts are modified from the EIA Electricity Market Module forecast for the New York Control Area (NYCA). The outlook forecast is an estimate of future fuel market conditions, given current demand patterns, approved legislation, and predictable business cycles. The High and Low forecasts are derived from the *AEO 2002* national demand and price forecasts. The High and Low forecasts establish a range within which it is reasonable to believe demand and prices will fall. The High or Low case, does not necessarily infer a high or low demand or price case, but a High or Low Economic case. In the High Economic Case, the U.S. economy grows 3.4% annually, over the forecast period. In the Low Economic Case, the U.S. economy

Load

Growth in peak demand, depicted in Figure 1, is projected to be between 0.75% and 1.23% per year, with an Outlook Case growth rate of 0.92% per year. Growth in total electricity requirements, depicted in Figure 2, is projected to be between 0.76% and 1.32% per year, with an Outlook Case growth rate of 0.99% per year.

Figure 1

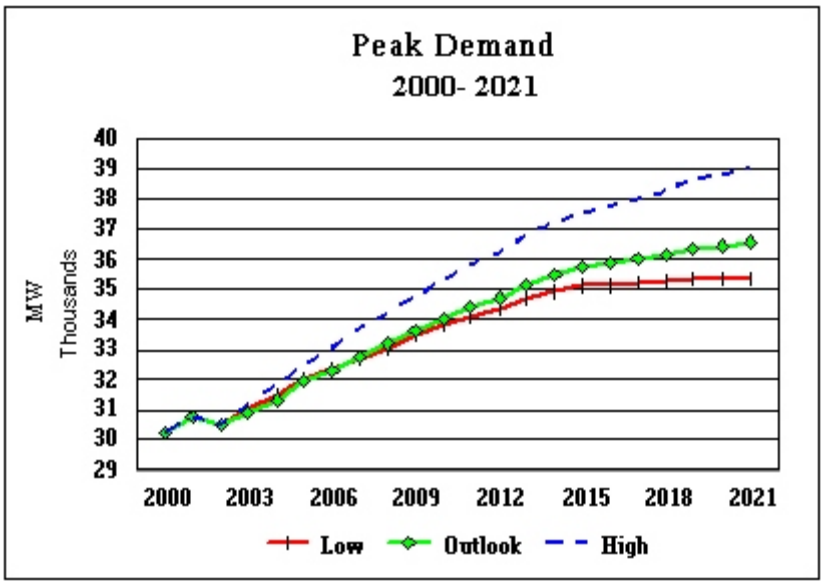
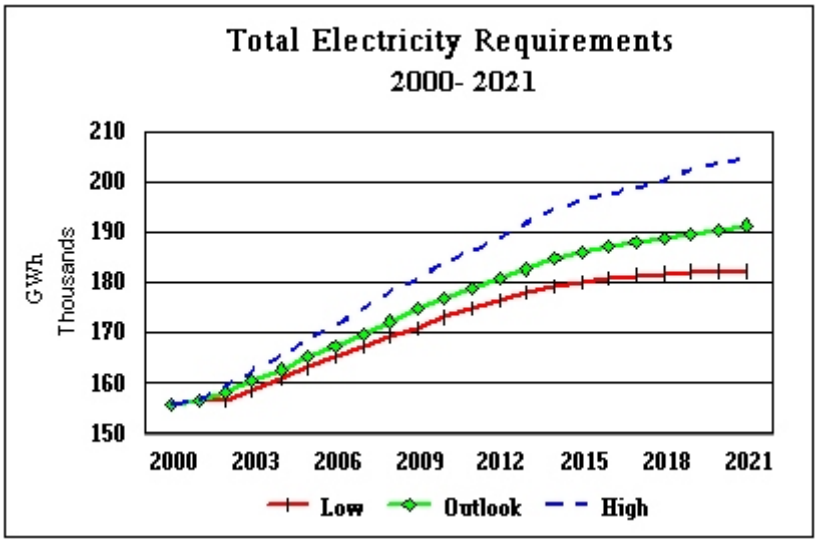


Figure 2



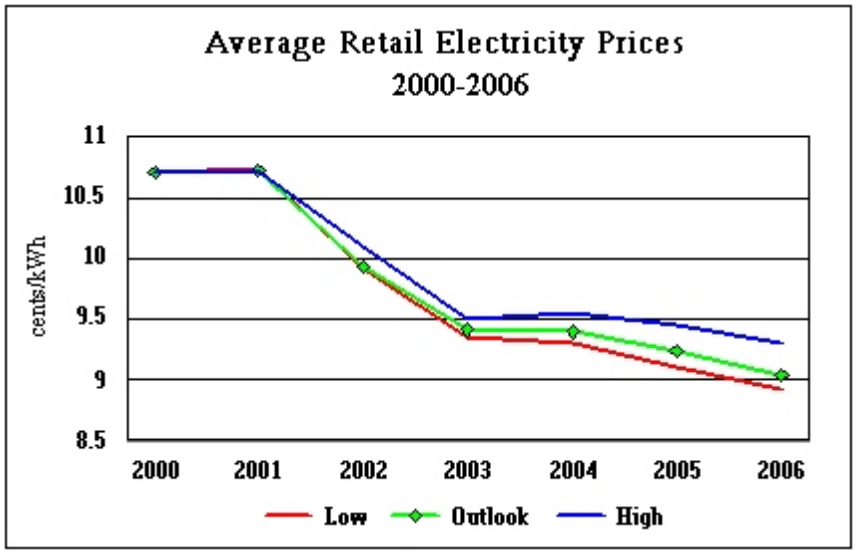
Retail Prices (Energy and Delivery)

During the past several years, the State's electric customers have received the benefits of significant reductions in their electric delivery rates, and these savings will continue to accumulate into the future. Since 1996, the PSC has issued orders that will result in cumulative customer savings of about $6 billion through 2003, with additional annual savings of about $1.5 billion expected thereafter. LIPA has similarly provided over $2 billion in base rate savings so far for its customers.

This section of the Electricity Resource Assessment forecasts average retail electricity prices over the planning period, which would include both the competitive energy and the regulated delivery components of customer bills.

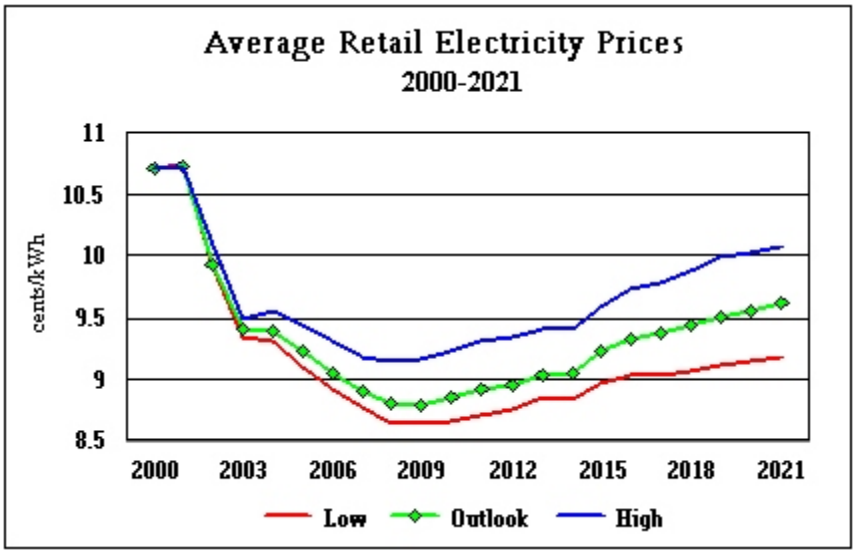
Near-term average statewide retail electricity prices, through 2006, depicted in Figure 3, are projected to decrease by 3.64% per year in the Low Economic Case, 3.36% per year in the Outlook Case, and 2.80% per year in the High Economic Case, in constant 2000 dollars.

Figure 3



Long-term average statewide retail electricity prices, through 2021, depicted in Figure 4, are projected to decrease in constant 2000 dollars by 0.73% per year in the Low Economic Case, 0.51% per year in the Outlook Case, and 0.29% in the High Economic Case.

Figure 4



LONG-RANGE PLANNING SCENARIOS

The Energy Law requires forecasts and assessments over a 20-year period. Accordingly, this section of the Electricity Resource Assessment provides several long-range planning scenarios that provide insights about various possible energy futures and show trends that could occur as a result of decisions made at this time. The scenarios of the Draft Energy Plan were used as starting points for the development of the scenarios presented here, with assumptions modified to reflect changed conditions. Some of the

Draft Energy Plan scenarios, however, were not updated because the basic trends that were shown in the Draft are not expected to changed dramatically and no significant additional information would be derived from an updating exercise. Finally, several additional scenarios were developed to provide information in response to comments received on the Draft Energy Plan. For all the scenarios considered, however, one should understand that they are not intended to serve as an accurate predictor of the future (or even of the present, as some conditions may have changed between the time the analysis was performed and the time of publication) or necessarily to present preferred outcomes. Certainly, conditions will change over time, and some conditions will change based on policy decisions that the Planning Board is making in this Energy Plan.

For most of the scenarios considered below, projected changes in reserve margins, generation fuel use, wholesale electric energy price trends, and air emission trends are presented. For wholesale electric energy price trends, the analyses were based on "locational based marginal prices" (LBMPs) derived from computer simulations of the electric system. While these do not reflect the ultimate prices that would include such elements as ancillary service costs, capacity costs, and NYISO administrative charges, they do provide a reasonable method for comparison of trends resulting from different decisions about the future of the electric system.

All of the scenarios studied include provisions by 2008 to ensure compliance with expected emissions caps resulting from the Governor's Acid Deposition Reduction Program. No further specific system modifications to ensure compliance in the later years of the study period were included in the analyses undertaken here, primarily because plans for such modifications would be extremely speculative at this time. The analyses in this Assessment, instead, are based on assumptions that will provide emissions data in the absence of further emissions controls so that the various scenarios may be compared without the introduction of additional factors. Obviously, while some of the scenarios show emissions that would exceed the expected caps, these conditions would not be allowed to occur in actual practice. At some point, existing units would need to reduce emissions further, cease operations, or purchase emissions credits, if available, all of which would likely impact costs. Alternatively, the increase in emissions might be halted by reductions in demand, introduction of renewable energy technologies, or addition of new, more efficient, non-renewable generation to replace existing, less efficient generation (which would also be needed in most scenarios to maintain adequate reserve margins). Each of these solutions could impact the costs of wholesale energy and ultimately the retail costs for the consumer. All of the strategies will need to be considered over time as the need arises and system conditions become clearer.

No Additional Construction Scenario

As a starting point for analysis purposes, this scenario assumes that no additional generation or transmission, other than those facilities under construction at the time of this analysis or committed through the SBC program (about 2000 MW total), will be installed, no additional benefits from new demand reduction programs will be achieved during the planning period, and about 570 MW of existing capacity will be retired. Under these assumptions, and based on the load forecast presented later, the current statewide reserve margin[27] target of 18% would not be met by 2005 (see Table 10).[28] Additional resources would be needed even before that date if load should increase to a greater degree than projected or some of the expected interim resources do not materialize or are delayed. In particular, this scenario assumed:

1. The fuel price, load, and demand reductions described in the forecast section of this Energy Plan will occur;

2. Only 1,080 MW of additional generation certified under Article X of the Public Service Law, which is currently under construction, will be placed into operation during the planning period;

3. Approximately 693 MW of additional capacity from miscellaneous non-Article X generation will become available in 2002 and 2003 (432 MW in 2002 and 261 MW in 2003);

4. Approximately 222 MW of additional renewables will be added between 2002 and 2006 through use of the System Benefit Charge program;

5. Retirements or deactivation of 60 MW of generation in 2004 and 511 MW in 2005 will occur;

---

[27] Reserve margins requirements (also known as installed reserve margin or system reserve margin requirements) are established by the New York State Reliability Council. The purpose of the reserve margin is to ensure reliability within the control system, that is, a system in which the probability of a customer outage due to lack of supply will be no greater than once in any 10-year period. The reserve margin is determined annually on February 1st, 90 days before the capability year beginning May 1. The reserve margin is defined as the ratio of required excess generation capacity to projected peak load demand within the control area. Currently, the reserve margin requirement for the New York Control Area has been established at 18%. The one day in ten year generation standard assumes that transmission os always available and that normal peak loads occur. Because extreme weather and transmission outages also have a probability of occurrence, meeting the generation standard results in actual probabilities of rolling blackouts that are higher than one day in ten years.

[28] Approximately 5,400 MW of additional resources would be needed by 2020 to maintain the 18% reserve margin requirement throughout the period.

6. All other existing units in the State will continue to operate, with relicensing of all operating nuclear and hydropower units occurring;

7. Firm purchases and sales, as described in the ISO's 2001 Load and Capability Analysis, filed with the New York State Energy Planning Board, will take place; and

8. No additional transmission interconnections, other than the Cross-Sound cable now under construction, will occur to provide for additional power and reserve interchanges.

Table 10

PROJECTED RESERVE MARGINS WITH NO ADDITIONAL RESOURCES										
2002	**2003**	**2005**	**2007**	**2009**	**2011**	**2013**	**2015**	**2017**	**2019**	**2020**
21.6%	21.1%	17.9%	14.8%	11.8%	9.3%	7.0%	5.3%	4.3%	3.5%	2.8%

More importantly, perhaps, is the fact that the necessary reliability requirements in critical load pocket areas such as New York City and Long Island would not be achieved.[29] Clearly, the system would not be reliable under these circumstances. Assuming for analysis purposes, however, that the system, although constrained, would actually function in accordance with this scenario, the following results might be seen.

Capacity and Energy Mix. Table 11 below shows how the system's "capacity mix" might change between the historical reference year 2000 and 2020 under the "No Additional Construction" scenario. Similarly, Table 12 shows how the system's "energy mix" might change between the reference year 2000 and 2020. The tables indicate that the use of natural gas would likely increase as a percentage of the State's energy mix (due in part to the addition of the Athens gas-fired facility and the various gas turbines being installed in the New York City and Long Island area to meet the 2002 and 2003 loads).

[29]As previously noted, an adequate statewide reserve margin does not necessarily translate into adequate reserves for specific areas within the State, such as New York City and Long Island. Efforts are underway to ensure that reliability criteria specific for New York City and Long Island are met for the summers of 2002 and 2003. The projections here assume that those efforts will be sucessful. An analysis of the New York City and Long Island areas is provided later.

Table 11

FUEL MIX CHANGES BASED ON CAPACITY OF INSTALLED UNITS (NO ADDITIONAL CONSTRUCTION SCENARIO)			
Generation Fuel	**2000 (Actual)**	**2002 (Projected)**	**2020 (Projected)**
Natural Gas	11.9%	15.0%	18.2%
Oil	10.9%	10.5%	10.1%
Natural Gas/Oil	34.8%	33.4%	32.6%
Coal	11.2%	10.8%	9.2%
Nuclear	14.0%	13.5%	13.2%
Hydropower	15.3%	14.8%	14.4%
Other	1.9%	2.0%	2.4%
TOTAL	100%	100%	100%

Table 12

GENERATION CHANGES BY FUEL TYPE In % of Total Energy Produced (NO ADDITIONAL CONSTRUCTION SCENARIO)									
Fuel	**2000** (Actual)	**2002**	**2003**	**2004**	**2005**	**2008**	**2012**	**2016**	**2020**
Natural Gas	25%	26.2%	26.9%	29.7%	32.4%	32.2%	33.5%	34.0%	34.4%
Oil	9.8%	5.0%	4.5%	3.6%	4.1%	5.5%	6.2%	7.1%	7.8%
Coal	15.7%	16.9%	16.7%	15.7%	10.8%	10.8%	10.7%	10.8%	10.8%
Nuclear	20.1%	20.6%	20.3%	20.1%	19.7%	18.9%	18.1%	17.5%	17.1%
Hydropower	15.5%	18.4%	18.1%	17.9%	17.6%	16.9%	16.0%	15.6%	15.4%
Other	2.0%	1.8%	1.9%	1.9%	2.0%	2.0%	1.9%	1.9%	1.9%
Net Imports	11.9%	11.1%	11.6%	11.2%	13.5%	13.8%	13.6%	13.2%	12.6%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%

Wholesale Electric Energy Price Changes. Table 13 shows how wholesale electric energy prices (LBMPs in the NYISO lexicon) might change during the planning period under the "No Additional Construction" scenario. The table indicates that, assuming the

electric system would continue to function, wholesale electric energy prices, in real or constant dollars, could increase on average about 40% over the planning period, with the greatest increases downstate (perhaps as much as 47%). These increases would result primarily because existing inefficient generating units would be called upon to operate more often. In addition, because of insufficient reserves, as well as the impact of emission caps, the total wholesale cost of electricity would likely be higher, especially downstate.

Table 13

RELATIVE PROJECTED WHOLESALE ENERGY PRICE INDEX CHANGES[30] (NO ADDITIONAL CONSTRUCTION SCENARIO)								
Transmission Zone	**2002**	**2003**	**2004**	**2005**	**2008**	**2012**	**2016**	**2020**
West	0.79	0.78	0.77	0.84	0.86	0.93	1.01	1.07
Genesee	0.84	0.84	0.81	0.88	0.91	0.97	1.04	1.11
Central	0.86	0.85	0.82	0.89	0.92	0.98	1.05	1.11
Mohawk	0.89	0.89	0.85	0.92	0.95	1.01	1.08	1.13
North	0.88	0.88	0.85	0.91	0.93	0.98	1.04	1.07
Capital	0.94	0.94	0.89	0.95	0.99	1.05	1.12	1.17
Hudson	0.98	0.99	0.98	1.04	1.08	1.14	1.23	1.28
Millwood	0.99	0.99	0.98	1.04	1.07	1.13	1.22	1.29
Dunwoodie	1.11	1.12	1.12	1.13	1.25	1.35	1.47	1.50
NYC	1.00	1.01	1.00	1.05	1.13	1.23	1.34	1.42
Long Island	1.10	1.13	1.16	1.19	1.24	1.34	1.47	1.57
Statewide Average	1.00	1.00	0.99	1.05	1.12	1.21	1.32	1.40

Emission Changes. Table 14 shows how emissions might change during the planning period under the "No Additional Construction" scenario, assuming that no emissions caps were in place. The tables indicate that emissions of SO_2, NO_x, and CO_2 should decline between now and 2005, primarily due to the changes in existing generation that were assumed in an attempt to meet the Governor's Acid Deposition Reduction Program, but then would (without the cap) begin to increase as the existing units are asked to produce more energy for increasing demand.[31] As discussed above,

[30] Indexed to the statewide 2002 weighted average LBMP in constant 2000 dollars. The current 11 transmission zones used in NYISO operations are displayed in this table.

[31] The expected emission caps of the Governor's Program would not be met under this scenario.

wholesale price impacts under this scenario do not reflect the increased costs of compliance with air emission requirements to meet caps for SO_x and NO_x .

Table 14

PROJECTED EMISSION CHANGES (NO ADDITIONAL CONSTRUCTION SCENARIO)								
Emission (000s tons)	**2002**	**2003**	**2004**	**2005**	**2008**	**2012**	**2016**	**2020**
Annual $S0_2$	324.3	317.5	289.6	158.6	164.7	186.1	200.2	209.7
Annual $N0_x$	104.3	101.1	87.7	66.3	72.2	82.8	90.4	95.2
5-Month $N0_x$	40.1	38.0	35.3	30.3	33.6	38.1	42.6	45.0
Annual $C0_2$	59,422	59,422	58,092	52,427	56,749	62,103	66,743	69,991
PROJECTED EMISSION INDEX CHANGES (NO ADDITIONAL CONSTRUCTION SCENARIO)								
Emission	**2002**	**2003**	**2004**	**2005**	**2008**	**2012**	**2016**	**2020**
Annual $S0_2$	1	0.98	0.89	0.49	0.51	0.57	0.62	0.65
Annual $N0_x$	1	0.97	0.84	0.64	0.69	0.79	0.87	0.91
5-Month $N0_x$	1	0.95	0.88	0.763	0.84	0.95	1.06	1.12
Annual $C0_2$	1	1	0.98	0.88	0.96	1.05	1.12	1.18

High Resource Scenario

At the opposite end of the spectrum from the "No Additional Construction" scenario would be a scenario that postulates significantly greater reserves. Such a scenario was provided in the Draft Energy Plan as the "More Generation Sensitivity." It was based on the addition of capacity to the New York electricity system at a pace needed to reach a reasonably high reserve margin level (30%) for the New York electricity system. Based on updated assumptions, the "High Resource" scenario (or the "More Generation Sensitivity") would require about 9,000 MW of resources above the 2,000 MW assumed in the "No Additional Construction" scenario above (approximately 11,000 MW total between 2002 and 2020). If one were to assume that the additional resources would be gas-fired, consistent with current trends, and assume that they would be located in the appropriate locations in the State, the system's capacity and energy mix would show a marked increased reliance on gas-fired generation, wholesale energy prices would decline significantly in real terms throughout the planning period, and emissions would likely be reduced, making compliance with emissions caps less expensive (which

could be reflected in a lower market price). One can question, however, the premise that developers would continue to add generation when reserve margins exceed 18% to such an extent.

Reference Resource Scenario

A more likely scenario is that generation will be built during the next few years to maintain the margin at or somewhat above 18%, but not sustained at the higher 30% level assumed in the "High Resource" scenario. Accordingly, Table 15 below provides the results of a statewide load and capability analysis using one reasonable set of minimum resource assumptions and three different forecasts of peak system loads (low-, mid-, and high-range forecasts, as set forth in the "Electricity Load and Price Forecasts" section in this Electricity Resource Assessment). The resources assumed in this analysis are the same as assumed for the "No Additional Construction" scenario plus others that might reasonably be expected (at the time of this analysis[32]) to be available during the planning period, based on planned projects that have been publicly announced as of this time.[33] For this scenario, 7,139 MW of new resources are assumed to be added during the time period 2002 through 2020 (more than the 2,000 MW assumed for the "No Additional Construction" scenario, but less than the 11,000 MW assumed for the "High Resource" scenario). In particular, the "Reference Resource" scenario includes the same assumptions as previously listed for the "No Additional Construction" scenario except that:

- Instead of only about 2,000 MW of additional generation, 7,139 MW is assumed to be placed into operation between 2002 and 2006 (5,224 MW of Article X projects, 1,000 MW of firm capacity from facilities located outside New York State, 693 MW of small scale generation under construction in New York City and on Long Island, and 222 MW of projects through the SBC program). It should be noted that the existence of a certificate to construct and operate a generation plant does not guarantee that the plant will in fact be built and

[32] Subsequent to this analysis, one approved generation project has been cancelled and there have been indications that some others could be delayed or even cancelled. The "Reference Resource" scenario, however, was designed with an assumption that all the planned units will not be built, and it was not intended to represent the only viable or preferred expansion plan for the State. Even if some projects may ultimately be cancelled or delayed, or if more are built than modeled, or more are retired than assumed, the scenario remains valid as a base or reference for assessing the impacts of the other scenarios presented in this section of the Assessment.

[33] As noted, the "Reference Resource" scenario considers only known projects. It does not provide for additional resources to be added in the later years of the planning period as reserve margins begin to decline. One should expect, however, that such additional resources will be added when they are needed to maintain adequate reserve margins. For the limited purposes of the analyses presented here, however, no such additions are included.

operated. The assumptions for this scenario assume that only about half of the capacity of the plants that have filed for certificates under Article X will be developed. These assumptions, however, should not be interpreted as any prejudgment of particular applications.

- Several new transmission interconnections will take place to provide for power interchanges and installed reserves.

Of course, many other resource scenarios might also be considered, and several such alternatives are discussed later. Further, the existence of an appropriate statewide reserve level does not necessarily ensure that adequate resources exist in every area, or any specific area, of the State. It is clear, however, that the greater the supply of generation in relation to demand (or the smaller the demand in relation to supply), within a reasonable range, the better consumers will likely be in terms of both price and reliability.

New York State Reliability. As can be seen in Table 15, the statewide reserve margins during the planning period might be as high as 33% or as low as 9.6%, depending on the load forecast assumed (and assuming no additional resources are added to maintain an 18% reserve margin). The data based on the Outlook (or Mid-Range) forecast, using the "Reference Resource" expansion scenario, shows that statewide reserve margins throughout the planning period could exceed the 18% level until about 2019 when additional resources would be needed.[34] Reserves could even exceed 33% in the 2005 time frame, but they would decline over time as load increases and no new generation or additional load reduction occurs under this specific scenario. As noted previously, however, these projections are made on a statewide basis; accordingly, conditions in the critical New York City and Long Island area must be examined separately.

New York City and Long Island Reliability. The "Reference Resource" scenario assumes that by 2006 and thereafter, 11,698 MW of generation capacity will be available within (or connected directly into) New York City (NYC) and 5,915 MW of generation capacity will be available on Long Island (LI). Table 16 shows how this capacity is projected to increase from now through 2006 (no additional resources are assumed in the "Reference Resource" scenario after 2006).

[34] Approximately 270 MW of additional resources would be needed by 2020 to maintain the 18% reserve margin requirement throughout the period.

Table 15

PROJECTED RESERVE MARGINS (%) (REFERENCE RESOURCE SCENARIO)											
Forecast	**2002**	**2003**	**2005**	**2007**	**2009**	**2011**	**2013**	**2015**	**2017**	**2019**	**2020**
Low-Range	21.6	20.5	33.0	30.8	27.8	25.4	23.3	21.8	21.4	21.0	21.0
Outlook Mid-Range	21.6	21.1	33.4	30.5	27.1	24.2	21.6	19.7	18.6	17.6	17.3
High-Range	21.6	19.8	31.0	27.1	23.0	19.4	16.2	13.8	12.4	10.8	10.2

Table 16

INSTALLED CAPACITY (MW IN EACH YEAR)								
Location/Year	2002	2003	2004	2005	2006	2010	2015	2020
NYC	8,760	8,974	9,836	11,357	11,548	11,548	11,548	11,548
LI	5,033	5,080	5,230	5,915	5,915	5,915	5,915	5,915

The generation increases shown between 2002 and 2003 are due to the addition of gas turbine units currently being installed at various sites in NYC and on LI, all of which are assumed to become available in time to serve loads. The larger increases for 2004 through 2006 are due to the addition of new or upgraded capacity authorized under Article X of the Public Service Law (see Table 3) or to be provided as firm capacity through proposed additional transmission line interconnections. For the New York City area, the analysis assumes that about 1,600 MW out of about 3,000 MW of new generation capacity subject to Article X will be constructed and in service during the 2004 to 2005 time period. It also assumes that 1,000 MW of additional firm generation capacity will also be available through new transmission interconnections with locations outside of New York City. For the Long Island area, the analysis assumes that about 800 MW out of 1,600 MW of new generation capacity subject to Article X will be constructed and in service during the 2004 and 2005 time period.

As previously noted, the assumptions of the “Reference Resource” scenario are not intended to represent any preferences or predictions concerning which projects might be certified and built. In addition, because of changing circumstances, the assumptions used for this analysis will not necessarily agree with actual conditions at any given time.

They do, however, provide a reasonable basis for undertaking the limited analysis below.

Customer loads in New York City and on Long Island have been projected by the NYISO through 2005 as shown in Table 17. The additional projections through 2020 have been added, for the limited purposes of this analysis, at an assumed 200 MW per year for New York City and 100 MW per year for Long Island.

Table 17

PROJECTED PEAK LOADS (MW in each year)								
Location/Year	2002	2003	2004	2005	2006	2010	2015	2020
NYC	10,665	10,930	11,105	11,245	11,445	12,245	13,245	14,245
LI	4,777	4,939	5,014	5,114	5,214	5,614	6,114	6,614

Under the New York State reliability rules, sufficient installed capacity must be located within the confines of each area (or connected directly to them) to meet the annually calculated locational requirements for New York City and Long Island, currently 80% and 93%, respectively, of the projected loads. As shown in Table 18, these criteria (assuming they remain the same) can be met through most of the planning period based on the projected generation additions and the assumed loads. If the loads should grow faster than assumed, or if less generation (either internal to the areas of connected directly with transmission lines) than projected becomes available, additional resources would be needed sooner than expected. On the other hand, the need date for additional generation in these areas would be extend further out in time if loads grow slower than projected, demand is reduced (either through conservation, demand management programs, or the use of distributed generation facilities to off-set system load), and/or a greater percentage of Article X generation (or transmission interconnections with dedicated generation) becomes operational.

Table 18

PERCENT OF LOAD COVERED BY LOCAL GENERATION (% EACH YEAR)								
Location/Year	2002	2003	2004	2005	2006	2010	2015	2020
NYC (80% Req'd)	82	82	89	101	101	94	87	81
LI (93% Req'd)	105	103	104	116	113	105	97	89

An on-going study funded by the NYSERDA and the NYISO to address the interrelationships of the natural gas and electricity systems is described in the "Natural Gas Assessment" and "Promoting Energy Industry Competition" issue paper sections of

this Energy Plan. The results of that study and the analysis presented in those sections of the Energy Plan indicate that adequate pipeline capacity exists to serve electric generation needs, but that additional pipeline capacity now under consideration will be beneficial for ensuring reliability, allowing for reduced air emissions, and addressing matters that the study did not consider.

To the extent that the proposed new capacity is installed, and/or demand reduction efforts are successful, in a timely manner, the New York City and Long Island systems should continue to provide reliable service through most of the planning period, and emissions from older, less efficient generators will decline. Additional resources, however, will provide benefits to these areas and to the State as a whole through increased reliability, additional emission reductions, and potentially lower energy costs.[35] Finally, many other factors, such as transmission and distribution system maintenance, can affect system conditions. Most of those factors, however, are subject to regulatory oversight, with programs in place to monitor and upgrade such facilities as necessary to ensure reliable service.

Capacity and Energy Mix (statewide). Table 19 shows how the system's "capacity mix" might change between 2002 and 2020 under the "Reference Resource" scenario.

Similarly, Table 20 shows how the system's "energy mix" might change between 2002 and 2020. The tables indicate that natural gas use could increase significantly over the planning period. If this scenario unfolds as described, the State would become more and more reliant on natural gas. The potential for dependency on a single source, even though oil can be a back-up fuel in some cases, needs to be addressed through, for example, increased demand reduction efforts, additional renewables, and new technologies that do not rely on natural gas and oil.[36]

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[35] Wholesale power costs should decline in both New York City and on Long Island as new resources are added, as shown in Table 21 and discussed in the "Wholesale Price Changes" section below. Prices, however, could increase in the near term because of certain methodological changes in the LBMP calculation methodology the NYISO is proposing.

[36] This Energy Plan recommends such actions.

Table 19

FUEL MIX CHANGES BASED ON CAPACITY OF INSTALLED UNITS (REFERENCE RESOURCE SCENARIO)			
Generation Fuel	**2000**	**2002**	**2020**
Natural Gas	11.9%	15.0%	26.2%
Oil	10.9%	10.5%	9.1%
Natural Gas/Oil	34.7%	33.4%	29.4%
Coal	11.2%	10.8%	8.3%
Nuclear	14.0%	13.5%	11.9%
Hydropower	15.3%	14.8%	13.0%
Other	1.9%	2%	2.2%
TOTAL	100%	100%	100%

Table 20

GENERATION CHANGES BY FUEL TYPE In % of Total (REFERENCE RESOURCE SCENARIO)								
Generation Fuel	**2002**	**2003**	**2004**	**2005**	**2008**	**2012**	**2016**	**2020**
Natural Gas	26.2%	26.9%	31.2%	36.4%	37.5%	38.0%	38.8%	39.7%
Oil	5.0%	4.5%	3.1%	1.1%	1.2%	1.5%	2.0%	2.5%
Coal	16.9%	16.7%	15.3%	9.3%	9.0%	9.2%	9.6%	9.8%
Nuclear	20.6%	20.3%	20.1%	19.7%	18.9%	18.1%	17.5%	17.1%
Hydropower	18.4%	18.1%	17.8%	17.6%	17.0%	16.3%	15.8%	15.6%
Other	1.8%	1.9%	1.9%	2.0%	2.0%	1.9%	1.9%	1.8%
Net Imports	11.1%	11.6%	10.6%	13.9%	14.4%	15.0%	14.6%	13.5%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Wholesale Price Changes (statewide). Table 21 shows how wholesale electric energy prices (LBMPs) might change during the planning period under the "Reference Resource" scenario. The table indicates that under this scenario wholesale electric energy prices should decline in real terms in most areas of the State between now and

some point between 2005 and 2008 as new, relatively efficient generation is added to the system, primarily downstate. Thereafter, as load continues to increase, but no additional generation is assumed to be added, wholesale electric energy prices would rise. The table suggests that on average there could be a 5% increase in real energy prices over the planning period if no significant additional generation units are added and no additional demand reduction techniques are employed after the 2004 - 2006 time period. This average is significantly less than the 40% increase expected with the "No Additional Construction" scenario. If additional resources were added in the later years of the planning period to maintain the 18% reserve margin, or to exceed that level as assumed in the "High Resource" scenario, wholesale electric energy prices would likely continue to fall throughout the planning period.

Table 21

RELATIVE PROJECTED WHOLESALE PRICE INDEX CHANGES[37] (REFERENCE RESOURCE SCENARIO)								
Transmission Zone	**2002**	**2003**	**2004**	**2005**	**2008**	**2012**	**2016**	**2020**
West	0.79	0.78	0.75	0.76	0.76	0.80	0.86	0.92
Genesee	0.84	0.84	0.78	0.78	0.78	0.81	0.87	0.92
Central	0.86	0.85	0.79	0.78	0.78	0.82	0.87	0.93
Mohawk	0.89	0.89	0.82	0.79	0.79	0.82	0.88	0.93
North	0.88	0.88	0.82	0.79	0.78	0.80	0.84	0.88
Capital	0.94	0.94	0.85	0.80	0.80	0.84	0.89	0.94
Hudson	0.98	0.99	0.96	0.83	0.82	0.86	0.91	0.97
Millwood	0.99	0.99	0.96	0.82	0.81	0.84	0.90	0.95
Dunwoodie	1.11	1.12	1.03	0.89	0.89	0.94	1.01	1.07
NYC	1.00	1.01	0.96	0.84	0.83	0.87	0.93	0.98
Long Island	1.16	1.13	1.17	0.94	0.98	1.05	1.16	1.25
Statewide Average	1.00	1.00	0.97	0.86	0.86	0.91	0.98	1.05

Emission Changes (statewide). Table 22 shows how emissions might change during the planning period under the "Reference Resource" scenario. The table indicates

[37] Indexed to the statewide 2002 weighted average LBMP in constant 2000 dollars. The current 11 transmission zones used in NYISO operations are displayed in this table.

that significant emission reductions will occur in the early years of the planning period and then increase slightly after about 2008 (assuming no new generation is added that could displace less efficient generation), but will remain significantly below today's levels (except for CO_2, which decreases and then returns to approximately the same level as today).[38] The reductions are due primarily to the modifications of existing units resulting from the Governor's Acid Deposition Reduction Program, the introduction of efficient new gas-fired generation that off-sets existing generation, and new transmission interconnections. The subsequent increases occur because no additional resources are assumed added to off-set the need to use the older, less efficient generation for the increasing loads. Overall, the emission reduction benefits are greater than what would be obtained under the "No Additional Construction" scenario, but would likely be less than under the "High Resource" scenario.

Table 22

PROJECTED EMISSIONS CHANGES (REFERENCE RESOURCE SCENARIO)								
Emission (000s tons)	**2002**	**2003**	**2004**	**2005**	**2008**	**2012**	**2016**	**2020**
Annual $S0_2$	324.3	317.5	276.1	116.5	110.1	123.7	137.7	146.8
Annual $N0_x$	104.3	101.1	81.1	39.1	38.1	42.9	49.8	54.7
5-Month $N0_x$	40.1	38.0	32.2	18.3	18.4	21.7	25.4	27.7
Annual $C0_2$	59,422	59,422	57,778	46,213	48,210	52,705	57,075	60,541
PROJECTED EMISSION INDEX CHANGES (REFERENCE RESOURCE SCENARIO)								
Emission	**2002**	**2003**	**2004**	**2005**	**2008**	**2012**	**2016**	**2020**
Annual $S0_2$	1	0.98	0.85	0.36	0.34	0.38	0.42	0.45
Annual $N0_x$	1	0.97	0.78	0.37	0.37	0.41	0.48	0.52
5-Month $N0_x$	1	0.95	0.80	0.46	0.46	0.54	0.63	0.62
Annual $C0_2$	1	1	0.97	0..78	0.81	0.89	0.96	1.02

At some point during the next ten years, the U.S. electric power industry could face additional requirements to reduce emissions of NO_x, SO_2, CO_2, and mercury. Various "four-pollutant" (or "4-P") bills have been introduced at the federal level that

[38] In the later years of the planning period, system modification would be needed to maintain emissions below the cap, which could impact wholesale prices at that time.

would address all of these emissions simultaneously. The proposed bills vary widely with respect to timing and level of emission reductions for each pollutant. The 4-P approach is an alternative to regulations that would address each pollutant individually. Proponents have argued that a multi-pollutant strategy would lead to lower overall program and societal costs compared to pollutant-by-pollutant policies, and that it would provide greater regulatory certainty and lower industry investment risks.

The 4-P approach was not specifically modeled in the scenarios used for this Energy Plan because of the high uncertainty of timing and levels of control. In addition, there is considerable uncertainty about the cost and performance of mercury removal technologies because full-scale demonstrations have not yet been carried out.

The combination of new natural gas-fired generation capacity and implementation of the Governor's Acid Deposition Reduction Program will go a long way toward helping New York meet the emission reduction targets proposed in the more moderate of the 4-P bills, including emissions of CO_2. The cost and price impacts of reducing mercury emissions, however, are likely to be substantially larger than those of reducing SO_2 and NO_x. Overall, a 4-P bill could result in a substantial increase New York's electricity prices. From an acid rain perspective, this could benefit the State in that upwind State's emissions would be reduced.

Renewable Energy Scenario

As noted in the "Reference Resource" scenario discussion above, options to reverse the trend toward excessive dependency on natural gas need to be found. An option that should be considered is the expanded use of technologies that use renewable fuels (*e.g.*, biomass) or require no fuels (*e.g.*, wind). The "Reference Resource" scenario included a broad spectrum of electricity generation facilities that currently exist or might reasonably be expected to exist, including 222 MW of renewable resource capacity from wind which was based on conservative expectations resulting from the SBC initiatives. This "Renewable Energy" scenario includes all the facilities modeled in the "Reference Resource" scenario, plus an additional 2,278 MW of renewable resource facilities for a total renewable capacity of 2,500 MW. While this additional capacity represents a significant addition to the system, only a portion of it would contribute toward satisfying reserve margin requirements because much of it would not typically be available during peak load period. Even so, the addition of the renewable resources to the "Reference Resource" scenario capacity would provide much of the additional capacity needed in that scenario to maintain an 18% reserve margin during the last several years of the planning period when the "Reference Resource" scenario would otherwise be deficient.

These facilities would also help the State to meet expected emission caps.

The renewable generation technology selected for this scenario was based primarily upon information in the "Renewable Energy Assessment" (Section 3.3 of this Energy Plan). Table 23 lists the types and the cumulative capacity of facilities modeled in the "Renewable Energy" scenario.

Table 23

RENEWABLE ENERGY SCENARIO CUMULATIVE CAPACITY (MW)								
Renewable Category	**2002**	**2003**	**2004**	**2005**	**2008**	**2012**	**2016**	**2020**
Wind	45	195	595	795	1,295	2,045	2,045	2,045
Hydropower	0	35	50	75	110	135	150	162
Landfill Gas	56	61	67	73	77	77	77	77
Fuel Cells	0	0	0	0	10	50	100	150
Wood	0	0	0	36	36	36	36	36
Photovoltaics	1.2	3	5	8	13	18	24	30
Total	102.2	294	717	987	1,541	2,361	2,432	2,500

The following summarizes the "Renewable Energy" scenario assumptions for the respective technology.

- **Wind.** The largest resource addition in this scenario is wind generation. A total of 1,645 MW of wind energy was modeled throughout upstate and 400 MW was modeled off the coast of Long Island, as these areas offer significant potential and promise for wind generators.

- **Hydropower.** The second largest component of renewable capacity is based on hydropower. New York State has numerous opportunities for hydropower development at both existing hydropower facilities and at undeveloped sites. The 162 MW modeled in this scenario is based on retrofitting existing hydropower facilities. Efficiency improvements are currently being made to NYPA's Niagara and St. Lawrence hydropower facilities and are estimated to result in an additional 60 MW of capacity. The remaining 92 MW of additional hydropower capacity was modeled at the older, larger existing hydropower facilities.

- **Landfill Gas.** The 56 MW of landfill gas capacity included in this scenario represents the existing landfill-gas-to-energy projects in New York State that were not included in the "Reference Resource" scenario. The additional landfill

gas capacity was based on studies that identified economically viable landfill-gas-to-energy projects.

- **Fuel Cells.** Currently, the costs of fuel cells limit their market share in the energy sector. As the technology develops, however, the cost should decrease and market share should increase. For this scenario, it was assumed that fuel cells will be most economically viable in 2008 in the highest electricity cost areas of the State (*i.e.*, predominately in New York City and on Long Island). As the technology matures and costs decrease, fuel cells will likely become economically viable throughout the State. For all locations, it was assumed the fuel cells will serve base loads.

- **Wood.** This scenario also assumes one 36 MW wood facility would be constructed in the very northern portion of the State. This location was selected due to the proximity of a vast supply of wood for fuel.

- **Photovoltaics.** The economic viability of a photovoltaic system depends on the relative cost of electricity and the availability of sunlight. For purposes of this analysis, it was assumed that, by 2020, 30 MW of photovoltaic electricity would be economically viable in New York City and on Long Island. While the other nine NYISO regions of the State may be economically viable for photovoltaic systems, it was not included in the analysis because the amount in any single region did not exceed the minimum threshold for modeling.

Generation Mix. Table 24 compares the generation mix of the "Reference Resource" scenario with the generation mix of the "Renewable Energy" scenario (*i.e.*, showing the impact of the addition of the 2,500 MW of renewable capacity). The additional hydropower capacity has been included in the "Hydropower" classification, while the remaining renewable generation has been classified as "Other."

Compared to the "Reference Resource" scenario, by 2020 when all the 2,500 MW of renewable generation is assumed to be operational, the use of natural gas, oil, and coal are reduced by 5%, 38%, and 1% respectively, resulting in a slightly improved fuel mix.

Table 24

Comparison of Generation Mix Based on Energy Produced Between the Renewable Energy and Reference Resource Scenarios In % of Total Generation				
	2002		2020	
Generation Fuels	**Renewable Energy Scenario**	**Reference Resource Scenario**	**Renewable Energy Scenario**	**Reference Resource Scenario**
Natural Gas	26.1%	26.2%	37.6%	39.7%
Oil	4.9%	5.0%	1.8%	2.5%
Coal	16.9%	16.9%	9.7%	9.8%
Nuclear	20.6%	20.6%	17.1%	17.1%
Hydropower	18.5%	18.4%	16.0%	15.6%
Other	2.1%	1.8%	5.9%	1.8%
Net Imports	10.9%	11.1%	11.8%	13.5%
Total	100%	100%	100%	100%

Wholesale Price Changes. In a competitive energy market, generators bid for the opportunity to supply electricity to the bulk transmission system. Certain types of generators operate only when it is cost-effective (*e.g.*, able to vary generation output). These generators are responsive to price and, under certain circumstances, are able to "set the price" for their respective zone. Other generators cannot modify their operations (*e.g.*, nuclear facility operates at a constant rate); those generators operate regardless of the cost to operate. These types of generators are not responsive to price and are "price takers."

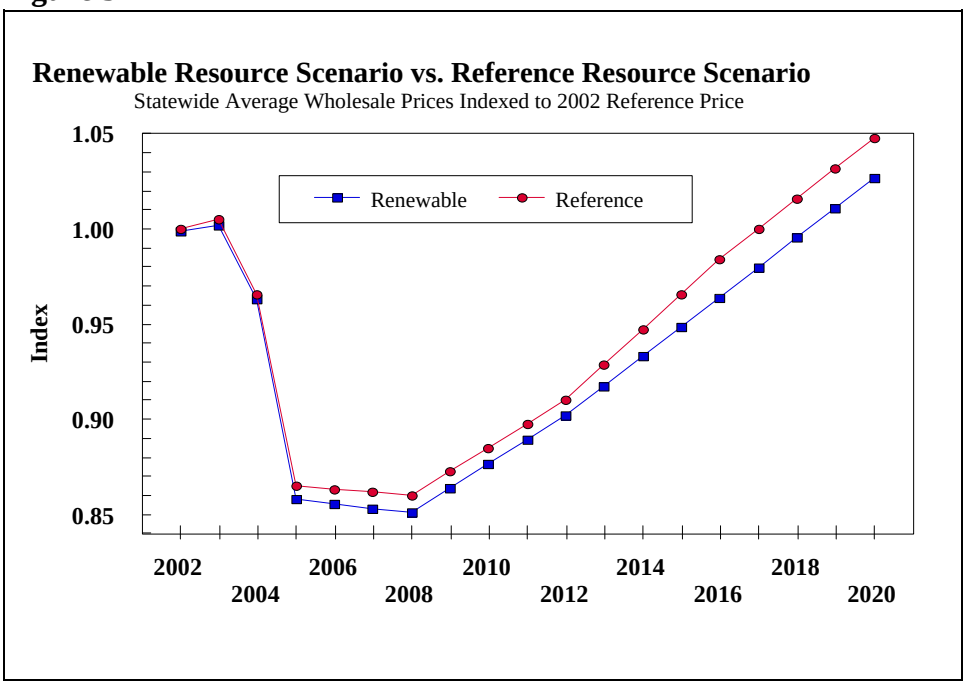
Wind, hydropower, and landfill-gas-to-energy projects are not responsive to price. These technologies are reliant on the availability of their fuel source. For example, wind resources are intermittent resulting in a capacity factor of only about 30%. Within this "Renewable Energy" scenario, the wood burning generator is the only facility that responds to prices. Consequently, it is modeled as a standard generator. The remaining renewable technologies, fuel cells and photovoltaic, are modeled such that the demand is reduced.

Lower prices should occur from a load reduction situation, based on the economic supply/demand theory. The inability to vary operations such that the amount paid for the electricity reflects, at a minimum, the cost to produce the electricity, impacts

the economic viability of a renewable energy project. As described in Section 3.3, a significant barrier to a renewable energy project is the premium cost of the electricity. Most, if not all, renewable energy projects receive some incentives in the form of tax credits and/or grants to improve their economic viability.

Figure 5 compares the projected wholesale electric energy prices over the planning period for the "Renewable Energy" scenario with the energy prices of the "Reference Resource" scenario. The weighted average of real wholesale electric energy prices in the State would increase to a somewhat lesser degree over the planning period with the renewables included (*i.e.*, the increase would be 3% instead of 5% at the end of the planning period).

Figure 5



The additional cost of the renewable energy facilities, however, is not reflected in these prices. Table 25 summarizes the premium costs (*i.e.*, the difference between the cost to produce electricity and the wholesale price) of the various renewable technologies simulated in this scenario over the planning period. If these costs to produce renewable electricity were incorporated into the statewide average wholesale price, the "Renewable Resource" scenario wholesale price would be higher by 2020.

Table 25

PREMIUM COST FOR RENEWABLE ENERGY IN CONSTANT 2000 $								
	2002	2003	2004	2005	2008	2012	2016	2020
Premium Cost for Renewable Energy (millions 2000$)	$3.9	$12.8	$38.8	$52.3	$108.9	$170.4	$175.5	$181.5
Premium Costs as a % of Total Cost to NYS	0.08%	0.26%	0.80%	1.20%	2.43%	3.41%	3.24%	3.09%

Emissions. Figures 6, 7, and 8 compare the changes in emissions that might be expected if the 2,500 MW of renewables are added to the "Reference Resource" scenario. Compared to the "Reference Resource" scenario with the renewables added, in 2002, SO_2, $NO_{x,}$, and CO_2 emissions increase slightly due to the additional 56 MW of landfill gas generation. Using landfill gas is beneficial in that methane (CH_4) emissions are reduced through combustion. However, landfill gas also has other constituents, such as the acid rain gases, SO_2 and NO_x. Installing air pollution control systems on such small generators would be cost-prohibitive for a landfill-gas-to-energy project. As more renewable energy is available, $SO_{2,}$ NO_x, and CO_2 emissions decrease. For example, in the 2008 and 2020, SO_2 decreases by approximately 2% and 3%, the NO_x decreases by approximately 3% and 6%, and the CO_2 decreases by 3% and 6%, when compared to the "Reference Resource" scenario. Again, to the extent that the emissions are capped, forecast increases or decreases will not affect total emissions, but cost of compliance with the cap will be affected. This decreasing trend is associated with the additional non-thermal generation.

It should be noted again that while 2,045 MW of wind resource is a significant addition to the State's overall capacity, this capacity is only available when the wind resource is available. Consequently, during the peak demand months of the summer, especially on the hottest days, the wind capacity is likely to be significantly reduced. When demand is lower during other times of the year, only the most efficient, and thus lower emission rate generators will typically be used. As demand increases, less efficient, and thus higher emission rate, generators will then be required. During the higher demand periods, which occur during the summer months when the availability of wind resources are at the lowest, the less efficient, higher emission rate generators are used. Therefore, the emission reductions may not be as significant as one might anticipate.

Figure 6

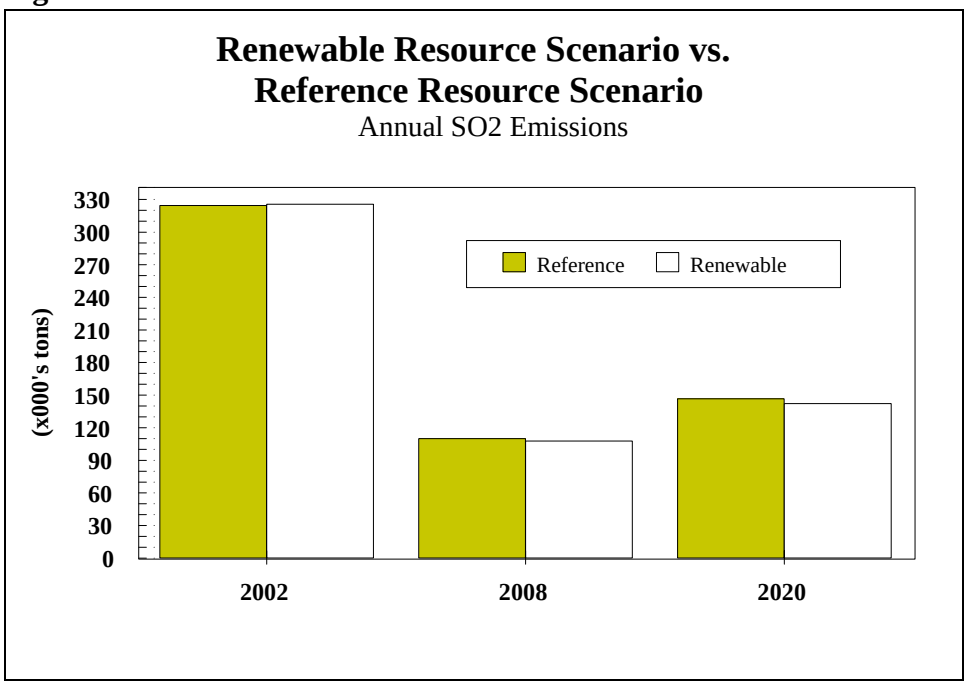


Figure 7

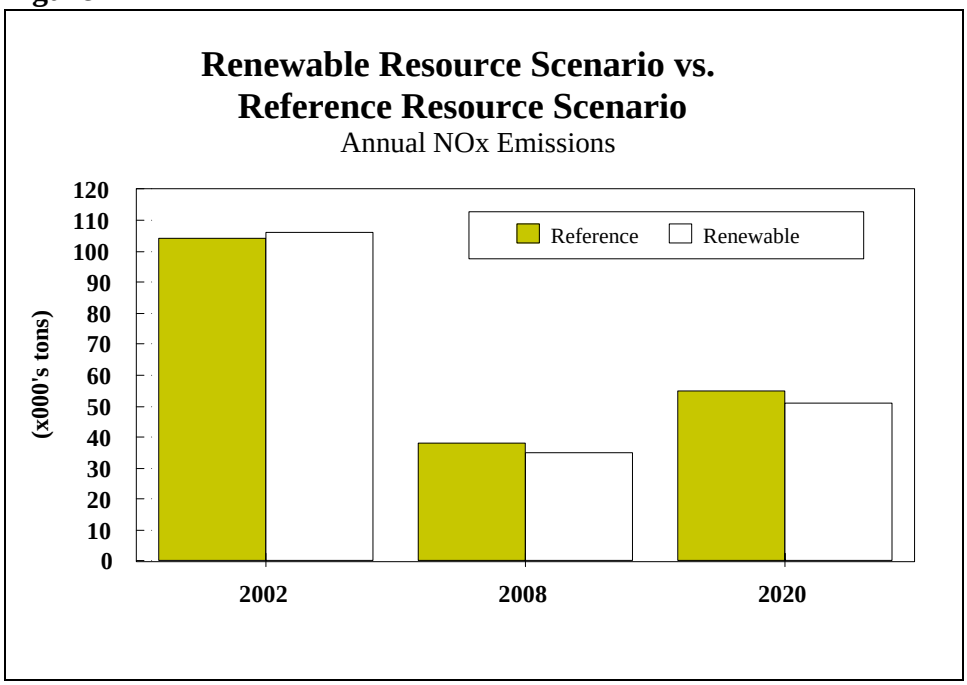
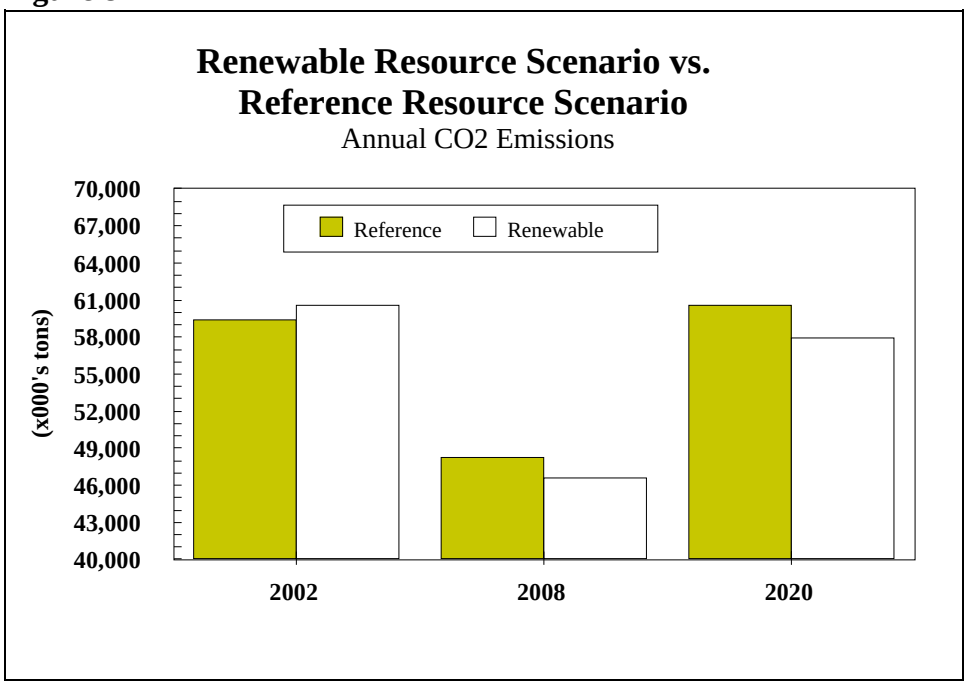


Figure 8



It should also be noted that the introduction of 2,500 MW of renewable generation could have significant consequences for the way the electric system is operated. This is because much of the renewable generation, particularly the 2,045 MW of wind power, cannot be scheduled with certainty, which would have an impact on the scheduling of the other units in the State. If a significant amount of non-dispatchable resources are to be added to the system, this issue will need to be addressed by the NYISO.

Advanced Coal Technology Scenario[39]

Another option to reverse the trend toward excessive dependence on natural gas is to consider the use of clean coal technologies. The "Coal Assessment" section of this Energy Plan describes the technologies and how they compare with other technologies. This section of the Electricity Assessment discusses how use of one form of advanced coal technology might impact the State as compared with the "Reference Resource" scenario. In particular, this analysis assumes that a developer installs a circulating

[39] This Energy Plan recommends (see Section 1.3) support of advanced coal technology research, demonstration, and commercialization. The analyses presented here support the basis for that recommendation.

fluidized bed (CFB) coal facility at a site in the Hudson Valley instead of a gas-fired unit assumed in the "Reference Resource" scenario, both with the same generating capacity (approximately 1,000 MW). Unlike most other scenarios, only the year 2005 was examined, and no modeling software was used in the analysis. While this analysis does not attempt to determine if it would be economic for a developer to build such a unit, and does not suggest that the particular unit substitution used for the analysis is the optimal substitution, it does provide some insight that should help to determine if use of the technology is a reasonable option for the State.

Results. Total variable costs, or the "full load cost", is projected to be $17.13 per MWh for the CFB facility compared to $29.61 per MWh for the replaced combined cycle unit, a 42% reduction. Based on currently available information, it appears that capital costs and fixed operating costs for the CFB facility would be approximately 2 times and 4 times more, respectively, than such costs for the combined cycle natural gas plant.

The CFB facility replacing the combined cycle unit is projected to result in a net decrease of about 50,000 MMBtu of natural gas consumption (approximately 10% of New York State's projected use for electric generation) and a net increase of about 77,000 MMBtu of coal consumption (approximately 48% of New York State's projected use for electric generation) in 2005.

Wholesale electric energy prices are assumed to be unaffected as both units are assumed to produce the same amount of energy in 2005, and operate as "baseload" units, accepting payment for energy at whatever the market dictates.

On the other hand, NO_x and SO_x emission levels would likely rise if the combined cycle natural gas-fired plant were replaced with a CFB facility. Table 26 below compares the projected NO_x and SO_x emissions in 2005 for a combined cycle natural gas, CFB and traditional coal-fired electricity generation facility.

Table 26

Comparisons of NO_x and SO_x Emissions Combine Cycle Natural Gas vs CFB vs Traditional Coal		
Plant Type	NO_x (approximate tons)	SO_x (approximate tons)
Combined-Cycle Natural Gas	250	15
CFB	3,800	480
Traditional Coal Facility*	18,000	4,500

* assumes 1.8% sulfur content coal and no scrubbers, but with low-NOx burners.

CO_2 emissions would also likely be greater (more than double) if a CFB unit were substituted for a combined cycle unit, and only marginally lower (6%) than a traditional coal facility.

Decision makers must balance multiple considerations in determining the appropriate resources for meeting consumer needs. The analysis presented here indicates that the use of CFB would be beneficial to the State in comparison with conventional coal technologies. When compared with state-of-the-art natural gas technologies, CFB can be also beneficial in some respects (improved diversity and lower operating costs), but more costly in others (emissions). It should be noted, however, that other emerging Advanced coal technologies, such as integrated gasification combined cycle, which is discussed in the "Coal Resource Assessment" (Section 3.7) of this State Energy Plan, have even lower emission rates than CFB facilities.

Low Load Scenario

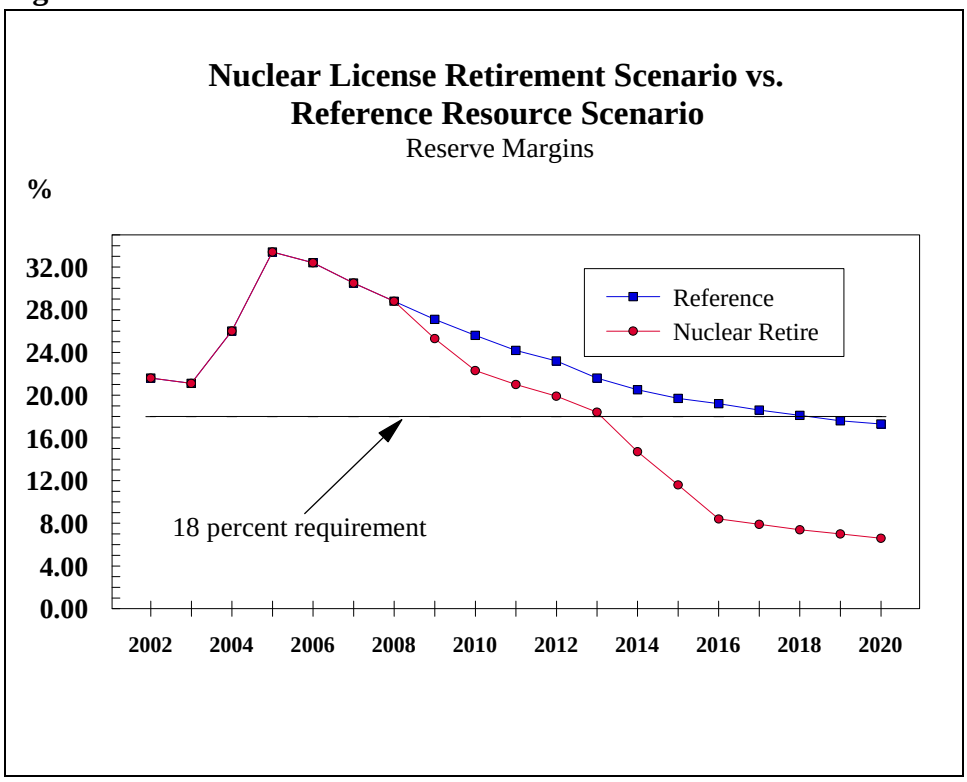
The "Reference Resource" scenario assumes that load will develop in accordance with the "Outlook" forecast presented elsewhere in this Plan. The "Low Load" scenario presented in the Draft State Energy Plan provided a sensitivity to show how conditions might change if the forecast turns out to be optimistic, or if demand reduction efforts grow. The Draft Energy Plan showed that the "Low Load" scenario would provide, as compared with the "Reference Resource" scenario, increased reserves, less reliance on natural gas, lower costs, and less emissions. Similar results can be expected if the analysis were repeated using the revised assumptions for the final Energy Plan. Clearly, load reduction, whether occurring naturally or through peak demand reduction and conservation efforts, will benefit the system. This Energy Plan supports such efforts (see recommendations in Section 1.3).

Nuclear License Retirement Scenario

The "Reference Resource" scenario assumes that all nuclear units in the State will continue to operate and will receive extensions of their operating licenses from the NRC (the license expiration dates are identified in Table 9, contained in the "Nuclear Generation" discussion of the "Electricity Generation" section of this Electricity Assessment). If the licenses are not extended, all other things being equal, additional resources would be needed to raise reserve margins to acceptable levels, the State's growing reliance on use of natural gas would be increased, wholesale electric energy prices would rise, and emissions would increase (subject to the limits of the statewide emission caps).

Figure 9 compares the projected reserve margins of the "Nuclear License Retirement" scenario with the "Reference Resource" scenario. As can be seen, additional capacity would be needed sooner than assumed in the "Reference Resource" scenario.

Figure 9



Tables 27 and 28 compare the resulting fuel mix changes over the planning period for the "Nuclear License Retirement" scenario with the fuel mix changes for the "Reference Resource" scenario that assumes continued operation of the units. The comparisons show that the trend toward reliance on natural gas would be increased. If additional gas-fired units were added to replace the retired capacity, the trend would be even greater.

Table 27

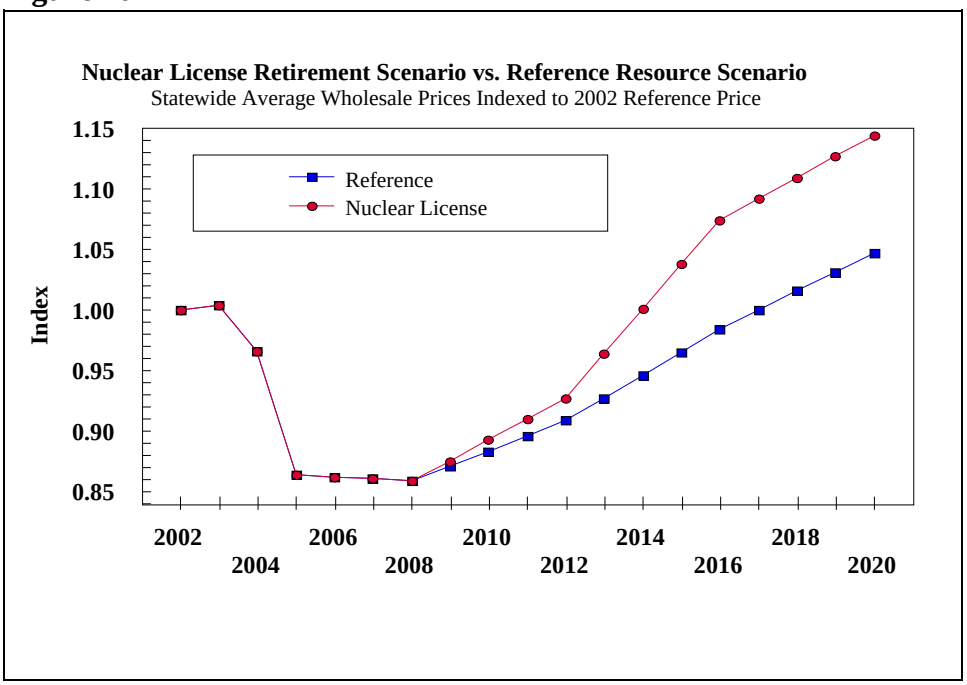
Comparison of Generation Mix Changes Based on Installed Capacity Between the Nuclear License Retirement and Reference Resource Scenarios In % of Total			
	2002	2020	
Generation Fuels	License Retirement and Reference Scenarios	License Retirement Scenario	Reference Scenario
Natural Gas	15.0%	29.7%	26.2%
Oil	10.5%	10.3%	9.1%
Natural Gas/Oil	33.4%	33.4%	29.4%
Coal	10.8%	9.4%	8.3%
Nuclear	13.5%	0.0%	11.9%
Hydropower	14.8%	14.8%	13.0%
Other	2.0%	2.5%	2.2%
Total	100%	100%	100%

Table 28

Comparison of Generation Mix Based on Energy Produced Between the Nuclear License Retirement and Reference Resource Scenarios In % of Total Generation			
	2002	2020	
Generation Fuels	License Retirement and Reference Scenario	License Retirement Scenario	Reference Scenario
Natural Gas	26.2%	46.6%	39.7%
Oil	5.0%	4.7%	2.5%
Coal	16.9%	10.4%	9.8%
Nuclear	20.6%	3.9%	17.1%
Hydropower	18.4%	15.6%	15.6%
Other	1.8%	1.8%	1.8%
Net Imports	11.1%	17.0%	13.5%
Total	100%	100%	100%

Figure 10 compares the trends in statewide weighted average wholesale energy prices for the "Nuclear License Retirement" scenario with the "Reference Resource" scenario. The comparison shows that statewide weighted average wholesale energy prices would be larger beginning in 2009 and would tend to increase to a greater extent, as more new resources are needed, and needed sooner, to meet reserve requirements. As with the "Reference Resource" scenario, the greatest increases would occur in the New York City and Long Island areas. If additional capacity were added to replace the retired nuclear units, the wholesale energy prices described here would be somewhat reduced but likely still above the prices for the "Reference Resource" scenario.

Figure 10



Emissions would also be expected to be greater. Figures 11, 12, and 13 compare the projected emissions of SO_2, NO_x, and CO_2 in selected years for the "Nuclear License Retirement" scenario and the "Reference Resource" scenario. Again, if additional capacity were added to replace the nuclear units as they retire, emissions would be somewhat less than described in this scenario, but they would be greater than for the "Reference Resource" scenario.

Figure 11

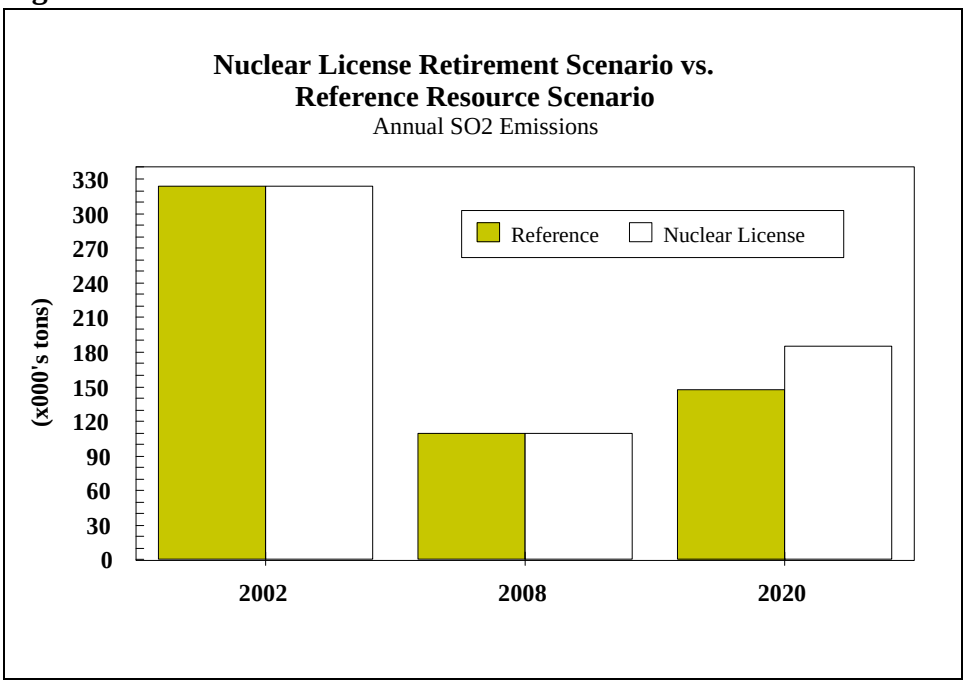


Figure 12

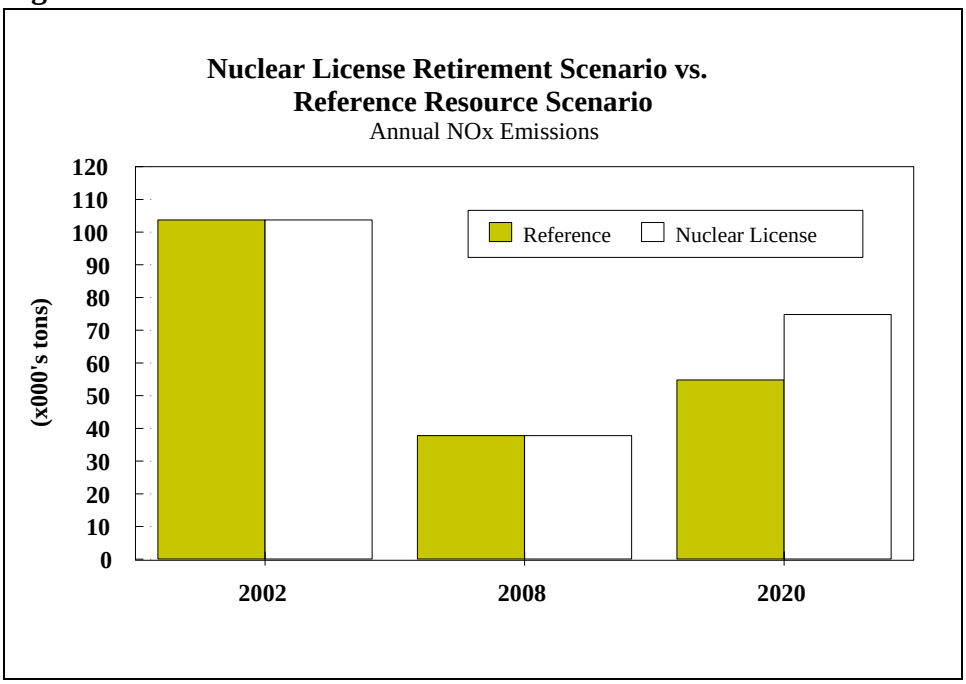
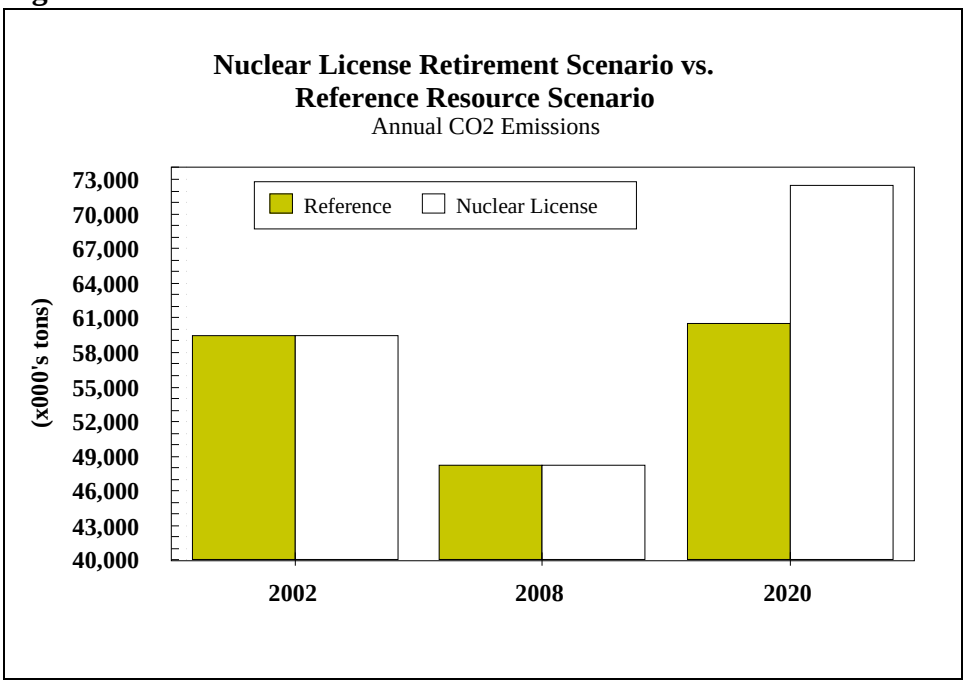


Figure 13



Transmission Upgrade Scenario

Transmission facilities are an important part of the bulk electricity system. They provide means for resources to be shared among regions to minimize costs, environmental impacts and system reliability concerns. Constraints that exist in the transmission system, however, can limit those benefits. The Draft Energy Plan explored a scenario that restricted trading with neighboring control areas. That scenario showed that such restriction would result in higher wholesale energy prices, a slightly greater reliance on fossil fuels in New York State, and somewhat higher in-State emissions. If transmission capability into other control areas were enhanced, rather than restricted, and assuming that trading rules were not tightened, opposite trends might be expected. Wholesale electric energy prices would likely be lower, the State's reliance on fossil fuels would be relieved somewhat, and emissions within the State would likely be reduced.

Many other alternative "Transmission Upgrade" scenarios can also be devised, including those that relieve some of the constraints that exist internal to the New York system. Similar to the upgrades of interfaces with neighboring control areas, upgrades of

internal transmission might also result in lower overall statewide average wholesale energy prices, which might mean lower prices in some parts of the State, especially downstate, and somewhat higher prices in other parts of the State. Similarly, emissions could be increased from facilities in the western part of the State and eased in the downstate areas. Whether any such upgrades can be justified by those that must pay for them would depend on the specific modifications required, the costs, and the benefits that might result. As noted in the "Transmission" section of this Assessment, there is currently no requirement that transmission lines be upgraded for reliability purposes, except perhaps in the downstate areas to serve local needs.

Distributed Generation Scenario

A distributed generation (DG) scenario was developed for the Energy Plan based on data provided by the Center for Clean Air Policy (CCAP). This scenario provides a basis to analyze the impacts of adding small, customer-based, distributed electricity generation resources aggressively to the New York State electric system in addition to resources that might otherwise be installed.[40] For this analysis, CCAP provided forecasts for capacity additions, emission rates, O&M costs, fuel costs, heat rates, and outage rates. Eight different DG types (4 gas-fired and 4 diesel fired) were considered: diesel large grid (capacity greater than 500 KW); diesel small grid; diesel large emergency converted units (greater than 500 KW); diesel small emergency converted units; natural gas reciprocating engines; low-emission natural gas reciprocating engines; microturbines; and fuel cells. With the exception of fuel cells, the DG units modeled were assumed to be price sensitive and would be dispatched only when wholesale electric prices would be above a predetermined threshold, or "dispatch price." Fuel cells were modeled as "must run" units, which means they were assumed to operate regardless of the wholesale price of electricity.

It should be noted that the CCAP's forecasts do not include any combined heat and power (CHP) electricity generation units. While NYSERDA's R&D staff are separately developing estimates of future CHP potential and related unit characteristics, that effort was not sufficiently advanced to allow its ready inclusion in this analysis. Also, it was generally believed by CCAP and NYSERDA staff that CHP units would need to be modeled differently from DG units that are exclusively used for electricity generation. CHP units have a dual purpose (power and heat) and are more likely to operate irrespective of wholesale market electric prices. Also, there was concern that a

[40] 4,736 MW of DG were assumed to be added between 2002 and 2020 as supplements to the resources assumed in the "Reference Resource" scenario.

combined modeling exercise might mask important differences between the two distinctly different types of DG. A CHP analysis will be performed after the issuance of the State Energy Plan, and the results will be reported to the Energy Planning Board at a future Board meeting.

The CCAP also projected both aggregate statewide DG additions and DG additions by utility service territory. For analytical convenience, DG was grouped in blocks by utility service territory and spread across each territory at ten separate grid interconnections to simulate geographic distribution of projected units.

CCAP assigned a "dispatch price" to each unit type for each year, and units were assumed to be dispatched only when the wholesale electric energy price would be above the dispatch price for that hour. In determining the dispatch price, CCAP considered each DG types' projected cost structure and all possible revenue streams available to the units, including savings or revenue associated with wholesale market electric prices, and potential revenue from price responsive load programs, capacity market programs, and reserve market programs. CCAP also did not include "capital costs" in the dispatch price calculation as all initial capital costs are assumed to be "sunk costs." Additionally, units were not given any "minimum run times" or "minimum down times" in the analysis, which allowed the DG units maximum flexibility to adapt to changing market prices. Fuel cells (one of the 4 natural gas-fired unit types) were the exception to this rule and were modeled as "must run" units, given the nature of the technology and the general difficulty in turning the units on and off quickly.

The modeling analysis started with a 2001 DG capacity level of zero and began adding incremental DG in 2002. Previously existing DG was assumed to be "inherently" within the Reference Resource Scenario and assumed to be reflected in load and capacity forecasts.

Results. The results of the analysis suggest little change from the "Reference Resource" scenario in the first 5 model years (*i.e.*, through 2008). In later years, however, as DG capacity and DG capacity factors increase, DG generation began to "back down" generation from older, larger, and less flexible oil and gas units in the State.

The CCAP assumed that no NO_x control technologies were applied when projecting DG unit emission levels. Consequently, NO_x emission rates increased significantly in the DG scenario in later study years when compared to the "Reference Resource" scenario. These differences, however, were not severe until the 2012, 2016, and 2020 study years, when NO_x emissions increased by 14.5 (34 percent), 49.8 (82

percent), and 75.5 (138 percent) thousand tons, respectively. This was because, as noted below, combined annual diesel capacity factors never exceeded 3 percent until 2012, but reached 21 percent by 2020.

SO_2 and CO_2 emission levels declined under the DG scenario compared to the Reference Resource Scenario. SO_2 emissions were lower for all model years, reaching a maximum reduction of 7.8 percent in 2020. Likewise, CO_2 emissions were lower for all model years, reaching a maximum reduction of 3.9 percent in model year 2012. Later model years (*i.e.*, 2016 and 2020) showed smaller reductions of 2.3 percent and 1.1 percent, respectively.

An examination of wholesale electricity prices (LBMPs) revealed minimal impact in the early model years (2002, 2003, 2004, 2005) when compared to the "Reference Resource" scenario, and was generally within plus or minus 1.5 percent. In model year 2008, prices outside of Long Island were as much as 2.4 percent higher, while prices for Long Island were 2.2 percent lower. In model years 2012 and 2016, a similar pattern emerged with prices lower by more than 7 percent on Long Island but as much as 2 percent higher elsewhere. In 2020, all areas of the State had wholesale electric energy prices lower in the DG scenario. Downstate LBMPs drop significantly in 2020, with the lower Hudson Valley (5.6 percent), New York City (2.8 percent), and Long Island (9.8 percent) experiencing the largest declines. DG capacity factors increased dramatically in later study years, because wholesale electric energy prices were rising faster than CCAP's projections for DG dispatch prices.

Another result observed in this analysis was the projected decline in internal interface limitations, particularly in the downstate areas, starting in 2016. Meeting statewide load with more DG generally reduces the need to carry power over internal interfaces, because more load is met locally. This helped reduce congestion on the critical downstate interfaces as downstate DG generation increased significantly in later study years.

Overall, the analysis indicates that a movement toward use of DG in New York State, especially after the new baseload generation now in the certification and construction process are operational, would provide benefits with regard to wholesale electric energy prices, SO_2 and CO_2 emissions, diversity, and transmission flexibility. On the other hand, NO_x emissions, particularly from diesel units, could increase unless NO_x control technologies were employed. Whether or not DG would be cost effective for unit owners was not determined by this analysis.

DEC has undertaken a rulemaking on the emissions controls to be required on DG units. Under this model, if such regulations increase the running costs of the DG technology in question, DG units would be dispatched less often, and the modeled effects would be reduced.

FINDINGS AND CONCLUSIONS

- New York is a national leader in restructuring its electricity industry. Consumers have benefitted with savings in their delivery service charges, and further savings will occur during the planning period. The utilities in the State have divested most of their generation facilities to third parties who now operate them in a competitive wholesale market. Further, more than 16% of customer load has switched from local utilities to new service providers. Most switching in retail service providers has occurred in the commercial and industrial sectors with considerable variability throughout the State. More progress in increasing customer choice can be expected, especially when more supplies and demand reducing options become available.

- The initial years of wholesale electricity market operations in New York coincided with periods of high fuel prices, significant transmission congestion, and tight supply conditions. Wholesale electricity prices reflected these conditions, but they have begun to moderate, although not in a uniform pattern, across the State. Average wholesale electricity prices are forecast to decline in real terms over the remainder of the decade, as are retail prices. This expectation is strongly conditioned on new demand and supply resources being added, especially at critical locations that will serve to reduce transmission congestion, and on continued expansion in natural gas resources.

- Electricity peak demand is forecast to grow at annual average rates ranging from 0.75% to 1.23%, with a mid-range value of 0.92%. The loss of load in New York City resulting from the terrorist attack on the World Trade Center is not factored into the forecast. This load is expected to be restored gradually during rebuilding efforts and completely restored once rebuilding efforts are finished. Load is projected to be fully restored sometime in the early half of the forecast period.

- Reserve margins, representing one measure of system reliability, are projected to exceed the current requirement of 18% throughout most of the planning period if a reasonable number of new resources are added and/or demand is reduced. A higher peak demand growth rate than projected, however, will require more resources, especially in the later years of the planning period.

- In the near-term, simple-cycle gas turbines and demand reduction programs will be used to address growth in peak electricity demand. Over the longer-term, demand reduction programs will continue, and renewable generation facilities and

distributed generation will be added, but the bulk of the new resources will likely come from gas-fired, combined-cycle base-load units subject to Article X of the Public Service Law. As of May 1, 2002, seven generating projects, which could add approximately 3,600 MW to the electric system, had been approved under Article X, and another 17 projects were in the regulatory review process or have been publicly announced.

- The State's transmission system is generally adequate to provide reliable electricity service, provided that the system is operated in accordance with reliability rules established by the North American Reliability Council (NERC), the Northeast Power Coordinating Council (NPCC), and the New York State Reliability Council (NYSRC); however, there are reliability limitations in the use of the transmission system for the economic transfer of power between regions of the State for economic reasons. The siting of additional generation and transmission facilities can reduce price impacts attributed to economic congestion of the transmission system. This finding is consistent with the Planning Board's recent *"Report on the Reliability of New York's Electric Transmission and Distribution Systems."*[41] Some local transmission reinforcements might also be necessary in the New York City and Long Island areas.

- A Northeast regional common market offers possibilities for enhanced market efficiencies and economic benefits for New Yorkers. A regional market structure may also offer a vehicle for developing new transmission lines to increase power transfers across New York's borders. There are certain principles for common market formation that should be followed to ensure benefits are realized by New York consumers.

- The share of electricity generation fueled by natural gas could increase significantly over the planning period. This trend is consistent with other regions of the Northeast. A major force behind this trend is the decisions of merchant generators to select natural gas as the preferred fuel of choice. The choice is also influenced by environmental factors that recognize the relatively clean air emission profile of natural gas generation. This shift in primary fuel requirements for electricity could result in diminished diversity in the fuel requirements for electricity generation. Reduced fuel diversity increases risk exposure to fuel supply disruptions and price swings. This Energy Plan describes and recommends efforts to reverse or mitigate this trend.

- Air pollutant emissions from electricity generation not under a cap in the State would be expected to decrease as new resources are added to the electric system, increasingly stringent environmental regulations are imposed, and increased electricity trading among regional electricity systems takes place. The Governor's Acid Deposition Reduction Program is a major factor in reducing the

[41] Report of the New York State Energy Planning Board as required by Chapter 636 of the Laws of 1999.

State's emissions. SO_2 emissions will be reduced to a level that is 50% less than required by the Federal Clean Air Act, and summertime NO_X control benefits will exist year-round.

- Retirement of all nuclear power plants in the State when their licenses expire would likely result in higher wholesale energy prices, greater potential emissions, reduced fuel diversity, and a need for substantial additional resources to be added to the system to replace the lost capacity as the retirements occur.

- Distributed generation facilities can provide the State with benefits by reducing wholesale electric energy prices and emissions of SO_2 and CO_2 and by improving diversity and transmission flexibility.

- The use of renewable technologies for electricity generation in New York State can provide the State with benefits, but there are costs and operational issues that must be addressed.

- Advanced coal technologies offer a means to provide fuel diversity, lower wholesale prices, and reduced emissions in relation to conventional coal-fired generation technologies, but not in relation to gas-fired generation.

- Energy trades with neighboring systems provide significant benefits for New York State. Reducing transmission constraints, both with neighboring States and within New York State, will provide increased benefits; but the costs and benefits of such efforts must be addressed on case-specific bases.

- The New York Independent System Operator's (NYISO) efforts to modify its capacity market rules is important for ensuring that adequate capacity will be built and maintained in New York State.

SECTION 3.5

NATURAL GAS ASSESSMENT

INTRODUCTION

New York State currently uses approximately 1,200 million dekatherms (MMDT) of natural gas per year, making it the fourth largest gas consuming state in the nation behind Texas, California, and Louisiana.[1] The State has approximately 4.6 million natural gas customers[2] served by eleven local gas distribution companies (LDCs).[3] These LDCs depend on major interstate and intrastate pipeline systems for access to domestic and Canadian gas supplies.[4] Domestic gas, primarily from the Gulf Coast area, accounts for approximately 62% of the gas consumed in New York with nearly all of the remainder from Canadian sources.[5] Gas production within New York is growing and currently meets about 2% of the State's annual gas use.

Competitive forces have changed the gas industry dramatically and will likely continue to do so. As explained below, federal and State policies to enhance competition have been adopted and are being expanded.

Natural gas demand is expected to increase significantly, especially to generate electricity. Plans to build about 15,000 MW of new gas fired generation have been announced in New York. These plants combined would require about 2,500 thousand

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[1] The New York State breakdown of the volumes by sector: residential 35%; commercial/ industrial 30%; power generation 35%.

[2] The New York State breakdown by sector is: 4.2 million residential customers (including 1.7 million customers who use gas only for cooking or water heating) and 0.4 million commercial/industrial/power generation customers.

[3] Central Hudson Gas & Electric Corporation (CHG&E), Consolidated Edison Company of New York, Inc. and Orange & Rockland Utilities (Con Edison/O&R), Corning Natural Gas Company (Corning), KeySpan Energy Delivery of New York and KeySpan Energy Delivery of Long Island (KeySpan), Niagara Mohawk Power Corporation (Niagara Mohawk), New York State Electric and Gas Corporation (NYSE&G), Rochester Gas & Electric (RG&E), National Fuel Gas Distribution Company (NFGD), and St. Lawrence Gas Company (St. Lawrence).

[4] These pipelines are: Algonquin Gas Transmission Co. (AGT), Columbia Gas Transmission Corp.(Columbia), Dominion Transmission, Inc. (DTI), Empire State Pipeline Co. (Empire), Iroquois Gas Transmission System (IGTS), National Fuel Gas Supply Corp. (NFGS), North Country Pipeline, Tennessee Gas Pipeline Co. (Tennessee), Texas Eastern Pipeline Co. (TETCO), Transcontinental Gas Pipe Line Corp. (TRANSCO), and TransCanada Pipelines, Ltd. (TransCanada).

[5] Natural Gas Annual 1999, EIA, issued October 2000.

dekatherms of gas per day (MDT/D) if operated at full capacity.[6] Not all of these plants will be built (some have been canceled or delayed) and, as explained later, the ongoing study, "The Interaction of the Gas and Electric Systems in New York State" (NYSERDA-NYISO study) indicates that far less incremental natural gas pipeline capacity actually will be needed. In addition, the use of gas in core markets continues to grow, especially in the downstate (New York City-Long Island) area. Additional pipeline capacity, as well as expansion of distribution system capacity will be needed to meet the anticipated increase in gas use. A number of projects have been proposed to expand pipeline capacity to New York State.

As explained below, gas prices increased to unprecedented levels during the 2000-2001 winter due to a combination of factors and have since returned to more historic levels. However, gas prices will likely remain volatile.

Finally, the security of gas delivery facilities has not been a problem historically. However, in light of the September 11, 2001 terrorist attacks, Governor Pataki has created the Office of Public Security to assess the vulnerability of critical infrastructures to terrorist attacks and to develop a comprehensive, Statewide anti-terrorism strategy. Concurrently, the Department of Public Service has established the Security Assessment Team to assess utility efforts to maintain system reliability and security.

NATURAL GAS COMPETITION

Status of the New York State Retail Market

Large-volume natural gas customers in New York have been able to choose from non-utility suppliers since the mid-1980s. In 1996, the Public Service Commission (PSC) extended the opportunity to purchase gas from non-utility suppliers to all customers. As of December 2001, approximately 373,000 residential and smaller non-residential customers had switched to non-utility suppliers. These customers use approximately 102 MMDT of natural gas per year, or about 10.4% of the total volumes delivered to customers by the LDCs. Most large volume customers switched to a non-utility gas supplier years ago. In total, about 50% of the gas consumed in New York is gas purchased from non-utility suppliers. There are about 25 active marketers in the

[6] Current pipeline delivery capacity to New York is roughly 6,000 MDT/D, and this capacity is needed to meet existing core market (residential, commercial, and industrial) demand on a peak winter day.

downstate area, and about 15 in upstate New York. The retail gas market in New York is approximately a $7.5 billion per year market.[7]

Status of the Wholesale Natural Gas Market

Natural gas commodity prices have been completely deregulated for over ten years. The New York Mercantile Exchange (NYMEX) futures price is the benchmark price for natural gas nationwide, with futures contracts quoted at, and deliverable to, the Henry Hub, in Katy, Louisiana. Several market area hubs or liquid trading points[8] have emerged, including Dawn, Ontario, the Columbia pool, and DTI Southpoint. The establishment of additional market area hubs/liquid trading points is critical to the development of a competitive wholesale natural gas market closer to market demand.

Policies to Enhance Competition

New York State. In 1998 the PSC issued a Policy Statement establishing its vision for the future of the natural gas industry in New York.[9] The essence of that vision is that the most effective way to establish a competitive retail market in gas supply is for LDCs to cease selling gas.[10] The Policy Statement requires LDCs to hold new upstream pipeline capacity contracts to the absolute minimum necessary for system operation and reliability purposes and eliminates the LDCs' right to assign its capacity to migrating customers, except where specific operational and reliability requirements warrant. This encourages LDCs to relinquish capacity as contracts expire to make it available for marketers. A transition process consisting of three elements was established:

- Discussions with each LDC on an individualized rate and restructuring plan;
- Collaboration among stakeholders on the key generic issues of system reliability and market power; and

[7] Customer costs for LDC sales and transportation services are about $5 billion per year and payments to non-utility suppliers are roughly $2.5 billion per year.

[8] Generally defined as points where gas is readily available.

[9] Case 93-G-0932, Proceeding on Motion of the Commission to Address Issues Associated with the Restructuring of the Emerging Competitive Natural Gas Market; Case 97-G-1380 In the Matter of Issues Associated with the Future of the Natural Gas Industry Need and the Role of Local Gas Distribution Companies, Policy Statement Concerning the Future of the Natural Gas Industry in New York State and Order Terminating Capacity Assignment, (issued November 3, 1998).

[10] In this vision marketers would sell gas to customers and LDCs would deliver that gas to them.

- Coordination of issues that are also faced by electric utilities, including provider-of-last-resort and competition in areas such as metering, billing, and information services.

Multi-year rate and restructuring plans have been approved for all major LDCs. Generally, these plans freeze or reduce retail rates, establish back-out rates applicable when marketers replace certain LDC functions, establish or refine balancing services for marketers, incorporate gas capacity portfolio changes, and promote development of the competitive market through customer information programs.

A Reliability Collaborative was established in December 1998 to implement the Policy Statement's goal of maintaining the reliability of gas deliveries. Based on recommendations developed through this collaborative, the PSC requires marketers serving firm loads to have firm, primary delivery point capacity for the months of November through March, with a limited exception for KeySpan.[11] LDCs were also required to develop Gas Transportation Operations Manuals to codify all procedures that marketers must follow. A Natural Gas Reliability Advisory Group was established in the fall of 2001 to provide a forum for a continuing dialog on reliability issues and to advise staff and the PSC on reliability and related issues. Members of the Advisory Group include staff as well as representatives of various stakeholder groups: LDCs, pipeline companies serving the State, wholesale marketers, retail marketers, electric generators and customers. The Advisory Group meets monthly to discuss a range of topics that impact gas capacity markets and gas reliability.

Upstate LDCs (NFG, NYSE&G, Niagara Mohawk, and RG&E) have been able to relinquish capacity on upstream pipelines as contracts expire, resulting in net capacity cost savings of about $55 million per year to New York gas customers. Downstate LDCs (KeySpan and Con Edison /O&R) relinquished a small amount of capacity to their city-gates when the contracts expired on November 1, 2000, in anticipation of retail marketers acquiring this capacity. However, a wholesale marketer affiliated with an electric generation company acquired that capacity. Wholesale marketers with power generation interests recently acquired available capacity in the broader downstate market for periods of up to ten years.

The downstate capacity market has become tight, and marketers that acquire capacity at market prices cannot compete with the LDCs' weighted-average cost of capacity. In response, the downstate LDCs have developed programs under which they

[11] Due to the structure of its supply and capacity portfolio KeySpan was able to allow marketers to use non-primary capacity to meet a portion of their requirements.

will acquire the resources needed to meet market requirements on a year-to-year basis and make capacity available to marketers at their average cost of capacity for three years.[12]

Finally, the 2000-2001 winter led to the bankruptcy of one retail marketer and the withdrawal of another retail marketer from the residential market in Western New York. These failures were caused by cash flow problems associated with high gas costs and the lack of marketer action to manage price risk. Most of the customers served by these marketers were returned to the LDC who was able to acquire the capacity needed to serve them. The widely publicized bankruptcy of Enron in December 2001 did not have a significant impact on New York for two reasons. First, Enron's retail and wholesale gas marketing units provided gas to a relatively small number of customers in New York and a relatively small amount of gas New York LDCs, respectively. Second, the weather in the winter of 2001-02 was extremely mild and gas storage inventories were very high. As a result, finding replacement gas supplies was not a problem.

Several issues common to gas and electric that impact the development of the competitive market are being addressed in a coordinated fashion. These issues include provider-of-last-resort, billing and metering, electronic data interface, uniform business practices, and unbundling of costs. The Electricity Assessment contains a detailed discussion of these issues.

Federal. In the mid-1990s the Federal Energy Regulatory Commission (FERC) eliminated the merchant role of interstate pipeline companies and transferred responsibility for gas supply acquisitions to LDCs and customers. FERC issued Orders 637 and 637-A in 2000, waiving price ceilings for short-term released capacity for a two-year period, permitting use of peak/off-peak and term differentiated rate structures, allowing capacity segmentation, revising scheduling procedures, narrowing the right of first refusal and improving reporting requirements and penalty provisions. These changes are intended to improve the efficiency of the interstate pipeline capacity market.

Pipeline companies were required to file Order 637 tariffs beginning in the fall of 2000 on a staggered basis. Tariff changes to comply with FERC Order 637 have been approved by FERC for AGT, DTI, IGTS, NFGS and TETCO. Proposed tariff changes are pending FERC approval for Columbia, Tennessee, Texas Gas, and Transco.

[12] Case 97-G-1380, In the Matter of Issues Associated with the Future of the Natural Gas Industry Need and the Role of Local Gas Distribution Companies, (untitled Order dated July 27, 2001).

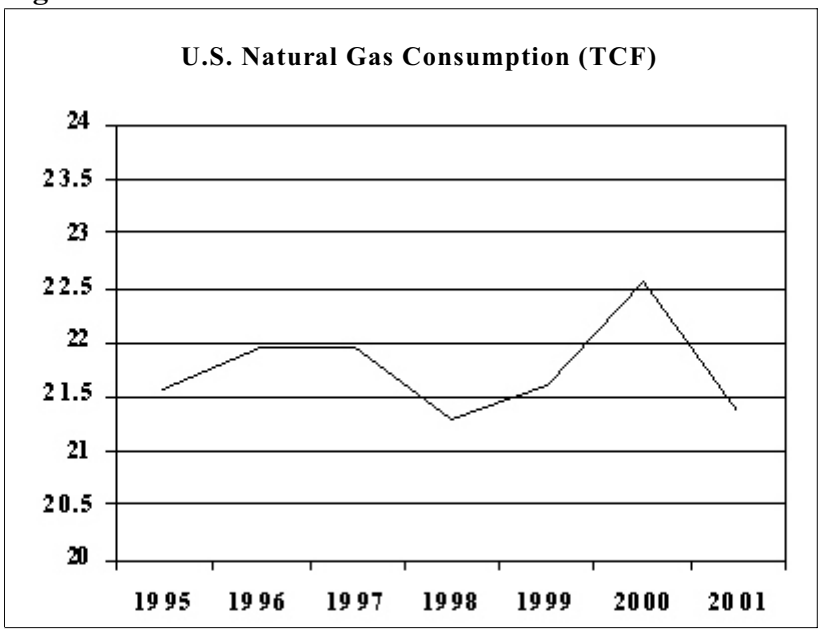
One of the common issues among the pipelines is the cash-out mechanism for customer imbalances. With new services and new information systems now available, there is less reason for customers to remain out of balance between their daily nominations and daily takes. Weekly, rather than monthly, cash-out of imbalances have been proposed by two pipelines.

The changing nature of the natural gas market has resulted in the development of new pipeline service offerings. One such development is the opportunity for shippers to make intra-day nominations, providing more flexible use of pipeline capacity to meet changes in system demand. Another is the introduction of increased hourly delivery quantity flexibility, a service specifically designed for electric generators. Another example, which is being used in the retail access programs in New York, is the development by DTI of its Delivery Point Operator/Customer Swing Service. This essentially allows marketers access to no-notice services with the LDC acting as the delivery point operator thereby administering a program to account for each marketer's use of such services to meet daily swings.

NATURAL GAS MARKET DEVELOPMENTS

Natural Gas Demand. Lower oil prices resulted in a decline in United States (U.S.) gas demand in 1998. However, gas demand recovered somewhat in 1999 and increased another 5% in 2000, the result of a strong national economy and the increased use of gas for power generation (see Figure 1). Gas demand declined by 5 % in 2001 due to the slowing of the economy, which was accelerated by the September 11, 2001 terrorist attacks, higher prices, and the mild winter weather. U.S. gas demand is expected to

Figure 1



increase significantly to 32.7 trillion cubic feet (TCF)[13], a 40% increase, by 2016.[14]

In New York, demand for gas in core markets (residential, commercial, and industrial) continues to grow, especially in the downstate area where the saturation of gas use is relatively low and there is a large potential conversion market. The most significant increase in gas use will be for power generation. Of this amount, about 70% is proposed in the area from Rockland and Orange counties through Long Island. In addition, the Governor's Clean Air Act Initiative, discussed in the Environment and Energy report in this Plan, will likely result in increased use of gas for power generation. Finally, the use of gas may increase in two other markets: the distributed generation market and the use of compressed natural gas as a transportation fuel. The increased use of gas in these markets could require improvements to gas distribution systems.

Natural Gas Commodity Prices

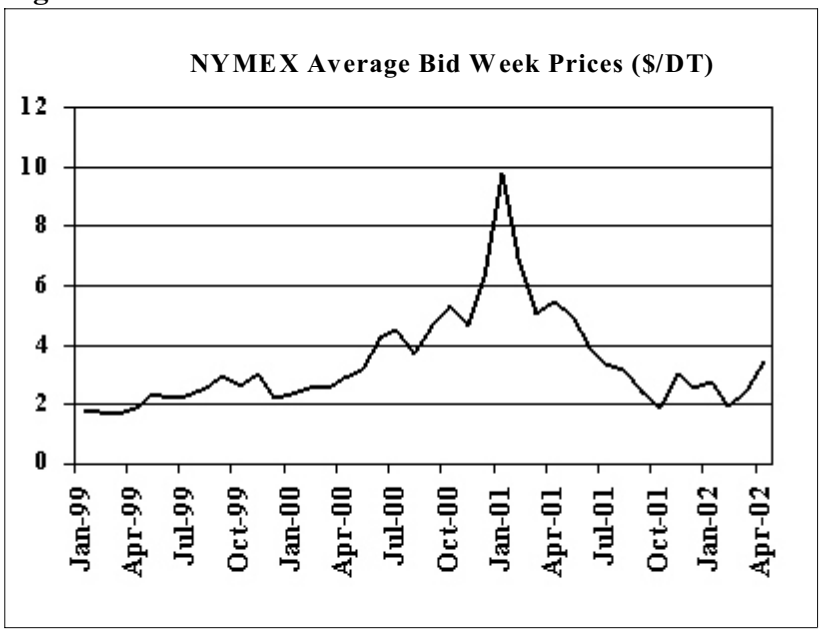
Natural gas commodity prices soared to unprecedented levels during the 2000-2001 winter. Several factors contributed to this increase. A sustained period of relatively low gas prices in the 1990s led to a substantial reduction in gas drilling, constraining domestic productive capacity. This set the stage for the price increase, but two factors that suppressed gas demand concealed the significance of the problem. First, low oil prices in 1998 and 1999 reduced gas demand through fuel switching to oil. Second, prior to last winter, there were three warm winters in a row, masking the underlying level of gas demand. U.S. natural gas consumption declined by 3% in 1998, grew by 2% in 1999, and grew by another 5% in 2000, as a result of a strong national economy, rising oil prices, and increased use of gas to generate electricity. In the spring of 2000, prices were still at a level of about $2.50-$3.00/DT. However, the summer of 2000 was unusually warm in the Southwest where substantial air conditioning load is met through gas-fired generation. Gas prices started rising steadily in response to the increased summer gas demand and the competing need to fill gas storage. By the beginning of the 2000-2001 heating season, prices were already at record high levels and storage inventories were still relatively low. The sustained cold weather in November and December 2000 (the 2nd and 7th coldest ever recorded, respectively), in combination with market nervousness due to low gas storage levels, caused gas prices to increase dramatically to nearly $10/DT. The balance of the 2000-2001 winter was mild, drilling for gas increased in response to higher gas prices, the national economy slowed, and storage had been refilled at record levels. As a result, gas prices have returned to more

[13] A TCF is roughly equal to 1,000 MMDT.

[14] Annual Energy Outlook 2002, Energy Information Administration, December 2001.

familiar levels (see Figure 2). However, gas prices will likely remain volatile.

Figure 2



In 1998, the PSC issued a Policy Statement on LDC gas purchasing practices.[15] The Policy Statement allowed the prudent use of financial instruments, such as "hedging" as a tool to mitigate price volatility. While the PSC did not direct any particular mix of portfolio options, it stated that volatility of customer bills is one criterion, along with other factors such as cost and reliability, that LDCs should consider in their gas supply portfolio strategies. The PSC stated that excessive reliance on any one gas pricing mechanism or strategy does not appear to reflect the best management of the gas portfolio and any LDC without a diversified gas pricing strategy will have to meet a heavy burden to demonstrate that its approach is reasonable.

Natural Gas Supplies

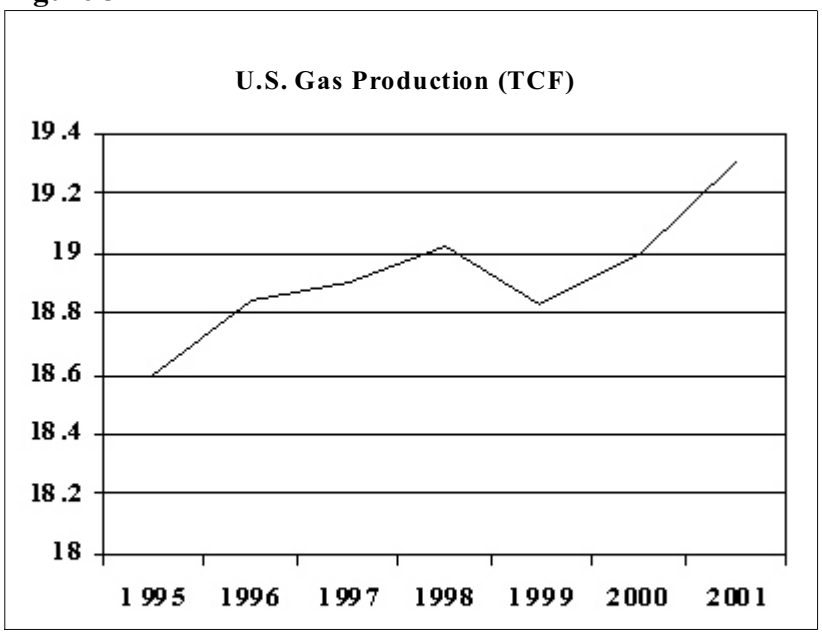
Domestic Gas. U.S. gas production in 2001 was 19.3 trillion cubic feet (TCF), a 1.7% increase over 2000 (see Figure 3).

Weakening gas prices in the late 1990s led to a reduction in gas drilling activity from 657 rigs in December 1997 to 362 rigs in April 1999. Gas rig activity began to reverse its downward trend during 1999, reaching 854 rigs by December 2000, and peaked at 1,058 rigs in July 2001 (see Figure 4). Gas rig activity has since declined to 617 in March 2002. Changes in gas rig activity are correlated with the changes in gas prices.

[15] Case 97-G-0600, In the Matter of the Commission's Request for Gas Distribution Companies to Reduce Gas Cost Volatility and Provide for Alternative Gas Purchasing Mechanisms, Statement of Policy Regarding Gas Purchasing Practices, (issued April 28, 1998).

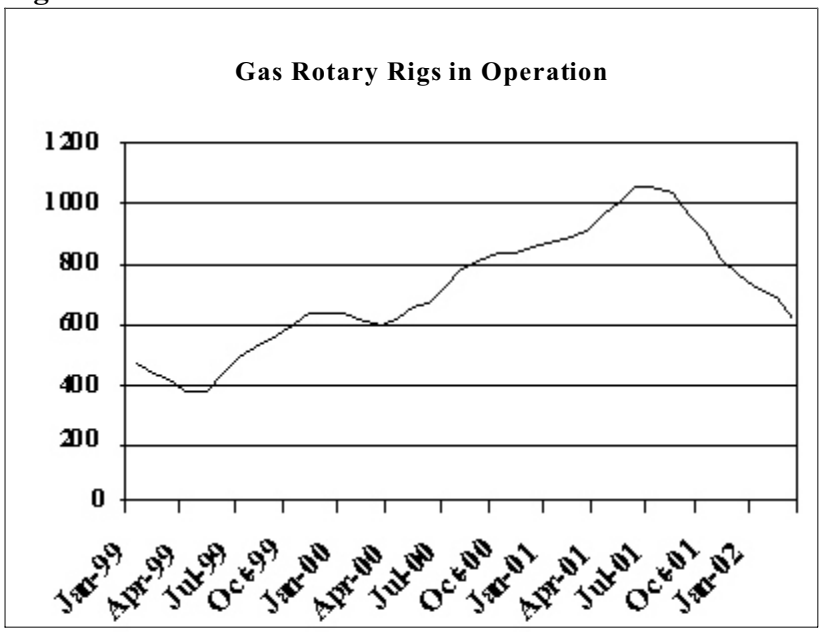
Proven natural gas reserves[16] for the lower 48 states totaled 168 TCF at the end of 2000. The amount of proven reserves has held fairly steady at about this level for the last ten years as cumulative production of 187 TCF over the last decade was offset by reserve additions. Potential gas reserves[17] are currently estimated at 1,206 TCF for the lower 48 states.

Figure 3



In addition, Alaska has 10 TCF of proven reserves and 34 TCF of potential reserves from conventional sources. Further, Alaska has about 210 TCF of reserves from unconventional sources, such as oil shale and coal-bed seams.

Figure 4



Two pipeline route alternatives are

[16] Proven na
reasonable certainty
conditions.

[17] Potential resources include all the undiscovered gas resources plus that part of the discovered resource that is not included in proven reserves.

being considered to bring Alaskan gas to the lower 48 states. The "southern" route would parallel the Trans-Alaska oil pipeline and then follow a route parallel to the Alaskan Highway through the Yukon Territory and British Columbia, to connect with existing pipelines in Alberta. This alternative would be about 2,000 miles long and cost about $10 billion. The "northern" route would extend east from the Alaskan North Slope to Canada's Mackenzie River delta where it would access additional gas supplies, and then south along the Mackenzie valley into Alberta. This alternative would be about 1,650 miles in length and cost about $8 billion.

Canadian Gas. Imports of Canadian gas historically have been from Canada's Western Sedimentary Basin (primarily Alberta). On December 31, 1999, Canadian gas imports began from offshore Nova Scotia (Scotian Shelf area) through the Maritimes & Northeast Pipeline (M&NE). Canadian imports into the U.S. totaled 3.7 TCF during 2001, an increase of about 6% over 2000.

Imports of Canadian gas have increased steadily since 1995. The U.S. imported roughly 17% of its total requirements from Canada during 2001. About 23% of the gas volumes coming into the mid-Atlantic region (NY, NJ, and PA) originate in Canada;[18] however, some of this gas continues on to New England.

Western Canadian Sedimentary Basin proven reserves totaled 63.9 TCF as of January 1, 2000. The Scotian Shelf area contains 3 TCF of established reserves (proven reserves that are connected to pipelines), 2 TCF of discovered resources (proven by drilling but not yet connected to pipelines), and 13 TCF of undiscovered potential reserves.[19]

LNG. Liquefied natural gas (LNG) imports have risen dramatically over the last several years (see Figure 5). After nearly doubling in 1999, LNG imports continued their growth in 2000 to a total of 223 MMDT, a 35% increase over 1999. Trinidad and Tobago and Qatar surpassed Algeria for the first time as suppliers of LNG to the U.S. in 2000.[20]

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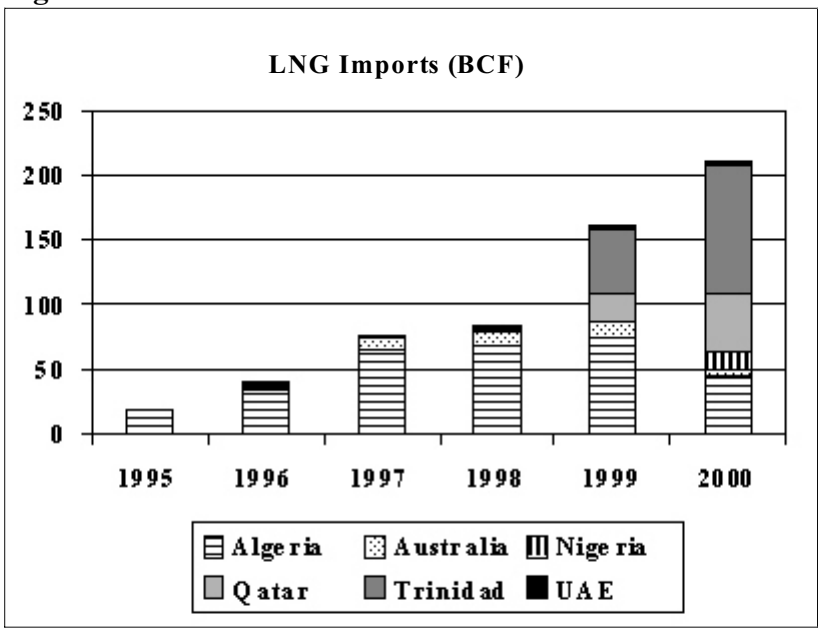
[18] Source: Natural Gas Annual 2000, EIA (issued November 2001).

[19] Canadian Natural Gas: Review of 1999 & Outlook to 2010, May 2000

[20] Trinidad supplied 96 BCF of LNG, or 44% of total LNG imports in 2000 and Qatar supplied 46 BCF of LNG or 21 percent. Algeria continued to be a major supplier of LNG accounting for 44 BCF or 20% of all LNG imports.

There are two operational LNG receiving terminals in the U.S. located at Everett, MA, and Lake Charles, LA. Imports into Everett totaled 99 MMDT in 2000, an increase of 3% over 1999.[21] Following the terrorist attacks of September 11, 2001, the U.S. Coast Guard banned LNG deliveries to Everett, MA, but has since lifted the ban.

Figure 5



Expansion of LNG imports is expected in the future. TRANSCO received FERC approval to reactivate import capability at its Cove Point, MD, LNG facility by 2002, which has not received any imports since 1980. The Elba Island terminal near Savannah, GA has received FERC approval to resume LNG imports and is expected to begin receiving shipments in 2002. In addition, about a dozen other LNG projects have been announced. Several are proposed in Texas, and would use either existing pipelines or build new ones to deliver re-gasified LNG for electricity generation customers. On the East Coast, expansion of the Everett, MA facility is planned to fuel a new 1,550 MW power plant currently being built nearby. A new plant is planned for Radio Island, NC to serve markets that are too distant from large pipelines.

In New York, LNG plays a critical role in meeting peak winter requirements. Instead of imports, this use of LNG involves liquefying pipeline gas during the summer, storing that LNG in insulated tanks, and re-gasifying it to meet peak day requirements.[22]

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[21] Almost 81% of the imports received in Everett came from Trinidad, primarily under long-term arrangements. The Lake Charles facility received 124 BCF, an increase of almost 85% over 1999.

[22] The 1998 *Report on Issues Regarding the Existing New York Liquefied Natural Gas Moratorium*, by the State Energy Planning Board, led to legislation that lifted the then-existing moratorium on siting new LNG facilities, except in New York City.

New York State Resources

The first natural gas well in the U.S. was drilled in Fredonia, NY in 1821. Historically, most wells in New York were drilled to sandstone formations at depths of 1,000 to 4,500 feet, and produced relatively small amounts of gas (up to 100 DT/D) for many years. Today there are approximately 6,600 gas wells in New York that produce a total of about 18.5 MMDT.

Over the last three years, exploration and development of the Trenton and Black River Group has intensified. This is a prolific and deep play (7,000 to 11,000 feet), with some wells producing as much as 10,000 DT/D. It has been under development in Canada and other states for some time. During 2000, natural gas was produced from the Trenton and Black River in Steuben and Chemung Counties. Production from 23 such wells totaled 5.3 MMDT, or about 30% of total Statewide natural gas production of about 18.5 MMDT (from less than 1% of the total number of wells). The New York State Department of Environmental Conservation staff expects that between five and ten additional wells will be placed into production during 2001, and that production from just the Trenton and Black River Group may reach 12 MMDT or more. Drilling is most active in the southern Finger Lakes area of Steuben, Schuyler, and Chemung Counties, but wells have been drilled as far west as Cattaraugus County and as far east as Cortland County.[23]

In an effort to expand natural gas production in New York, the New York State Energy Research Development Authority (NYSERDA) is working with exploration companies to improve the identification of carbonate reservoirs and increase the geographic distribution of production. Along with the Trenton and Black River groups, other carbonates under investigation include the Beekmantown Group and the Onondaga Formation. NYSERDA is also researching improved detection mechanisms to reduce the dry hole ratio. Some NYSERDA projects are located in areas that currently have little or no production, such as the Tug Hill Plateau and Otsego County.

[23] From 1995 to 2000, 75 wells were drilled to explore for and develop Black River gas reserves. Drilling on 22 of these wells were began in 2000. By August 1, 2001, 35 applications had been received for Black River wells, a 46% increase over the number of applications received by the same time in 2000.

MERGERS AND ACQUISITIONS

New York LDCs

Mergers and acquisitions continue to reshape the way in which LDC services are provided. KeySpan Corporation acquired three Massachusetts gas utilities (Boston Gas, Colonial Gas, and Essex County Gas); Con Edison acquired Orange and Rockland Utilities; and Energy East (the parent of NYSE&G) acquired Berkshire Gas, a Massachusetts gas utility, Connecticut Natural Gas Corporation and Southern Connecticut Gas Company, and established the Maine Natural Gas Company. A merger between Niagara Mohawk and National Grid Corporation has been completed. Energy East's acquisition of RGS Energy Group, Inc., the parent of RG&E, is pending.

Interstate Pipelines

Four major mergers have been completed involving interstate pipeline companies that serve New York. Dominion Resources (an electric utility based in Virginia) acquired CNG Transmission Corporation and it became Dominion Transmission, Inc. (DTI). Columbia Gas Transmission was acquired by NiSource a Merrillville, IN based holding company. El Paso Corp., owner of Tennessee, acquired the Coastal Corporation. El Paso now owns and operates the largest pipeline system in the country, extending from California to Texas, and from Texas to Massachusetts and Illinois. Finally, Duke Energy recently acquired Westcoast Energy. Duke is a diversified energy company headquatered in Charlotte, NC, and is parent of TETCO and AGT as well as part owner of the Maritimes & Northeast Pipeline (M&NE). Westcoast is a leading Canadian natural gas company based in Vancouver, BC and is parent of Union Gas, Empire State Pipeline, the Westcoast Pipeline (which serves CA), as well as part owner of M&NE.

Analysis of Natural Gas Market Developments

Competition for available capacity is developing between the core market and the electricity generation market. The use of gas to generate electricity has increased, because of the increased demand for electricity. Further, there is an expectation that the use of gas for electricity generation will increase significantly as a result of proposed new gas-fired generation facilities.

Retail marketers to date have not acquired the capacity necessary to serve their customers except on a short-term basis. Many factors have contributed to this situation such as the tightness in the capacity market, commodity cost volatility, and access to

competitively priced capacity. It is not clear whether retail marketers will ever be willing to make capacity commitments or whether the role of holding capacity will be filled by wholesale marketers. Meanwhile, wholesale marketers have begun to acquire capacity, ostensibly to serve the power generation market. Thus, electric market developments are increasing competition for available pipeline capacity and changing the dynamics of the gas capacity market.

INFRASTRUCTURE ISSUES

Current Interstate Pipeline Delivery Capacity

Interest in expanding interstate pipeline delivery capacity to New York and the Northeast continues to be strong. Three major projects have recently been completed to increase delivery of Canadian gas to the Chicago market area. The new Alliance Pipeline,[24] which extends 1,860 miles from Alberta, Canada to the Chicago, IL area, began service on December 1, 2000, and has a capacity of 1,325 MDT/D. The new Vector Pipeline,[25] which extends from Chicago to Dawn, Ontario, also began service on December 1, 2000, with an initial capacity of 700 MDT/D. The existing Northern Border Pipeline was extended from Harper, IA to Manhattan, IL and its delivery capacity increased by 700 MDT/D beginning in December 1998. In the East, the Maritimes & Northeast Pipeline (M&NE), which extends from Sable Island, through Nova Scotia and New Brunswick, Maine and New Hampshire to the Boston, MA area, began service at the end of 1999. It has delivery capacity of 440 MDT/D, and "back feeds" the existing gas delivery systems serving the Northeast with a new competitively priced and sizable gas supply. Several of the projects proposed to serve the Northeast would expand access to these Canadian gas supplies.

Approved Projects

FERC has approved the following projects to increase capacity to New York and the Northeast:

MarketLink Phase I & II. The MarketLink projects will expand capacity of the existing TRANSCO Leidy line, which extends from storage facilities in Leidy, PA to the New York City market, in two phases. Phase I increased capacity by 115 MMCFD to

[24] The sponsors of Alliance are Fort Chicago Energy Partners 26%, Westcoast 23.6%, Enbridge 21.4%, Williams 14.6%, and Coastal 14.4%.

[25] The sponsors of Vector are Enbridge, Westcoast, and the MCN Energy Group.

New York City in December 2001. Phase II will increase capacity by 130 MMCFD to New Jersey and Pennsylvania by November 1, 2002. These expansions will be accomplished through pipeline looping[26] and added compression within the existing pipeline right-of-way. MarketLink was proposed as the final link to bring Western Canadian and Midwestern gas supplies to the East Coast. The Independence Pipeline in combination with an upgrade of the ANR Pipeline (described below) would link MarketLink with the Chicago market area.

Independence Pipeline. The Independence Pipeline is a proposed 36-inch diameter pipeline that would extend 370 miles from Defiance, OH to TRANSCO's facilities at Leidy, PA, and have a capacity of 916 MDT/D.[27] Independence has a proposed in-service date of summer 2003. ANR Pipeline's SupplyLink Project will expand its existing ANR pipeline between Sandwich, IL and Defiance, OH by 750 MDT/D through a combination of added compression and looping to feed the Independence Project with a targeted in-service date of summer 2003. FERC has approved both of these projects, subject to certain conditions.

Stagecoach. This project involves development of new 12 MMDT storage facility in Tioga, NY and Bradford, PA.[28] In addition, Tennessee constructed a new a 23.7 mile, 30 inch diameter pipeline connecting this storage field to its "300 line" in PA and a new 4.7 mile, 12-inch diameter lateral would be built from this storage facility to the proposed Twin-Tier power plant in Owego, NY. The storage facility has withdrawal rates of up to 500 MDT/D and injection rates of up to 250 MDT/D. Tennessee also expanded capacity on that line to NJ by 100 MDT/D. One company[29] has contracted for 400 MDT/D of capacity on the lateral (out of 500 MDT/D) and 90 MDT/D (out of 100 MDT/D) on Tennessee's "300 line" for 10 years. All of these facilities went into service in December 2001.

Hanover Compressor. AGT and TETCO filed a joint application to increase the ability of TETCO to deliver gas to New York City by 135 MDT/D. This was accomplished by adding compression to AGT's existing compressor station in Hanover, NJ, allowing TETCO to shift some of its existing deliveries to AGT from the

[26] The addition of pipeline segments parallel to an existing pipeline to increase its capacity.

[27] The sponsors of Independence are ANR Pipeline Co., TRANSCO and National Fuel Gas Supply Corp.

[28] The sponsor of this storage project and the pipeline lateral is Central NY Oil & Gas Company.

[29] ECORP a marketing affiliate of Central NY Oil & Gas.

Lambertville, NJ interconnect. FERC approved this project on July 26, 2001, and the facilities were in-service in November 2001.

Leidy East. The Leidy East project involves looping and added compression in PA and NJ to expand the capacity of TRANSCO's Leidy line by 130 MMCFD.[30] Construction is scheduled to begin in April 2002 and the proposed in-service date is November 2002.

Dracut Expansion. Tennessee's Dracut Expansion Project will increase its ability to move gas from Dracut, MA to the west by 200 MDT/D. The project involves replacing 12 miles of 16-inch diameter pipe with 24-inch diameter pipeline. This project was filed at FERC in May 2001, and has an expected in-service date of fall 2002.

Iroquois' Eastchester Expansion. Involves construction of 33 miles of 24-inch pipe from the existing Iroquois mainline at Northport, LI to the Bronx, NY where it will interconnect with the Con Edison system. This project will increase capacity by 230 MDT/D, primarily for electric generation customers, with an expected in-service date of Spring 2003. Iroquois received FERC's approval for this project in December 2001. As part of this project, Iroquois will have to build new compressor stations in Boonville and Dover, NY and modify the existing Croghan, Wright, and Athens, NY compression stations to support the proposed deliveries through Eastchester.

Maritimes & Northeast Extension and Hubline. The Maritimes & Northeast Extension will be a new 25-mile pipeline extending Maritimes from Methuen to Beverly, MA. This line will interconnect with the Hubline pipeline, a new 29-mile, 24-inch diameter pipeline that would extend from Beverly, MA across Boston Harbor to an onshore interconnection with AGT's existing facilities in Weymouth, MA. Hubline would have a capacity of 300 MDT/D. Both of these projects have been approved by FERC and have a proposed in-service date of November 2002.

Cove Point Maryland LNG. TRANSCO plans to reactivate the import capability of its Cove, Point, MD, LNG facility and expand its storage tank capacity by 50%. Cove Point was originally built with an import terminal, which was last used in 1980 and has since been dismantled. FERC has approved the project and construction is scheduled to begin in the 2nd quarter of 2002. The receipt of LNG shipments is expected in the 4th quarter of 2002, with the additional tank capacity scheduled for completion in the 4th quarter of 2004.

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[30] This project is a replacement for the previously proposed phase III of MarketLink which was rejected by FERC because TRANSCO failed to secure precedent agreements with customers for the total volumes proposed for this phase of the project.

Proposed Projects

Several pipeline projects had been proposed for completion in the 2000-2002 time frame, but delays in the review and approval process have pushed the startup dates back. Since some of these projects compete with each other, it is likely that not all of these pipelines will be built.

The Millennium Pipeline.[31] Millennium would be a 36-inch pipeline that would extend 424 miles from a new interconnection with TransCanada Pipelines in Lake Erie to a termination point in Mt. Vernon, NY where it would interconnect with Con Edison facilities. Most of the route would follow the existing Columbia right-of-way. Millennium would provide access to Canadian gas and the Chicago market area through Union Gas as well as access to storage in Michigan and Ontario. The capacity of Millennium would be 700 MDT/D, of which 350 MDT/D would be for the New York City area. FERC has approved the route for Millennium, except for the portion within Mt. Vernon. FERC asked the parties to work to find an acceptable alternate route within Mt. Vernon. In May 2002, an agreement on an alternative route within Mt. Vernon was reached between Millennium, Mt. Vernon, and Con Edison. Sponsors of the Canadian portion of the project recently withdrew their applications filed at the Canadian National Energy Board (NEB). They attribute this action to delays in receiving U.S. regulatory approvals for Millennium and pledge continuing support to the project and say that they intend to re-apply for NEB approval at an appropriate time. At this point, the proposed November 2002 in-service date is no longer feasible.

Islander East Project.[32] One of three projects proposed to connect existing interstate pipelines to basically the same point on eastern Long Island. Islander East would consist of approximately 45 miles of new 24-inch diameter pipe from a point near Cheshire, CT, where it will interconnect with the existing AGT mainline, across the Long Island Sound to the town of Brookhaven, NY. Islander East will have an initial capacity of 285 MDT/D, with a proposed in-service date of November 2003. FERC issued a favorable Draft Environmental Impact Statement (DEIS) to Islander East in March 2002.

Connecticut-Long Island Lateral Project. Would consist of approximately 50 miles of new pipeline connecting the existing Tennessee pipeline near Agawam, MA, to

[31] Millennium is sponsored by Columbia Gas, TransCanada, Westcoast and MCN Energy Group.

[32] The Islander East Project is sponsored by Duke Energy (50%) and KeySpan (50%).

Long Island.[33] This project has been announced but not yet filed at FERC. The proposed in-service date is November 2003 and the proposed capacity is 450 MDT/D.

Iroquois' Eastern Long Island Expansion Project. Would consist of approximately 20 miles of submarine pipe under Long Island Sound from Iroquois' existing mainline in Milford, CT, to Shoreham, Long Island. The proposed capacity is 175 MMCFD and the proposed in-service date is November 2004. The project was filed at FERC in December 2001.

Texas Eastern Incremental Market Expansion. The TIME project would expand the capacity of the TETCO system by 100 MDT/D (through compression and looping) for delivery to New Jersey Natural Gas Company. The project has been filed at FERC with an expected in-service date of November 2002.

Maritimes & Northeast Expansion. Maritimes & Northeast Pipeline have filed and application with FERC to nearly double the capacity of the existing Maritimes' pipeline from 415 MDT/D to 800 MDT/D, for service in the 2003-04 time frame.

Iroquois Athens. This project is comprised of a second compressor unit (10,000 hp) that would be located at Iroquois' existing compressor station at Athens, New York. The added compression would provide 70 MDT/D of capacity for the Athens Generating Company. Iroquois filed this project at FERC in November 2001, with a proposed in-service date of September 2003.

Iroquois Brookfield. This project is comprised of a new 10,000 hp, compressor station to be located adjacent to Iroquois' existing Brookfield, CT meter station. The added compression would provide 25 MDT/D of capacity for PP&L Energy Plus LLC (a marketing company) and up to 60 MDT/D for Astoria Energy Company. Iroquois file this project with FERC in November 2001, with a proposed in-service date of November 2003.

ConneXion Project. Tennessee's ConneXion project involves expanding storage capacity in Pennsylvania and expanding its delivery capacity from those storage areas to New York City by about 500 MDT/D. Tennessee plans to file an application at FERC in the fall/winter of 2002 and expects the facilities to be in-service by November 2004.

Northwinds Pipeline**.** Would be a new 215 mile, 30-inch pipeline extending from Kirkwell, Ontario, cross the U.S. near Buffalo, NY and follow a southerly route to the

[33] The sponsor of this project is Tennessee.

Ellisburg-Leidy storage area in Pennsylvania.[34] It would have an initial capacity of 500 MDT/D and provide shippers access to the Dawn, Ontario hub and storage facilities. Northwinds plans to file for regulatory approvals in the spring of 2002, with a target in-service date of late 2004.

Blue Atlantic Project. El Paso Corporation has announced plans for a new approximately 750 mile, 36-inch pipeline from offshore Nova Scotia to Long Island. It would have an initial capacity of 1000 MDT/D and is estimated to cost between $1.6 billion and $1.8 billion. El Paso anticipates filing for approvals in late 2002, with a targeted in-service date of late 2005.

The development of gas resources located in the Scotian Shelf represents a significant new supply source to the Northeast. While several estimates of the potential gas supplies in the Scotian Shelf are in the 18 TCF range, some estimates are 50 TCF or even higher. Production from this area was 121 BCF in 2000, but is expected to increase to between 400 and 800 BCF by 2010[35]. These gas supplies are not only located closer to the Northeast market than traditional Gulf Coast or Canadian supplies but are a new supply source that will increase the diversity of gas supplies to the Northeast.

LDC Distribution System Capacity

Distribution system improvements will be needed to serve the power generation market as well as expanded core markets. Since several of the proposed power generation projects would be located in and around the Con Edison gas service territory, the company has an ongoing effort to work with project sponsors to identify their needs and to determine what distribution system improvements will be needed.

Further, the LDC system infrastructure is aging and, to ensure safe operations, there is a need to continue priority replacement programs on portions of the distribution system as well as to verify LDC transmission system integrity. The LDCs and Department of Public Service staff have been engaged in a collaborative effort to address the integrity of transmission systems. That effort involves the development of a risk assessment model to calculate and prioritize the relative risk of transmission pipeline segments and to work to reduce the highest risks to the pipelines. Both LDCs and operators of interstate pipelines, which deliver gas to the State, will need to verify transmission line integrity. Coordination of integrity verification efforts by both LDCs and interstate pipelines will be needed to prevent adverse impacts on continuous gas

[34] The sponsors are TransCanada Pipelines and National Fuel Gas Company.

[35] Canadian Natural Gas, Market Review & Outlook, May 2001, Natural Resources Canada.

deliveries. The federal Department of Transportation has issued a proposed definition of "high consequence areas" and is expected to issue a notice of proposed rulemaking specifying gas pipeline operator requirements for high consequence areas in the spring of 2002. There is a need for continued research and development (R&D) activities to develop new methods of verifying transmission system integrity as well as to develop cost-effective techniques to maintain and upgrade the existing distribution system.

Infrastructure Security

Interstate pipelines are periodically patrolled by helicopter, and routinely inspected and maintained. Major gas facilities, such as gas processing plants, LNG plants, and compressor stations are fenced and typically guarded. The security of gas delivery facilities has not been a problem historically. However, in light of the September 11, 2001 terrorist attacks, Governor Pataki created the Office of Public Security to assess the vulnerability of critical infrastructures to terrorist attack and to develop a comprehensive Statewide anti-terrorism strategy. Concurrently, the Department of Public Service has established the Security Assessment Team to assess utility efforts to maintain system reliability and security.

Analysis of Infrastructure Issues

It is clear that additional capacity will be needed to meet anticipated increases in natural gas demand in the State. However, because of uncertainties regarding the timing of new merchant power plants and their impact on the operation of existing gas-fired generators, the extent and timing of that need are less clear. The NYSERDA-NYISO study, discussed below, evaluated the adequacy natural gas pipeline capacity to meet the needs of the electricity generation market.

FUTURE NATURAL GAS DEMAND, SUPPLY, AND PRICE

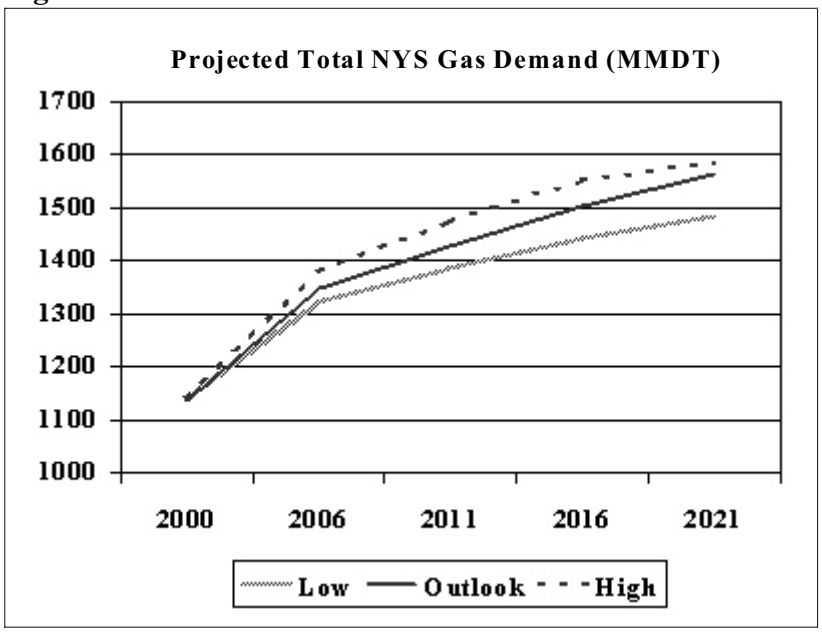
Approach

Future natural gas demand, supply, and price are especially difficult to project due to the dynamic changes taking place in the gas and electric industries and rapidly changing market conditions. These forecasts were developed from the *2002 Annual Energy Outlook* projections prepared by the federal Energy Information Administration (EIA). Considering the market uncertainties, a range of possibilities was examined.

Natural Gas Demand

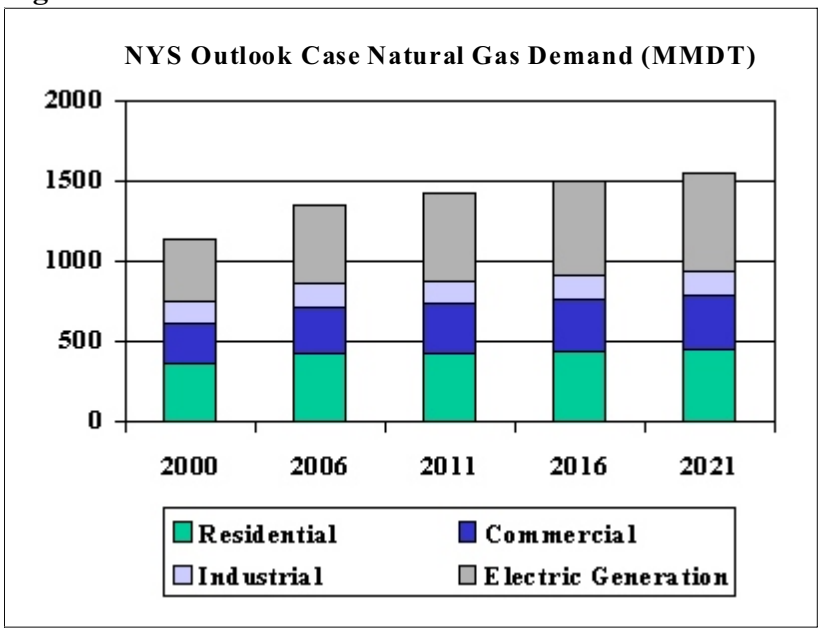
On a Statewide basis, the projected range of overall demand growth is expected to be 1.3% per year in the low case, to 1.6% per year in the high case, with the Outlook Case at 1.5% per year, as shown in Figure 6. Figure 7 shows the breakdown by sector of the Outlook Case demand projection.

Figure 6



On a Statewide basis, the projected range of core market demand growth is expected to be 0.9% year in the low case to 1.25% per year in the High Case, with the Outlook Case at 1.1% per year, as shown in Figure 8.[36]

Figure 7

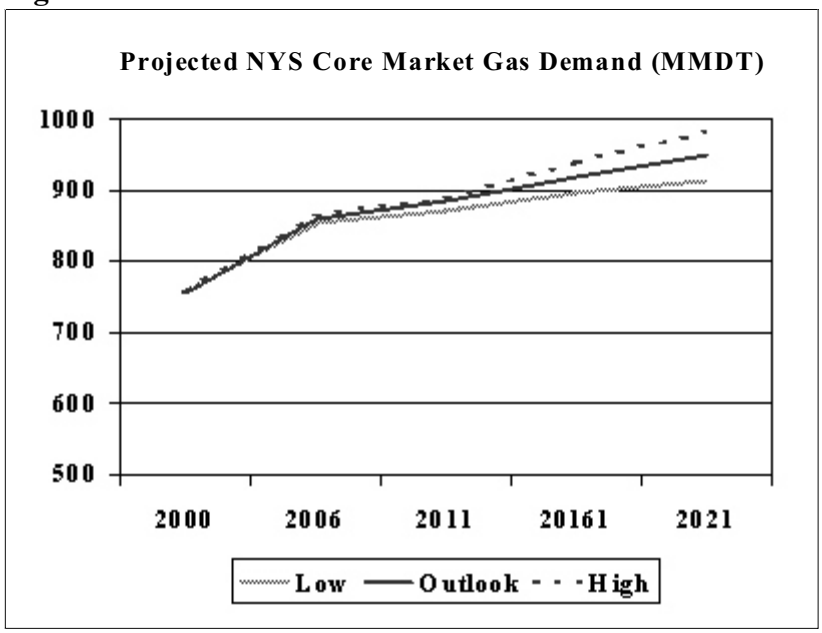


The largest increase in gas use in New York is expected to be for power generation. However, this expectation is subject to the greatest uncertainty because there is no way of knowing precisely how many new power plants will be built, how and when they will operate, and

[36] It should be noted that these forecasts are for annual requirements and peak-day requirements (which determine capacity requirements) are expected to increase at a faster rate.

how their operation will impact the operation of existing generation stations.

Figure 8



NYSERDA and the New York Independent System Operator (NYISO) initiated a study of the inter-relationships between the electricity and natural gas systems in New York. Through integrated modeling of the natural gas pipeline and electric generation systems, the study analyzed the level of gas and oil use for electric generation under a variety of pipeline and electric generation expansion scenarios[37]. Ongoing analysis is examining the interactions of the gas and electric system in contingency situations.

As a starting point, for the year 2002, the analysis assumes that electric generation and natural gas system expansion projects currently under construction, or expected to be in service through 2003, are completed.[38] This includes a net increase in electric generating capacity of 527 MW[39] and an increase in natural gas pipeline capacity of 465 MDT/D[40]. Most of this gas pipeline capacity increase (395 MDT/D) is to the downstate market. This represents approximately a 12% increase in pipeline capacity to the

[37] In this analysis, the current and projected needs of the core market (residential, commercial and industrial customers) are considered and are met first.

[38] It should be noted that recommendations for reducing State greenhouse gas emissions, discussed in Section 2.3, were developed following the completion of the analysis contained in this study. Such recommendations could further increase the demand for natural gas to generate electricity.

[39] NYPA and LIPA additions, and various unit up-ratings.

[40] Transco MarketLink (115 MDT/D), Iroquois Athens (70 MDT/D), Iroquois Eastchester (230 MDT/D), and another 50 MDT/D from among the following projects: Leidy East, Texas Eastern Hanover Compressor, and Stagecoach (see section on Infrastructure Issues in the Natural Gas Assessment for a description of these projects).

downstate market since November 2001. About 30% of the 395 MDT/D increase in pipeline capacity to the downstate area has been constructed to date.

Projected changes in the maximum annual amount of natural gas that can be delivered and burned (and the corresponding, or minimum oil use) in power plants between 2002 and 2005 are shown in Table 1[41].

TABLE 1

Changes (from 2002) in Annual Maximum Gas and Corresponding Oil Consumption for Electricity Generation (MMDT)											
Generation Capacity Added*	Year	Amount of Post 2003 Pipeline Capacity Added (MDT per day)									
		0		300		400		500		800	
		Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil
1030 MW[42]	2005	25	6	41	-10						
1780 MW[43]	2005	15	4	34	-10	36	-12				
4435 MW[44]	2005	-14	0	31	-7	38	-12	41	-14	44	-18
5015 MW[45]	2010	64	77	116	4	123	-6	127	-12	135	-18

*While the scenarios are based on actual new generation proposals, they should be taken as representative cases given the current uncertanties regarding which projects will actually be built.

These changes are relatively small because the increased use of gas in new combined cycle units and gas turbine units is nearly offset by a decline in gas used in (existing) steam units[46]. This is because the heat rates of new combined cycle units are about 7,000 Btu/Kwh, as opposed to 10,000-12,000 Btu/Kwh for existing steam units, so

[41] To test the ability of the gas delivery system to meet maximum electricity generation gas requirements, the price inputs to the model were set so that gas would be the economic fuel of choice. Therefore, the results shown in this table represent changes in the maximum amount of gas (and corresponding minimum amount of oil) that the electric system would require, constrained only by the availability of natural gas pipeline capacity.

[42] Includes capacity additions from the Athens and East River projects.

[43] Includes capacity additions in the 1030 MW case, plus the Ravenswood and Poletti projects.

[44] Includes capacity additions in the 1780 MW case, plus the Orion, Heritage, Albany, and Astoria projects.

[45] This includes capacity additions in the 4435 MW case, plus the Brookhaven project.

[46] For reference, the 2002 values are 453 MMDT for gas and 18 MDT for oil.

that about 50 percent more power can be generated with the same amount of gas. As can be seen, for a given level of pipeline capacity, as more new generation is added, the change in maximum natural gas use decreases and oil use generally decreases. Again, this is the result of new, efficient combined-cycle generation units displacing gas from existing, steam electric units. For a given level of new generation capacity, as more natural gas pipeline capacity is added, the maximum gas use increases and oil use decreases. This is because removing natural gas pipeline capacity constraints allows more gas to be delivered to electric generation units. By 2010, the increase in gas use becomes more significant as more generation is required to meet additional electricity demand.[47]

The study focused on an analysis of the downstate area where much of the proposed increase in electric generation capacity would be located, and the ability of various increases in gas pipeline capacity to meet downstate electricity generation needs.[48] As discussed earlier, several pipeline projects for the downstate area have been proposed that collectively could increase capacity by about 800 MDT/D. The study did not evaluate particular pipeline projects, but instead examined post-2003 capacity addition levels of 0, 300, 400, 500 and 800 MDT/D.

Table 2 shows the percentage of electric generation requirements that would be met by gas under these scenarios in 2005.

TABLE 2

Percentage of Annual Electric Generation Requirements that Could be Met by Gas - Downstate Area 2005					
Amount of Electric Generation Capacity Added	Amount of New Pipeline Capacity Added Post-2003 (MDT per day)				
	0	300	400	500	800
1030 MW	93	98			
1780 MW	91	98	98		
4435 MW	79	95	98	99	100

As can be seen, the addition of 300 MDT per day of new, post-2003 capacity will meet at least 95% of electric generation fuel requirements. Oil would be used to provide the remaining fuel, at levels that are predicted to be below historical oil use levels. If the

[47] The study assumes that electricity demand will increase at a rate of about 1%/year between 2002 and 2005 and about 0.9%/year between 2005 and 2010.

[48] The study did not model LDC systems.

amount of new pipeline capacity is increased to 800 MDT/D, all of the electric generation requirements (including the highest generation capacity addition case) can be fully met using natural gas. By 2010, an additional 100-200 MDT/D of pipeline capacity would be needed to maintain oil use at the high generation capacity addition case levels in 2005.

The study's overall findings are that:

- If no post-2003 pipeline expansion projects are built, the existing gas and oil systems will be adequate to meet all generation scenarios.
- Pipeline capacity additions of between 300 MDT per day and 800 MDT per day would provide additional benefits to the electricity and natural gas systems, including enabling the use of larger quantities of cleaner-burning natural gas and providing better contingency protections.[49] Nonetheless, the more natural gas pipeline capacity built and used to serve electricity generation, the more dependent the electricity system is on natural gas availability and the more exposed it is to natural gas price variation.
- If 800 MDT per day of post-2003 pipeline capacity are built into the downstate New York area, gas could meet 100% of all generation scenario fuel needs.
- If fewer pipeline expansions and/or less additional generating capacity are added, a substantial portion of the maximum potential gas demand for generation can be met. Some oil would need to be burned, but the total annual oil burn in all cases in 2005 would be less than the amount burned in 2000 and 2001.

These findings assume that the steam units remain available, and can use residual oil when needed, providing important flexibility to meet peak electric generation needs. The addition of 4,435 MW of generation capacity and 300 MDT/D of pipeline capacity will result in existing steam units running at very low load factors with low earnings. Unless these plants can offset this loss of earnings from the capacity and ancillary services markets they could become uneconomic and retire. To the extent that these steam units are retired, either more pipeline capacity will be needed to meet the electric generation needs, or new combined cycle plants will need to have the ability to burn oil for longer periods. These new combined cycle plants, as currently planned, will have neither the oil storage capacity nor air emissions permits to do that. The residual oil storage tanks at existing steam-units are a valuable asset that could be converted to distillate oil storage. However, the inability to burn distillate oil in new, efficient combined cycle plants for more than 30 days would result in the need to burn greater quantities of more polluting residual oil in remaining existing inefficient steam electric

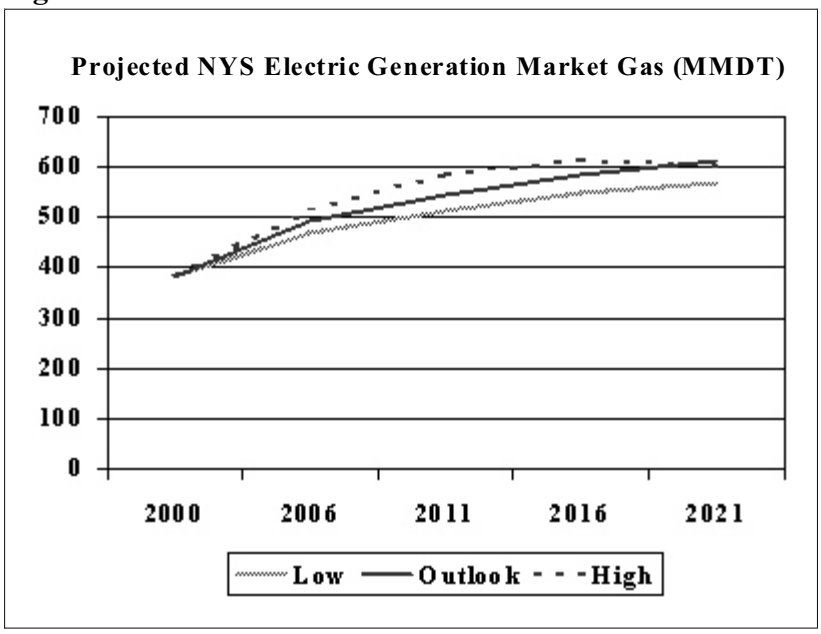
[49] Work is continuing to assess the impact on the electricity and natural gas systems resulting from additional contingencies.

units. These issues highlight the importance of the ability to use oil as a substitute for gas pipeline capacity to generation system reliability.

The study considers pipeline capacity that is built to the New York market as capacity that will remain available to customers in New York. This assumes an open pipeline capacity market where bidders can acquire capacity on a short-term basis if they are willing to bid high enough. However, this same pipeline capacity could be used to deliver gas to upstream points or even downstream points (*e.g.*, New England). There is a risk that these customers (*e.g.*, new generators or other users) might emerge and be willing to sign a long-term contract for that pipeline capacity. If that were to happen, that pipeline capacity would become unavailable to the New York market, and building replacement pipeline capacity may take several years.

The study also assumes normal winter weather for the purpose of calculating non-generation loads. LDC's hold capacity to meet severe weather requirements[50] and can offer excess capacity to the market when the weather is less than severe. To the extent that winter weather is colder than normal, less pipeline capacity will be available for generation. If New York State had a severe winter, about 100 MDT per day of additional pipeline capacity would be needed to keep oil use at "normal winter" levels in 2005.

Figure 9

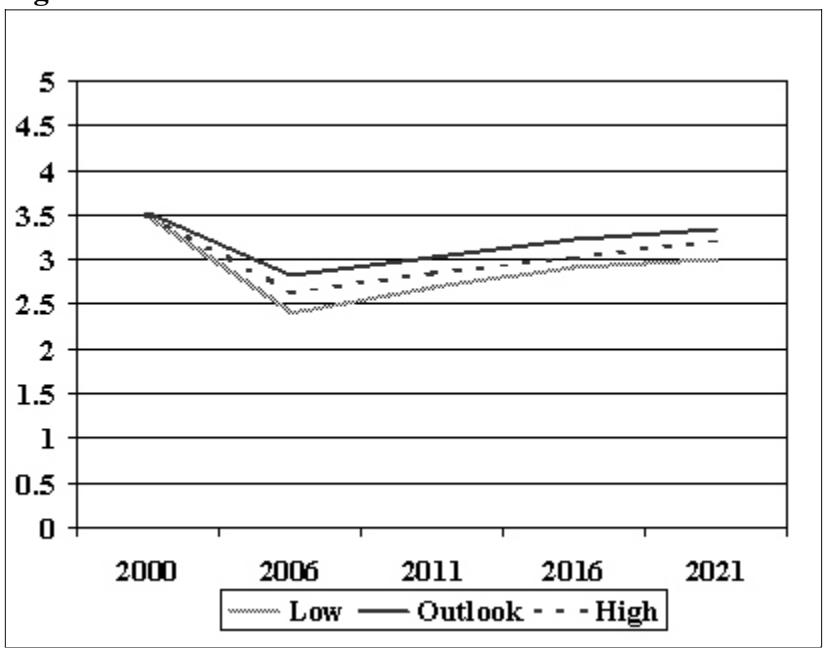


In this plan, over the long-term on a Statewide basis, the projected range of power generation demand growth is expected to be 1.9% per year in the Low Case, to 2.2% per year in the High Case, with the Outlook Case at 2.3% per year, as shown in Figure 9.

[50] The definition of a "severe winter" varies by LDC, but downstate it is about 13% colder than normal.

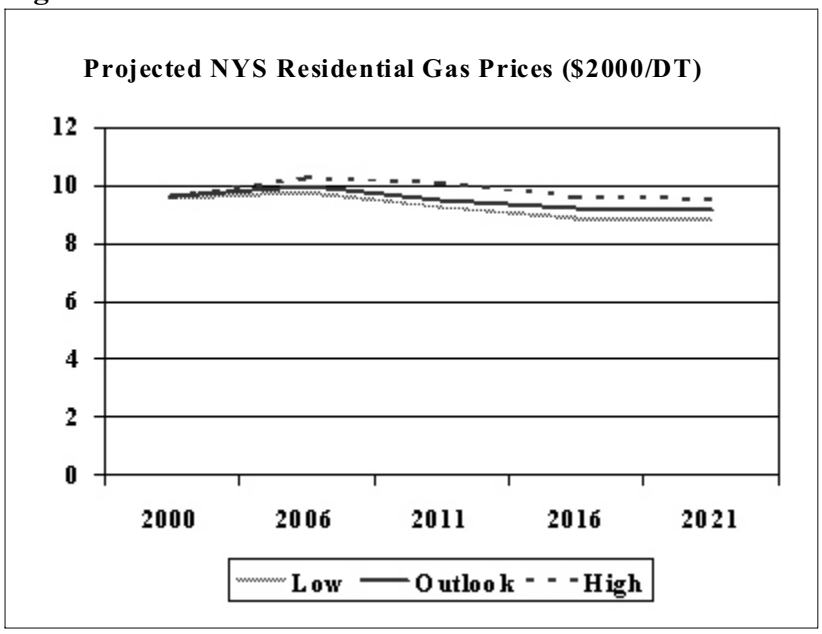
Natural Gas Price

Figure 10



It is especially difficult to project future natural gas prices due to uncertainties and rapid changes in natural gas markets. Early in the year 2000, no industry analysts predicted that gas prices would reach anywhere near $10/DT during the 2000-2001 winter. Similarly, no one predicted that gas prices would fall below $2.50/DT before the 2001-02 winter. Further, long-term price projections are not intended to, and do not reflect, short-term price variations observed in the market. However, such price volatility will likely be a permanent feature of the competitive gas market.

Figure 11

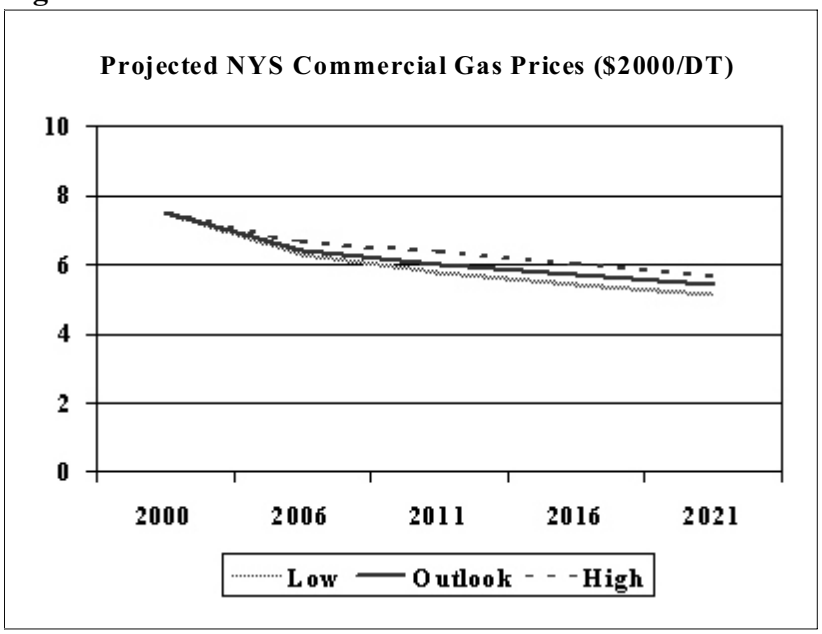


EIA projections show Outlook Case natural gas wellhead prices trending down and then gradually increasing, but not reaching, the level of 2000 prices in real terms over the planning period (see Figure 10). Retail core market prices are expected to decrease slightly in real terms over the forecast period. This is because, in addition to anticipated decreases in commodity cost, there are also anticipated reductions in transmission and distribution system costs. Figures 11, 12, and 13 show the range of core market prices for the

residential, commercial, and industrial sectors, respectively.

Retail prices of gas for power generation are also expected to decrease slightly and then increase slightly, essentially remaining flat over the forecast period. Figure 14 shows the range of gas prices for the power generation sector.

Figure 12



Natural Gas Supplies

According to EIA's projections, there will be adequate supplies of natural gas at all forecast levels of demand and price. The largest increase in supply will come from domestic sources, along with increased dependence on Canadian gas and LNG imports. New York State gas production will likely increase significantly. However, since demand is expected to grow significantly, the portion of the State's needs met with indigenous gas is not likely to change much.

Figure 13

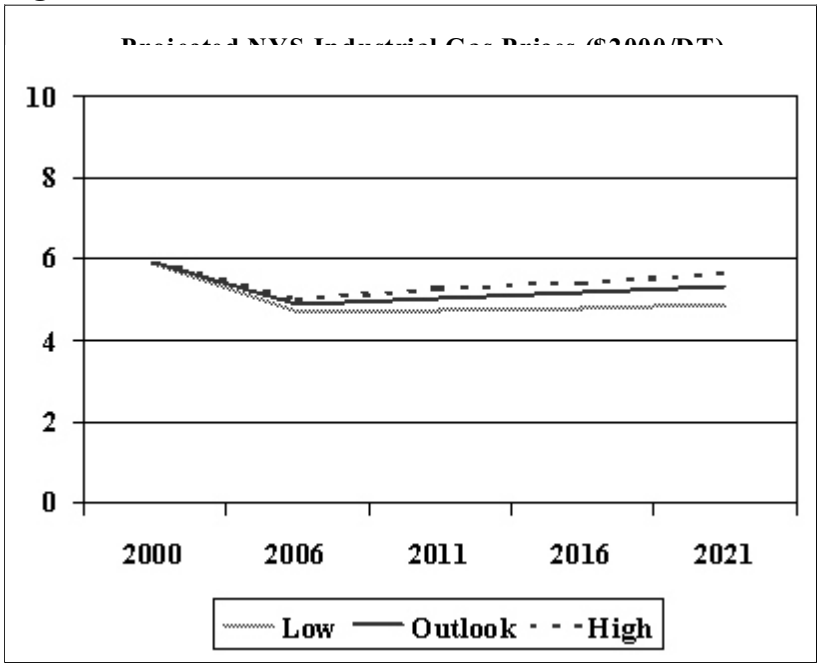
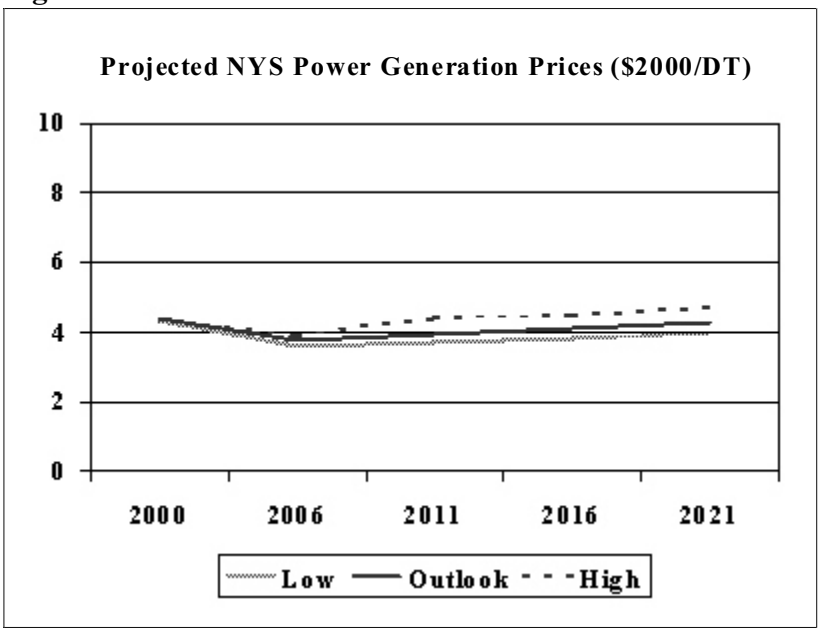


Figure 14



FINDINGS AND CONCLUSIONS

- The demand for natural gas is expected to expand significantly over the planning period, particularly in the near-term, with the greatest increase in the use of gas for power generation.

- More pipeline capacity will be needed to meet the increased demand for natural gas. Interest in expanding interstate pipeline delivery capacity to the Northeast and New York State continues to be strong. The local distribution company (LDC) systems will also have to be expanded to meet these increased needs.

- The Federal Energy Regulatory Commission (FERC) recently approved 9 natural gas pipeline projects to serve the Northeast, and another 11 projects have been proposed.

- Natural gas prices will decrease slightly in real dollars over the long-term and are expected to remain volatile.

- There is a general need to continue LDC system integrity and safety programs, as well as to continue research and development efforts to develop cost savings techniques to maintain and upgrade the existing distribution system.

SECTION 3.6

PETROLEUM RESOURCE ASSESSMENT

INTRODUCTION

New York State is a major consumer of petroleum fuels such as motor gasoline, home heating oil, diesel fuel, propane, and residual oil. The State is the fourth largest petroleum fuel market in the U.S., exceeded only by Texas, California, and Florida. In 2000, total Statewide expenditures on all petroleum fuels by all economic sectors equaled $16.3 billion. The transportation sector accounted for $12.3 billion, or 75% of the total. To meet this demand, numerous multi-national, national, and independent companies supply refined petroleum products to the State through an extensive distribution system. The Port of New York, with large petroleum storage terminals located on both the New York and New Jersey sides of the port, is an important component of this system. These deep water terminals receive a steady flow of refined petroleum products and crude oil into the New York area from domestic and foreign sources. Crude oil is used by refineries located in the mid-Atlantic region to produce refined products for the Northeastern U.S. Once refined fuels arrive at these facilities, they are distributed by barge and truck transport to smaller coastal and inland terminals for further redistribution to customers. New York State also receives petroleum products from several pipeline systems that connect terminals located throughout the State to the major refining centers located along the Gulf and East Coasts.

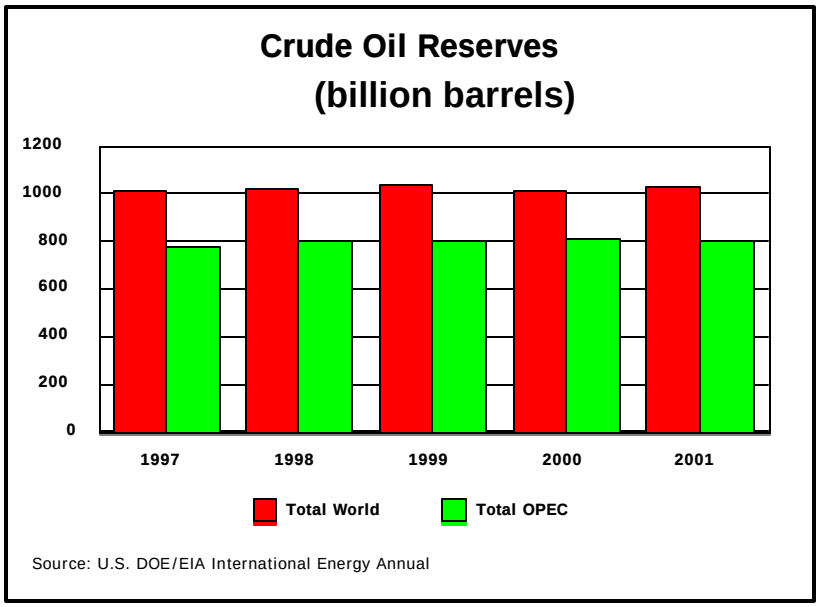
PETROLEUM SUPPLY OVERVIEW

Crude Oil Reserves

Geographic location is as important a consideration as the quantity and quality of crude oil. The amount of proven world crude oil reserves varies annually with new discoveries and improved extraction techniques. In recent years, world crude oil reserves have remained relatively stable as new discoveries have effectively offset depletion of existing reserves. Between 1997 and 2001, estimated worldwide reserves remained steady at approximately one trillion barrels, as shown in Figure 1. While there are a number of important crude oil producing regions around the world, one of the most vital is the Middle East, home to many

member nations of the Organization of Petroleum Exporting Countries (OPEC)[1]. Current OPEC crude oil reserves equal approximately 800 billion barrels and accounted for 77% to 80% of total world reserves between 1997-2001. As a comparison, United States crude oil reserves for this same period averaged about 22 billion barrels, slightly more than 2% of the total world-wide.

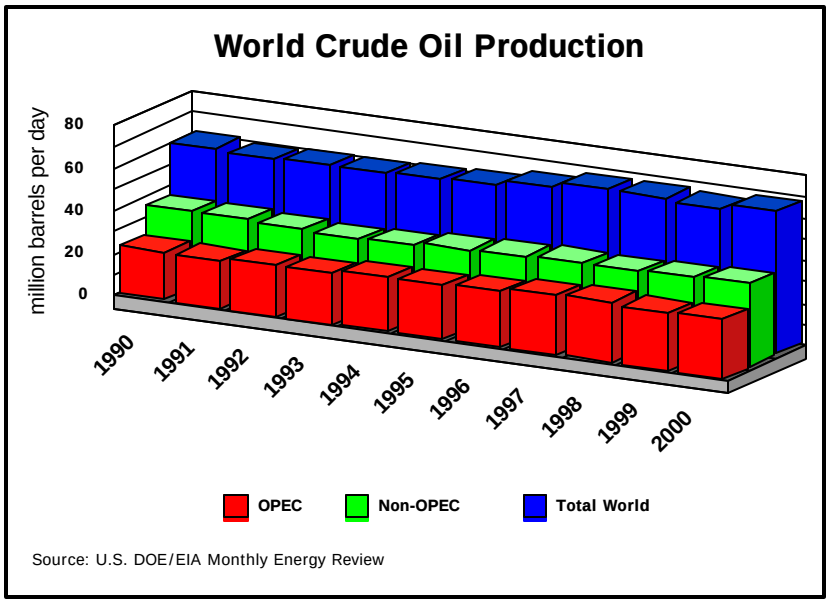
Figure 1



World Production Trends

In general, world crude oil production has increased steadily to meet growing world demand. This gradual trend is occasionally interrupted by periods of inventory draw down and short duration reductions in demand resulting from reduced economic activity. World crude oil production, as shown in Figure 2, fell slightly from 60.6 million barrels per day (mmb/d) in 1990 to an average of 60.2 mmb/d for the

Figure 2



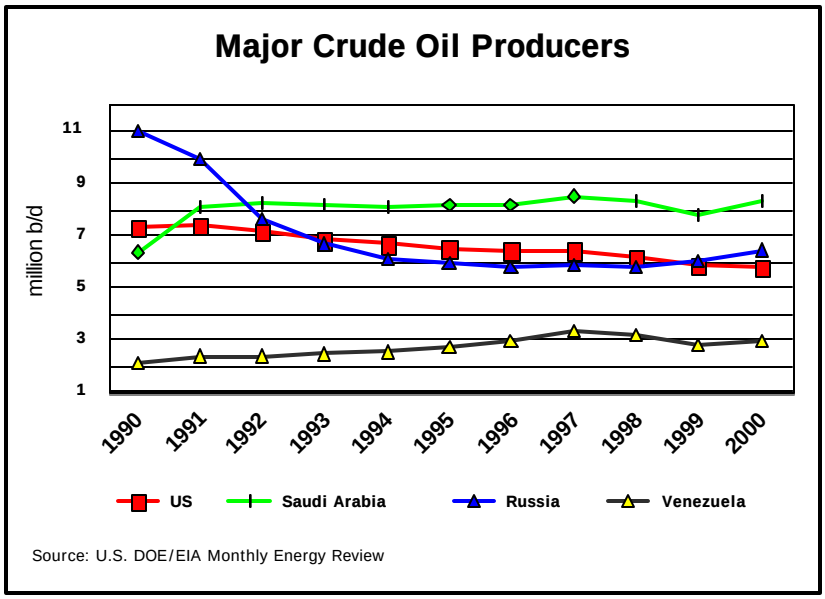
[1] Member nations include Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela. Ecuador withdrew in 1992 and Gabon withdrew in 1994.

1991-1993 period, a decline of 0.7%. During the 1994-1998 period however, world demand continually moved higher and reached 67.0 mmb/d by 1998. A small reduction of 1.6% occurred in 1999, but this was offset by an increase of 3.5% in 2000 as total world production reached 68.2 mmb/d and petroleum fuel use rose in response to a growing world economy.

Over the past ten years, the percentage of world crude oil production attributed to OPEC member nations has climbed steadily, rising from 38.3% in 1990 to 42.7% in 2000. This upward trend was briefly interrupted in1996 and 1999. In 2000, the OPEC percentage share was at its highest level since 1980 when the 44.6% level was reached. OPEC's all time highest percentage share of 55.0% occurred in 1973.

Figure 3 presents the annual crude oil production volumes of several major producers between 1990 and 2000. The four countries, Venezuela, Russia, Saudi Arabia, and the United States, accounted for 34.6% of world production in 2000, down from 44.3% in 1990. The reduction in combined market share by these countries is primarily the result of production declines in Russia[2] and the United States. U.S. crude oil production fell from 7.4 mmb/d in 1990 to 5.8 mmb/d by 2000, a 20.8% decline. During the same period Russian production fell from 11.0 mmb/d to 6.5 mmb/d, a 41.0%[3] decline as that country dealt with the breakup of the Soviet Union. While U.S. production continues on a downward trend, production in Russia has rebounded in recent years from a low of 5.9 mmb/d in 1996 to 6.5 mmb/d in 2000, an

Figure 3



[2] Data for Russia from 1990-1991 consists of the volumes for the 15 republics that made up the Union of Soviet Socialist Republics (USSR). The USSR ceased to exist on December 31, 1991.

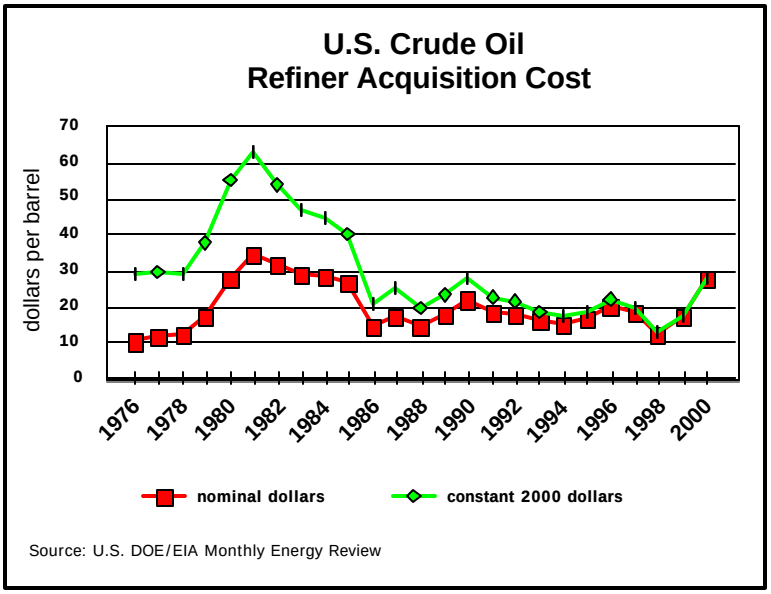
[3] In 1992 Russia accounted for approximately 90% of total USSR production. Data from 1992 onward does not include the remaining 14 former USSR republics.

increase of 10.2%. Increases in production from Saudi Arabia and Venezuela partially offset the declines recorded by the U.S. and Russia. Between 1990 and 2000 production from Saudi Arabia rose from 6.4 mmb/d to 8.4 mmb/d, a 31% increase. Similarly, production in Venezuela increased from 2.1 mmb/d to 2.9 mmb/d, a gain of 38%.

Petroleum Price Review

A review of the refiner acquisition cost (RAC) of crude oil, the average price paid by U.S. refiners for crude oil processed at domestic refineries, in both nominal and constant year-2000 dollars, is presented in Figure 4. The nominal dollar line shows the average price paid by a U.S. refiner for a barrel of crude oil in that year. The constant year-2000 line indicates the price that a refiner would have paid in year-2000 dollars during a given year. In 1981, on a nominal basis, RAC prices reached a high of $35.24 per barrel (bbl) as the Iranian revolution disrupted the world petroleum markets. As high as this price seems, in terms of constant year-2000 dollars, the price of crude oil actually reached an estimated $63.28/bbl that year.

Figure 4

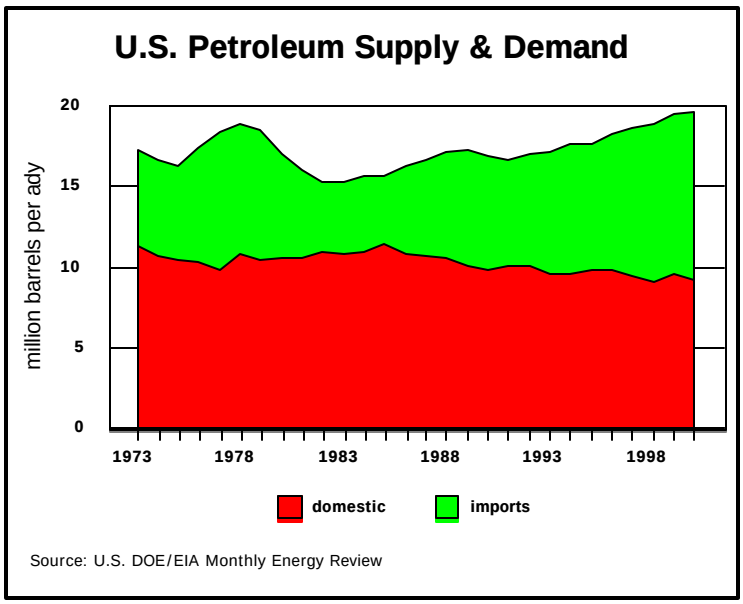


Since the mid-1980s, nominal RAC prices have generally remained within the $15/bbl to $25/bbl range. Even significant events such as the Persian Gulf War in 1990 only temporarily interrupted the relative stability of crude oil prices. More recently, OPEC member nations, as well as some large non-OPEC producers including Mexico, Norway, Oman, and Russia, have sought greater control over crude oil prices internationally by restricting production. The reduction in the amount of crude oil available on world markets has forced RAC prices upward from a 1998 low of $12.52/bbl to $28.23/bbl in 2000, an escalation of $15.71/bbl or about 125%.

U. S. Petroleum Supply and Demand

U.S. demand for petroleum products has grown steadily over the past nine years, as illustrated in Figure 5. Petroleum demand increased from 16.7 mmb/d to 19.7 mmb/d between 1991 and 2000, an increase of 3.0 mmb/d or approximately 18%. During this same period U.S. domestic production, see Figure 3, fell from 10.1 mmb/d to 9.3 mmb/d, a reduction of 7.9%. To offset both the decline in U.S. production and to meet the rise in domestic consumption, imports rose from 6.6 mmb/d to 10.4 mmb/d, a gain of 57.6%. On a percentage of total supply basis, by 1998 imports of crude oil and refined products passed the 50% level for the first time, equaling 51.6%. For the most recent year, 2000, imports achieved a U.S. market share of approximately 53%. For comparison, the 1990 import share was 42% and in 1980 it was 37%.

Figure 5



OPEC's share of total U.S. petroleum product imports exceeded 50% for the first time in 1974 when OPEC supplied 55.7% of total imports. The percentage share moved steadily higher until 1977, when an all time high of 72.3% of total imports were supplied by OPEC members. During the 1978 to 1985 period, the Arab oil embargo and sharply higher world crude oil prices pushed the OPEC share down to 42.7% by 1985. Since that time, OPEC's share of the U.S. market has remained in the 50 to 60% range.

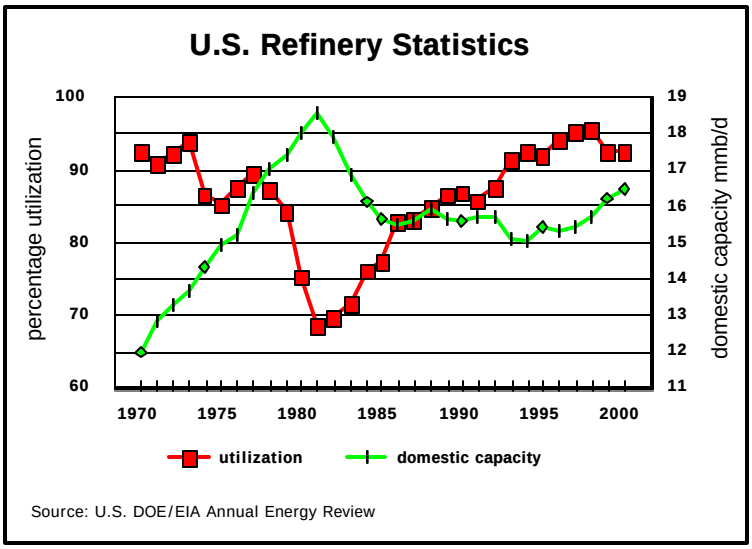
Refining Industry Profile

The domestic refining industry has undergone significant changes over the past 30 years. During the 1970s and early 1980s, domestic refining capacity climbed from approximately 12 mmb/d to 18.6 mmb/d, a 55% gain, as the number of refineries increased from 276 to 324 by 1981. This increase in refinery capacity occurred in response to rising domestic

demand. However by 1978, petroleum demand had reached a peak of 18.8 mmb/d, and as a result of higher energy prices stimulating conservation initiatives, U.S. use began to decline.

As domestic capacity rose, see Figure 6, the percentage utilization rate for domestic refineries began to fall from the 1973 peak of 93.9%. In effect, capacity additions were occurring at a faster rate than the growth in demand. This caused utilization rates to decline. The combination of rising capacity and falling demand pushed refinery utilization rates sharply downward until they reached a low of 68.6% in 1981. As a result, between 1981 and 2000, the number of domestic refineries fell from 324 to 158, a 51% decline. The corresponding reduction in capacity from 18.6 mmb/d to the current level of 16.5 mmb/d, a decrease of 11.3%, resulted in increased utilization rates in the mid-90% range for the remaining refineries during the 1990s. While this consolidation effort has increased the utilization rate of the remaining refineries, it has made the industry more susceptible to equipment breakdowns and outages as facilities have been required to operate closer to their maximum design capacity over longer durations. One result of this consolidation effort is that regions of the country once served by a number of different companies and facilities now must depend on fewer refineries. When operational problems occur at one of the remaining facilities, a region may experience supply disruptions and price surges until adequate replacement volumes find their way to the affected markets.

Figure 6

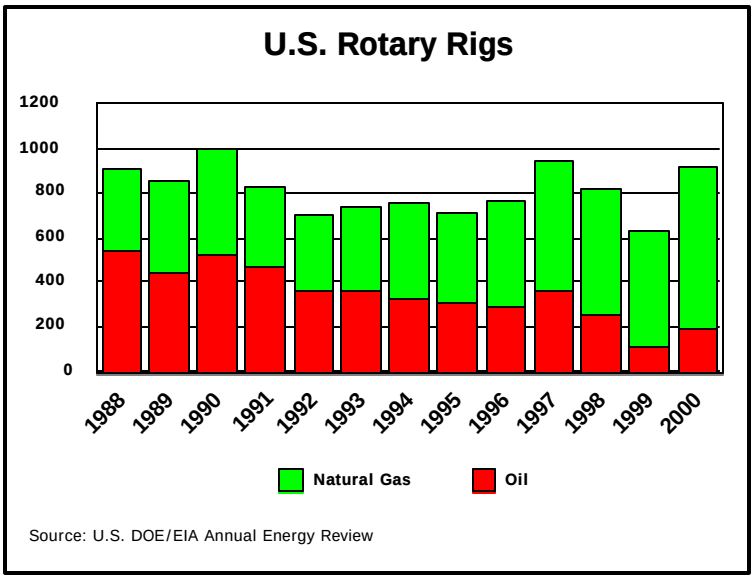


Since 1995, domestic refining capacity has increased even as the number of refineries continues to decline. While financial, environmental, and legal considerations make it difficult for new refineries to be built in the U.S., many facilities have added capacity as various existing processing units are upgraded or expanded. Refiners are also altering processing units to maximize the production of higher value “light products” such as gasoline, distillate, jet fuel, and liquified petroleum gases at the expense of residual fuel which has seen its market share decline for many years.

Exploration Industry Profile

The amount of exploratory drilling and development drilling undertaken by the industry relies heavily on the prices of crude oil and natural gas as well as on drilling costs. Data showing the number of rotary rigs operating in the U.S. for natural gas and oil exploration over the past 13 years are presented in Figure 7. The direct correlation between oil prices and the number of rigs in operation was most pronounced in 1990 and 2000. By referring back to Figure 4, it can be determined that crude oil prices were relatively high during those two years. Correspondingly, Figure 7 shows that the number of rotary rigs exploring for oil also increased. Between 1999 and 2000 the number of rigs exploring for oil increased from 128 to 197, a rise of almost 54%. This escalation in activity follows a two year upturn in crude oil RAC prices from $12.52/bbl in 1998 to $28.23/bbl in 2000, a gain of $15.71/bbl, or 125%. The rise in drilling activity in 1990 also followed a two year crude oil price gain equaling $7.55/bbl, or 51.5%. Additionally, the 2000 data indicates that higher prices greatly stimulated natural gas exploration activities. The number of rotary rigs exploring for natural gas climbed from 496 in 1999 to 720 in 2000, a gain of 224 rigs or 45.2%, as natural gas prices surged to record highs.

Figure 7



As important as the raw prices of crude oil and natural gas are, the productivity of drilling operations is also critical. As the cost of operations and activities, such as data acquisition and processing, and the display and integration of seismic data with geologic data, continue to fall, the costs of drilling become more affordable. Additional factors, such as powerful computers and the general increase in knowledge and experience, continue to exert downward pressure on drilling costs and help stimulate exploration.

NEW YORK STATE OVERVIEW

Infrastructure and Distribution Network

Meeting New York's future petroleum demands requires both an adequate supply of refined products and an efficient distribution network to move the various fuels from refining centers to end users. However, the reliability and efficiency of the present petroleum distribution system will be continually challenged by changing circumstances, such as stricter environmental requirements, land use issues, and the general aging of the infrastructure throughout the forecast period.

The petroleum supply industry in New York has adapted over time in response to ever greater dependence on imported oil. As domestic sources of crude oil and refined products became less plentiful, the Port of New York developed into a ready entry point for petroleum products. As tanker shipments of petroleum products from foreign and distant Gulf Coast refineries increased, many terminal companies established large supply operations along the New York and New Jersey sides of the Port. Today, these primary oil storage facilities are vital mechanism's for redirecting bulk deliveries of imported and domestic products to end users across the State and throughout the Northeast.

A diverse distribution network has developed over the years to transport petroleum products into and throughout New York State. Several pipeline systems connect New York consumers to the major refining centers located along the Gulf and East Coasts. Waterways, consisting of coastal channels, rivers, and canals, allow barges and coastal tankers to move supplies of refined products to end users Statewide. These water routes also provide an alternative means for shipping fuels from domestic refineries located outside the State. Highway transport vehicles deliver supplies from New Jersey, Pennsylvania, and Canada across the southern and northern regions of the State. Rail shipments are not as common as other modes of transportation and generally are confined to interstate movements of bulk quantities of fuel. Refined products often are placed in interim locations, such as major regional terminal centers, for later truck or barge distribution to retail outlets and end users.

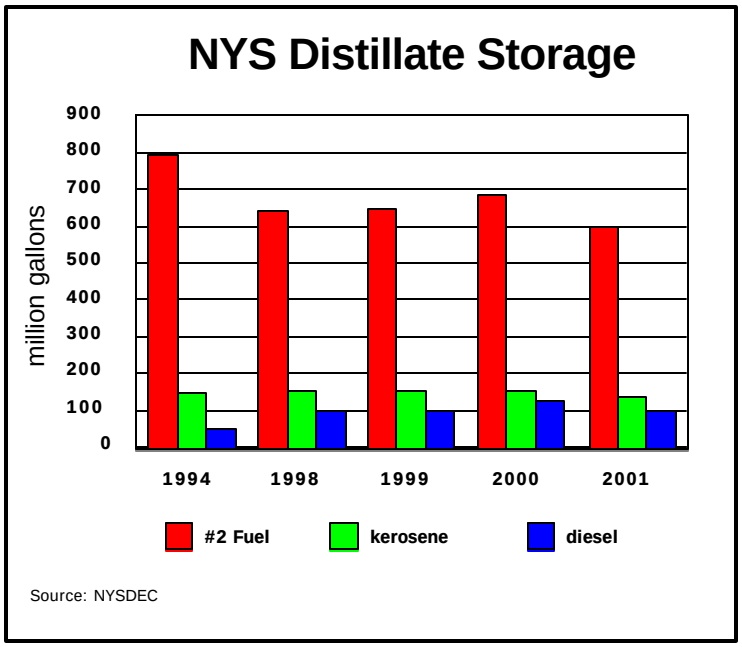
Statewide Storage Capacity

In recent years, petroleum product distribution companies throughout the State have expressed concern over the long-term decline in the number of storage terminals and associated

storage capacity. They note that this reduction has impaired the operating flexibility needed to satisfy consumer oil demand. Petroleum storage terminal facilities face many of the same environmental, land use, and economic pressures that affect the refining sector. Operators note the high costs associated with meeting more stringent environmental regulations, increased insurance costs, greater carrying costs associated with holding petroleum products, and the lack of market incentives to build new facilities as impediments to adding storage capacity in the State.

Statewide distillate fuel storage capacity, which includes volumes of #2 home heating oil, kerosene, and diesel fuel, is shown in Figure 8. Operational storage capacity of #2 home heating oil has declined from 794 million gallons in 1994 to 600 million gallons by 2001, a reduction of 194 million gallons or 24.4%. However, over the same period, Statewide demand for this fuel by the residential, commercial, industrial, and electricity generation sectors has increased 4.3%. This indicates that while terminal capacity is being used more efficiently to meet normal everyday demand, there is less capacity to meet atypical demand surges associated with cold weather. This creates marketplace supply uncertainty and contributes to greater short-term price volatility. In effect, consumers have become more dependent on the ability of the petroleum transport industry (tugboats, barges, and tankers) to resupply the remaining terminals during peak demand periods.

Figure 8

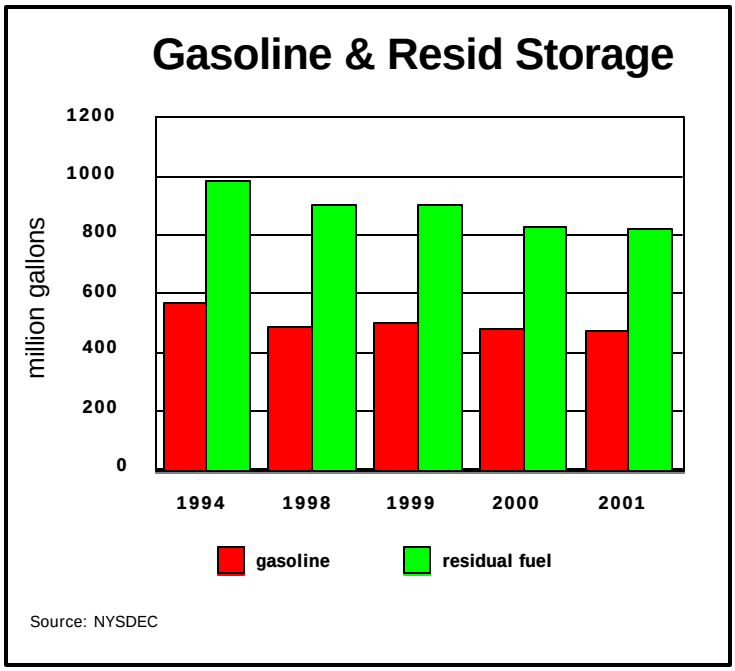


Kerosene is an important fuel used to meet heating needs and as a blending agent to prevent cold weather gelling in diesel fuel. Statewide storage capacity of this fuel has remained steady at approximately 150 million gallons between 1994 and 2000. It was only in the most recent year that capacity declined to 136 million gallons, a reduction of 13.2% from 2000.

Storage capacity of diesel fuel increased steadily from 48 million gallons in 1994 to 127 million gallons by 2000, a gain of 79 million gallons or 165%. However, a significant decline in capacity occurred in 2001 as the total Statewide volume equaled 99 million gallons, a fall of 28 million gallons, or 22%.

Statewide motor gasoline and residual fuel storage capacities, presented in Figure 9, indicate the same declining capacity trend discussed for distillate fuels. Between 1994 and 2001, gasoline capacity fell from 571 million gallons to 471 million gallons, a drop of 17.5%. Again, while capacity decreased, demand for gasoline over the same period increased from 5.5 billion gallons to 5.8 billion gallons, a gain of 4.2%. Similarly, the capacity of residual fuel, a fuel used by the electricity generation sector and in large industrial, commercial, and residential boilers, saw capacity move downward from 981 million gallons in 1994 to 823 million gallons in 2001, a decline of 158 million gallons, or 16%.

Figure 9

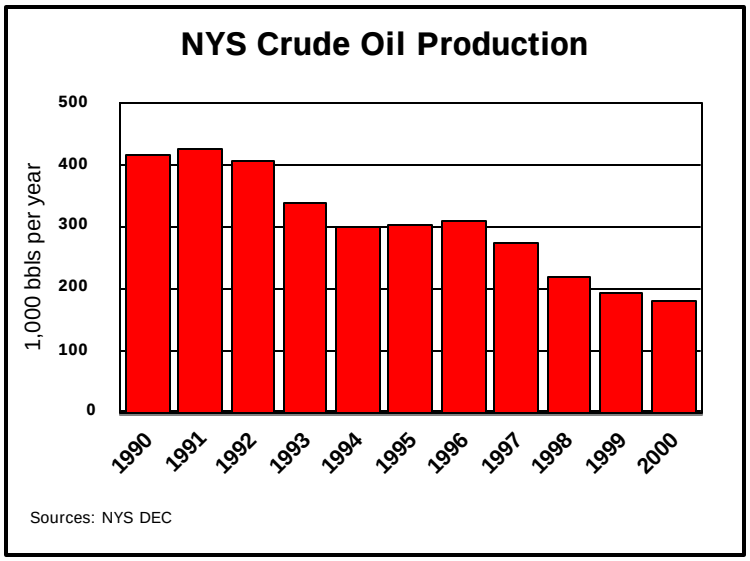


Exploration Activities

Historic Industry New York's first commercial oil well began production in 1865, and Statewide production peaked in 1882 at 6.8 million barrels per year. This initial oil boom was short lived, and by 1893 production was down to one million barrels per year. New York's second oil boom occurred with the invention of water flooding, the first enhanced oil recovery technique. The technique led to a second peak of 5.4 million barrels in 1943. Since then, Statewide oil production has steadily declined. The last major oil find occurred in 1981 when the "Bass Island Trend" was discovered in Chautauqua County. This geographic formation proved to hold a significant amount of oil and has produced over 1.5 million barrels of oil and significant volumes of natural gas.

Current Production Trends According to the U.S. Energy Information Administration (EIA), New York ranked 29th out of 31 oil producing states in the year 2000. New York's oil production comes from two distinct regions: 1) the historic areas of Allegany, Cattaraugus, and Steuben counties, and 2) from the Bass Island Trend in Chautauqua County. Oil production in 2000 totaled 180,590 barrels, less than 0.1% of annual demand, and a 57% decline from 1990 as shown in Figure 10. By the end of 2000, there were 2,803 active oil wells and another 1,906 not reporting any production. Active wells in the State produce a yearly average of 64 barrels per well. New York's historic oil fields in Allegany, Cattaraugus, and Steuben counties accounted for 87% of reported production, reflecting the rapid decline of the Bass Island Trend in Chautauqua County.

Figure 10



From 1990 to 2000, oil well completions ranged from a high of 71 in 1992 to a low of 7 in 1998. Completions rebounded slightly to 25 in 1999 and 17 in 2000. This modest rebound in new wells can be partly attributed to a 125% increase in average crude oil prices from 1998 to 2000. In 1997, the only wildcat[4] well drilled in New York in the last ten years led to the discovery of a small field in northern Cattaraugus County. The field, named Bixby Hill, continues to produce approximately 3,000 barrels of oil per year.

Crude Oil Production Outlook New York's decreasing oil production can be attributed to the lack of new discoveries, declining Bass Island production, and the continued plugging of both oil and injection wells caused by increased environmental compliance costs. Though low product prices have been blamed as a factor for declining production in the past, increased prices in 1999 and 2000 only stimulated a moderate drilling increase that did not alter the downward trend in Statewide production.

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[4] An exploratory well drilled in unproven territory.

Yet, the remaining resource base is substantial. In an extensive geological study of the State's resource base done in the 1980s, original oil-in-place was estimated at 1.118 billion barrels.[5] Cumulative production through 2000 totaled approximately 244 million barrels. This represents an estimated recovery rate of approximately 22%. Primary production can usually recover a maximum of 30% with another 15% possible from water flooding. Using this very optimistic 45% maximum recovery factor, total New York production from primary and secondary methods may total 600 million barrels with 356 million barrels yet to be recovered. In reality, any significant recovery of this resource requires new and expensive technologies, such as tertiary recovery methods and horizontal drilling.

The New York State Energy Research and Development Authority (NYSERDA) has funded projects that demonstrate horizontal drilling and enhanced recovery techniques in New York's oil fields. A particular success was the Maring 3-B horizontal well recompletion drilled in the Bass Island Trend. The well was completed in August 1998 with flow rates in excess of 250 barrels of oil per day with associated gas.

Without renewed commercial interest, discovering any new major geologic target may be difficult. If business conditions improve, the application of new technologies, such as horizontal drilling and tertiary recovery methods, may help slow the State's production decline. Otherwise, the outlook for crude oil production is a continued decline of 5 to 10% per year.

Petroleum Share of New York Sector Demand

Petroleum fuels are vital to the State's economy and remain the single largest source of energy consumed in the State. As of 2000, petroleum supplied approximately 42% of New York's total demand. While this is well below the 65% level recorded in 1975, it is greater than the 28% figure for natural gas in 2000. Petroleum fuels provide energy for each of the State's economic sectors, as shown in Figure 11. The electric sector has posted the sharpest decline, falling from about 48% in 1975 to the year 2000 rate of 10.2%. Since the early 1990's, the electricity sector has steadily turned to natural gas to satisfy the State's increased electricity demand. However, petroleum products such as residual fuel continue to supply a number of large baseline generating units. Distillate fuels serve the dual purpose of fueling electricity generation peaking units and providing backup fuel capability at some generation

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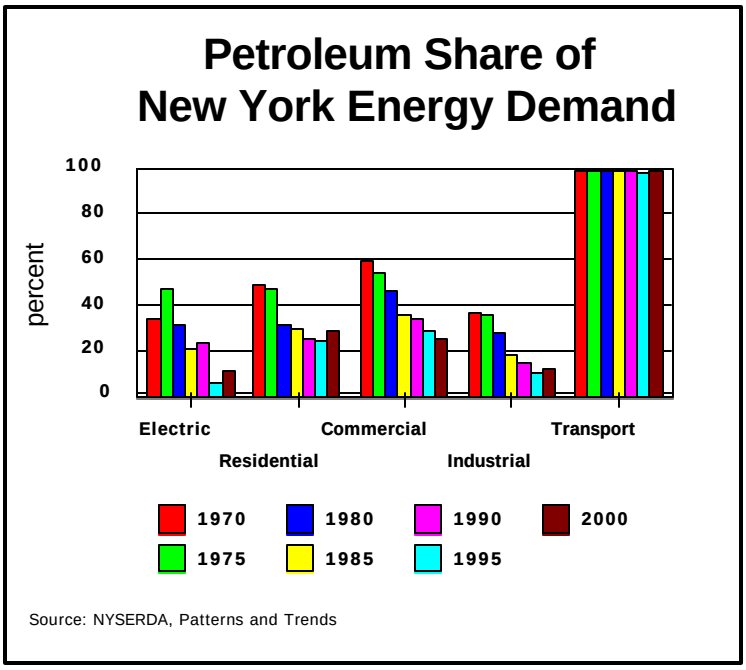
[5] Reed, C. ed., 1989. *New York State Oil and Gas Drilling and Production 1988*. New York State Department of Environmental Conservation - Division of Mineral resources, p. 59.

facilities during periods when natural gas is unavailable. Finally, in the transportation sector, gasoline and diesel fuel still account for over 99% of energy supplies.

In the residential sector demand for all petroleum fuels, including home heating oil, kerosene, and propane fuel, declined as higher prices in the 1970s and early 1980s encouraged homeowners to convert to natural gas, increase home insulation, lower thermostats, and purchase high efficiency furnaces. Similar end-user sentiment in both the commercial and industrial sectors acted to reduce petroleum's share of total energy supply. A limited amount of dual-fuel capability exists in large apartment buildings in the residential sector and in both the commercial and industrial sectors. Dual-fuel equipment allows end-users the option to switch between natural gas and distillate fuels when the price for one makes it an economic advantage to do so. As a result, if a sufficient amount of fuel switching occurs, petroleum use may increase from year to year. This occurred in both the residential and industrial sectors between 1995 and 2000.

Figure 11



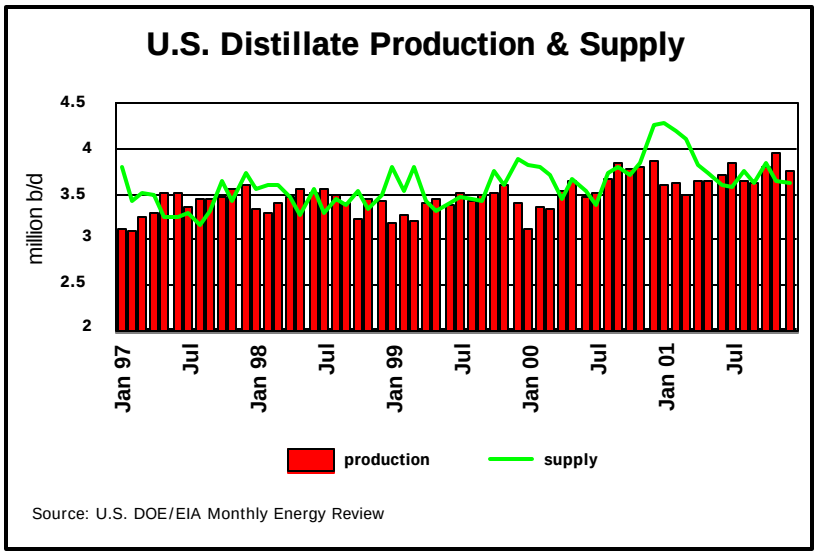
REFINED PRODUCT REVIEW

Distillate Supply and Demand

Monthly total U.S. distillate fuel production and supply is presented in Figure 12. In this analysis supply is used as a surrogate measure for demand. As the graph illustrates, there are a number of months during the winter period when demand outstrips the production capacity of domestic refiners. It is during these times that inventories and product imports

become critical to meet consumer needs. A review of the graph shows that the spread between domestic production and demand has widened over the past four winter seasons. During the October 1997 through March 1998 winter period, the demand to production spread averaged 153,000 b/d. The following year the spread increased to 295,000 b/d, a gain of 142,000 b/d, or 93%. Over the next two winter periods the spread climbed to 371,000 b/d in 1999-2000, and finally to 375,000 b/d in 2000-2001.

Figure 12



New York Distillate Fuel Focus

New York State is a major user of distillate fuel[6] with an estimated 2.9 million households (representing nearly one-half of the population) using home heating oil and kerosene for heat. The three distillate fuels are utilized in each of the economic sectors of the State and accounted for approximately 27%[7] of total petroleum fuel used in New York in 2000. New York consumers use approximately 20% of the nation's total distillate supply, with the residential sector accounting for the majority of the use within the State. New York uses more heating oil than any other state in the nation. The residential, commercial, industrial, and electricity generating sectors use an average of 11 million gallons of distillate fuel per day over the four-month November through February winter period. This figure does not include diesel volumes used in the transportation sector.

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[6] Distillate fuel is defined as home heating oil, kerosene, and diesel fuel.

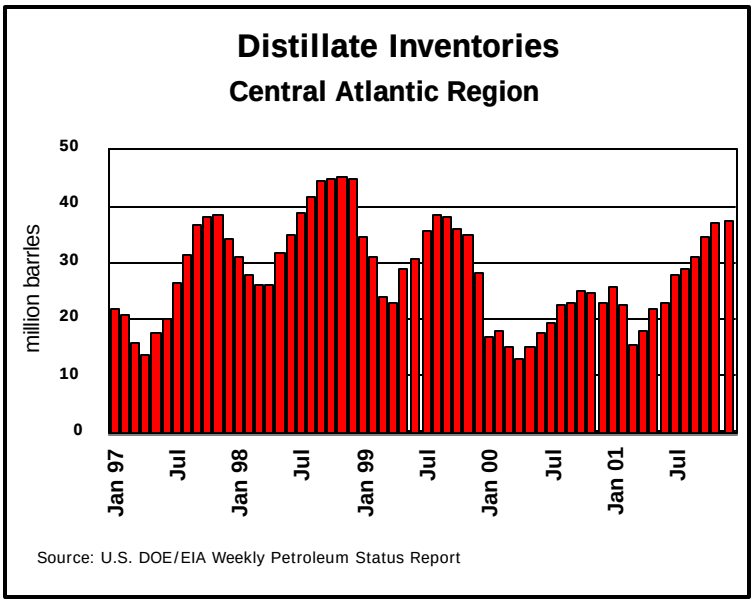
[7] NYSERDA, *Patterns and Trends 1999*.

Distillate Inventory Trends

Inventory volumes are important components of the distillate fuel supply system and at the regional level act as critical buffers to meeting demand during the winter months. Monthly distillate fuel quantities for the Central Atlantic Region[8] of the U.S. are presented in Figure 13. Regional analysis is important because New York's fuel needs, as well as those of neighboring states, are met from terminals located both within and outside the State. Correspondingly, some fuel inventories held at terminals in the New York Harbor area and northward along the Hudson River, supply neighboring New England and Central Atlantic states.

Figure 13 illustrates that the three-year trend of progressively lower inventory volumes of distillate fuel in the Central Atlantic Region at the start of the heating season was reversed during the 2001-2002 winter season. The data show that distillate fuel inventories in 1998 peaked at 45.2 million barrels in November. The following year, a peak inventory of 38.4 million barrels was reported in August. This represents a 6.8 million barrels reduction, 15% lower than the previous year. By 2000, inventory volumes reached the 24.9 million barrel level at the October highpoint, 35% less than the year earlier and 45% below the 1998 level. However, by December 2001 inventory quantities had reached 37.4 million barrels, the highest monthly total since September 1999.

Figure 13



The three-year pattern of lower inventories reflects the industry's movement to "just-in-time" inventory resupply. Just-in-time inventory practices reflect the desire of petroleum terminal operators and distributors to lower costs. The industry now relies on the petroleum supply chain to deliver fuel to satisfy market requirements. While this management practice

[8] Includes Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania.

reduces inventory carrying costs, it exposes the petroleum distribution chain to a greater level of potential volatility and vulnerability should supply disruptions occur anywhere, or for any reason, along the distribution chain. The higher volumes recorded at the beginning of the most recent heating season offered greater supply and price certainty.

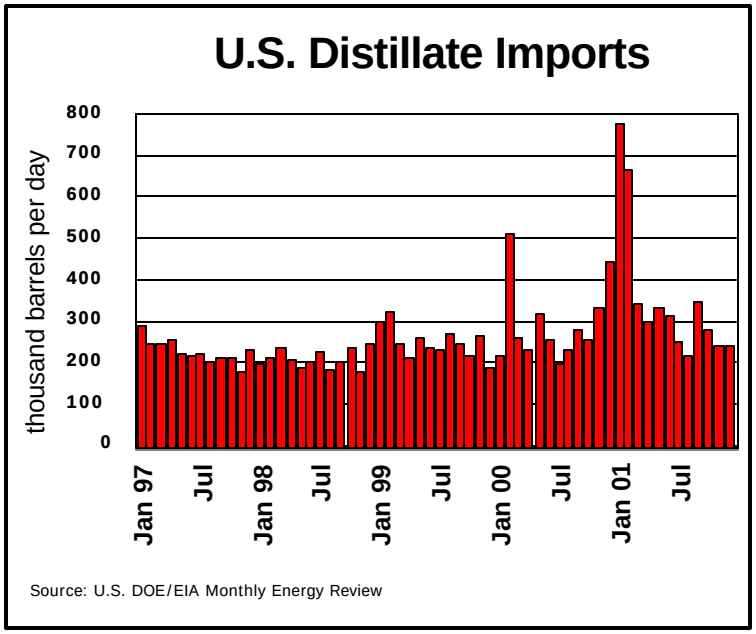
Northeast Home Heating Oil Reserve

As a result of the distillate fuel shortfalls that occurred during the 1999-2000 winter season, the U.S. Department of Energy (U.S. DOE) established the Northeast Home Heating Oil Reserve in the summer of 2000. This reserve consists of two million barrels of government-owned heating oil. The reserve is intended to provide insurance against lower than normal inventories, supply shortfalls, and delivery interruptions. In the initial year of operation, reserves of 500,000 barrels each were held at Equiva's Motiva Terminal and Morgan Stanley's Williams Terminal, both in New Haven, Connecticut, and one million barrels were held at the Hess Terminal in Woodbridge, New Jersey. In the summer of 2001, U.S. DOE approved the relocation of 150,000 barrels of the Reserve from New Haven to Providence, Rhode Island. There is also an option to expand this Rhode Island volume to 250,000 barrels in the future. This third location enhances the distribution capabilities by increasing truck and marine loading options. States covered by the reserve are New York, Connecticut, Maine, New Hampshire, Rhode Island, Vermont, Massachusetts, Pennsylvania, and New Jersey.

Distillate Imports

In response to lower inventory levels and relatively steady domestic production trends, the petroleum industry has increased imports of distillate fuel to meet the surge in demand that occurs during peak periods. Monthly total U.S. distillate fuel imports are shown in Figure 14. The graph illustrates that, as inventory volumes declined over the past three years, the petroleum

Figure 14



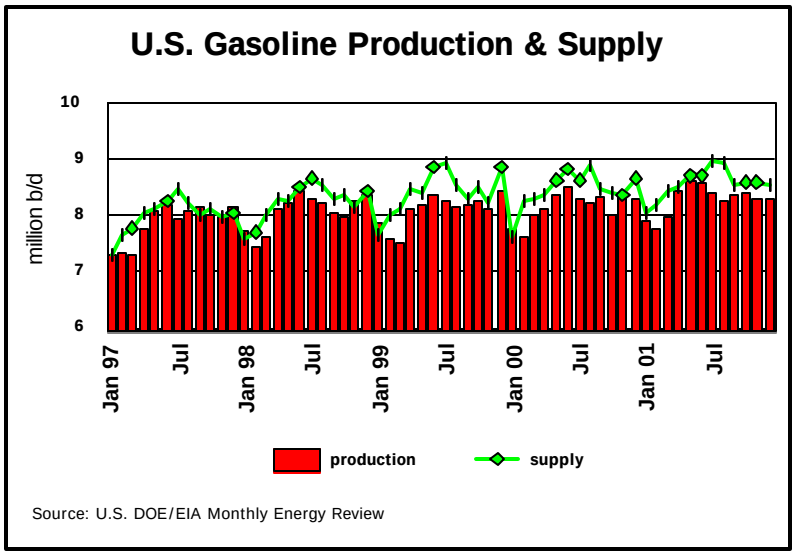
industry satisfied demand with increasingly larger quantities of imports. In February 1999, the industry imported a high of 322,000 barrels per day (b/d), 85,000 b/d or 36% more than the previous year. By February 2000, the total had climbed to 510,000 b/d, 188,000 b/d or 58% above the year earlier level. Finally in 2001, the petroleum industry imported record volumes for two consecutive months, 778,000 b/d and 668,000 b/d, respectively for January and February.

With import volumes of this magnitude, there is concern whether the distribution system, including barges and tankers, can satisfy the future requirements of the region. Also, potentially significant increases in demand for distillate products used as backup fuel for natural gas in the electricity generation sector add to the concern. Lower storage tank capacities and quantity of fuel stored increase the likelihood that supply disruptions caused by winter storms or heavy ice conditions could adversely affect New York end users in all economic sectors.

Gasoline Supply and Demand

Monthly total U.S. gasoline production and supply are presented for the January 1997 to December 2001 period in Figure 15. Once again, supply is used as a surrogate measure for demand. The clear pattern that emerges from the data is that, for numerous months of the year, the U.S. depends on imported gasoline to meet every day demand. This is particularly true during the summer months and again highlights the importance of maintaining adequate inventories. On an annual basis the data indicate that from 1997 to 1999 the difference between domestic production and demand increased from 147,000 b/d to 320,000 b/d, an increase of 173,000 b/d or about 118%. For 2000, this difference declined to 286,000 b/d and for 2001 the difference equaled 294,000 b/d, a decrease from 1999 of 26,000 b/d or 8.1%. The greatest

Figure 15

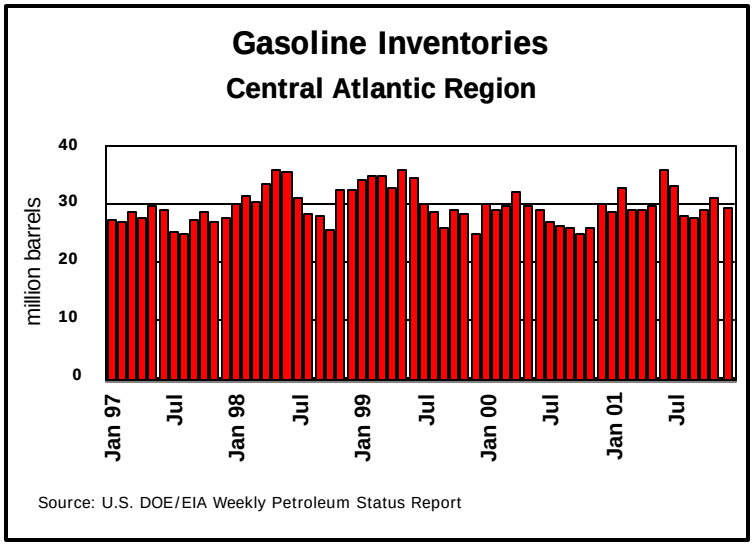


individual monthly difference since 1997 occurred in August 2000, when demand surpassed domestic production capacity by 673,000 b/d.

Gasoline Inventory Trends

Like distillate fuel inventories, gasoline inventories play critical roles in ensuring adequate supplies of motor gasoline, particularly during the peak summer driving season. Total gasoline inventories for the Central Atlantic Region for both conventional and reformulated gasoline are presented in Figure 16. Unlike distillate fuels, which show a downward trend in total volume, seasonal gasoline inventories have remained relatively stable since January 1997. In general the petroleum industry increases stock levels during the spring in anticipation of higher demand during the summer driving season. During 2000, inventories on average were below the previous two years but in 2001 they once again moved to a higher level.

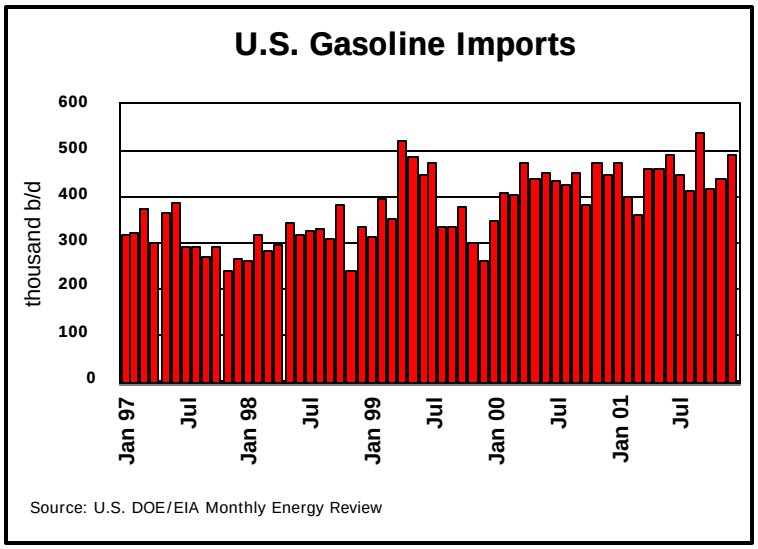
Figure 16



Gasoline Imports

Since the increase in domestic gasoline production has not kept pace with the rise in demand, volumes of imported fuel have been on an upward trend. Monthly total U.S. gasoline imports are shown in Figure 17. As the graph illustrates, since 1997 the quantity of gasoline imports has

Figure 17



been rising. In 1997, imports averaged 309,000 b/d. By 2001, the volume had risen to 448,000 b/d, an increase of 139,000 b/d or approximately 45%. During the 1997 to 2001 period, U.S. dependence on gasoline imports to meet domestic demand climbed from 3.8% of total supply in 1997 to 5.2% in 2001. While it is expected that product imports will continue to be available, the difference in U.S. gasoline regulations compared to other areas of the world may limit supply availability in the future.

New York State Gasoline Focus

New York gasoline requirements are satisfied by either conventional grade fuel or U.S. Environmental Protection Administration (U.S. EPA) mandated reformulated (RFG) gasoline. Gasoline retailers are required to sell RFG grade gasoline throughout the year in New York City, Long Island, and in the counties of Westchester, Putnam, Orange, Dutchess, and Rockland. This region of the State uses an estimated 2.9 billion gallons, or approximately 50% of New York's annual gasoline demand. One of the primary components of RFG is methyl tertiary butyl ether (MTBE). This additive has been used in gasoline since 1979. Initially it was used as an octane enhancing replacement for lead and later as an oxygenate to reduce ozone, carbon monoxide, and other air pollutants. Other areas of the State use conventional gasoline.

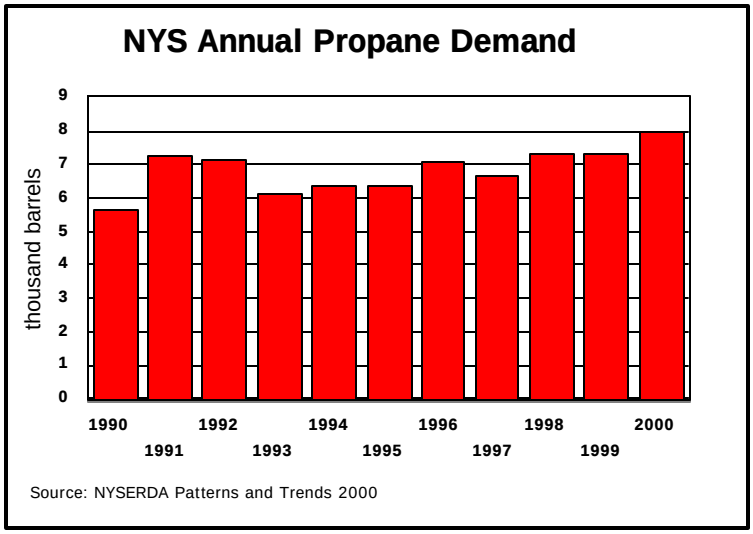
About 50% of all gasoline delivered to New York State is produced at Gulf Coast refineries. Most of this fuel is shipped by pipeline to storage terminals in northern New Jersey and central and western New York. A small volume of this supply is transported by coastal tanker into New York Harbor. Approximately 40% of the gasoline consumed in New York is produced at Mid-Atlantic refineries, located primarily in New Jersey and Pennsylvania, and moved into New York Harbor and Long Island terminals by barge. The remaining 10% of the gasoline used in the State is imported by ocean tanker from the Caribbean area, largely from Virgin Islands and Venezuelan refineries, or by truck from Canada. Gasoline reaching New York Harbor is also barged to regional terminals along the Hudson River, north to Green Island, and east to Long Island. Tanker trucks then move the gasoline from regional terminals to neighborhood gasoline stations.

Propane Overview

Propane fuel is a small but essential source of energy for New York residents and business owners. Propane, often referred to as "bottled gas" or "LP-gas," is used in the residential sector for heating homes and water, cooking, drying clothes, and fueling fireplaces.

It is also used in the commercial and industrial sectors and as transportation fuel. As shown in Figure 18, demand for propane fuel in New York State has risen steadily since 1993. Between 1993 and 2000 annual propane demand increased from 6.1 to 8.0 million barrels, a gain of 1.9 million barrels or 30%.

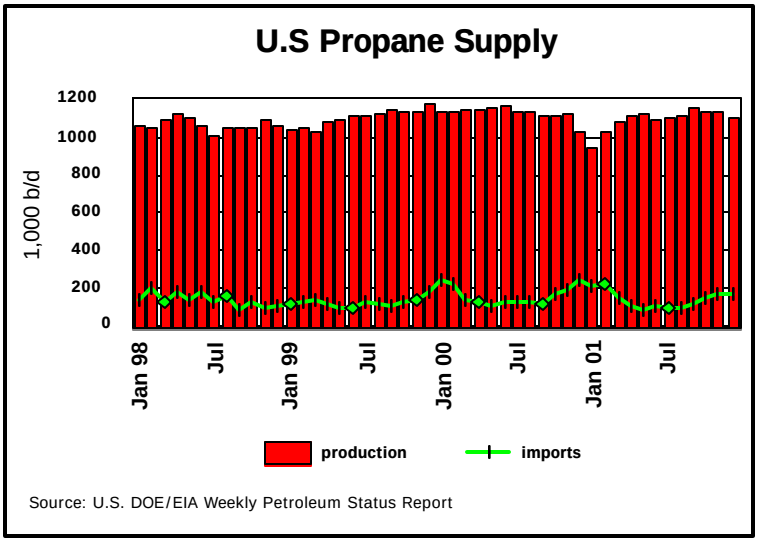
Figure 18



Propane Supply

Propane is produced as a by-product of natural gas processing and petroleum refining. Domestic propane is shipped to New York State via the Texas Eastern Products Pipeline, which originates in the U.S. Gulf Coast, and by rail car and by truck. Propane is also imported from Canada by rail car and pipeline, and from foreign sources by ocean going tankers. While propane is used year round, the highest demand period in the State is during the winter heating months. As shown in Figure 19, the U.S. becomes more dependant on imports to meet demand during the winter months.

Figure 19



Propane Storage

Propane storage is important because the sole pipeline supplying propane to the State does not have sufficient capacity to meet peak winter demand. Additionally, rail car deliveries and truck transport are often slowed due to weather conditions in the winter months. In New York State there are three levels of storage for propane inventories: primary, secondary, and

tertiary. At the primary level, in central New York, there are several underground salt dome storage caverns that hold large volumes of propane. These facilities are injected with propane during the summer and early fall in anticipation of high demand during the winter months. At the secondary level there are a many pressurized above-ground tanks located at retail dealers around the State. Finally, tertiary storage is represented by small above-ground storage tanks located at residences and commercial properties.

Article X Focus

Table 1 summarizes petroleum fuel information for 12 of the 23 Article X projects that have filed applications and have been approved by the New York State Board on Electric Generation Siting and the Environment, filed applications and are pending, filed pre-application reports, and/or filed preliminary scoping statements as of April 15, 2002.

These 12 projects have indicated plans to use petroleum distillate fuel products, such as #2 fuel oil and kerosene, as backup fuel. All the projects plan to use natural gas as the primary fuel. Of the 12 projects that have stated they plan to use distillate fuel as a backup to natural gas, three of the projects, with their winter megawatt capacity in parenthesis are: Athens (1080), Bowline Point 3 (750), and Bethlehem Energy Center (750); all are located on the Hudson River between Albany and New York City. The remaining nine projects with winter megawatt capacity are: Astoria Energy (1000), East River Repowering (360), Ravenswood Cogeneration (250), Sunset Energy Facility (580), Poletti Station Expansion (500), Kings Park (600), Caithness Island Power (750), Astoria Repowering (589), and Trans Gas Energy (1100); all are located in New York City and on Long Island. The 11 projects that do not plan to utilize backup fuels are: Sithe Sentry Station (827), Ramapo (1100), Twin Tier Power (520), Grassy Point (550), Glenville Energy (520), Brookhaven Energy (580), Oak Point Energy (1075), Wawayanda Energy (540), Empire State Newsprint (510), Spagnoli Road Energy Center (250), and Indian Point Peaking Facility (330).

Table 1

ARTICLE X PROJECTS PETROLEUM PROFILE						
Project Name	**Winter Capacity (MW)**	**Backup Fuel**	**Storage Capacity million gallons**	**Average Burn Rate Days of Storage**	**Backup Fuel Maximum Burn Rate gal./hr.**	**Backup Fuel Average Burn Rate** gal/hr.**
Athens	1080	#2 Oil	4	3.9	66,000	43,000
Astoria Energy	1000	#2 Oil	6	6.9	56,000	36,400
Bowline Pt. 3	750	#2 Oil	n/a	n/a	34,300	22,300
East River Repowering	360	#2 Oil	4.4	9.4	30,000	19,500
Ravenswood Cogeneration	250	< .04% kerosene	2	8.5	15,000	9,750
Sunset Energy	580	#2 Oil	0.25	0.5	30,528*	19,843*
Bethlehem Energy Center	750	<.04% distillate	10.5	17	39,476*	25,660*
Poletti Station Expansion	500	< .04% kerosene	6	14.6	26,318*	17,106*
Kings Park	300	#2 Oil	0.08	0.5	31,581*	20,528*
Caithness Island Power	750	#2 Oil	2.5	4.1	39,476*	25,660*
Astoria Repowering	589	#2 Oil	n/a	n/a	31,002*	20,151*
Trans Gas Energy	1100	#2 Oil	n/a	n/a	57,899*	37,634*
Total	8,009		35.73		457,580	297,532

Table notes:

* Calculated using a 7,300 Btu/hour heat rate.

** Based on an average burn rate of 65%.

- Assuming a 65% average daily load factor on backup fuels, if each the 12 projects were to call upon backup distillate fuel capability at the same time, the average Statewide burn rate would be approximately 298,000 gallons per hour, or an estimated

7.1 million gallons per day. If the facilities were to use the maximum capacity burn rate, the 12 projects would consume almost 458,000 gallons per hour, or approximately 11 million gallons per day. To put this usage level into perspective, it is estimated that on a typical winter day New York State uses, on average, 11 million gallons. Therefore, the potential exists that these generating facilities could double the demand for distillate fuels were each of them to have their natural gas supply interrupted at the same time.

- With hourly use of this magnitude, adequate on site storage capacity for backup fuel is critical. While several of the projects have not yet provided complete information, a number are considering backup fuel storage capacity ranging from 4 to 15 days of supply. However, there are several projects that are proposing only very limited backup fuel capacity, some as low as less than one day. The implications of this limited capacity is that the electricity generation facilities may not be able to secure timely resupply of backup fuel and be forced to completely curtail operation.

- Whether electricity generation facilities choose interruptible or firm natural gas service will affect several sectors of the State's economy. If interruption of gas service to these facilities should occur at the same time that the residential sector is maximizing the use of #2 heating oil to meet heating demand, there is concern whether the petroleum supply and transportation industries, including trucking, barge, and tugboats, will have the resources available to meet the increase in demand by the electricity generators. During the peak heating season, most petroleum transportation resources are fully committed to the resupply of traditional customers in the residential, industrial, and commercial sectors. Although these transportation companies also serve the electric sector during the winter, the magnitude of increase associated with the Article X generators raises important resupply questions.

- Six of the 12 Article X projects propose to be supplied by barge, three will use truck transport to receive fuel, two have yet to specify a delivery option, and one, proposed to be built at an existing petroleum terminal, will have access to both barge and petroleum pipeline supplies. During peak demand periods much of the petroleum transport industry is already fully committed. A facility that consumes 20,000 gallons of distillate fuel per hour and does not have, or has only limited, on site storage would need enough truck transport delivery capacity to cover the actual burn rate, the time needed to cover the travel distance to and from a petroleum terminal, highway and weather delays, loading and unloading times, and delays that may be encountered at the terminal. This may require the total commitment of 6-8 trucks or more for just one of the generating facilities. If additional facilities turn to backup fuel at the same time, the unavailability of sufficient transport resources will be magnified.

- Increased reliance on #2 heating oil as a backup fuel is not exclusive to New York

State electricity generators. Numerous states in the Northeast are seeing construction of electricity generation facilities using natural gas as the primary fuel and relying on distillate for backup. Whether there will be sufficient quantities of natural gas, backup fuel, and the ability to transport the backup fuel to facilities located in New York State is being examined by Charles River Associates, Inc. for NYSERDA and the New York Independent System Operator (NYISO). A final report is expected by June 2002 (see Natural Gas Assessment).

FORECAST SUMMARY

As is evidenced in Table 2, the Energy Plan projects total residential distillate (home heating oil) demand will decline 1.61% annually over the forecast period. Residential distillate demand is projected to decline by 57 TBtu in the reference case forecast from 197 TBtu in 2000 to 140 TBtu in 2021. However, motor gasoline is expected to increase 0.97% annually during the forecast period from 697 TBtu in 2000 to 853 TBtu in 2021.

Table 2

New York State Petroleum Demand and Price Forecast						
	Actual	Outlook	Outlook	Average Annual Growth		
	2000	2006	2021	2000-2006	2006-2021	2000-2021
DEMAND: TBtu						
Residential						
Distillate	197	167	140	-2.68%	-1.18%	-1.61%
Gasoline	697	758	853	1.4%	0.79%	0.97%
PRICE*: cents/gal.						
Residential						
Distillate	152.56	116.51	128.22	-4.39%	0.64%	-0.82%
Gasoline	158.80	142.74	140.66	-1.76%	-0.10%	-0.58%

Source: Energy Plan, *Forecast Summary*.

* Petroleum prices are expressed in constant 2000 dollars.

Residential distillate fuel prices are estimated to decrease 0.82% per year over the forecast period. The Energy Plan projects that New York State residential distillate prices will decline from 152.56 cents per gallon in 2000 to 128.22 cents per gallon in 2021. Similarly, gasoline prices will decrease by 0.58% over the forecast period from 158.8 cents per gallon in 2000 to 140.66 cents per gallon in 2021.

For a more detailed discussion of the various forecast assumptions and a description of the forecast methodology see the Forecast Summary section of the Energy Plan.

PETROLEUM INDUSTRY AND INFRASTRUCTURE SECURITY

The events of September 11, 2001 have alerted the petroleum industry that there are numerous steps the industry can take to help protect the critical energy facilities that supply petroleum fuels to end-users. Company officials, trade associations, and federal and State government representatives are working together on the common goal of ensuring the security of critical energy infrastructure components. Just a partial list of these critical components includes: off-shore and on-shore crude oil production facilities; a vast network of crude oil and refined product pipelines; refineries; storage terminals; transportation components such as trucks, railroad tank cars, barges, and tankers; and even the local service station and convenience store. Fortunately, the petroleum industry, as well as others, addressed many security concerns and upgraded various measures in preparation for the "Y2K" event. There will be many challenges in the future and more work needs to be done. Together, the petroleum industry and government representatives need to devise a long-term strategy to ensure the security of the national energy delivery system.

Reliance on any one crude oil producing region of the world has the potential to disrupt the domestic economy in the event that supplies from that region are interrupted. Such reliance could cause price volatility and increased prices paid by consumers. To offset this reliance, greater diversity of sources of oil supply may be achieved by developing new exploration and production technologies and expanding trade and investment initiatives between consuming and producing countries. Equally important is the development of energy efficiency programs and services that offset demand and create permanent changes in the market place.

FINDINGS AND CONCLUSIONS

- U.S. production of crude oil continues to decline. Between 1990 and 2000, domestic production has declined 20.8%. As a consequence, both U.S. and New York State continue to increase their dependance on foreign sources of crude oil and refined petroleum products to meet consumer demand.

- In-State petroleum terminal storage capacity for distillate fuels, gasoline, and residual fuel continues to decline. The size of the decline for each fuel is: distillate, 15.9%; gasoline, 17.5%; and residual fuel, 16.0%. Reasons for this decline include land use

concerns associated with storage, costs associated with properly maintaining facilities, increased insurance costs, lack of market incentives to construct new facilities, and the costs of holding large volumes of fuel.

- Lower inventory storage can result in degradation of the operational flexibility needed to satisfy consumer demand, greater supply uncertainty, and greater short-term price volatility.

- If the natural gas fueled electric generation facilities with interruptible gas contracts are unable to acquire their primary fuel and are forced to switch to distillate fuel, they will use significant quantities of distillate over a very short period of time. This could strain the ability of the petroleum infrastructure to respond to this need.

- Electricity generation facilities burning distillate fuel as a backup when natural gas is interrupted, have the potential to disrupt the delivery of electricity in cases where such facilities are being relied upon to meet peak demand and where availability of distillate fuel is limited. In addition, a sudden, large increase in petroleum use in electricity generation could potentially have negative impacts on air quality.

SECTION 3.7

COAL RESOURCE ASSESSMENT

INTRODUCTION

This assessment addresses coal use, production, prices, transportation, reserves, and mining operations in New York State and the United States. It also addresses recent developments and trends in the coal industry, examining environmental factors, including the Governor's Acid Deposition Reduction Program and advanced coal technologies, the U.S. Department of Energy's (U.S. DOE) Clean Coal Power Plant Improvement Initiative, and the implications of electric power restructuring on the coal industry. In addition, this assessment reports on the future outlook for coal use in New York and presents a forecast of price and demand.

UNITED STATES COAL OVERVIEW

Coal is America's most abundant indigenous fuel source, accounting for 95% of the nation's fossil energy reserves. The U.S. has a 250-year supply of coal based on current usage levels. One quarter of the world's known coal supplies are in the United States. U.S. coal production is second only to China's among world producers. In 2000, over one billion tons of coal were produced in the U.S., mined in 25 coal-producing states. Wyoming is the largest coal producer, with 339 million tons mined in 2000, representing 31% of U.S. production. Approximately two-thirds of U.S. coal production is surface mined. Nearly all of U.S. coal production is used domestically.

As shown in Table 1, over one billion tons of coal were used in the U.S., with more than 90% used in the electric power sector. Coal-fired power plants account for 57% of all U.S. electricity generation, and over 80% of

Table 1

2000 United States Coal Production, Use, and Prices
(Million Tons and Nominal Dollars)

Production by Region	**mmtons**	**%**
Appalachian	420.9	39.1
Interior	144.7	13.5
Western	509.9	47.4
Total	**1,075.5**	
Use by Sector	**mmtons**	**%**
Electric Power	979.9	90.8
Coke Plants	29.5	2.7
Other Industrial Plants	65.4	6.0
Residential/Commercial Users	4.9	0.5
Total	**1,079.7**	
Average Delivered Price	**$/ton**	
Electric Utilities	$23.83	
Coke Plants	$44.43	
Other Industrial Plants	$31.59	

Source: U.S. DOE, Energy Information Administration, *U.S. Coal Supply and Demand: 2000 Review* *Annual Energy Review, 2000*

electricity generation in twelve states in the Midwest, Southwest, and West.

Coal is by far the least expensive fossil fuel on a dollar per British thermal unit ($/Btu) basis, averaging less than one-half the prices in 2000 of petroleum and natural gas. The delivered price of coal continues to decline, in keeping with a trend that started more than two decades ago. Approximately two-thirds of all coal mined in the U.S. is transported by rail. Hauling coal is the largest single source of freight revenue for U.S. railroads. Coal is also the largest freight revenue commodity moved by barges on the nation's inland waterways.

United States Coal Production

During the past seven years, U.S. coal production continued to grow at an annual rate of nearly 2%. This growth occurred, despite the closing or consolidation of mines, because the average size and productivity of the remaining mines increased. The 20 largest coal producing companies now account for more than 70% of U.S. production.

In 2000, coal production in the U.S. totaled 1,075.5 million tons from the Appalachian, Interior, and Western coal supply regions. As shown in Table 2, coal production in the Appalachian Region was 420.9 million tons in 2000. West Virginia is the largest coal producing state in the Appalachian Region, followed by Kentucky and Pennsylvania. Coal production in the Interior Region was 144.7 million tons in 2000. Texas is the largest coal producing state in the Interior Region, followed by Illinois and Indiana. In 2000, a total of 509.9 million tons of coal was produced in

Table 2

2000 United States Coal Production by Coal-Producing State

Region and State	Number of Mines	Production (Million Tons)
Appalachian Region	**1392**	**420.9**
Alabama	47	19.2
Kentucky, Eastern	421	105.1
Maryland	15	4.3
Ohio	79	22.2
Pennsylvania	339	75.1
Tennessee	24	2.7
Virginia	161	32.8
West Virginia	306	159.8
Interior Region	**125**	**144.7**
Illinois	23	33.4
Indiana	34	28.0
Kansas	2	0.2
Kentucky, Western	37	27.0
Louisiana	2	3.7
Mississippi	1	0.9
Missouri	2	0.4
Oklahoma	10	1.6
Texas	14	49.6
Western Region	**71**	**509.9**
Alaska	1	1.6
Arizona	2	13.1
Colorado	12	29.1
Montana	6	38.4
New Mexico	7	26.2
North Dakota	4	31.3
Utah	15	26.7
Washington	2	4.3
Wyoming	22	339.3

Source: U.S. DOE, Energy Information Administration, *U.S. Coal Supply and Demand: 2000 Review*

the Western Region, dominated by Wyoming, which accounted for two-thirds of the regional production and nearly one-third of the U.S. production. The state of Wyoming produced 339.3 million tons of coal, which represents nearly the sum of the next three largest coal-producing states combined. Coal production has grown in the Western Region in recent years and is now nearly 50% of U.S. production.

The classification of coal is based on its fixed carbon, volatile matter and moisture content, and on its heating value. Lignite, also called brown coal, is ranked lowest in quality, and has a high moisture content, as much as 45% by weight. Its heating values range from 9 to 17 million Btu per ton, with an average of about 14 million Btu per ton. Subbituminous coal, or black lignite, contains 20% to 30% moisture and has a heating values that ranges from 16 to 24 million Btu per ton. Subbituminous coal's heating values average about 18 million Btu per ton. Bituminous coal, or soft coal, is the most commonly mined. Its moisture content usually is less than 20% and the heating values range from 19 to 30 million Btu per ton for an average of 24 million Btu per ton. Anthracite, or hard coal, is ranked highest in quality. With a moisture content generally less than 15%, its heating values range from 22 to 28 million Btu per ton and average about 25 million Btu per ton. This coal is found only in Pennsylvania and is used mostly for space heating and limited electricity generation. The Appalachian Region is the principal source of bituminous and anthracite coal. The Western Region coal includes some bituminous coal, but is primarily subbituminous coal and lignite. Table 3 provides U.S. coal production statistics by classification of coal, mining methods, and origin.

Table 3

United States Coal Production, 2000
(Million Tons)

Classification	**mmtons**	**%**
Bituminous Coal	548.5	51.0
Subbituminous Coal	433.8	40.4
Lignite	88.7	8.2
Anthracite	4.5	0.4
Mining Method	**mmtons**	**%**
Underground	382.9	35.6
Surface	692.6	64.4
Origin	**mmtons**	**%**
West of the Mississippi	566.2	52.6
East of the Mississippi	509.3	47.4

Source: U.S. DOE, Energy Information Admin., *Annual Energy Review, 2000*

United States Coal Use

In 2000, the use of coal in the U.S. reached an all-time peak of 1,079.7 million tons. More than 90% of all coal was used by the electric power sector. In 2000, coal was used to produce 57% of all electricity generated in the United States. The 991.3 million tons of coal used in the electric power sector does not include coal used by cogeneration facilities. Use of coal for cogeneration is included in industrial and commercial sector figures reported by U.S. DOE, Energy Information Administration

(U.S. DOE/EIA), so actual contribution of coal to electricity generation is slightly higher. In 2000, New York State ranked thirty-fifth among U.S. states in coal use; Texas, Indiana, Ohio, Alabama, and West Virginia, respectively, were the top five.

United States Coal Reserves

As of January 1, 1997, the demonstrated reserve base (DRB) of coal resources in the U.S. exceeded 500 billion tons (estimated by U.S. DOE/EIA), nearly half located in the Western Region. The DRB is the estimated quantity of in-ground coal resources in the U.S. that meet minimum criteria. Although the DRB is approximately 500 times the U.S. annual coal production rate, all coal in the DRB is not recoverable. Almost half of the DRB is either inaccessible or likely to be lost in the mining process. The estimated recoverable reserves of coal in the U.S. (the portion of DRB that can be recovered economically with the application of current extraction technologies) total 275 billion tons. The estimated recoverable reserves for low (0.60 pound of sulfur per thousand Btu or less), medium (0.61 to 1.67 pound of sulfur per thousand Btu), and high (1.68 pound of sulfur per thousand Btu or higher) sulfur coal are relatively similar, as shown in Table 4.

Table 4

Estimate of Recoverable Reserves of Coal in United States
(as of January 1, 1997) - (in billion tons)

Region	Low Sulfur	Medium Sulfur	High Sulfur	Total
Appalachian	12	20	23	55
Interior	1	10	58	69
Western	88	55	9	151
U.S. Total	**100**	**85**	**90**	**275**

Source: U.S. DOE, Energy Information Administration, *U.S. Coal Reserves: 1997 Update*

The amount of recoverable reserves at active mines in the U.S. is estimated at 19.3 billion tons, based on information from mine operators for each active property. The majority of active recoverable reserves are in the Western Region (13 billion tons), followed by the Appalachian Region (4.7 billion tons), and Interior Region (2.6 billion tons).

United States Coal Mining

The U.S. coal mining industry has undergone considerable change in the past

several decades that has resulted in a significant decrease in the total number of coal mines, while at the same time mining productivity has increased. Coal mine productivity, in tons of coal produced per miner hour, improved both in underground and surface mines in all three coal-producing regions. Between 1995 and 2000, as labor productivity improved from 5.4 to 6.5 tons per miner hour, the average number of miners working daily declined from 90,000 to 78,000. See Table 5 for additional U.S. coal mining statistics.

The U.S. coal mining industry has adopted a number of technological changes to improve the productivity and cost-effectiveness of mining operations. Examples of such changes include improved mining equipment, better material handling techniques, and enhanced automation of equipment monitoring.

Table 5

United States Coal Mining Statistics	1995	2000
Production (in million tons)		
Underground	396	383
Surface	637	693
Total	1,033	1,076
Number of mines (active)		
Underground	977	839
Surface	1,127	749
Total	2,104	1,588
Number of miners (in thousands)		
Underground	58	46
Surface	32	32
Total	90	78
Productivity (tons per miner hour)		
Underground	3.4	3.9
Surface	8.5	10.3
Average	5.4	6.5

Source: U.S. DOE, Energy Information Admin., *Annual Energy Review, 2000* *Coal Industry Annual, 1999*

United States Coal Price

Coal prices declined in 2000, continuing the downward trend of the past twenty-five years. In 2000, the annual average price of coal delivered to utilities was $24.28 per ton. As reported by the U.S. DOE/EIA in the *Annual Energy Review - 2000*, the 1999 national average prices for coal by class were $38.94/ton for anthracite, $23.88/ton for bituminous, $11.04/ton for lignite, and $7.02/ton for subbituminous.

Because of differences in shipping distance and transportation mode, transportation costs vary greatly for different regions and sources of coal. Appalachian and Interior Region coal is costlier at the minemouth, but its transportation costs are lower, involving relatively shorter hauls to consumers by rail and barge. Low-cost Western Region coal is shipped primarily by rail over great distances, thus incurring higher transportation costs than Appalachian and Interior Region coal. Coal transportation costs on average represent 50%, 20%, and 12% of the delivered price for Western, Appalachian, and Interior Region coal, respectively.

United States Coal Transportation

Coal is an important commodity carried by rail. In 2000, railroads received $7.8 billion, in excess of 20% of their revenues, from transporting coal, and coal comprised 758 million tons, or over 40%, of the total tons of freight hauled by rail. Over the past ten years, the rail industry's share of coal transportation has increased, primarily to satisfy increased demand for low-sulfur western coal. About 74% of U.S. low-sulfur coal reserves are located in Montana and Wyoming. Domestic railroads carried 68 percent of the nation's coal, transporting an average of 14.4 million tons of coal per week in 2000. Coal is also moved by barges, ships, and trucks, where these modes of transportation are economical. A few electricity-generating facilities are located near coal mines and receive their coal directly by conveyor or coal-slurry pipeline.

Average coal rail hauls are getting longer, reflecting the increased penetration of western coal carried by rail into southern and eastern U.S. markets. The average haul of coal by rail grew by 33% from 485 miles in 1979 to 643 miles in 1995. Railroads continually adopt technological innovations that offer customers greater flexibility. One example is the "coaltainer", a container designed especially for transporting coal by rail and by truck. Another innovation for transporting coal by rail is the use of real-time satellite monitoring and computerized traffic management systems to improve the scheduling and routing of trains. These electronic traffic management systems will become increasingly important as more electricity generators move toward "just-in-time" inventory management.

NEW YORK STATE OVERVIEW

New York used 311 trillion Btu of coal in 2000. This figure represents 8% of the State's total primary energy use of 4,094 trillion Btu. New York has no coal mining activity and no known coal reserves. In 2000, the average cost of coal delivered to New York electricity generators was $39.11 per ton, over 60% higher than the national average of $23.83 per ton.

Coal Use in New York State

In 2000, nearly 12.1 million tons of coal were used in New York State, representing 1% of the nation's demand. About 80% of this coal was used to produce electricity; the industrial sector accounted for 18%; residential and commercial use accounted for the remaining 2%. Over the past several years, the amount of coal used for

electricity generation has remained relatively stable, while coal used by the other end-use sectors (residential, commercial, and industrial) has declined.

New York State Coal-Fired Generating Units

New York has 16 coal-fired electricity generating plants located in thirteen counties of the State. These facilities, listed in Table 6, represent nearly 4,000 megawatts of net summer capability for the New York electricity system, accounting for 16% (24,520 gigawatt-hours) of electricity generated in the State in 2000. These plants are all located outside of the metropolitan New York City area; the greatest concentration is in Western New York.

Table 6

Coal-Fired Generating Units in New York State
(net summer capability in megawatts)

Company and Plant Name	County	Units	Summer Capability
1. AES - Hickling	Steuben	2	63.0
2. AES - Greenidge	Yates	2	124.9
3. AES - Jennison	Chenango	2	54.0
4. AES - Milliken	Tompkins	2	307.0
5. AES - Somerset - Kintigh	Niagara	1	674.8
6. AES - Westover	Broome	2	106.9
7. Black River - Fort Drum	Jefferson	1	46.3
8. Central Hudson	Orange	2	363.6
9. CH Resources - Niagara	Niagara	1	51.9
10. Eastman Kodak	Monroe	12	186.4
11. Fibertex Energy	Onondaga	1	84.0
12. Jamestown, City of	Chautauqua	2	50.0
13. Mirant - Lovett	Rockland	2	376.8
14. NRG - Huntley	Erie	6	684.0
15. NRG - Dunkirk	Chautauqua	4	504.0
16. Rochester Electric & Gas	Monroe	4	252.0

Source: U.S. DOE, Energy Information Administration, *Inventory of Nonutility Electric Power Plants in the United States 1999*

New York State Electricity Coal Prices

In the electricity generation sector, the average delivered cost of coal to New York has remained fairly stable over the past ten years, as shown in Table 7. Table 8 lists detailed average delivered cost of coal to New York State electricity generating plants for the year 2000.

The average sulfur content of coal delivered to the State's electricity generators in 2000 was 1.1% by weight, compared to the U.S. average of 0.9%. Because New York generators buy eastern coal, the Btu content of coal used for electricity generation is much higher than the U.S. as a whole, 13,117 Btu per pound on average for New York, compared to 10,115 Btu per pound nationally.

Table 7

Average Delivered Cost of Coal to New York State Electric Utility Plants		
Year	(¢/MMBtu)	($/ton)
1991	159.4	41.19
1992	148.8	38.62
1993	149.6	38.63
1994	145.2	37.63
1995	141.2	36.86
1996	142.8	37.15
1997	142.4	37.32
1998	143.4	37.44
1999	144.9	37.77
2000	149.1	39.11

Source: U.S. DOE, Energy Information Administration, *Cost and Quality of Fuels for Electric Utility Plants, 2000*

Table 8

2000 Average Delivered Cost of Coal to New York State Electric Utility Plants		
Type of Purchase	(¢/MMBtu)	($/ton)
Contract	152.2	$40.04
Spot	127.9	$32.91
Mine Type		
Surface	129.9	$32.88
Underground	150.4	$39.56
Sulfur Content		
Less than 0.5%	159.5	$40.21
0.5% - 1.0%	157.2	$41.40
1.0% - 1.5%	136.6	$34.97
1.5% - 2.0%	130.3	$33.29
2% - 3%	132.3	$34.98

Source: U.S. DOE, Energy Information Administration, *Cost and Quality of Fuels for Electric Utility Plants, 2000*

Origin of Domestic Coal Used in New York State

In 1999, domestic coal delivered to New York originated in six states. Pennsylvania and West Virginia accounted for 87%. By far the dominant mode of coal transportation into New York is rail. Coal is also moved by barge and trucks to end-users in New York. Barge transport of coal occurs primarily on Lake Erie. Table 9 lists the origin of domestic coal delivered to New York in 1999 by method of transportation.

Table 9

Origin of Domestic Coal Delivered to New York State by Method of Transportation, 1999 (thousand tons)						
State:	**Railroad**	**River**	**Great Lakes**	**Tidewater**	**Trucks**	**Total**
Illinois	0	0	0	0	63	63
Kentucky	1,176	39	0	0	0	1,216
Ohio	16	0	0	0	4	20
Pennsylvania	4,227	50	465	0	634	5,376
Virginia	93	0	0	0	0	93
West Virginia	3,608	92	0	77	5	3,782
Total	**9,120**	**181**	**465**	**77**	**706**	**10,550**

Source: U.S. DOE, Energy Information Administration, *Coal Distribution Report*.

Some coal-fired power plant operators have expressed concerns over the potential adverse economic impacts of State actions to limit the present and future use of coal for electricity generation. In particular, they cite the strong dependence of New York's rail freight industry on coal transportation and suggest that limiting coal use would hurt the railroads and those other industries and businesses that rely on the railroads for delivery of supplies and products.

DEVELOPMENTS AND TRENDS IN THE COAL INDUSTRY

Environmental Factors

Coal mining can have significant negative effects on land and water resources. Soil subsidence and erosion are long-standing problems associated with underground and surface mining. These environmental matters are addressed by the Surface Mining Control and Reclamation Act of 1977 and the Abandoned Mine Reclamation Act of 1990. Water resources are degraded by mining and coal preparation. The Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977 both contain provisions to limit water pollution and run-off from coal extraction and processing. The management and disposal of coal waste from mining, preparation, and combustion are regulated at the federal level by the Resource Conservation and Recovery Act of 1976 and at the State level by 6 NYCRR Part 360 Solid Waste Management Facilities regulations. Nationally, coal mining waste is used as fill for mine land reclamation projects. In New York State, coal combustion wastes have a variety of uses, including: as an ingredient in the manufacture of cement, asphalt, roofing shingles, gypsum, calcium chloride, lightweight aggregate, lightweight block, and low-strength backfill; as a traction agent on roadways and cement; as an aggregate substitute in concrete; and as structural fill in building foundations. It is estimated by New York State Department of Environmental Conservation that 731 thousand tons of coal combustion waste were beneficially reused in 1999.

Coal combustion presents air quality and other environmental concerns due to the release of sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulate matter (PM), and carbon dioxide (CO_2) into the atmosphere. SO_2, NO_x, and PM emissions are associated with air quality impacts and acidification of water resources (acid rain), while CO_2 emissions are believed to contribute to global warming. In-State emissions of SO_2 from coal-fired plants have been reduced significantly as a result of New York's State Acid Deposition and Control Act (SADCA), and Title IV of the federal Clean Air Act (CAA) Amendments of 1990. As a result of these initiatives, total SO_2 emissions from New York's electricity generation plants have been reduced by 50% from 1980 levels. NO_x

emissions, which combine with volatile organic compounds (VOCs) in the presence of sunlight to form ozone (or smog), are being addressed by Title I of the federal CAA amendments. Substantial staged reductions in summer ozone season NO_x emissions from electricity generation plants were made in 1995 and 1999 (up to 55% for upstate coal-fired plants). By 2003, summer NO_x emission reductions of up to 75% from 1990 levels will be required for coal-fired plants. Issues associated with utility sector air emissions are discussed in more detail in the Energy and the Environment issue report (Section 2.3).

Governor's Acid Deposition Reduction Program

The Governor's Acid Deposition Reduction (ADR) Program announced in 1999 is expected to result in regulations that will require New York's electricity generation plants to reduce SO_2 emissions by 50% below the levels required by the federal CAA Amendments of 1990. The ADR Program will also require such plants to implement year-round controls for NO_X, a substantial extension of the five-month summer ozone season controls required under current federal and State regulations. The first full year of fully-implemented NO_X controls is expected to be 2005, and SO_2 controls are expected to be fully phased in by January 2008.

NO_X compliance actions may include a mix of end-of-pipe emission control technologies, such as selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR). SO_2 compliance actions may include switching to lower-sulfur coal, retiring certain coal plants, and installation of flue gas desulfurization (FGD) equipment, or scrubbers, on a substantial proportion of existing coal plants. While the primary objective of the ADR Program is to reduce emissions of precursors of acid rain, modeling analysis indicates that emissions of CO_2, the principal greenhouse gas associated with global warming, could be reduced by up to 10%. This indirect benefit would likely result in shifts from coal and oil-fired generation to natural gas.

The Market Assessment and Portfolio Strategies (MAPS) is a computer-based analytical tool that models the operation of New York's electricity system and those of neighboring systems on an hour-by-hour basis. The objective of such modeling is to meet the required hourly electric load with available generation units, subject to generation and transmission constraints, operating reserve, and other requirements, while minimizing electricity production costs. Using MAPS, a Base Case was defined and evaluated for selected years to model the electric system without the ADR Program. Subsequently, a Compliance Case was defined and evaluated to show how the system might operate in order to comply with the ADR Program. This analysis of New York's electricity system indicates that implementation of the ADR Program is technically

feasible with respect to the proposed time frame and emission targets. However, there are some risks of higher wholesale electricity prices in certain areas as a result of the incremental costs of the emission control actions required for compliance. In addition, there could be reliability impacts if operators of certain units choose to cease or restrict operations for significant portions of the year as an emission control strategy. Further, the proposed regulations are likely to increase the State's dependence on natural gas which could result in supply problems and/or higher prices.

Table 10 shows typical emission rates for SO_2, NO_X, CO_2, and Hg for existing coal plants in New York compared to estimated emission rates for coal plants that burn low-sulfur coal, plants with advanced emission controls, plants that have incorporated two new advanced coal technologies and natural gas combined-cycle plants. Burning low-sulfur coal could reduce SO_2 emissions from an uncontrolled plant by two-thirds; installing a scrubber could reduce emissions by 90% or more. These representative emission-reduction actions could be undertaken at existing coal-fired plants to meet the emission targets of the ADR Program.

Table 10

Emission Rates for Electric Generation Plants
(pound per megawatthours)

	SO_2	NO_X	CO_2	Hg
Existing Upstate Coal Plant[1]	28.4	4.7	2,310	0.000073
Existing w/Low-Sulfur Coal[2]	9.5	4.7	2,310	0.000073
Existing w/Advanced Controls[3]	3.0	1.6	2,412	0.000047
New Advanced Coal: CFB[4]	3.0	1.0	2,180	0.000042
New Advanced Coal: IGCC[5]	0.4	0.9	2,028	0.000010
Natural Gas Combined-Cycle	0.02	0.05	819	0.0

[1]Existing upstate coal plant assumes 1.8% sulfur coal with no scrubber; low-NO_X.burners.
[2]Low-sulfur coal assumes 0.6% sulfur coal; low-NO_X.burners.
[3]Advanced controls assumes 90% SO_2 reduction and 35% Hg reduction by scrubber and 65% NO_X reduction by selective catalytic reduction.
[4]Circulating fluidized bed.
[5]Integrated gasification combined cycle.

Source: NYSERDA, Energy Analysis Program

Advanced Coal Technologies

Technologies are available and emerging to reduce emissions from coal burning at three different stages; pre-combustion, combustion, and post-combustion. Pre-combustion cleaning involves the removal of impurities from coal with physical, chemical or biological processes. Advanced combustion processes include improvements in existing coal combustion processes and new processes that remove pollutants from coal as it is burned. Post-combustion cleaning involves the removal of pollutants from the downstream flue gas after combustion and before exiting the stack. In addition, another category of advanced coal technologies involves the conversion of coal into another form of fuel. In most cases, the new fuel form provides both energy and environmental benefits by reducing the pollutants emitted from combusting the new fuel as compared to coal.

Most advanced coal technologies are the products of research conducted over the last 20 years. In recent years, technological advancements have led to substantial reductions in the cost of controlling SO_2 and NO_X emissions. Some of the most successful advancements are low-NO_X burners, selective catalytic reduction and scrubbers. Advanced pollution controls installed on existing power plants or built into new facilities can provide more effective and lower-cost ways to reduce sulfur dioxide and nitrogen emissions. Advanced power generation technologies are complete electric power generating systems that offer superior efficiency and environmental performance over conventional coal-burning systems. These new combustion processes, such as circulating fluidized bed (CFB) combustion, improve both efficiency and emission control. Another emerging combustion technology, integrated gasification combined cycle (IGCC), converts coal to a gaseous form similar to natural gas before being burned. As shown in Table 10, emissions of SO_2 and NO_X from coal plants using advanced coal technologies are expected to be 80% to 90% lower than typical existing coal plants.

Development and implementation of advanced coal technologies can be a significant contributor to achieving the State's energy, economic, and environmental goals. Advanced coal combustion technologies can provide opportunities for re-powering or upgrading existing coal-fired electricity generating facilities.

U.S. Department of Energy Clean Coal Power Plant Improvement Initiative

The U.S. Department of Energy (U.S. DOE) Clean Coal Power Plant Improvement Initiative provides funding for demonstrations of innovative technologies to improve the performance and economics of both new and existing coal-fired electric

power plants. The AES-Greenidge Multi-Pollutant Project, located on Seneca Lake in Yates county, New York, has been selected by U.S. DOE for funding. The advanced emission control technologies being tested by this project are expected to reduce SO_2 by 95%, NO_X by 60%, and mercury by 90% from the existing 100 megawatt generator at a significantly lower cost than conventional retrofit technologies. It will be the first application of co-firing biomass with a dry scrubber to remove SO_2 and mercury, and selective catalytic reduction to remove NO_X. The State supported AES-Greenidge's request for U.S. DOE funding for the project.

Electric Power Restructuring

During the 1990s, coal producers began to feel the dampening effects of electricity restructuring on demand for their fuel. Electric utilities and other power producers came under pressure to shed high-cost, long-term coal supply contracts and enter into more flexible, risk-sharing supply agreements. The current movement to restructure U.S. electricity generation markets and make them more competitive may lead to changes in the financial risks and demands on the supply and transportation infrastructures of the fuels used in electricity generation. Electric power industry restructuring is expected to result in renewed pressure for cost-cutting and consolidation in the coal industry. Electric power generators will attempt to pass on market risks to coal producers and carriers. As a result, coal contracts will likely become shorter in duration and lower in price. Also, small coal-producing firms may be forced out of business, and large firms are likely to continue to grow in size through acquisitions and mergers.

FORECAST SUMMARY

At the national level, coal demand is expected to increase 1% annually over the forecast period, in response to increasing electricity demand. At the same time, real mine-mouth prices for coal are expected to decline as a result of continued improvements in productivity, which has increased an average of 6.7% per year since 1979.

In contrast to the national trend, the State Energy Plan projects that total coal demand in New York will decrease 1% annually over the forecast period, largely due to the implementation of stronger environmental regulations, as discussed in Section 2.3 of the Energy Plan. Related compliance actions at coal-fired power plants might include switching to low-sulfur coal, adding scrubbers or other emission controls, repowering with alternative generation technologies, or retirements. New York coal demand is projected to decrease by 60 trillion Btu from 311 trillion Btu in 2000, to 251 trillion Btu

in 2021, as shown in Table 11. Coal prices paid by the electric generation sector are estimated to decline 0.7% per year over the forecast period, from $39.11/ton to $33.46/ton in constant 2000 dollars. For a detailed description of the forecast methodology and more discussion on the forecast assumptions, see the Forecast Summary (Section 3.1).

FINDINGS AND CONCLUSIONS

Table 11

New York State Coal Demand and Price Forecast						
	Actual	Outlook	Outlook	Average Annual Growth		
	2000	2006	2021	2000-2006	2006-2021	2000-2021
Demand: (TBtu)	311	218	251	-5.8%	0.9%	-1.0%
Price*: ($/ton)	$39.11	$36.33	$33.46	-1.2%	-0.6%	-0.7%

Source: Energy Plan, *Forecast Summary*.
* Coal prices are expressed in constant 2000 dollars.

- Coal is America's most abundant indigenous fossil fuel resource, accounting for 95% of the nation's fossil energy reserves. The United States has a 250-year supply of coal.

- The U.S. is second only to China among world coal producers. In 2000, over one billion tons of coal were produced in the United States, mined in 25 coal-producing states.

- Approximately two-thirds of all coal mined in the United States is transported by rail, making coal the largest single source of freight revenue for United States railroads. Coal freight in New York accounts for approximately 37% of the total tons of freight hauled by rail.

- In 2000, nearly 12.1 million tons of coal were used in the State, representing less than 1% of the nation's coal demand. While coal use represents 8% of the State's total primary fuel mix, most of the coal (80%) was used to produce electricity.

- New York has 16 coal-fired electricity generation plants located in the State, representing nearly 4,000 MW of net summer capability for the State's electricity system.

- A major consideration in the use of coal as a fuel in electricity generation is the emission of sulfur dioxide, nitrogen oxides, particulate matter, and carbon

dioxide. Advanced coal technologies offer utilities options for making substantial reductions in acid rain and greenhouse gas emissions, while providing health-related benefits as the result of improved air quality.

- Development and implementation of advanced coal technologies can be a significant contributor to achieving the State's energy, economic, and environmental goals.

SECTION 4.0

COMPLIANCE WITH THE STATE ENVIRONMENTAL QUALITY REVIEW ACT

This section is intended to correlate applicable sections of the State Energy Plan with the components of a Final Environmental Impact Statement, pursuant to the State Environmental Quality Review Act (SEQRA) and its implementing regulations 6NYCRR Part 617. Notice of a Positive Declaration under SEQRA, indicating that implementation of the State Energy Plan may have a significant effect on the environment, was published in the Environmental Notice Bulletin on April 4, 2001. The integrated Draft State Energy Plan and Draft Environmental Impact Statement was issued for public comment on December 26, 2001. In total, 171 sets of oral comment were presented to the Energy Planning Board at its nine public hearings and 747 sets of written comments were received by the close of the public comment period on March 15, 2002. The Energy Planning Board has thoroughly reviewed the comments and has accordingly revised the State Energy Plan and the Final Environmental Impact Statement, as deemed appropriate.

The Energy Law generally requires that energy-related actions or decisions of state agencies, boards, commissions, and authorities be reasonably consistent with the forecasts and long-range energy planning objectives and strategies contained in the State Energy Plan. However, the State Energy Plan does not commit any agency, board, commission, or authority to a definite course of specific future decisions. Accordingly, each specific energy-related action of an agency, board, commission, or authority is independently subject to applicable environmental review requirements, such as SEQRA, or Articles VII and X of the Public Service Law.

Overall, the policy objectives and strategies set forth in the State Energy Plan are intended to maintain and improve environmental quality. For example, greenhouse gas and acid rain precursor emission reductions, as well as aquatic ecology enhancement, will directly result from the Plan's objectives and recommendations to continue to develop and implement strategies such as the Governor's Acid Deposition Reduction Program, Clean Air for Schools Program, Clean-fueled Bus and Diesel Vehicles Programs, Clean Fueled Vehicles Program, enhanced vehicle inspection programs, etc. Further, implementation of the Plan's objectives and recommendations to enhance energy efficiency and renewable energy sources will reduce air and water emissions and discharges resulting from fossil fuel combustion and other processes. Examples are the **New York Energy $mart** program, Governor Pataki's Executive Order 111 to increase

the energy efficiency of State buildings and vehicles, the State Green Building Tax Credit. Similarly, implementation of the Plan's objectives and recommendations to improve transportation mobility will enhance air quality by reducing traffic congestion. The Plan addresses these and many other environmentally enhancing objectives and recommendations.

The State Energy Plan addresses the environmental impacts of its energy policy objectives and strategies. Although specific activities will need to be addressed individually (see above) these broad objectives and policies do not appear to have significant adverse environmental impacts. The integrated State Energy Plan and the Response to Comments complies with the specific requirements for a Final Environmental Impact Statement as specified in §8-0109 of SEQRA (ECL, §8-0109) and 6NYCRR 617.9(b), as follows:

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New York State Energy Plan

and

Final Environmental Impact Statement

June 2002

George E. Pataki, Governor

New York State Energy Planning Board

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Response to Comments

Introduction

This document summarizes comments received by the Energy Planning Board on the draft New York State Energy Plan and Draft Environmental Impact Statement. Oral comments were presented at the Board's nine public hearings and written comments were received during the Board's open public comment period. Every attempt was made to address each comment and recommendation in the 171 sets of oral comments and 747 sets of written comments. In almost all instances, responses include references to the State Energy Plan where the comment is addressed. In several instances, the intent of the comment was unclear, making response difficult. If individuals and organizations making comments feel their comments were not addressed sufficiently in the State Energy Plan, they should contact the Energy Planning Board agencies' staffs to continue the dialogue. In general, the numerous positive comments that did not require responses have not been presented.

Note: Comments are grouped according to similarity of contents, and a response may address more than one comment. In those cases, the response is placed at the end of the series of comments. Long series of comments will include a page reference to the response.

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1. General Comments

General Recommendations

Daniel Jones

One of the fundamental issues that guides the current draft proposal is that it bases its supply projections primarily on the presumption of increasing demand. The policy should be centrally based on conservation and efficiency improvement scenarios that will reduce demand even with population growth.

The young generation in New York would like to see a more aggressive energy plan that takes on the challenges that our dangerous energy habits have set for us. We want New York to be a leader in the clean technologies that will protect our future.

Response: The Energy Planning Board shares the commentor's goal of making New York a leader in protecting our future. The State Energy Plan places substantial emphasis on demand reduction, conservation, and efficiency measures. The most recent study of energy efficiency potential in New York State was conducted in 1989, and NYSERDA is currently conducting a major study, the *Efficiency and Renewable Energy Potential Assessment*. The findings of the technical assessment portion of the study were incorporated into State Energy Plan. The economic and achievable potential assessments will not be finalized until late summer 2002. Population growth has less impact on energy supplies than increased demand caused by commercial expansion and economic development. On a per capita basis, New York is already the most energy-efficient state in the continental United States.

The Plan is Too Broad and Should Set Specific Goals

Energy Association of New York State

In this transitional era, it will not be enough to compile facts and perspectives without providing actual guidance on how to achieve the State's goals and without planning for reasonably foreseeable contingencies.

The State must recognize that it is in competition with other states in the region, the nation, and the world.

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Because the plan is a well-intentioned efforts to include all points of view, it is necessarily inconsistent. We believe it badly misplaces its emphasis as to the paramount issues of reliability and price.

The draft places a disproportionate emphasis on programs that may be superficially attractive but will make only a small contribution to the State's overall energy needs. Because of this misplaced emphasis, the plan is likely to encourage complacency and even hostility toward the building of the new and preservation of existing generation plants and natural gas pipelines that we must have.

The Draft State Energy Plan needs to have a dramatic shift in emphasis toward aggressive action by the State to encourage required investment.

Many of the recommendations and projections appear to be predicated on optimistic assumptions and scenarios. The plan projects a 25 percent decline in real electric prices over the next 5 years. It does so in the face of its own recommendations to create and continue expensive public policy programs and in reliance on the assumption of a continuing low rate of economic and energy demand growth.

To achieve secure, reliable, reasonably priced energy, the maximum reasonable degree of market certainty is essential. These efforts should include an examination of the appropriate role, if any, of the New York Power Authority and the Long Island Power Authority in the competitive market and how their activities may impact that market.

Government-added energy costs must be reduced and not increased as they would under the draft State Energy Plan. The State Energy Plan must recognize that the State needs to reduce its own cost impacts on energy prices. (See Response on page 1-6.)

<u>Mirant New York, Inc.</u>

Mirant recognizes the difficult challenge facing the Energy Planning Board in attempting to craft a plan to serve as the blueprint for New York's energy future. It is not enough for the Draft State Energy Plan to compile facts and perspectives. What is needed is for the State Energy Plan to offer a consistent sense of how the State can get from where it is to where it need to be.

Identifying the goals that should drive the State's energy policy is not difficult. Two considerations outweigh all others: reliability and quality of service first and price.

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These become largely irrelevant if people cannot get all the energy they need when, where, and how they need it, and at a reasonable price.

With the tightening of the capital markets, the State must recognize that it is in competition with other states in the region and in the nation, and with the international community.

In part because the Draft State Energy Plan is a well intentioned effort to include all points of view, it is necessarily inconsistent in a number of important respects and badly misplaces its essential emphasis.

The Draft State Energy Plan places a disproportionate emphasis on programs that, while they may be superficially attractive and politically popular and which we generally support when they are cost effective, offer the potential to make only a small contribution, at best, to the State's overall energy needs.

The avoid such outcome, the State Energy Plan needs to have a dramatic shift in emphasis toward aggressive action by the State to encourage the investment that is required for the State's security and economic future.

The Draft State Energy Plan does little to highlight or promote the importance of the continued operation of the State's existing facilities. It ought to do so particularly with regard to the State's nuclear and coal-powered facilities, which are often the object of misguided and ill-informed political opposition but which are critical sources of fuel diversity and price moderation. (See Response on page 1-6.)

Sierra Club

The Draft State Energy Plan fails to include a list of clearly stated goals. There is not sufficient emphasis on efficiency and conservation processes. New York should adopt the Renewable Portfolio Standard. We should develop a program that eliminates our dependence on nuclear power. Before its re-authorization, Article X should include the elimination of the grandfathering clause applicable to plants built before 1977. Energy Plan should include a goal of reducing CO_2. Emphasis should be on renewable energy as we pursue new technologies/jobs. The State Energy Plan should include regional planning. There should be a peak and high demand conservation contingency plan. More emphasis on public transportation. The State Energy Plan should include an analysis of the impact of siting and distribution of energy on low income and minority

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communities. The Sierra Club supports the Governor's desire to use renewables. (See Response on page 1-6.)

Deborah Marie Glover

The State Energy Plan is too subjective. It should be more specific in its policy. Where are the analysis, constructive plans, goals, and objectives as will as the policies and procedures in the draft energy plan? (See Response on page 1-6.)

Tompkins County Environmental Management Council Energy Committee

The State Energy Plan is very comprehensive in setting goals for energy use but must explain further the issues surrounding the implementation of these goals. (See Response on page 1-6.)

Honorable Paul D. Tonko, Chair, Assembly Energy Committee

The draft State Energy Plan is incomplete in terms of providing a set of specific and structured programs that will render the State more secure in its energy supply while rendering the State more competitive with other States. (See Response on page 1-6.)

Scenic Hudson, Inc.

Energy Plan should include specific goals and objectives and a strategy time line. The State Energy Plan should set specific recommendations to promote the development of sustainable renewable energy generation. Close Indian Point. New York State needs to improve public input in the Article X process. The State Energy Plan should include a conservation contingency plan. (See Response on page 1-6.)

League of Women Voters

Energy Plan has no measurable goals set or no timetable to reach these goals.

State should put in measures to control electric energy demands, remove barriers to clean distributed generation, and commit to clean renewable energy sources. (See Response on page 1-6.)

Environmental Advocates

This document would be most valuable if it could really inform decisions, *e.g.* about Article X power plant siting and transportation issues, and include specific recommendations with numerical targets and metrics to measure progress towards targets. (See Response on page 1-6.)

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Environmental Advocates

In general, we feel the plan lacks clearly stated goals, targets, and specific recommendations for meeting those targets. We feel the plan should not be a series of analyses of existing programs and markets. Measurable outcomes and objectives, time lines, and actions should be stated. (See Response on page 1-6.)

New York Public Interest Research Group (NYPIRG)

The State Energy Plan needs to provide specific actions to reach our target goals and include rates and date of where we need to be. It should provide the methodology or potential methodology of how we are going to reach those rates and dates.

The draft State Energy Plan takes a broad focus on policy directions instead of on specific goals and objectives. Many New Yorkers feel the same way, that specific goals need to be set to bring about safer, cleaner, and healthier energy policy. For example, goals like a ten percent renewables portfolio standard and a citizens utility board. (See Response on page 1-6.)

Ben Tevelin

A responsible energy plan includes specific goals, objectives, and actions to promote a safer, cleaners, and healthier energy policy. Specific goals and objectives such as capping power plant emissions to seven percent below 1990 levels and actively implementing renewable energy supply programs. (See Response on page 1-6.)

UPROSE

The Draft State Energy Plan does not lay out a specific plan; it merely implies general policy. (See Response on page 1-6.)

Stop the Barge

The Draft State Energy Plan only suggests broad policy direction instead of requiring specific action. New York City deserves a well thought out plan that includes an estimate of how much energy is required by the City in the next 10 years, a careful placement of new facilities taking into consideration the other environmental burdens already faced by mixed-use zoning communities, and an action plan that would stage the building and recruitment of new plants so that each new construction project would be properly permitted and supervised. (See Response on page 1-6.)

Note: Comments are grouped according to similarity of contents, and a response may address more than one comment. In those cases, the response is placed at the end of the series of comments. Long series of comments will include a page reference to the response.

Sierra Club, NYC Group

The Draft State Energy Plan fails to include a list of clearly stated goals in the current document. Clearly defined goals should form the basis of the plan and must be prominently presented. (See Response on page 1-6.)

Communities United for Responsible Energy (CURE)

CURE is calling for a rational energy plan for the State which will promote, among other things, true repowering of existing power plants to reduce air emissions and increase efficiency, the increase in energy conservation and alternative energy development, a needs assessment before any new power plants are sited, and equitable siting practices. The draft State Energy Plan should be substantially revised to present a comprehensive and meaningful planning document to guide State and private action. A proper energy plan must include specific goals, objectives, and actions instead of broad policy suggestions. No new electric generating facilities should move forward until there is an environmentally and economically sound and equitable energy plan in place.

Response: The policies recommended by the Energy Planning Board in the State Energy Plan were selected to keep New York in the forefront among all the states in providing its citizens with fairly priced, clean, efficient energy resources. To do this, the Plan must encompass many diverse issues without unduly emphasizing one at the expense of the others. The five major policy objectives that provide a framework for the Plan are designed to address all the diverse issues facing New Yorkers. (See Section 1.3, Energy Policy Objectives and Recommendations.) Numerous recommendations address continued secure operation of the State's existing facilities, including coal-fired and nuclear power plants, and many are responsive to the multitude of comments from citizens and organizations urging the State to focus on demand-reduction methodologies and technologies and on alternative methods of power generation. In addition, the State Energy Plan predicates many of its recommendations on the concept that New York State will benefit from diversity in sources of fuel, and renewable energy resources and demand reduction measures can make valuable contributions to fuel diversity. Prices for renewable energy will decline as the renewable energy resources industry and infrastructure are developed. A vibrant renewable energy resources industry will contribute to economic development in the State and will promote fuel diversity.

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Commit to Action

Better Queens Environment (BQE)

The scope and impact of the Energy Plan is limited. In its own words, "the State Energy Plan does not commit any agency, board, commission or authority to a definite course of specific future decisions." SEQRA and Articles VII and X of the Public Service Law are given precedence.

Consumers Union

As noted in the all-too-brief environmental impact statement, "the State Energy Plan does not commit any agency, board, commission or authority to a definite course of specific future decisions." We wish it did. By not proposing a plan for specific actions, the state is maintaining a laissez-faire policy stance where much more is needed.

Star Foundation

We feel that the Draft State Energy Plan must actually be binding on the State and that, until that is the case, it's really just an exercise in futility.

Response: The role and function of the State Energy Plan are legislatively determined. While the Energy Plan cannot dictate specific decisions, Article 6 of the Energy Law requires that "Any energy-related action or decision of a State agency, board, commission or authority shall be reasonably consistent with the forecasts and the policies and long-range energy planning objectives and strategies contained in the plan, . . . " If a state entity acts in a way that is contrary to the plan, it must demonstrate that the "relevant provisions of the plan are no longer reasonable or probable. . . ."

Specific Recommendations Regarding the Energy Plan

Bronx Environmental Action Coalition

The Governor should work to allocate resources of local community organizations in Mott Haven and Port Morris to develop waterfront revitalization plans and create public access to the waterfront. Public access can be achieved in the immediate short term at a number of coastal locations where parks, piers, and marinas could be created. The Governor can work to channel line-item Environmental Protection Fund monies towards such ecological and economic development opportunities. In an area which already hosts a disproportionate burden of waste related and industrial polluting facilities, compensatory amenities will narrow the gap in environmental justice.

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A significant monetary investment in the design and implementation of a Local Waterfront Revitalization Plan is necessary and fair.

Response: The recommendations in this comment are predominantly outside the scope of the State Energy Plan. Information on the findings of the New York State Department of Environmental Conservation's Environmental Justice Task Force is outlined in Section 2.3 of the State Energy Plan.

Tahira Faune Alford

I want to know if the energy plan will have a public vote. Will there be a chance for a public vote? In California there was an alternate clean energy plan and 73 percent of the public voted for it.

Response: The role and function of the State Energy Plan are legislatively determined. The State Energy Plan is adopted, with extensive public input and lengthy internal deliberations, by the Energy Planning Board, which consists of the Commissioners of the Departments of Economic Development, Transportation, and Economic Development, the Chairman of the Public Service Commission, and the President of the New York State Energy Research and Development Authority.

Ann Link

Promoting and achieving a healthier and cleaner environment should be the first energy policy objective, not the fourth. Personal health is a prerequisite for everything else we do in life.

Under promoting and achieving a healthier and cleaner environment, No. 6 – develop a program that allows businesses . . . . This goal should not preempt strict state enforcement of currently existing law.

Response: The five public policy objectives that provide the framework for the recommendation in the State Energy Plan are not presented in order of precedence.

No goals presented in the State Energy Plan can preempt enforcement of currently existing laws.

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Consumers Union

Secrecy about energy trades is unacceptable. The State should require that all information related to energy trading be subject to Freedom of Information laws. Consumers have a fundamental Right-To-Know and transparency is critical to protecting consumers from market abuse. In the wage of the Enron collapse, the current secrecy about energy trading is unacceptable. Consumers must be assured access to information on trades to prevent market abuse.

Response: The New York State Freedom of Information Law provides access to certain government records and applies to all records held by or for a State agency. It provides that all records, with certain exceptions listed in the statute, such as trade secrets, are subject to disclosure. The State Freedom of Information Law does not apply to private companies and to require such application would require legislation. To protect consumers and ensure that an orderly market is maintained, the New York Independent System Operator has established a market monitoring unit that is charged with investigating alleged incidents relating to market abuse. In addition, the Federal Energy Regulatory Commission is in the process of establishing an oversight unit for similar purposes.

Babylon Greens, Town of Babylon

The Energy Planning Board could use a citizen or an activist member, someone who is not from a government agency, who would provide another viewpoint. Someone who could make it safe for people who are attached to certain government agencies to push the envelope a little bit.

Response: The composition of the Energy Planning Board is designated by the Energy Law. The Board recognizes the need for diverse viewpoints throughout the planning process and undertakes an extensive scoping process that includes public hearings and meetings with stakeholders at strategic locations across the State.

New York Chapter Association of Energy Engineers

The New York Chapter recognizes that the State seeks to develop a strong and vibrant energy services industry to serve the needs of end users. We believe it is important to build capacities that will become permanent in the State. In its procurement of energy services, the State should establish significant criteria that favor firms located in New York State.

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Response: NYSERDA is the primary conduit for developing a strong, vibrant energy services industry in New York State through its system benefits charge funded **New York Energy $mart**[SM] programs. Programs such as the Commercial/Industrial Performance Program and the Peak Load Reduction Program vigorously support the energy services industry. The Commercial/Industrial Performance Program currently has more than eighty participants. While the majority of these firms are located in New York State, those from other states also provide valuable energy services to facilities in New York that benefit New York as a whole. For this reason, NYSERDA has not elected to limit participation to in-state firms. The expectation is that, as the energy services industry grows, many of the out-of-state firms will relocate, bringing jobs and investment with them.

New York State Environmental Justice Alliance

Recent forecasted economic downturn suggest that we may be better able to consider opportunities now than when this scoping process started for this plan. With that in mind, maybe we need to go back and take a look at where we are and extend this process, if that is necessary.

Response: The Energy Planning Board believes that the State Energy Plan accurately reflects the economic climate in the State at this time. However, pursuant to, Article 6, the legislation governing the energy planning process, the Energy Planning Board may adopt a new plan for good cause at any time. Major changes in the economic climate could potentially lead the Board to adopt a new plan before the next one is scheduled.

Katie Makarowski

I believe that our State should turn its focus to less short-term goals and look more at the broader spectrum of things, at more long term goals, to avoid the inevitable crises that arise from relying on oil and gas. Drastic measures need to be taken, trade offs and sacrifices made, both politically and socially.

Response: The State Energy Plan seeks to be a thoughtful, systematic study of the State's energy future and is mindful of the importance of long-term planning. However, the assessments in the State Energy Plan now embrace a twenty-year planning period that is untenable given the complex changes occurring in the energy industry. The movements to competition and regional markets in the energy industry have introduced enough uncertainty that the Energy Planning Board proposes reducing the planning horizon to ten years.

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The New York Renewable Energy Coalition

There are many individuals, organizations, and corporations interested in working in the energy industry. These groups lack a single point of contact in New York State that will act as a clearinghouse for information.

Response: NYSERDA is an excellent source of information for individuals, organizations, and corporations interested in working in the energy industry in New York State, as is the New York State Independent System Operator, and myriad industry organizations exist. For example, statewide organizations with specific interest in the promotion of renewable technologies and energy resources include the New York State Energy Industries Association and the American Wind Energy Association.

New York Gas Group (NYGAS)

NYGAS is concerned that the Board will base policy and form conclusions using the data and analysis found in the interim reports of the NYISO/NYSERDA Gas Capacity Study. We urge that the Draft State Energy Plan be flexible enough to incorporate the final results when they become available.

Response: The results of the NYISO/NYSERDA study, *The Interaction of the Gas and Electric Systems in New York State*, are included in the State Energy Plan. See Section 3.5, Natural Gas Assessment. Incorporation of these results does not preclude or foreclose future actions by the Planning Board.

Riverkeeper, Inc.

The State needs a comprehensive energy policy and, through the collaborative activities of the agencies that make up the Energy Planning Board, one can be achieved. The State Energy Plan Board should be a stronger voice with respect to recommending policy on energy-related issues. In fact, the Energy Plan Board should be able to evaluate the costs and benefits of existing and proposed electric generating units and recommend which are in the public interest and which are not.

Response: The Energy Plan provides the comprehensive energy policies for New York State. Four of the five members of the Energy Planning Board – the exception is the New York State Department of Transportation – are members of the Siting Board and the staffs of those agencies collaborate and serve as the staff of the Planning Board.

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Scenic Hudson, Inc.

The Draft State Energy Plan should be a blueprint for energy sector decision making and also underscore the need to integrate this decision making with other State plans and second highlight the need for regional planning. The State Energy Plan should identify locations that are inappropriate for power plants due to inconsistency with other State and local plans. The State Energy Plan should provide region-based analysis to inform the development of regional plans.

Response: The State Energy Plan is a statewide planning document, and regional analyses generally are outside its scope. That being said, local and regional issues are considered where they impact the State as a whole. For example, the Electricity Assessment (Section 3.4) includes a subsection that evaluates conditions in the New York City and Long Island areas.

The Article X process is the vehicle for determining the appropriateness of specific power plant sites. The Article X process is legislatively mandated.

Tompkins County Environmental Management Council Energy Committee

"The energy technology sector grew by 134 percent in 2000. . . ." Is this correct? It seems high for one year. (See page 1-11 [of the draft State Energy Plan].)

Response: This figure refers to growth in the energy technology sector nationwide and is considered accurate by industry professionals. The magnitude of the figure reflects the fact that growth in the energy technology sector has been vigorous in the recent past.

Torne Valley Preservation Association

The State Energy Plan should present electric power needs that are clear and understandable to the public. It should show in terms that the public will understand where power is needed and how it should be provided.

Response: In the State Energy Plan, Section 3.4, Electricity Assessment, contains extensive information on New York State's projected electricity requirements and potential supplies for the planning period, 2002 through 2021.

Western New York Sustainable Energy Association

There need to be audits by auditors or representative panels of stakeholders of the programs run by NYSERDA, NYPA, and LIPA

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We need to look at the amount of installed savings in terms of kilowatt hours saved versus dollars spent in the short term and the long term. How much are we really achieving? There's lots of programs. Are they doing what they're supposed to?

I would also suggest that part of this auditor review would consider the extent to which those running those programs are capable of thinking outside the box.

Response: In-depth evaluations are conducted on the NYSERDA, LIPA, and NYPA public benefit energy efficiency programs. In the case of NYSERDA's System Benefit Charge (SBC) programs, the New York State Public Service Commission established the System Benefits Charge Advisory Group to act as the independent, third-party program evaluator. This advisory group is composed of a variety of stakeholders and experts including energy industry associations, utilities, low-income advocates, and renewable energy association representatives. This group reviews data on installed savings, spending, and projected achievements and provides advice and recommendations on the directions of the SBC programs based on evaluation results. The different perspectives of the members of the SBC Advisory Group, and their cutting-edge work in this field, help ensure that SBC program development and evaluation is well informed and that fresh ideas are available.

In addition, all State agencies are audited by outside, independent auditors and the State Comptroller.

Green Power

Better Queens Environment (BQE)

Leading organizations around the country are starting to buy green power, recognizing it is the next step in environmental responsibility. Leading experts on U.S. green energy development have expressed confidence that a dramatic growth in participation in U.S. green energy programs is likely to occur over the next several years. The four-year plan does not really reflect that.

Response: The State Energy Plan recognizes the need for and encourages the development of green power in New York State. At the present time, however, U.S. green energy development is in its infancy. In essence, the Governor's Executive Order 111 has directed the State to purchase green power in expanding stages through 2020. Additionally, environmental labeling, now in effect in New York State, informs electricity customers of the environmental attributes of the power available for purchase.

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Information comparing the amounts of nitrogen oxides (NO_X) sulfur dioxide (SO_2) and carbon dioxide (CO_2) missions in the power sold by the supplier with the statewide average will help customers make decisions and will stimulate suppliers to add green power to their mix.

Article 6

New York Independent System Operator (NYISO)

Regarding changes to Article VI, the NYISO supports the modifications that reduce the demand forecast time horizon from 20 to 10 years. The NYISO recommends that it no longer be designated as an agent to collect and supply data to NYSERDA. NYISO recommends that all data be submitted directly to the State.

National Fuel Gas Distribution Corporation

The Draft State Energy Plan states that the State should reauthorize, with modifications, Article VI. Natural Fuel Gas feels all aspects of Article VI must be revisited. Modified regulations must reflect information requirements from new entrants into the energy market place, including marketers, suppliers and brokers, with a compliance feature that makes the information filing requirements mandatory.

Response: A revised Article 6 will be introduced for action by the Legislature in 2002. It will likely include reduction of the forecast time horizon from 20 to 10 years and reflect updated information requirements from all participants in the energy market place. Other changes may also made to make the Energy Law more useful and responsive to the needs of the State, of energy providers, and of rate payers.

Niagara Mohawk Power Corporation

The draft State Energy Plan suggests a future ten-year planning horizon. Niagara Mohawk endorses this recommendation. In fact, it would support a shorter planning horizon if it were appropriate. The draft State Energy Plan also suggests that the Energy Planning Board meet annually to coordinate development and implementation of energy-related strategies and policies and to deal with certain information materials. In the near term, this is an excellent idea. However, we must be sensitive to the resources needed to engage in the energy planning process. To avoid the administrative burden of a continuous year-long planning proceeding, Niagara Mohawk suggests the annual efforts be tightly focused on two specific questions: (1) Are all State agencies coordinating their efforts and following the policy guidance laid out in the last approved plan? Do the recent actions complement each other and further the policy objectives of the currently

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valid State energy plan? (2) What key policies, if any, require immediate reconsideration in view of major industry developments since the last plan was completed?

Response: The comment substantially defines the agenda for the Energy Planning Board's annual meetings. Under normal circumstances, the annual planning will be neither continuous nor year-long.

Sustainability

Clarkson University

Clarkson endorses the efforts of the Energy Planning Board and recommends a broader inclusion of sustainability concepts and principles into the Draft State Energy Plan as a means of promoting long-term economic development and environmental health throughout the Empire State.

Sustainability is the conservation movement of the twenty-first century and, like conservation, sustainability holds that we can have economic development and environmental health today and in the future if we apply new ways of thinking and working to solve the challenges of production, consumption, and disposal, among others.

Riverkeeper, Inc.

The Draft State Energy Plan should include a definition of sustainable energy.

Response: The State Energy Plan contains many recommendations that will contribute to energy sustainability for New York State including those that move the State's emphasis away from imported oil and toward renewable technologies and peak shaving programs. See Section 3.2, Energy Efficiency Assessment, and Section 3.3, Renewable Energy Assessment, of the State Energy Plan.

Babylon Greens, Town of Babylon,

You might want to look at the Brentwood Report which created the idea of sustainability through the UN. They held their hearings first and then wrote the report. The problem is, once you have a document created, it sets a lot of ideas in stone.

Response: The process of developing the State Energy Plan is outlined in Article 6 of the Energy Law. The draft Plan is written based on extensive public input. The Notice of Commencement of the Planning Proceeding was published on April 18, 2001 in the *New York State Register*, initiating a 60-day public comment period that closed on

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June 18, 2001. Fifteen outreach meetings were held with interested parties. Forty seven sets of comments were received from 43 individuals and organizations in response to the Notice of Commencement.

Reliability

New York State Reliability Council (NYSRC)

Supports the importance of maintaining the reliability of the State's power system.

The State Energy Plan needs to critically assess the likelihood that massive capital investment in new generation in the State will really come to pass and describe the impact if such facilities are not built.

Response: The Electricity Assessment section of the State Energy Plan contains a range of analyses under different combinations of supply and demand. One such analysis addresses a situation of "low supply" of generation.

New York State Reliability Council (NYSRC)

The Reliability Council strongly supports the first Energy Policy Objective in the Energy Plan. The following textual changes in the State Energy Plan are suggested.

Response: The State Energy Plan incorporates the NYSRC's recommended language.

New York State Reliability Council (NYSRC)

The following paragraph should be inserted before the paragraph that starts with "In the process to develop a Northeast RTO. . ." on page 3-88 of the draft State Energy Plan.

Response: The paragraph, which addressed the State's commitment to reliability was inserted, with minor changes, in the State Energy Plan.

Regarding NYPA, LIPA

Mirant New York, Inc.

Although included in its original scoping list of issues, the Draft State Energy Plan fails to address in any meaningful way the appropriate role of New York Power

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Authority and Long Island Power Authority in the new competitive environment. There needs to be an examination of the significant impact of the development of competitive energy markets of the substantial and ongoing investment by State Authorities in electric generation projects. Such examination should offer a basis for assessing the potential impact of proposed legislation that looks to expand the sphere of NYPA's activities in the competitive market. Nor is there a discussion of the NYPA hypropower relicensing issue and its enormous potential impacts.

Honorable Paul D. Tonko, Chair, Assembly Energy Committee

The State Energy Plan sidesteps discussions of the role of public power.

With respect to the Power Authority of the State of New York (PASNY), the Energy Plan does not examine the authority's activities, whether such activities fall within or beyond the scope of the authority's statutory responsibilities, nor the impacts on developing private markets. The State Energy Plan fails to address the appropriate role of public power authorities in emerging competitive markets (same as 1st sentence).

Response: The Energy Planning Board does not consider it within the scope of the State Energy Plan to address the New York Power Authority's statutory responsibilities. However, the State Energy Plan predicates many of its recommendations on the concept that New York State will benefit from diversity in sources of fuel and that renewable energy resources will make a valuable contribution to fuel diversity. Prices for renewable energy will decline as the renewable energy resources industry and infrastructure are developed. Therefore, the State Energy Plan calls for the New York Power Authority and the Long Island Power Authority to purchase contracts for specific amounts of renewable energy. Such purchases will encourage development of the industry, contribute to economic development in the State, and promote fuel diversity.

Multiple Intervenors

The final Energy Plan should not recommend that New York Power Authority and Long Island Power Authority solicit bids for renewable resources.

Response: The Energy Planning Board understands the concerns of the commentor that promotion of renewable energy resources may result in increased prices for energy. However, the State Energy Plan supports the concept that New York State will benefit from diversity in sources of fuel, and renewable energy resources can make a valuable, albeit at this time limited, contribution to fuel diversity. Prices for renewable energy will decline as the renewable energy resources industry and infrastructure are

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developed. Such purchases will encourage development of the industry, contribute to economic development in the State and promote fuel diversity.

Sustainable Energy Alliance of Long Island

Any New York State Master Energy Plan must include a binding provisions upon the Long Island Power Authority to adhere to and fulfill the mandates of the State Plan. LIPA continues to operate with little to no oversight by the State, and, although it is a publicly owned authority, it is largely unaccountable to its ratepayers.

The Sustainable Energy Alliance of Long Island seeks assurance that LIPA will be required to adhere to the guidelines, strategies, and milestones set forth in the final New York State Energy Plan upon its adoption.

Response: Long Island Power Authority, like all State agencies, authorities, commissions, and boards must act in reasonable consistency with the State Energy Plan. Article 6 of the Energy Law requires that "Any energy-related action or decision of a State agency, board, commission or authority shall be reasonably consistent with the forecasts and the policies and long-range energy planning objectives and strategies contained in the plan, . . . " If a state entity acts in a way that is contrary to the plan, it must demonstrate that the "relevant provisions of the plan are no longer reasonable or probable. . . ."

New York Independent System Operator (NYISO)

New York Independent System Operator (NYISO)

With respect to recommendation 1.C. on page 1-29 of the draft State Energy Plan: "State agencies and authorities should encourage the New York Independent System Operator (NYISO) to consider the certainty and availability of primary and back-up fuels as factors in the valuation of capacity from electricity generators, to ensure that the reliability of the electricity, natural gas, and petroleum supply and delivery infrastructures are not adversely affected if generator fuel supplies are disrupted." The NYISO suggests that the contemplated modifications to the NYISO installed capacity market may be premature. It may be more useful to address these concerns through reliability rules.

Empire State Petroleum Association, Inc.

The State should examine methods of enhancing and developing the security and reliability of its petroleum storage and distribution infrastructure.

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Response: With respect to the reliability of petroleum storage and distribution infrastructure, the State Energy Plan requests the New York Independent System Operator to consider the certainty and availability of primary and back-up fuel supplies in valuing capacity from electric generators or to consider the certainty and availability of primary and backup fuels in establishing local reliability rules. See Section 1.3, Energy Policy Objectives and Recommendations, in the State Energy Plan.

With respect to security of the petroleum storage and distribution infrastructure, the Energy Planning Board explicitly recognizes the need to take a hard look at the security of the State's energy infrastructure, as evidenced by the State Energy Plan's recommendation that the State initiate a study of the security of New York's energy infrastructure used for production, storage, and delivery, and that the study include a risk and vulnerabilities assessment and make recommendations for appropriate actions. The Planning Board suggests that the study be conducted cooperatively by the Office of Public Security, the Energy Planning Board agencies, and major energy market participants.

New York Independent System Operator (NYISO)

The NYISO wants to emphasize the continued need for new capacity, particularly in New York City and on Long Island. This additional capacity is required for system reliability to be maintained. On August 7, 8, and 9, [2001] NYPA's 440 megawatts of capacity became critical. They are still critical. However, demand reduction measures can play a significant role in maintaining New York's electric reliability. The NYISO would like add these recommendations to those outlined in the draft State Energy Plan: (1) eliminate barriers to real-time pricing at the retail level, (2) encourage the development of "smart metering" to empower consumers to assist in demand-reduction efforts, (3) develop real-time residential and commercial rates, and (4) continue education efforts on the benefits of demand-reduction measures.

Response: Both the Energy Planning Board and the State Energy Plan support additional resources (both supply and demand reductions) to ensure the development of a competitive market. The Board also supports: (1) elimination of barriers to real time pricing at the retail level; (2) development of "smart metering"; (3) development of real-time residential and commercial rates; and (4) educational outreach regarding the benefits of demand reduction measures.

The New York Public Service Commission (PSC) and NYSERDA have already taken major actions in this area. In 2001, the PSC directed all utilities to develop and

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implement voluntary real-time pricing tariffs for customers with load in excess of 100 kilowatts. The PSC approved these tariffs in the summer of 2001. Using System Benefit Charge funding, administered by NYSERDA,"smart" or interval meters are subsidized up to 100 percent of the customer's installed cost. In addition, the PSC, NYSERDA, the Long Island Power Authority and the New York Power Authority have implemented major campaigns to educate customers regarding the benefits of demand reduction measures and actions. Finally, it should be noted that New York State law does not permit mandatory time-of-use pricing for residential customers.

Riverkeeper, Inc.

The Draft State Energy Plan should promote a more balanced New York Independent System Operator board of directors.

Response: The board of directors of the New York Independent System Operator is approved by the Federal Energy Regulatory Commission, not New York State.

New York State Electric and Gas (NYSEG)

The State Energy Plan pays only slight notice to the serious market practices and design issues that have been seen in the NYISO-administered market since its inception.

The State Energy Plan will be more useful if it is guided by the most significant needs of the electric market, *i.e.*, the NYISO must replace its hour-ahead and real market software which is obsolete and flawed.

The Public Service Commission adopted interim measures requiring marketers to demonstrate certain capacity holdings, however, no long term policy regarding capacity obligations currently exists in New York State.

Response: The Electricity Assessment of the Energy Plan identifies some of the efforts underway to improve the efficiency of the NYISO-administered wholesale market. The Planning Board supports these efforts and will continue to monitor the market to ensure that necessary improvements are made.

Lifeline Rates

Tompkins County Environmental Management Council Energy Committee

The State Energy Plan should include lifeline block pricing.

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League of Women Voters

It is an important social policy for the State to require "lifeline" rates. To support energy conservation the State should disallow declining block rates.

Response: Rate Orders recently issued by the Public Service Commission provide for discounted customer charges for qualified low income utility customers.

Formatting Comments

Jennifer Bostaph

Overall, the Draft State Energy Plan is very informative. Section III is very confusing and difficult to understand. The tables offer too much information. Some of the graphs do not help with explanations. The Energy Plan needs to have an acronym page.

League of Women Voters

In the Energy Plan there should be the addition of a subject matter index.

Response: The suggestions are good ones, and an attempt has been made to improve the readability of the document within the tight time frame for developing and approving the Plan.

Pace University School of Law; Pace Energy Project

The State Energy Plan should provide a new section that summarizes New York positions and interests with regard to federal energy, transportation, and environmental policies, including climate change.

Response: The contents of the State Energy Plan are defined by the Energy Law, however the State's position vis-à-vis federal government is discussed throughout the Energy Plan where appropriate.

Petroleum and Gas Issues

El Paso Corporation

The State Energy Plan should include a more comprehensive assessment of new energy supplies, particularly natural gas, that are under development offshore from Nova Scotia, and an additional focus on the need for, and value of, diversity in fuel supplies, not just diversity of the fuels themselves.

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Response: The State Energy Plan has been modified to reflect El Paso's comments.

Better Queens Environment (BQE)

The Draft State Energy Plan anticipates a 50 percent reliance on one source of fuel – gas. As current local and world events have shown, this reliance on fossil and nuclear fuels causes enormous security concerns. The heavy reliance on a single source of fuel leaves the State vulnerable to price fluctuations and supply problems.

Response: The State Energy Plan recognizes this risk and as a result supports several actions including that the State initiate a study of the security of New York's energy infrastructure used for production, storage, and delivery. The Energy Plan calls for the study to include a risk and vulnerabilities assessment and action steps for the appropriate actions. The study should be conducted cooperatively by the Office of Public Security, the Energy Planning Board agencies, and major energy market participants.

Diane A. Davis

New York's dependence on Organization of Petroleum Exporting Companies oil is projected in the Energy Plan to exceed nearly 50 percent by 2016, this is in contradiction to President Bush's State of the Union address. The State Energy Plan should be re-worked to become less dependent on foreign oil supplies. The Draft State Energy Plan says that we should transfer our oil dependency from OPEC to Russia, Azerbaijan, Kazakhstan, and the Caspian Sea area. This defeats President Bush's directive. Section 2 needs to be re-written to incorporate President Bush's January 28, 2002 State of the Union Address.

Response: The State Energy Plan calls for the State to significantly increase energy resource diversity in electricity generation and transportation through increased reliance on indigenous, renewable, energy efficiency, and demand management resources. These steps will help reduce New York's dependency on imported energy.

Empire State Petroleum Association, Inc.

Empire State Petroleum Association, Inc. agrees with the basic goals, principles and planning objectives in the Energy Plan. Competition in the energy market, uninfluenced by government interference, will provide customers with the best products, services, and prices. This approach should be applied to all energy markets in the State.

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The State Energy Plan should include a provision that every interruptible electric generating facility should maintain adequate back-up fuel and that should be mandated in the re-authorized Article X statute.

Response: The State Energy Plan requests the New York Independent System Operator to consider the certainty and availability of primary and back-up fuel supplies in valuing capacity from electric generators or to consider the certainty and availability of primary and backup fuels in establishing local reliability rules.

Empire State Petroleum Association, Inc.

The State should expand research and development projects for petroleum products and equipment and support research and development projects testing the feasibility of using biodiesel as a home heating extender.

Response: The State Energy Plan supports the expansion of biofuels research and development activities with the goal of creating a self-sustaining private sector biofuels industry in the State within the next five to ten years. The State will develop a specific plan for producing, refining, and marketing biomass fuels derived from waste, soybean, and corn oils, and from paper sludge, municipal solid waste, and other cellulose sources, working in cooperation with other states. The State also supports the commercialization of biofuels technology and use of biofuels as vehicle fuel, heating fuel, emergency generation fuel, and in marine applications.

Empire State Petroleum Association, Inc.

The final Energy Plan should recommend the elimination or reduction of taxes on petroleum products. The final Energy Plan should recommend the complete elimination of the petroleum business tax on heating oil for commercial space heating. The final Energy Plan should recommend that the State adopt a unified petroleum tax calculated on a per-gallon basis.

Response: Issues of taxation require legislation enacted by the New York State Legislature. The Energy Planning Board supports reductions in taxes where appropriate and when due consideration is given to fiscal considerations.

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Diversity

Ben W. Ebenhack,

Energy projects should include an evolving energy mix that gradually phases out dependence on depletable resources.

El Paso Corporation

The Draft State Energy Plan rightly identifies the need for fuel diversity as a means of minimizing the impacts of shortages of fuel. El Paso feels that there are practical limits to how far you can go in developing a truly diverse fuel mix and we would like to offer that most focus be placed on the supply sources, delivery capability, and redundancy of the delivery systems of the fuels now in use in assessing how best to meet the State's energy needs. El Paso believes it does not serve the public interest if you have a situation where there are a variety of fuel types but uncertainty with how reliable and secure those fuel types are.

Mirant New York, Inc.

New York is blessed with an unusual amount of fuel diversity. The critical importance of diversity relates to the fuels that are used to provide electric generation. The emphasis and the focus must be on diverse fuel supplies rather than on diverse energy portfolios.

Response: The State Energy Plan predicates many of its recommendations on the concept that New York State will benefit from diversity in sources of fuel. Renewable energy resources and demand reduction measures can make valuable contributions to fuel diversity. Prices for renewable energy will decline as the renewable energy resources industry and infrastructure are developed. A vibrant renewable energy resources industry will contribute to economic development in the State and will promote fuel diversity.

Rebuilding Lower Manhattan

Natural Resources Defense Council

With respect to rebuilding lower Manhattan, from an environmental perspective, the vision NRDC wants to put out there, and what we would like to see the State embrace and challenge itself to do, is to try to build . . . rebuild lower Manhattan in a way that is not only efficient and green buildings but actually gets the CO2 emissions to zero.

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Response: The State Energy Plan calls for the State, in coordinating rebuilding efforts in lower Manhattan with private developers following the terrorist attacks of September 11, 2001, to ensure that these efforts maximize the use of energy-efficient and environmentally-sound design and construction practices to reduce energy use and costs, to reduce pollutant emissions, and to improve indoor air quality.

Other (No response is required for comments in this section.)

Eugene Marner

The draft State Energy Plan does little to help us face the future with the knowledge we need to make intelligent decisions. In no case has a serious impartial scientific study been done in the public interest to demonstrate that these energy alternatives can produce more energy than they use. Studies that have been done are not encouraging. The beginning of the greatest of all transitions in human history will arrive sometime this decade. This is what the draft State Energy Plan should be about.

- Helping people to understand the new life and new economies caused by the end of cheap oil
- Preparing people to survive in a world without mechanical slaves
- Explaining that we need to radically conserve the remaining oil and gas in the world to make the transition to the post-oil world.

General Comments in Support of the Plan (No response is required for comments in this section.)

Marshah-Reaff Barrett

The Draft Energy Plan is very informative. Moving forward, more analysis will be required on some of the recommendations in the Energy Plan prior to their implementation. Due consideration must be given to cost impacts, security and diversity of energy supplies and electricity generation technologies, protection of public health and safety, beneficial and adverse environmental impacts, and the State's ability to compete economically.

Pace University School of Law; Pace Energy Project

The Draft State Energy Plan does an excellent job of framing the overall issues. The underlying analysis provides a solid foundation for developing a comprehensive plan for State actions that are needed and will be needed in the future to assure that New York has safe, clean, efficient, and reliable energy over the long term.

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Power Light Corporation

Power Light likes what it sees in the Draft State Energy Plan. There is a lot of good language in there, and there seems to be a clear understanding of the benefits of renewable energy, particularly PV.

Power Light particularly applauds the Governor for his Executive Order 111. It is a truly visionary statement.

Integrated Waste Services Association (IWSA)

IWSA would like to commend the Energy Planning Board for its leadership and commitment in providing a blueprint which would help ensure secure and well maintained energy infrastructure, while also ensuring adequate energy supply within the State.

New York City Economic Development Corporation

This document [the Draft State Energy Plan] does appropriately try to strike the balance between providing crucial information to local decision makers, while trying to not go too far in the direction of making specific proposals for planning for the long term when things change so rapidly. Energy planning is a very dangerous concept. Some of the worst mistakes have been made in the name of long-range planning.

Robert A. Smith

The Draft State Energy Plan gives a good overview of energy supplies and distribution networks in New York State. The ordinary citizen should be in awe of this energy structure and all the effort that has gone into first building and maintaining these systems and the organizational discipline exercised in keeping track of updated information on its utility to the State and its people the compilers of the first draft certainly are to be commended for a job well done in gathering and presenting this information.

Long Island Power Authority (LIPA)

The Energy Planning Board has enunciated sound strategies for putting New York on a continued path toward a sustainable energy future that both improves our environment and grows the economy through market forces. LIPA is currently and will continue to implement objective No. 1, which supports the continued safe, secure, and reliable operation of the energy system infrastructure. LIPA stands ready to participate in the proposed study regarding the security of New York's energy infrastructure recommended in the Draft State Energy Plan.

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Policy objective No. 2 is also supported by LIPA. LIPA will continue to actively support the establishment of a Northeast RTO.

Regarding the recommendation that the State move expeditiously to a fully competitive retail electricity marketplace, LIPA recently opened its retail access program, Long Island Choice, to all of LIPA's more than one million customers.

Policy objective no. 4, promoting and achieving a cleaner and healthier environment, is strongly supported by LIPA's Clean Energy Initiative. Meaningful greenhouse gas emission targets are needed if progress in this area is to be made.

LIPA's mission is aligned with Policy objective no. 5, ensuring fairness, equity, and consumer protections in an increasingly competitive market economy. Clearly LIPA has somewhat of an advantage in addressing this objective, because LIPA's primary mission is public service.

LIPA stands ready and willing to assist in achieving the Plan's goals.

Mary Griffin

The physical structure of the Energy Plan is fine and needs no adjustment.

Brett Maxwell

Generally impressed with scope, depth, and organization of the Energy Plan.

Adirondack Hydro Development Corp.

Supports the Energy Plan’s planning process and energy policy objectives.

New York Power Authority

On behalf of the New York Power Authority, I want to express our appreciation to the Energy Planning Board and its staff for the extraordinary amount of work that has gone into producing the Draft State Energy Plan. You should be very proud of this important policy document and the unprecedented lengths to which you have gone to solicit a diverse selection of public opinion on the Empire State's energy issues.

The blueprint for New York's electricity future should resemble a three-legged stool balanced on generation, transmission, and energy efficiency. All three of these elements are needed to provide New York with a solid foundation for economic growth and environment protection.

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In summary, let me simply say that, under the leadership of Governor George Pataki, the New York Power Authority is practicing what it preaches about generation, transmission, and energy efficiency. I believe the Draft State Energy Plan shares that essential sense of balance and as a consequence will provide an excellent map to a better energy future for all New Yorkers.

New York State Consumer Protection Board

The New York State Consumer Protection Board strongly supports the Draft State Energy Plan. We believe its flexible, market based approach and its strong and proper focus on consumer interests provide a good roadmap for the transition to competitive markets as well as for improvements in the environment and transportation systems.

Scenic Hudson, Inc.

Scenic Hudson, Inc. would like to acknowledge and thank the Board and staff for the time and effort that went into creating the Draft State Energy Plan. As well, we thank you for hosting this and eight other public hearings throughout the State of New York.

New York Public Interest Research Group

We want to be very clear that there are certain things the plan does very, very well and that we want to congratulate you for. It provides a very good snapshot of where we are, our current picture, how we generate our power in New York State, the programs we have. There are a few points we definitely agree on. Specifically, the very strong defense of demand-side management programs, the potential for nuclear power here in New York State, the need for update of power plants emissions standards.

Battery Park City Authority

The impressive work done to date by the Energy Planning Board, as evidenced by the Energy Plan, will inform the policy making process in New York and beyond.

The State Energy Plan is a well researched examination of the New York State current energy picture. We support its recommendations.

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2. Economic Development

Power for Jobs

A.E.S. Ltd.

To allow New York to compete more effectively from an economic development standpoint, continued emphasis should be placed on the Power for Jobs program, in partnership with the State and independent private suppliers.

Clarkson University

Clarkson regards the Power for Jobs recommendation for extension in the State Energy Plan as critically important.

The Business Council of New York State, Inc.

The Draft State Energy Plan makes welcome references to the need to continue the second and third year contracts for low-cost power under the "Power for Jobs" program. We also agree with the State Energy Plan's assessments with respect to the repeal of certain energy taxes and their beneficial impact on the cost of electricity and the acknowledgment of the added costs that New York's tax code imposes on business and industry in the realm of energy.

Response: The State Energy Plan supports authorization of another phase of the Power for Jobs program. The Governor has proposed legislation (S.6425) that would extend the Power for Jobs program to allow new allocations and authorize companies with expiring Power for Jobs contracts to be eligible for reallocations.

Promote Efficiency and Renewables

New York City Environmental Justice Alliance

The portion on development in the draft plan was disappointing. We have seen that efficiency and conservation brought about by weatherization programs, new technologies, and on-site generation through renewable technologies, fuel cells, and photovoltaics stand to offer a lot of new jobs. Probably more new jobs in construction than we would see through construction of a few mega-power plants.

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Great Lakes United

New York State should analyze the potential for generation of new jobs through development of new energy efficient and renewable industries and technologies and include these job benefits in any cost analysis of the transition to a sustainable energy system.

Susan Caumont

We are at the end of an era, the oil era, and at the beginning of a new era, the era of renewable energy. Now is the time to turn to build energy sustainably. There are technologies we can grow at home and export nationally and internationally. New York State can be a leader in renewable energy technologies.

New York State Tug Hill Commission

The State Energy Plan should offer overarching incentives to integrate renewable energy sources in communities that are host to power generating plants.

Diane A. Davis, Environmental Advocates of New York

Tax credits to businesses should be instituted for non-polluting alternative re-energy sources for capital improvements and capital expansion projects.

The State Energy Plan needs to be quickly re-worked to include incentives and breaks for businesses and utilities to develop wind and sun farms, hydropower generating plants, and solar panel collectors so there is no further combustion waste added to the environment.

Response: The State Energy Plan states in several places that New York State should encourage the development of a renewable energy market and that efforts should also be made to remove the barriers to the renewable marketplace. Moreover, the Plan provides general estimates of potential job growth. In Section 1.1, the Saratoga Technology and Energy Park is discussed, and the expectation is stated that over the next five years between 1,000 and 1,500 jobs will be created when emerging, energy technology companies take advantage of the Park's resources. In addition, Governor Pataki in his 2002-2003 Executive Budget calls for the establishment of a Renewable Energy Initiative. The Governor's plan would encourage State, local, university, and private resources to work together to develop and deploy renewable energy technologies. Until this initiative is more fully developed, it is premature to estimate job impacts. However, it is expected that as investments are made in renewable technologies, the impact on job creation could be substantially similar to the growth experienced in the

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energy efficiency sector. The State Energy Plan also establishes an expected outcome for new renewable energy development. Over the planning period a 50 percent increase in primary energy use in the State is to be provided by renewable energy resources. See Section 1.3 of the State Energy Plan.

Cheap Energy, Low Prices

A.E.S. Ltd.

Energy prices and policies need to be brought more in line with other states to allow New York to compete more effectively with our surrounding states.

Response: A.E.S. is correct that energy prices in New York need to be brought more in line with energy prices in other states. That objective is consistent with the State's efforts to restructure the electricity and natural gas industries in New York and to promote both wholesale and retail competition in energy markets. The policies established by the Energy Planning Board and set forth in the Energy Plan are designed to achieve these objectives, while at the same time protecting the environment and ensuring that other public interest values are met.

The Planning Board recognizes that energy policy must be coordinated across markets to achieve maximum benefits, but it also recognizes that New York and other individual states, and areas within states, each have unique attributes and needs. The Planning Board rejects a "one size fits all" approach and any assumption that the policies of other states are necessarily the best policies for New York State. It does, however, support efforts to coordinate both national and regional policies to the extent practicable.

Ann Link

Regarding energy and economic development, cheap energy can be substituted for tax breaks to industries that want to start up or relocate in New York.

Response: As New York moves to competitive electric markets, energy costs are expected to decrease. However, it will take some time to achieve a fully functioning, robust market. To successfully manage the transition, the State has established programs to encourage growth through programs such as Power for Jobs and the Empire Zones Program. These programs provide businesses with power at reduced costs in return for job creation commitments. In addition, most utilities have tariffs that provide for economic development rates in certain circumstances.

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Green Party Broome County

The State Energy Plan is pleased that the state is giving up the sales tax on the delivery of energy. How about eliminating the sales tax on things that save energy, like compact fluorescent light bulbs, Energy Star® appliances, and, maybe, automobiles that get more than 40 miles to the gallon.

Response: Changes to the sales tax would require action by the State Legislature.

Power Quality

The Joint Supporters

Opportunities for improved reliability and power quality are central to economic development in the digital economy of the twenty-first century. New forms of generation, storage, communication, and management of energy are becoming increasingly important to the State's economic competitiveness and development. The issue report on Energy and Economic Development (Section 2.2) should acknowledge the growing importance of reliability, power quality, and demand management in the digital economy and the essential role that distributed generation will play in that future.

Response: The Energy and Economic Development issue report (Section 2.2 of the State Energy Plan) supports improvements in reliability and power quality as methods to further promote economic development. To that end, NYSERDA is working to forge public-private partnerships to explore the development of Power Quality Parks. In addition, the State Energy Plan acknowledges and establishes policy objectives concerning the development and use of distributed generation with the goal of becoming the national leader in its deployment. Throughout the Energy Plan, distributed generation is acknowledged as a major way to address system reliability concerns that, in tandem with demand management strategies, will ensure adequate and diverse supplies of energy.

Albany NanoTech

One priority that is just beginning to come into sharper focus is the need in certain industrial sectors for power of higher quality than is generally available from the utility grid. This is a challenge that creates an opportunity to generate enormous economic benefits to the State.

The Draft State Energy Plan describes price, security, and reliability as the principal issues involved in meeting the needs of electric customers. Power reliability, however, cannot be equated with power quality. Increasingly, manufacturers are using

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digital technologies that are prone to disruption caused by relatively minor voltage transients. The costs to a manufacturer of even a minor voltage problem can be huge.

We suggest that the State complement its utility programs with premium power incentives designed to lure high technology manufacturers into the State by reducing their cost of ensuring power quality. The Draft State Energy Plan refers to the possibility of establishing Power Quality Parks. They are an attractive method. Other means of providing premium power incentives should be explored.

The State should also bolster research and development efforts in the area of power quality.

Response: The ability to provide industry with reasonably priced high-quality power is a useful incentive for economic development. To that end, NYSERDA is working to forge partnerships between the public and private sectors to explore the development of Power Quality Parks and other options. These partnerships will provide the State with useful information that can be used to determine appropriate ways to attract high technology manufacturers to the State. Potential options may include increased spending for research and development with respect to power quality and premium power incentives to reduce costs associated with high quality power.

Specific Recommendations

Ashok K. Trikha

San Francisco permits the municipal Public Utilities Commission to issue as much as $100 million in bonds to finance solar and wind turbine facilities, thus producing 25 percent of the city government energy needs. Maybe New York State should do the same.

Response: The comment refers to the use of government assistance to promote solar and wind turbine facilities that produce energy for governmental needs. New York State is already promoting the development and use of renewable energy resources. The State Energy Plan contains numerous recommendations that encourage the development of a renewable energy market, and the Governor's Executive Order No. 111 requires State agencies to assume a leadership role in promoting the efficient use of energy. Pursuant to this Order, State agencies are directed to increase their purchase of energy generated from renewables such as wind and solar. In addition, the Executive Order directs NYSERDA, the New York Power Authority, the Office of General Services, and

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the Long Island Power Authority to offer assistance to local governments and school districts to achieve the goals set forth in the Executive Order.

The Business Council of New York State, Inc.

We acknowledge the need for the continuation of programs such as tax credits for alternative-fuel vehicles and distributed generation that help foster economic development.

Response: New York's alternative-fuel vehicle tax credit package provides incentives for the purchase of alternative-fuel and electric vehicles and for the installation of fueling and charging equipment by private fleets and consumers. The legislation that put these incentives in place will sunset in 2002. In recognition of the importance of these incentives to jump-start the alternative-fuel vehicle industry in New York State, plans to extend the tax credits are under discussion. With respect to distributed generation, the State Energy Plan acknowledges and establishes policy objectives concerning the development and use of distributed generation with the goal of becoming the national leader in its deployment.

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3. Deregulation

Wendy Harris

I think deregulation is a complete disaster. Overall I'd like to think that the State of New York might think more creatively about its energy policy and the future of the industry in the State of New York and come up with a greater vision for what the State might do in the future. I think it ought to be a state that eliminates nuclear entirely. That we don't have a solution for what to do with the waste is no reason to continue to create more.

The Manufacturers Associations of Central New York and the Greater Syracuse Chamber of Commerce

We encourage New York to continue to work toward new and efficient technologies but that should be done alongside a priority effort to get more power online. The members of the Manufacturers Associations of Central New York and the Greater Syracuse Chamber of Commerce are business people. We believe strongly in the marketplace. We believe that the market provides the best opportunities for our energy needs. New York State was right to deregulate its energy market. It is on the right path. New York must continue to assist in development of this market system, adding more capacity is the best way to accomplish that goal.

Honorable Paul D. Tonko, Chair, Assembly Energy Committee

The assumption that during this time of transition, market participants alone will provide optimal energy supplies and services renders the Energy Plan incomplete and ineffective to meet market challenges.

The State Energy Plan raises more questions than supplies answers. Furthermore, the overall thrust of the document, delegating to “the market” the decision making with respect to current and future energy policy, is an evasion of the administrative and political dynamics at stake with each new power plant, transmission line, gas pipeline, and transportation alternative.

Response: The Energy Planning Board and the 2002 Energy Plan strongly support the movement to competition in energy markets and the development of new technologies to assist in that movement. The spiraling costs and inefficiencies that resulted from regulation of energy markets have already started to move in the opposite direction, and new opportunities for consumers have begun to emerge. While the benefits of competition may not yet be obvious, thousands of stakeholders have already begun to

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see benefits. As will additional consumers as the markets mature and the infrastructure is developed.

In a competitive energy market, each supply and demand resource must compete with other supply and demand resources. If consumers choose to support one resource over another, they will have that right and the power to shape the resources available. Only those resources that prove to be cost effective and desired by consumers will survive. For example, renewable energy can become a significant contributor to the State's supply mix if consumers choose to purchase energy from such sources; similarly, other supply sources (such as nuclear and coal) and demand reduction measures, will be subject to the demands of consumers. In a free, competitive market, it is the consumers that decide which products and services survive and which ones don't. The State's role is to ensure that the market is open and fair and that the citizens are protected from conditions beyond their control. If consumers truly want safe, clean, reliable energy at steady and steadily declining prices, they will demand it through their purchases in a competitive market. The regulatory policies of the past clearly failed to meet these goals.

New York State Environmental Justice Alliance, Brooklyn

The Environmental Justice Alliance feels the Draft State Energy Plan is not actually doing planning because deregulation has occurred. Really deregulation has not worked in the energy sector.

Federated Conservationists of Westchester County, Inc., New York

I'm quoting from the 1998 energy plan, "In a properly functioning market, participants should be able to determine when and where generation or demand reduction measures are needed to meet customer needs." As the energy market has been developing, it is apparent that it is not enough to rely on market forces alone to maximize the public good. Energy does not appear to be the properly functioning market laid out in Economics 101. And even if it were, the social and environmental cost of such an energy market is proving to be unacceptable.

Response: While the State's commitment to competition in the electricity and natural gas markets remains strong, barriers remain to full competition. The State Energy Plan contains numerous recommendations that will help the State move toward full competition while protecting the interests of New Yorkers. While some fluctuations are expected in wholesale natural gas prices, they are not expected to exceed the levels reached in 2000. Retail electricity prices are expected to decline in real terms throughout the planning period (*i.e.*, through 2021).

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Robert A. Smith

I don't understand why the Draft State Energy Plan does not forcefully recommend forming several New York Power Authorities in the State and why the Federal Energy Regulatory Commission is not trying to form similar entities for both electricity and gas manufacture and distribution. We as a State and Nation have become reliant on electricity and gas and can no longer rely on the "invisible hand or complex laws and mores" to magically adjust not only the markets but to generate the technology for continued growth and environmental safety. It is about time to start building organizations whose sole purpose is to generate, distribute and explore future energy options in the most efficient and least costly manner, unencumbered by the need to make fast and large profits.

I would ask the Energy Planning Board and the Commissioners in the final draft to at least look at the idea of a federal reserve system for energy, of five regional power authorities to actually generate both electricity and gas and distribute it in New York State under uniform control.

Response: Effective competition in the natural gas and electricity markets, where practical, is the policy of the State of New York. The policies and recommendations in the State Energy Plan are based on this concept, and the State Energy Plans, since 1994, have embraced the idea that competition has the potential to reduce energy costs, increase customer choices and satisfaction, promote economic development, enhance system reliability, improve environmental quality, and promote technological growth. Introduction of regional power authorities would contravene the statewide and regional integration of competitive markets.

Tompkins County Environmental Management Council Energy Committee

The Plan should recognize that the competition promised in the 1998 Plan has not materialized for many New Yorkers.

Response: While the State's commitment to competition in the electricity and natural gas markets remains strong, barriers remain to full competition. The State Energy Plan contains numerous recommendations that will help the State move toward full competition while protecting the interests of New Yorkers. While some fluctuations are expected in wholesale natural gas prices, they are not expected to exceed the levels reached in 2000. Retail electricity prices are expected to decline in real terms throughout the planning period (*i.e.*, through 2021).

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New York State government plays an objective and active role in administering public benefits. The State studies the patterns, trends, and behaviors of energy customers lacking market influence, such as low-income households, and looks for cost effective opportunities to better serve their needs. Energy customers in New York with less market influence require government assistance largely because competitive market forces have not yet addressed their energy needs. Government interventions to assist in energy market development are necessary to align public and private interests. To this end, the State Energy Plan makes numerous recommendations to ensure fairness, equity, and consumer protections in an increasingly competitive market economy.

Consumers Union

With respect to "competition," what does the State mean by competition? What structures do we put in place to insure that it can thrive? How do we know when we have it? What measures can we use to assess how well competition is functioning? What measures do we have to monitor anticompetitive practices? Are they adequate? How are mergers and acquisitions in the industry consistent with more competition? What are the physical constraints to competition, such as the existing transmission constraints? Is the state's idea of competition consistent with that envisioned by Congress in the Energy Policy Act of 1992?

Response: These issues are discussed in the Section 2.1, Promoting Energy Industry Competition, of the State Energy Plan.

Green Party Broome County

The State, in the Energy Plan, by giving us energy deregulation, is abandoning the power – the key power is the power to set the rate structure – is abandoning the power to give us what we all want, which is safe, clean, reliable energy at steady and steadily declining prices.

Response: The Planning Board believes that competition is the best way to allocate scarce energy resources and control prices. Regulation of generation failed as a way to hold down prices during the 1970s, 1980s, and early 1990s, and continuation of the failed policies of the past would lead only to further price increases. If consumers consider fossil fuels to be undesirable from a price volatility perspective, they will now have a mechanism to choose non-fossil-based options, including long-term contracts for renewables.

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Consumers Union

What does deregulation mean in New York? Does it mean the State will entertain no regulations to control the exercise of market power? What does consumer protection mean in New York? The Draft State Energy Plan advances no plan for consumer protection. We believe the State must adopt a stringent regulatory framework for Consumer Protection including providing for just and reasonable pricing and describe this in the final Energy Plan.

The economic impacts of electricity restructuring have not been adequately analyzed in this State Energy Plan. Neither has the Plan examined various regulatory mechanisms to protect consumers.

What is a functioning market for electricity, according to the State and how do we get one? How many losers are acceptable in this functioning market? All markets have losers. How greedy can the winners be? How much wealth will the losers have to transfer in New York to the winners? What will the State do to prevent the fleecing of consumers?

Response: To protect consumers and ensure that an orderly market is maintained, the New York Independent System Operator has established a market monitoring unit that is charged with investigating alleged incidents relating to market abuse. In addition, the Federal Energy Regulatory Commission is in the process of establishing an oversight unit for similar purposes.

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4. Citizens Utility Board

New York Public Interest Research Group

In a deregulated environment with far less state oversight, New York needs to reinstate the Citizens Utility Board.

Hudson River Sloop Clearwater, Inc.

A Citizens Advisory Board is crucial. It is important that members of the public are represented, that oversight and accountability are provided, and feedback provided to the State from citizens.

New York City Environmental Justice Alliance

Consumers are entitled to just and fair pricing for electricity. They must be protected from price gouging and market manipulations. An active Citizens Utility Board . . . could provide this consumer protection. But the public needs to express their support for this board to the Governor and other elected officials, and has done so, to a large extent, through this [the State Energy Plan] process, and will continue to do so.

Jocelyn McGinnis

I want to make another plug for refunding and re-institution of the Citizens Utility Board.

New York Public Interest Research Group

The transfer of the sale of electricity for New York's utility market to a northeastern regional body dominated by electrical distributors and generators in a deregulated environment will require someone to look out for New York's interests. That's why New York needs to reinstate and fund the Citizens Utility Board.

Consumers Union

The State should support and fund the Citizens Utility Board.

New York State Sustainable Energy Coalition (NYS-SEC) *et al.*

In a deregulated environment, with far less State oversight, ratepayers need a mechanism that looks out for their interests and monitors the industry. New York needs to reinstate and fund the Citizens Utility Board.

Response: The Department of Public Service, The Department of Law, and The Consumer Protection Board are all charged with protecting the consumer's interests, and

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little evidence has been presented to support the reinstatement of the Citizens Utility Board. The Energy Planning Board welcomes and encourages citizens and businesses to form consumer advocacy groups and to advocate for their individual interests. The Planning Board does not support reinstating the Citizens Utility Board at this time.

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5. Environmental

Against NYS-only Environmental Regulations; In Favor of Regional, National, and International Regulation

A.E.S. Ltd.

The State is urged to be sensitive to negative consequences of unilateral New York environmental regulation. Rigorous State-specific air, water, and solid waste regulations could result in significant increased costs to generate electricity and reduce competitiveness with plants in surrounding states. Generation displaced to plants in surrounding states that are not subject to New York's rules could result in increased emissions from these out-of-state plants and offset or be greater than reduced emissions inside New York.

Response: The Department of Environmental Conservation, acting on behalf of New York State, considers the environmental need and economic consequences of all environmental regulations prior to promulgation. Although New York would prefer a regulatory "level playing field" with neighboring states and the rest of the nation, the Department takes steps to protect New York's environmental resources when warranted.

Independent Power Producers of New York, Inc. (IPPNY)

The Energy Plan should encourage regional cooperation in the development of environmental regulations. The states must move away from the patchwork approach to environmental regulations toward a multistate approach.

Response: New York State, as a member of the Northeast Ozone Transport Commission, the Northeast States for Coordinated Air Use Management, the Ozone Transport Assessment Group, the Environmental Council of States, and other organizations, has worked to foster regional and national approaches to environmental regulation. Many of the regulations now in place in New York were promulgated to meet commitments made with one or more of these organizations. New York has worked cooperatively with other states to reduce air and water pollution, improve solid waste management, and protect and preserve natural resources. In addition, as evidenced by the strategies contained in the State Energy Plan (see Section 1.3) the State first and foremost prefers a multistate, regional, or federal approach to greenhouse gas reductions.

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New York State Petroleum Council

With respect to the Greenhouse Gas Task Force Recommendations, if a State climate program is implemented, it should coordinate with proposed and ongoing industry and federal government programs. It should focus on technology development and voluntary actions and avoid hard, near-term emission reduction targets and timetables. These are costly and inefficient and could place the industry and other businesses in the State at a competitive disadvantage.

While it is critical to be able to accurately measure emissions, it is much more complicated and potentially costly than might be assumed.

Response: New York State recognizes the need to coordinate regionally and nationally to reduce emissions of greenhouse gases and address global climate change. Creating an accurate inventory of such emissions is an essential step in developing strategies to reduce them.

Environmental Energy Alliance of New York

The Energy Plan should encourage action for control of greenhouse gases only when a national program is proposed.

Response: As discussed above, New York State recognizes the need to coordinate regionally and nationally to reduce emissions of greenhouse gases and address global climate change. As scientific evidence is amassed regarding the impact of greenhouse gas emissions and the need to reduce them, the State reserves the right to address the issue in the absence of an appropriate national response. As a result, recommendations in the State Energy Plan include strategies to address greenhouse gases.

Innovative Energy Solutions (IES)

IES's main concern is that any policies in New York affect our relative competitive position to neighboring states. New York, if it takes a very aggressive environmental policy relative to a more lax policy at the federal level, could put our State at a cost disadvantage, a further cost disadvantage that will hurt our competitive position and make it more difficult to attract new businesses and jobs to the State.

Response: New York is committed to both protecting the State's natural resources and fostering economic development and growth. In addition, as evidenced by the strategies contained in the State Energy Plan (see Section 1.3), the State first and foremost prefers a multistate, regional, or federal approach to greenhouse gas reductions.

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The Business Council of New York State, Inc.

The Business Council strongly opposes the recommendation that the State adopt State-level greenhouse gas emission targets for 2010, 2020, and 2050 and opposes the establishment of sector-specific reduction goals. These are international issues and the United States' participation is being negotiated and addressed at the national level.

We favor a national approach to "four-pollutant" emission policies rather than a State initiative.

Response: New York State recognizes the need to coordinate regionally and nationally to reduce emissions of greenhouse gases and address global climate change. As scientific evidence is amassed regarding the impact of greenhouse gas emissions and the need to reduce them, the State reserves the right to address the issue in the absence of an appropriate national response. Along with the current efforts to reduce emissions of sulfur dioxide and nitrogen oxides, New York supports efforts to reduce emissions of mercury and carbon dioxide. New York supports a "four-pollutant" approach provided it does not weaken or delay previous commitments to reduce currently regulated pollutants.

In Favor of Statewide Cap-and-Trade Program; Emissions Targets; Four-Pollutant Approach; PM 2.5 Studies

Marcia Slatkin

The State Energy Plan should set a cap on global warming emissions from power plants, reduce pollution, and increase the focus on renewable energy. Older power plants should be cleaned up.

Justin Green

I urge NYSERDA and the other agencies developing the State Energy Plan to set a cap for global warming emissions from power plants, reduce pollution, and increase investments in renewable energy, energy efficient technologies, and clean up of older, more polluting power plants.

David Leidig

I urge NYSERDA and the other agencies developing the State Energy Plan to set a cap for global warming emissions from power plants, reduce pollution, and increase investments in renewable energy, energy efficient technologies, and clean up of older, more polluting power plants.

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Lisa Catapano *et al.*

An Energy Plan should be developed that sets a cap on global warming emissions from power plants, reduces pollution from other sources, and increases investment in renewable energy. The plan should support energy-efficient technologies, and older power plants should be cleaned up.

Response: New York State currently has the strictest air pollution control standards for power plants in the nation and will continue to develop new strategies to reduce emissions from these sources. The State Energy Plan makes recommendations to promote the use of renewable sources of energy and reduce emissions of greenhouse gases. In addition to the New York State Energy Research and Development Authority has implemented a number of programs to develop renewable technologies.

In Section 1.3, Energy Policy Objectives and Recommendations, of the State Energy Plan, the Energy Planning Board makes numerous recommendations to support the Governor's Greenhouse Gas (GHG) Task Force, develop an annual GHG emission inventory and sequestration registry, promote energy-efficient technologies and sustainable transportation services, emphasizing GHG emission reduction potential, using CO_2 as a criterion, in developing new programs for the State's public benefits programs, and significantly increasing the use of indigenous renewable resources.

Mary Griffin

The "cap and trade" program needs to be expressed in different terms which better explains the process.

Response: National and State "cap-and-trade" programs require all covered facilities to "cap" their emissions at a prescribed level, which becomes more stringent over time. Facilities have the option of limiting their emissions to the capped level or continuing to emit above the capped level and purchasing allowances to cover the excess emissions from facilities that have reduced their emissions to levels below their own caps. In this manner, total emissions are reduced in a cost-effective manner. Cap-and-trade programs are discussed in more detail in the State Energy Plan. See Section 2.3.

Natural Resources Defense Council (NRDC)

Probably the most important issue in terms of the Greenhouse Gas Task Force is the issue of having a cap-and-trade program for carbon dioxide emissions. New York cannot rely on just voluntary approaches. We have to send a clear signal to the marketplace that there is a cost associated with climate changes and that cost needs to be

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internalized. We should be working toward figuring out how to achieve and put in place a carbon cap in New York and send a very clear message to other states and to the country.

Response: New York State recognizes the need to coordinate regionally and nationally to reduce emissions of greenhouse gases and address global climate change. The State Energy Plan includes strategies to reduce greenhouse gas emissions. See Section 1.3, Energy Policy Objectives and Recommendations, and Section 2.3, Energy and the Environment.

New York Public Interest Research Group

In the Energy Plan, emissions from power plants are dealt with in two ways: through the Governor's Acid Deposition Reduction Program and through the Greenhouse Gas Task Force. The Energy Plan also states that the State should look at committing to targets for carbon dioxide emissions, although targets are not given. On the acid rain initiative, the 75 percent reduction in nitrogen oxides is great. On the sulfur dioxide, the 50 percent reduction is a great step in the right direction. We need to go deeper, 25 percent deeper to be specific. With a 75 to 80 percent reduction in sulfur dioxide emissions we will see biological recovery of New York's water bodies in the next 50 years. NYPIRG believes that in addressing nitrogen and sulfur, a comprehensive four-pollutant approach is needed, including carbon dioxide and mercury. For carbon dioxide, the Energy Plan should propose seven percent below 1990 levels. Now it proposes to reach seven percent below 1990 levels by 2012, NYPIRG thinks it should reach that level by 2009. Mercury isn't mentioned in the Energy Plan. New York needs to implement an emission standard which would require 90 percent emissions reductions from working power plants. NYPIRG proposes a stepped approach in five year increments, first nitrogen and sulfur, then mercury, then carbon dioxide.

New York Public Interest Research Group

The State Energy Plan needs regulations requiring reduction in sulfur dioxide, a 50 percent reduction is a step in the right direction. But data from New York's waterways show that a 75 to 80 percent reduction in sulfur dioxide emissions is needed for recovery in the next 50 years. So, New York should set the standard at 75 percent or stricter as part of a pollutant cleanup strategy. Also part of the methodology would be 25 percent additional reduction of sulfur dioxide, and New York should cap power plant emissions of carbon dioxide at seven percent below early 1990 standards.

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Rhonda Belluso

The State Energy Plan calls for a 50 percent reduction in sulphur dioxide emissions from power plants, we should call for a 75 percent reduction.

Environmental Advocates of New York

Along with four other environmental groups on the task force, Environmental Advocates urges the establishment of a statewide goal for greenhouse gas emissions reductions at ten percent below 1990 levels by the year 2012.

The electric sector has more cost effective opportunities than others for greenhouse gas emissions reductions. Accordingly, we urge the establishment of an enforceable cap on power plant greenhouse gas emissions at 30 percent below 1990 levels by the year 2017.

To this end, the rule making [Draft State Energy Plan] should establish a statewide cap-and-trade program for CO_2 emissions from power plants.

New York City Environmental Justice Alliance

- New York should set a stricter standard, 75 percent or more for sulfur dioxide emissions.
- This standard should be part of a four-pollutant cleanup strategy.
- The levels of fine particulates, 2.5 microns or smaller, are already well above federal standards and suggestions by U.S. EPA.
- New York should cap power plant emissions of carbon dioxide at seven percent below 1990 standards.

Great Lakes United

New York State should set mandatory emission caps for all fossil fuel power stations to control nitrogen oxide, sulfur dioxide, carbon dioxide, and mercury. We call for closure of non-compliance stations by 2007. New York State should commit to specific greenhouse gas targets utilizing the four-pollutant approach.

Sierra Club Long Island Group, Environmental Advocates of New York

The Draft State Energy Plan should include a recommendation to phase in the clean up of four major pollutants: sulfur dioxide should be reduced another 75 percent; nitrogen oxides by 50 percent; mercury reduced by 90 percent; and a cap on CO_2 to 30 percent below 1990 levels.

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Sierra Club, NYC Group

The Draft State Energy Plan should be revised to include clean up steps as follows: [1] reduce SO_2 by an additional 75 percent from current law, [2] NOx by 50 percent, [3] mercury by 90 percent, and [4] cap CO_2 emissions. In order to reduce the State's impact on Global Warming, the Draft State Energy Plan should include a goal of reducing CO_2 emissions from the electricity-producing sector by at least 30 percent below 1990 levels.

New York State Sustainable Energy Coalition (NYS-SEC) *et al.*

The Draft State Energy Plan proposes a 50 percent reduction in sulfur dioxide emissions from power plants. New York should set the standard of 75 percent or stricter as a part of a four-pollutant clean-up strategy. The levels of PM 2.5 in New York City and other areas around the State are already well above federal standards.

The Energy Plan proposes carbon dioxide emissions limits with no specific numbers of goals. New York should cap power plant emissions of carbon dioxide at seven percent below 1990 standards as part of a four-pollutant cleanup strategy.

Stop the Barge

The Draft State Energy Plan proposes a 50 percent reduction in sulfur dioxide emissions from power plants. New York should set the standard at 75 percent or stricter. In addition to the acidification of New York's waterways, sulfur dioxide from power plant emissions leads to secondary formation of fine particulates (PM 2.5). The levels of PM 2.5 in New York City and other areas around the State are already well above federal standards.

Please set the sulfur dioxide standard at 75 percent or higher. The Draft State Energy Plan must protect our future as citizens and the health of the earth, not just the welfare of corporations.

Environmental Advocates of New York

The State Energy Plan should examine ways to reduce emissions from pollutants. For instance, there is the four-pollutant approach that has been talked about in the State. Those numbers should be modeled in this plan. Governor Pataki has indicated a four-pollutant approach to clean up power plants at the national level, but it would be of value to know what the effect for New York State would be.

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The U.S. Environmental Protection Agency (U.S. EPA) has indicated they will be regulating mercury from plants by 2007. That should be analyzed in New York to see what the effects will be and to model the emissions reductions as well as any reliability or price problems that might result.

Natural Resources Defense Council (NRDC)

It's very important, as the State moves forward, to develop innovative emission strategy for reducing pollutants, looking at all four pollutants including particulates.

UPROSE

The Draft State Energy Plan must also implement emission standards of PM 2.5 on all power plants.

Donna Lupardo

According to the U.S. Environmental Protection Agency (U.S. EPA) and the web site run by Environmental Advocates, in Broome County we have one of the dirtiest power plants in the country – A.E.S. Westover. It benefitted from the Clean Air Act loophole that let New York's twenty-one dirtiest power plants continue to pollute. I'm urging that the Energy Plan add something about cleaning up these old polluting power plants. The Energy Plan could recommend critical phase-ins of some clean-ups of these plants using a four-pollutant approach to reduce sulfur dioxide, nitrogen oxide, mercury, and carbon dioxide.

Lisa Catapano *et al.*

A energy plan should be drafted which reduces the harmful impacts of electricity production.

Response: New York State currently has the strictest emission limits in the nation for NOx and SO_2 from power plants and will continue to develop new strategies to reduce emissions from these sources. New York supports efforts to reduce emissions of mercury and carbon dioxide and supports a four-pollutant approach provided it does not weaken or delay commitments to reduce currently regulated pollutants. As data about the impact of the recently implemented emission cuts on the State's water and forest resources become available, New York will evaluate the need for additional reductions. In the interim, the State strongly supports the revision of federal emission standards to the same levels currently required in New York. The State Energy Plan includes strategies to reduce greenhouse gas emissions.

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As the U.S. Environmental Protection Agency revises its National Ambient Air Quality Standards for fine particulates (PM2.5), New York will develop and submit federally enforceable State Implementation Plans to bring those areas of the State designated as non-attainment into compliance.

Ethanol and MBTE

New York State Petroleum Council

Methyl Tertiary Butyl Ether (MBTE) . The current initiatives of several states, including New York, to ban the use of MTBE in the near future, while maintaining the federal oxygenate mandate, may have serious implications for this State and may influence the forecasts for petroleum use both near and long term.

The federal oxygenate mandate. In its 1999 report, a U.S. Environmental Protection Agency (U.S. EPA) Blue Ribbon Panel called for a repeal of the oxygen mandate for federal reformulated gasoline. The American Petroleum Institute (API), of which New York State Petroleum Council (Petroleum Council) is a division, supported that recommendation. Subsequently a number of states, including New York, enacted legislation to ban the use of the oxygenate MTBE. A recent report prepared by the California Energy Commission expressed significant negative impacts from banning MTBE. The Petroleum Council believes some of the presumptions, forecasts, and assessments in New York's Draft State Energy Plan also may be significantly affected by the ban.

Boutique Fuels. The two percent reformulated gasoline federal oxygenate mandate has been a primary cause of the proliferation of boutique fuels, customized local gasolines. Boutique fuels make it more difficult for the petroleum industry to supply consumers, especially in tight supply situations, which can also lead to higher consumer prices. With little or no excess capacity, refiners do not have the flexibility to supply discrete markets, particularly in times of tight supplies or supply disruptions.

As a solution to the problem of boutique fuels, our industry recommends the repeal of the federal two percent oxygenate mandate and that regional fuel programs be developed.

In summary, in addition to emissions inventory impacts, the net air qualify effect of removing the two percent oxygen mandate for reformulated gasoline and imposing a renewable fuels mandate should be carefully evaluated. To proceed otherwise may create

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an unstable petroleum market with increased vulnerabilities to supply disruptions and price spikes.

Response: New York State has enacted legislation which will phase out gasoline containing MTBE in 2004. The 1990 amendments to the federal Clean Air Act include requirements that areas in non-compliance with federal ozone standards use fuels containing 2 percent oxygen. Action by the federal government will be needed to waive or repeal this requirement. The State Energy Plan supports relief from the oxygenate requirements. See Section 2.3, Energy and the Environment.

New York Corn Growers Association

In section two on page 47 of the Draft State Energy Plan the first paragraph states, "the use of ethanol, however, raises new concerns such as the potential for higher VOC emissions."

New York Corn Growers points out that there is no volatility problem with ethanol in New York. Ethanol does not have a one pound per square inch volatility tolerance in reformulated gasoline. All reformulated gasoline must meet the performance standards in the law including volatility control.

New York can also use the State Implementation Plan process to eliminate the volatility tolerances in conventional gasoline if they demonstrate that it is necessary for air quality. Beyond that, there is no volatility problem with ethanol.

Response: Use of ethanol as a gasoline additive has been demonstrated to raise the volatility of fuel. Gasoline containing ethanol may therefore require additional formulation changes in order to meet Reid Vapor Pressure specifications. Because of ethanol's tendency to absorb water and other characteristics, it has traditionally been difficult to blend with gasoline at the refinery.

New York Corn Growers Association

In the same paragraph [page 47 of the draft State Energy Plan, first paragraph], the State Energy Plan states that, "ethanol would most likely have to be trucked separately from the production sites and be splash-blended at gasoline distribution centers." New York Corn Growers points out that ethanol is not splash-blended but match-blended at the fuel terminal.

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Ethanol can be transported by truck, rail, or barge, depending on that particular facility. Most major terminals have rail siding for shipping gasoline-blending components that are not refinery blended.

Response: Because there is currently little ethanol production capacity in the Northeast, it is likely that ethanol would have to be shipped to regional distribution hubs, thus adding cost to gasoline. The term "splash-blended" has been removed from the State Energy Plan and replaced with the word "blended."

New York Corn Growers Association

On page 47 of the draft State Energy Plan, "it is unlikely that the national ethanol production capacity exists to replace MTBE any time soon."

New York Corn Growers points out that the total amount of MTBE used is approximately four billion gallons nationally. On an oxygen basis, only about two point four billion gallons of ethanol would be needed to replace MTBE. Current production capacity for ethanol exceeds two point two billion gallons and is growing. In a recent study, the California Energy Commission stated that ethanol capacity will exceed four billion gallons by 2004. There have been studies by the U.S. Department of Agriculture that indicate sufficient ethanol capacity to replace MTBE under a reasonable timetable.

Response: In 2001, the National Renewable Fuels Association stated that national annual ethanol production is 1.7 billion gallons, with the capacity for 2.3 billion gallons. Although the California Energy Commission does predict that ethanol capacity will soon reach 4 billion gallons, this capacity would be insufficient to meet national demands if California, New York and other large states all use ethanol to meet oxygenated fuel requirements. For this reason, California recently postponed its ban on MTBE for one year. Although ethanol capacity may increase to needed levels at some point, it is doubtful whether adequate capacity will be available to fully replace MTBE on a national basis in the short term.

New York Corn Growers Association

On page 47, section two, the State Energy Plan states, "ethanol may be difficult to remove from ground water as is MTBE." To equate ethanol with MTBE or similar chemicals is erroneous. Ethanol has been in the environment and consumed by humans for thousands of years. Ethanol is rapidly biodegradable in surface water, ground water, and in soil. A recent study conducted by the Governor's Ethanol Coalition concluded that ethanol poses no threat to surface water and ground water. Furthermore, ethanol is the

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most harmless and biodegradable component of gasoline. When gasoline contaminates soil or water, ethanol is the first component to quickly, safely, and naturally degrade.

A study commissioned by the MTBE industry suggests that in the event of a gasoline spill or leak ethanol will break down and benzene would continue to persist in the environment. This ignores the fact that ethanol-blended fuels contain less benzene than gasoline and the real threat posed to the environment is from the presence of benzene in gasoline.

Response: The presence of ethanol and petroleum compounds in a mixed plume in groundwater can greatly complicate the overall remediation, *i.e.*, when a gasoline and ethanol mixture is released. One reason for this complication is the effect of co-solvency. The ethanol causes the petroleum compounds to migrate quickly, creating a more rapidly moving commingled plume. With MTBE and petroleum compounds, the plumes tend to separate and, by itself, MTBE moves more quickly.

Although MTBE is readily soluble in water, it can be removed from groundwater using activated carbon filtration. Similar technology would be employed to remove commingled ethanol from groundwater. The comment is correct in that soil microbes biodegrade ethanol before other constituents of gasoline. Benzene was used as an example, but the phenomenon occurs with other constituents of gasoline, as well. Ethanol, at extremely low concentrations, has been shown to have harmful impacts on the health of pregnant women.

New York Corn Growers Association

On page 47, the Energy Plan states, “that MTBE increases the octane rating of fuels and additives used to replace that octane, lost with the elimination of MTBE, could potentially increase the toxicity of fuels.”

Octane components do increase toxic emissions and the potency of those emissions. An analysis submitted to U.S. EPA on the California waiver request demonstrated that blending ethanol and gasoline will produce a cleaner fuel than using no ethanol.

Response: MTBE was originally added to gasoline as an octane enhancer. Removing MTBE from gasoline may require the addition of other additives to replace lost octane, and some of these additives can result in negative environmental and public health impacts.

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Marshah-Reaff Barrett

Why has the MTBE ban taken so long? Why wait until 2004? Will it be a hard ban or will it have exceptions?

Response: MTBE makes up a significant portion of fuel in areas (such as New York City) that are required to use reformulated gasoline. If the federal government maintains the oxygenate requirement, the only viable short term replacement will be ethanol. Time will be needed to develop the production and distribution infrastructure needed to supply the necessary levels of ethanol. Aside from the oxygenate issue, MTBE makes up approximately ten percent of the fuel supply in greater New York, and a replacement for this volume of fuel will be needed once MTBE is phased out.

General Comments on Emissions Reductions

Riverkeeper, Inc.

The State Energy Plan should recommend that any State initiative to combat global warming and air pollution exclude nuclear power.

Response: A major trend in electric generation in New York and throughout the Northeast is away from reliance on oil and toward increased use of natural gas. While natural gas is the fuel of choice because of its relatively clean air emission profile, increased reliance on natural gas will result in diminished diversity among fuels used for electric generation. Reduced fuel diversity increases the State's risk of exposure to fuel supply disruptions and price swings. Continued safe operation of the State's nuclear power plants, as recommended in the State Energy Plan, is an important element in ensuring the State's fuel diversity.

Cancer Action

There is a transition process that New York State DEC has developed whereby a facility, such as a coal-burning or wood-burning facility, can change to another fuel. You should be very cautious in allowing any of these dirty fuel transitions, in particular the particulate and the persistent organochloride increasing fuel transitions.

Response: The Department of Environmental Conservation requires stack emissions testing prior to authorizing a facility to use alternative fuels to ensure that emissions are below permitted levels. Levels vary depending on the type of facility.

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Cancer Action

It is incorrect in the State Energy Plan to cast the monitoring that occurs in New York State as somehow very careful and very complete and providing a clear picture of the quality of the air supply in St. Lawrence County. St. Lawrence County does not have any air quality monitoring network that functions, and the need exists because of its location directly across the St. Lawrence River from a very heavily industrialized zone of Ontario.

Enforcement should be an important part of the Energy Plan. Several facilities in the St. Lawrence area exceed their Clean Air Act regulated levels of emissions. New York State DEC does not conduct enforcement in a very stringent or uniform manner.

The Energy Plan should link fuel cost and electricity cost to the environmental record of the facility.

Response: New York State has an extensive air quality monitoring network. In northern New York State, monitoring or pollutants is conducted according to federal requirements for ambient air quality compliance monitoring for pollutants. Equipment is not sited in every county, but the network is sufficient to measure air quality throughout the state. The State makes every effort to conduct appropriate, uniform enforcement initiatives.

The Joint Supporters

Our public policy should encourage market participants to move toward cleaner technology by providing incentives for market players to replace old, dirty units with new, clean-burning units. We suggest that the Draft State Energy Plan consider a funding and incentive strategy for deployment of new, clean-burning units, *i.e.,* a swap out of all older generators smaller than ten megawatts in the Lower Manhattan zone and within twenty miles of Ground Zero.

We also recommend a tiered approach to environmental rules that acknowledges several levels of emissions. At one end of the spectrum would be ultra-clean renewable technologies, fuel cells, and CHP sources. The other end of the spectrum would be most heavily regulated and would consist of the old diesel standby units and gasoline powered emergency home generator units that produce the most emissions. Between these two extremes, we should recognize and appropriately regulate technologies that have proven to be far superior to the older emergency units but that fall short of the “ultra-clean” label. Natural gas fired turbines, natural gas fired internal combustion units, and bi-fuel

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units, for example, should not be subject to the same restrictions as a gasoline fired home unit.

Response: The relative inefficiencies and cost of operating older dirtier power plants will provide an economic incentive to operate them less frequently, or replace them altogether. The Department of Environmental Conservation is currently developing a strategy to regulate distributed generation and combined heat and power in a manner which recognizes efficiency and environmental benefits of such technologies.

Old Lindenmere Civic Association

Some of the things that should be part of the State Energy Plan, Nassau County is located between Suffolk and the [New York] City, and we don't have regulations about carbon dioxide. Basically, the CO_2 regulations in Suffolk and the City are just a framework. They are not stringent. If the State would take the initiative it would help a lot.

In short, we think the State has to do a little bit more to monitor what is going on. We were successful in objecting to the power plant; we would like to see it cleaned up. It seems as if the State should be involved in all these things.

Response: The State does not currently directly regulate emissions of carbon dioxide, although an initiative is under way to create an accurate inventory of CO_2 sources. Reductions in CO_2 and other greenhouse gases will result from implementation of recommendations contained in the State Energy Plan and recommendations of the Governor's Greenhouse Gas Task Force. The State has an extensive program in place to monitor and regulate emissions from power plants.

North Fork Environmental Council

The section of the Plan that talks about environmental impacts really doesn't address environmental impacts. It just basically says, if you're building a gas-fired power plant, there aren't environmental impacts because you're building a gas plant and gas is one of the cleaner power plant technologies.

That is true, but that doesn't mean that there's not environmental impact.

The first sentence [of that section] says increased competition in the energy market would not have an undue adverse impact on the environment as compared with traditional industry regulation, because environmental oversight continues and mitigation

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is implemented. What that means is that merchant plants are coming in an uncoordinated manner, often trying to circumvent the Article X process by using smaller turbines, which this plan actually encourages, and those do have an impact. There are a lot of new plants, and they have a big impact.

New York Public Interest Research Group

New York should not move forward with the building of new facilities until there's an adequate plan in place, especially with the proposed building of ten new turbine generators here on Long Island. These generators completely circumvent the Article X process by siting two plants on some sites that are designated for 80 megawatts. This problem is going to continue unless there is a plan that specifies specific actions that Long Island Power Authority has to adhere to, and currently they do not have to adhere to the Energy Plan.

Response: All facilities that locate in New York are subject to federal and State requirements to mitigate environmental impacts. New York has the most stringent air pollution control requirements on power plants in the nation. Proposed facilities of less than 80 megawatts generating capacity are not subject to the requirements of Article X, but they must nevertheless still receive appropriate air and water permits. The sentence referred to in the Energy Plan that concludes " . . . increased competition in the energy market would not have undue adverse impact on the environment as compared with traditional industry regulation . . . " is based on extensive modeling work performed during the State's initial stages of restructuring. The finding is believed to be still valid today.

All State agencies, authorities, commissions, and boards must act in reasonable consistency with the State Energy Plan. Article 6 of the Energy Law requires that "Any energy-related action or decision of a State agency, board, commission or authority shall be reasonably consistent with the forecasts and the policies and long-range energy planning objectives and strategies contained in the plan, . . . " If a State entity acts in a way that is contrary to the plan, it must demonstrate that the "relevant provisions of the plan are no longer reasonable or probable. . . ."

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Greenhouse Gas; Acid Deposition Reduction Program; Emissions Registry

Center for Clean Air Policy

The first step in limiting our contribution to global warming is to know how much and how energy is being used in the State. To do this requires a mandatory accounting system that requires reporting of all sales of energy to consumers and release of process greenhouse gas (GHG) emissions. Many of the necessary elements are already in place but to create a comprehensive record of energy use and its climate change impacts requires additional mandatory data reporting such as home heating oil, natural gas, and gasoline sales.

Response: New York State recognizes the need to create an accurate inventory of greenhouse gas emissions as a critical step to developing strategies to reduce them. See recommendations in the State Energy Plan, Section 1.3, Energy Policy Objectives and Recommendations, and Section 2.3, Energy and the Environment.

Center for Clean Air Policy

The next step is to establish a statewide target for reducing greenhouse gas (GHG) emissions. New York should set its own targets for both near-term and long-term reductions in State-generated GHGs.

Response: The State Energy Plan includes goals to reduce emissions of greenhouse gases, and strategies to achieve these reductions.

Center for Clean Air Policy

New York's current acid rain initiative should be expanded to include a cap on CO_2 emissions from the electric power sector. By the State's own estimates, additional reductions in NOx and SO_2 will benefit the forests and water bodies and also reduce CO_2 emissions. To ensure that these emissions benefits are not eroded by growth in electricity demand, the State should institutionalize these benefits through a declining cap on CO_2 .

Response: The State Energy Planning Board concurs that a “cap-and-trade” program provides an efficient and cost effective means for meeting air quality goals. Such programs are of limited effectiveness if they are not offered on a regional basis, especially with regard to greenhouse gas emissions. The Board also believes that the recommendations for greenhouse gas emissions reductions in the Energy Plan address the concerns raised regarding expanding the Acid Deposition Reduction Program.

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Center for Clean Air Policy

With deregulation of the electricity industry, the State no longer has the same level of control over how much or where generation is likely to be built. But the emissions from these plants are still under control and, as the State recognized in its recent Acid Rain Initiative, can be most cost-effectively managed through a sector- or economy-wide cap and a market for trading emissions allowances. Long-range, multiple-pollutant caps provide substantial long-term cost savings compared to a pollutant-by-pollutant regulatory system.

Response: Strong economic incentives to reduce emissions of greenhouse gases already exist. Because the designs of older power plants are generally more inefficient than modern power plants, they offer the potential for emissions reductions of greenhouse gases and other pollutants. As new, more efficient power plants are sited, older facilities will not be dispatched as frequently and a significant reduction in emissions of greenhouse gases should result. The State has implemented a cap-and-trade program for other regulated pollutants.

Environmental Defense

The State's energy policy as set forth in the Draft State Energy Plan should be to pursue regulatory and economic incentive actions that will result in a significant reduction in emissions of both greenhouse gas (GHG) and regulatory pollutants over the next five to ten years.

In the electric utility sector, the State can and should consider adoption of a cap-and-trade program, with incentives for steadily increasing efficiency in electrical generation and renewables.

Environmental Advocates of New York

Older plants should be the target for reductions in greenhouse gas emissions. Governor Pataki's acid rain reduction program would yield as much as ten percent reduction in greenhouse gas. The target for power plants, specifically, we believe, should be a 30 percent reduction. The transportation and other aspects of the State's energy system could make up the remainder of the target.

Annie Wilson Miquet

The U.S. government has backed out of the Kyoto agreement. As a State, we could voluntarily implement the Kyoto agreement, thus reducing the greenhouse gases to the 1990 levels.

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Response: The Energy Plan includes goals and strategies for reducing emissions of greenhouse gases. See Section 1.3, Energy Policy Objectives and Recommendations, and Section 2.3, Energy and the Environment.

Diane A. Davis

Newer and more stringent environmental regulations associated with fossil fuel burning are costly to write and enforce. The costs deter and discourage corporations from siting their headquarters and manufacturing plants in New York State. This translates into a loss of jobs as well as corporation tax and sales tax on goods and services produced in New York State.

Response: New York is committed to both protecting the State's natural resources and fostering economic development and growth as evidenced by recommendations contained in the State Energy Plan. Although such regulations can add costs and increase the price of power, limiting the damaging effects of power plant emissions can also promote economic growth in sectors such as the tourism industry.

Jo Ann Arcarese

The State Energy Plan should set a cap for global warming emissions for power plants, reduce pollution from other sources, and increase investments in renewable energy.

The State Energy Plan should:

- Meet or exceed the emission reductions in the Kyoto Protocol throughout the State
- Reduce particulates, CO_2, SO_2, nitrogen oxides, and mercury from power plants
- Promote regulatory incentives that encourage utilities to work with customers to increase efficient energy use
- Reduce CO_2 emissions from vehicles and public transportation.

Peter Zadis

The plan must reduce emission particles from inefficient, older power plants, and must promote regulatory incentives. The State Energy Plan must address carbon dioxide emissions from cars and trucks.

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The University at Binghamton

We encourage a major effort to coordinate DEC air permitting with United States Environmental Protection Agency (U.S. EPA) air permitting and to simplify the language of DEC documents.

Alexander Ewing *et al.*

The State Energy Plan needs to be more specific in actions necessary to reduce greenhouse gases, build renewable energy markets, reduce pollution emissions from power generating facilities, and increase the inventory of clean vehicles in the State.

Response: The State Energy Plan includes greenhouse gas emission reduction goals and strategies for achieving them. NYSERDA has implemented several incentive programs to encourage the development and use of renewable fuels. New York already has some of the most stringent requirements in the nation for power plant controls on NOx and SOx. The State supports a "four-pollutant approach" to emissions reductions provided it does not weaken or delay previous commitments made by other states to reduce currently regulated pollutants. The State supports increased efficiency in automobiles, but such standards are regulated under the federal Corporate Automobile Fuel Efficiency (CAFE) program. The State Energy Plan includes descriptions of several programs that have reduced emissions from public transit fleets.

Tom Salo

State Energy Plan should include a statewide carbon dioxide target set at ten percent below 1990 levels and include a plan to meet the target. A carbon dioxide cap should be set for power plants at 30 percent over 1990 levels (15 year target).

Response: The State Energy Plan includes greenhouse gas emission reduction goals and strategies for achieving those goals.

The University at Binghamton

We encourage a major effort to coordinate DEC air permitting with United States Environmental Protection Agency (U.S. EPA) air permitting and to simplify the language of DEC documents.

Response: Although implemented by New York, the Title V permitting program for major stationary sources of air pollution is a federal program. All Title V permits prepared by the State must be reviewed by U.S. EPA prior to issuance. As a result, the State program is completely coordinated with the federal program. New York also does

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have other permitting programs for smaller sources of air pollution not covered by federal permitting requirements.

Alexander Ewing *et al.*

Supports the purchase of green power and establishment of a target in reducing greenhouse gas emissions.

Joel Tyner

Supports the provisions of the State Energy Plan that move New York towards the purchase of green power and the establishment of a target for reducing greenhouse gas emissions. The plan needs to be more specific in actions needed to reduce greenhouse gases, build renewable energy markets, reduce pollution emissions from power generating facilities and increase the inventory of clean (alternative) vehicles in the State.

Environment Advocates of New York

We hope that the State Energy Plan includes some specific greenhouse gas emission targets. We think that New York should have the goal of a ten percent reduction in greenhouse gas emissions from 1990 levels by 2012.

Response: The State Energy Plan includes specific greenhouse gas emission reduction goals and strategies for achieving those goals.

Niagara Mohawk Power Corporation

We suggest that to identify realistic greenhouse gas (GHG) reduction targets, an inventory of existing emissions is necessary. This data base would include all GHG resources, not just sources from the electric generation sector of the economy. Transportation, energy efficiency in buildings, waste management, forestry management, and other fossil fuel uses contribute to GHG emissions or the sequestration of carbon.

The collection of this data should be as non-intrusive as possible, maximizing use of existing data wherever possible. Targets should be realistic and compatible with national and regional goals and follow a time frame so that New York State industry is not at a competitive disadvantage during new command and control regulatory requirements.

Response: New York State recognizes that the need to create an accurate inventory of greenhouse gas emissions is critical to developing strategies to reduce them as evidenced in the State Energy Plan's recommendations. Reporting requirements used

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to create such an inventory should be as non-intrusive as possible, and should include all sectors that contribute greenhouse gas emissions. New York State also recognizes the need to coordinate regionally and nationally to reduce emissions of greenhouse gases and address global climate change.

Environmental Energy Alliance of New York

There is no mention in the State Energy Plan that the trading system proposed in the Acid Deposition Reduction Program (ADRP) will be restricted only to New York State sources. The assumptions used for the ADRP analyses should be described in the Energy Plan's modeling analysis.

Response: The ADRP initiative allows New York State sources to use allowances obtained from other states to meet all federal requirements. The program imposes additional requirements that go beyond the federal program and allow sources to trade with other New York facilities to meet those requirements.

Cooling System Upgrades; Fish Kills

Riverkeeper, Inc.

Five existing power plants on the Hudson River use antiquated 1950s era once-through cooling technology. These five use approximately five billion gallons of Hudson River water per day. In the process they slaughter millions of adult and juvenile fish, eggs, and larva. The response by New York State to this tragedy, and, specifically, the response in the 2002 State Energy Plan is wholly inadequate.

In addition, the Draft State Energy Plan misstates the law. Existing plants are required by federal law to use the best available technology to minimize adverse environmental impact. From reading the plan, one get the impression this applies only to new plants. This is not the case.

Most galling of all in the State Energy Plan is the claim that since 1998 significant gains in reducing environmental impacts have been achieved by the State. With regard to the State's most important river, nothing can be further from the truth. Permit renewals are now ten years overdue. There has been no change in the technology of these plants or the operating conditions.

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Retrofitting cooling towers, which is the most significant way to drastically reduce the impacts of these plants, are mentioned in the Draft State Energy Plan simply as an afterthought.

The Draft State Energy Plan, instead, in the environmental impact section, with regard to aquatic impacts, caps DEC's work in cost savings and plant efficiency. It seems obvious that, at least at the highest levels of government, these are the State's primary goals, at the expense of our precious and irreplaceable natural resources.

The Draft State Energy Plan fails to devote adequate attention to the enormous fish kills at existing power plants. Less than one and one-half pages of text are devoted to the aquatic impacts of steam driven electricity power generation. Water quality impacts – particularly the massive fish kills caused by cooling water intakes – should have been addressed much more comprehensively in the Energy Plan.

The Draft State Energy Plan fails to acknowledge the complete failure to mitigate fish kills at existing power plants. The response to this environmental tragedy by New York State and the Draft State Energy Plan is wholly inadequate.

Sierra Club, NYC Group

Modernization of the cooling systems should be mandated in the plan to reduce the heated water impacts on the environment.

Sierra Club Long Island Group, Environmental Advocates of New York

Furthermore, the outdated plants use millions of gallons of river water every day. We therefore include a recommendation to modernize cooling systems and minimize water use.

Response: The State Energy Plan includes a discussion of measures to mitigate impacts on fish in power plant water cooling structures. (See Section 2.3, Energy and the Environment.) New York is a leader in this regard and will continue to require all power plants to take measures to the greatest extent practical to reduce fish mortality through impoundment and impingement. The Energy Plan provides broad statewide energy policy guidance and does not single out specific local resource issues that are more appropriately dealt with directly by the State agencies and departments that have authority and jurisdiction over them.

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Environmental Miscellaneous

Natural Resources Defense Council (NRDC)

The State needs to provide greater leadership on these issues at the federal level so we can solve these problems nationally. It's extremely important that the federal government not roll back the new source review provisions.

Response: The State works closely with the federal government in addressing these issues and has communicated its support for new source review to the appropriate officials.

Honorable Paul Feiner, Supervisor, Town of Greenburg

New York should provide incentives to localities that commit to making our communities greener (*i.e.*, give localities additional funding for the acquisition of open space).

Response: York State has numerous programs to protect and enhance open space. These include land acquisition programs, the New York State Clean Water/Clean Air Bond Act, and the Environmental Protection Fund. The State also works with local governments to identify important parcels and help secure them through titles and easements.

Rhonda Belluso

The acidification of water sources needs to be addressed in the State Energy Plan.

Response: The acidification of water bodies in New York State is addressed in the State Energy Plan in Section 2.3, Energy and the Environment.

Key Span, New York

Key Span thinks raising the SEQRA limit to one hundred megawatts would be a realistic approach. We don't see any compelling reason not to raise the SEQRA limit from eighty megawatts to a hundred megawatts.

Response: The existing threshold of 80 megawatts for Article X review of proposed electric generating facilities has been characterized as being both too low and too high. As a matter of State law, the Energy Planning Board supports the 80 megawatts threshold. Action of the State Legislature would be required to raise it. It should be noted that lower limits for SEQRA vary and are set by localities.

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Sierra Club, NYC Group

With respect to the dams, New York State and New England have many old dams that are not being used, that are blocking the return of fish like the salmon and the trout. You are urged to focus on dam removal, all unnecessary dams as quickly as you possibly can because we are losing species that are also threatened by fish farming and escapees. These dams are blocking their natural regeneration cycle. Provide payment to the landowner for the removal. An awful lot of people will say, be my guest, I don't want it.

Response: The Department of Environmental Conservation has an extensive Dam Safety program and requires owners to safely maintain dams or remove them. Removal of dams may also result in environmental impacts, as contaminated sediments trapped behind dams can become resuspended once the structure is removed. In some cases, dams do create an obstacle to migration of fish species. In some cases, fish ladders or other technologies can mitigate these impacts.

Steve Davis

Light pollution should be addressed, and NYSERDA should take the lead by writing a light pollution law.

Response: Light pollution mitigation measures have been considered by the State Legislature. Turning off unnecessary lighting can have several benefits including lower energy costs and lower impacts on surrounding communities. In many cases, the desire to eliminate or reduce lighting must be balanced by safety and security issues.

James Little

I come from a family of sportsmen and we're concerned about contaminations such as PCBs and mercury in the environment. Thirty percent of the lakes in the Adirondacks have no life because of acid rain from dirty power plants. Additional legislation should be introduced to hold homeowners and business alike to conserve energy, to meet a certain level of energy efficiency. The government's role should be enforcement and fines for nonconformance and assistance in the form of grants, loans, and programs. Businesses and homes need to be insulated better, alternative energy invested in government buildings, and more money allocated toward research by universities for energy solutions.

Response: New York State is taking active measures to reduce the impacts of PCBs, acidic deposition, and other forms of contamination. The State also has numerous programs designed to promote energy conservation and efficiency, as well as

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development of new technologies to meet these goals. These are referred to in several sections of the Energy Plan.

The current State building codes do in fact require new and substantially renovated buildings, including homes, to meet or exceed certain levels of energy efficiency. The Code is currently under review, and revisions are expected to be adopted in summer 2002. These revisions will significantly raise the requirements in terms of energy performance of new and substantially renovated buildings.

With the advent of the utility-funded System Benefits Charge (SBC) program in 1998, many new government energy efficiency programs were begun. For more details, see Section 3 of the State Energy Plan.

Great Lakes United

The Draft State Energy Plan should specifically commit to no drilling or transport of oil or gas underneath the Great Lakes or on sensitive public lands.

Response: New York State has several programs to ensure that any activities designed to recover or transport mineral resources are done so in a way that minimizes impacts on the environment. Drillers must be certified and, in many cases, post bonds to ensure that the environment is not harmed during drilling or extraction operations. Similarly, pipelines must undergo extensive review and permitting before they can be sited or built. It is premature at this time to undertake any commitments with respect to this issue.

Consumers Union

The State should ensure the protection of New York's environment. The State should complete a proper Environmental Impact Statement. We find the Environmental Impact Statement to be grossly inadequate because:

- It failed to analyze the economic impacts of increased prices for electricity post-restructuring, including job and monetary losses.
- It failed to analyze the environmental impacts of allowing solely market decisions on power plant siting and construction.
- It failed to analyze the environmental impacts of the growth in greenhouse gas emissions predicted by the planned increase in electric generation.

Response: The Environmental Impact Statement was prepared in conjunction with the State Energy Plan and meets the requirements of the State Environmental Quality Review Act. That being said, the economic impacts of increased prices for electricity are

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included in the State Energy Plan, Section 2.2, Energy and Economic Development, and analyses of the environmental impacts of both market decisions and greenhouse gas emissions are included in the Electricity Assessment, Section 3.4 of the Energy Plan.

Tompkins County Environmental Management Council Energy Committee

On page 2-40 of the draft State Energy Plan, the discussion of diesel particulate filters is misleading. It is not until the next section that it is mentioned that these filters only work with low-sulfur diesel, which is generally unavailable.

Response: The discussion on diesel particulate filters have been revised to clearly indicate that the technology requires ultra-low sulfur fuels. The federal government has issued regulations requiring all diesel fuels to meet this standard in 2006, and the New York Metropolitan Transportation Authority has secured such fuel for its entire fleet of some 4,000 buses.

Wedlyne Guerrier

Regarding "Energy and the Environment," page 2-37 of the draft State Energy Plan, the Clean Air Act started to monitor ambient air pollutants in 1990. This is the year 2002. The State Energy Plan should explain why New York State does not have a completed National Ambient Air Quality Standards report.

Regarding "Energy and the Environment," pages 2-41 through 2-43, the State Energy Plan should explain the logic behind separating emissions limits into sections. This does not make sense. Emission levels should remain the same throughout the year, starting in July 2002, rather than waiting for full implementation until January 2008.

Response: The federal government initiated requirements to establish monitoring networks for certain air pollutants in the 1970 federal CleanAir Act. This measure also included requirements that areas that failed to comply with National Ambient Air Quality Standards develop and implement plans to come into compliance. This legislation has been revised several times since its original enactment, including the most recent revisions in1990. The New York State Department of Environmental Conservation provides extensive air quality data on its website at www.dec.state.ny.us. Annual Air Quality reports are also available at this site after the data has undergone quality assurance.

The seasonal variations on air pollution control requirements in New York and across the nation stem from the fact that ground level ozone, a pollutant of most concern

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in New York, is primarily a summertime problem. Emission reduction strategies designed to reduce summertime problems are oriented towards seasonal controls. Other pollutants that are more annual in nature, such as carbon monoxide or acid rain, require year-round control strategies.

Tire Burning

Green Party Erie County

Regarding tire burning, no environmental impact statement has been done on tire burning. We need to address tire burning as an issue by itself. We need hearings on it to determine is this a good thing or not.

The University at Binghamton

Tires should be considered renewable energy and included in the State Energy Plan.

Response: The Energy Planning Board does not consider tires to be a renewable energy resource. Substantial national data exists on the emissions from the recovery of energy from tires. Much of the data is from co-firing scrap-tire-derived fuel with coal and shows lower emissions than from firing coal alone. Given New York State's problem of unabated scrap tire piles, the generation of about twenty million scrap tire equivalents annually in our State, the inherent negative value of a scrap tire, and the benefit of reducing reliance on foreign oil, the recovery of energy from scrap tires represents one of the more economically sustainable markets for scrap tires.

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6. Environmental Justice and Low Income Programs

Environmental Justice

New York City Environmental Justice Alliance

Construction of power plants, use of diesel on-site generation, and operation of grandfathered power plants should not have a disproportionate impact on New York's low-income and minority populations. The draft plan did not speak to equity and environmental justice. (See Response on page 6-2.)

New York State Sustainable Energy Coalition (NYS-SEC) *et al.*

Environmental clustering (racism and economic slavery in the guise of progress) of polluting power plants in low income and communities of color is not considered in this so-called plan. It is the obligation of government to protect the weakest parts of society from the abuse of giant businesses. (See Response on page 6-2.)

Sierra Club, NYC Group

The Draft State Energy Plan should include an analysis of the impact of siting and distribution of energy power plants upon low-income and minority communities. These communities receive negative environmental impacts out of proportion to their size. In addition, energy delivery has been more frequently negatively impacted in these than other communities. Power plants and fuel use should not have any greater negative impacts on such communities than on the population as a whole. (See Response on page 6-2.)

Stop the Barge

Well meaning emissaries from the Department of Environmental Conservation come to educate us about the Environmental Justice and yet I don't think they realize that there is no real Environmental Justice program at DEC. The draft plan completely disregards environmental justice issues. (See Response on page 6-2.)

Better Queens Environment (BQE)

The Draft State Energy Plan does not attempt to reverse the environmental injustices that were discussed before in siting the power plants in poor and minority areas. BQE supports a moratorium on all the proposed plants until the issue of why they are all located in poor neighborhoods. (See Response on page 6-2.)

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Environmental Advocates of New York

We think the Draft State Energy Plan should better indicate and analyze how the State's energy policies would ensure justice in the distribution of both energy services and the effects of pollution resulting from the energy sector. (See Response on page 6-2.)

UPROSE

It is UPROSE's position that the State Energy Plan must address environment justice. There is no mention of Environmental Justice in the draft. Last summer, NYPA placed power plants all over the city, and low-income communities are disproportionately environmentally burdened. The Draft State Energy Plan seems to support further environmental racism.

No mention of Environmental Justice in the Draft State Energy Plan only suggests that the lives of communities of color in New York are valued less than the lives in other communities. (See Response on page 6-2.)

New York State Environmental Justice Alliance

Environmental equity and justice in the energy sector was more or less swept under the rug. The advocacy group put together by the Department of Environmental Conservation recently released their concepts. There's been no guarantee by the Department of Environmental Conservation that they would include that in the Draft State Energy Plan. (See Response on page 6-2.)

New York State Sustainable Energy Coalition (NYS-SEC) *et al.*

Using brownfields for siting power plants may have serious environmental justice implications that must be addressed. (See Response on page 6-2.)

Communities United for Responsible Energy (CURE)

The draft State Energy Plan completely disregards environmental justice issues. It inappropriately assumes that environmental justice may be eliminated from the draft plan because the Department of Environmental Conservation has an office of environmental justice. This illogical excuse is a blatant attempt to dodge a potentially controversial topic.

Response: In October 1999, in response to concerns raised by interested parties, the New York State Department of Environmental Conservation (DEC) announced a new program to address Environmental Justice concerns in the community. DEC named an Environmental Justice Coordinator to oversee the Office of Environmental Justice and

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develop DEC's Environmental Justice Program. A New York State Environmental Justice Advisory Group was formed. In January 2002, the Advisory Group submitted a report – *Recommendations for the New York State Department of Environmental Conservation Environmental Justice Program* – to the DEC Commissioner containing recommendations for creating an effective Environmental Justice program. The report: focuses on the environmental permit process and is intended to ensure DEC's programs are open and responsive to environmental justice concerns. DEC is reviewing the report and public comments received on the report. DEC is currently drafting a Commissioner's policy on environmental justice and DEC permitting. This issue is discussed in Section 2.3, Energy and the Environment, of the State Energy Plan.

Coordinate Low-Income Programs

New York State Community Action Association (NYSCAA) *et al.*

The State should consider the effectiveness, efficiency, and coordination of its low-income energy assistance programs, including the **New York Energy $mart**[SM] program, the Weatherization Assistance Program (WAP), the Low-Income Home Energy Assistance Program (LIHEAP), and other State programs that offer incentives, assistance, and information services to improve the efficiency of energy use and reduce the energy burden of low-income households. The State should consider consolidating programs where opportunities exist to improve administrative efficiency and customer service.

The NYSCAA supports the following: the Work Group appointed by the Governor should address the integration of these programs including representation from the NYSCAA and the New York State Weatherization Directors' Association. NYSCAA supports consolidation of WAP programs with system benefit charge low-income programs into one agency at the State level (at NYSERDA). However, this should be determined through a feasibility study to be completed by the Governor's work group and the network to determine their recommendation. (See Response on page 6-5.)

New York State Weatherization Directors Association (NYSWDA)

The Finding in the draft Energy Plan that opportunities to further coordination among State agencies that have roles in prospering and providing low income energy assistance and other public benefits programs are beneficial to program participants and should be fostered is a gross understatement. A work group should be established consisting of representatives from the Division of Housing and Community Renewal (DHCR), NYSERDA, the Office of Temporary and Disability Assistance (OTDA), the New York City based Association for Energy Affordability, and NYSWDA. The

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Governor's Office should provide oversight. This body would have the express task of facilitating the coordination of cost effective energy efficiency initiatives to low income residents. (See Response on page 6-5.)

New York State Weatherization Program

We realize that the portions that relate to low income are a small part of New York State's Energy Plan. We need a lot of voices in this Energy Plan for the population that has a hard time with their energy bills. And we're excited that New York State government has decided to allocate a portion of the system benefits charge funds for low income energy conservation. Our concerns are very strong that we don't want to see two weatherization programs set up in New York. We strongly support the statement on page 1-37 of the draft Energy Plan that the State should consider consolidating programs where opportunities exist to improve administrative efficiency and customer service. (See Response on page 6-5.)

Cattaraugus Community Action, Inc.

Under current conditions, several New York State entities, NYSERDA, the Office of Temporary and Disability Assistance (OTDA), and the Division of Housing and Community Renewal (DHCR), will be administering distinct but related low-income residential energy efficiency programs. Given the faltering economy, New York State can ill afford to support duplicate administrative systems. A carefully coordinated statewide approach would result in uniform policies. To function most effectively, this collaboration would move all low-income residential energy conservation programs to one agency (ideally NYSERDA, with its focus on advanced energy technologies) to be delivered by the local Weatherization subgrantee network. I offer my full endorsement of the recommendation in the Draft State Energy Plan, “The State should consider consolidating programs where opportunities exist to improve administrative efficiency and customer service.” (See Response on page 6-5.)

NHS of South Buffalo, Inc. (NHS)

NHS has several recommendations for fundamental changes in how weatherization works in New York State. These include:

- NYSERDA must become an active stakeholder in the weatherization program
- NYSERDA should lead all technical aspects of the weatherization program statewide including energy audit, development, training and professional certification
- The existing network of local weatherization providers of New York State should be fully used by NYSERDA. NYSERDA, DHCR, and others

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should collaborate to put program regulations in place that will streamline the process

- The Governor should put into place a strong body with administrative oversight that includes NYSERDA, OTDA, DHCR, the weatherization network, and others. This body would approve any and all funding uses for programmatic or policy changes. (See Response on page 6-5.)

Northfield Community, L.D.C.

The coordinated effort between the Weatherization Program and NYSERDA has shown immense success in the downstate region. The continued success of New York State's energy programs depends largely on State decisions on how these programs will be implemented. Decisions such as what State entity administers the program, which lend resource support and training, and how these entities and programs interact with each other must be clearly defined.

Response: The Energy Planning Board recognizes that the State needs to consider the effectiveness, efficiency, and coordination of programs targeting the low-income sector. Better coordination will yield higher levels of administrative efficiency, ease program delivery at the local level, and increase delivery of benefits to the low-income residents of New York State.

The ongoing dialogue occurring through the Low-Income Forum on Energy (LIFE), which has as active members State agencies, utilities, and advocates administering and delivering low-income energy efficiency and assistance programs, has served, and will continue to serve, as an open forum for discussions of issues facing the low-income sector, including program coordination and delivery.

In order to effectively administer the Weatherization Assistance Program and the **New York Energy $mart**[SM] low-income programs, NYSERDA and the New York State Department of Housing and Community Renewal are currently involved in high-level discussions pertaining to increased coordination and local delivery of each agency's programs.

Under the leadership of the Governor's Office, a Working Group on Low-Income Energy Affordability is expected to be convened over the next several months to discuss issues of program administration and delivery. The Working Group is expected to include representatives from all concerned State agencies and other representatives of the low-income sector.

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Consolidate Low-Income Programs, Use Subgrantee Network

Lewis County Opportunities, Incorporated

Unless a consolidation under a single administration agency is established between the New York system-benefits-charge-funded low-income program administered by NYSERDA and the federally funded weatherization program administered by the New York State Division of Housing and Community Renewal, the operation of these programs over the next five years could easily result in duplication, fragmentation, and competition at the local program delivery level.

It is time to consider consolidation within one State agency. The federal program and the State-funded system benefits charge program should be consolidated in a single State agency committed to the purposes of these two programs and carried out by the local weatherization service provider network. (See Response on page 6-9.)

Association for Energy Affordability

We wish to address the strategy recommendation at page 137 of the draft State Energy Plan, section 5(d), "The State should consider consolidating programs where opportunities exist to improve administrative efficiency and customer service."

Some issues to consider with respect to improved program consolidation and coordination: Several different agencies with different responsibilities for different programs are potentially in this mix. Many administrative reforms that have solved old problems have created more new problems that were not foreseen. In order to determine the best approach in the circumstance, we recommend an open collaborative process with involvement of interested parties similar to the one that has been developed and used effectively by the Department of Public Service in its Provider of Last Resort (POLR) proceeding. Local service providers have the best connection with low income families and communities and can offer incredibly grounded insights into program design.

A key coordination goal should be to clear away the roadblocks to most effective local program integration and to involve the folks at the front lines at the local level, on the ground, who actually have to implement the programs, in working through the details of what the next step should be. (See Response on page 6-9.)

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Northern Manhattan Improvement Corporation (NMIC)

The future success of New York State's low-income energy programs will depend on how the State decides the programs should be implemented. By this we mean, from which State entities and how these entities interact with one another. Whatever decision is made, there should be an open process that involves public debate and input. All of those who can participate in this open process should be given the chance to voice their opinion. This process should not be rushed or influenced by politics. The coordination or integration of programs happens locally. (See Response on page 6-9.)

Bronx Shepherds Restoration Corporation

With its collective experience and commitment, the weatherization subgrantee network of agencies serving the counties of New York State have the best and most logical service delivery mechanism for low-income and SBC programs.

In order to capitalize on the existing network, the program and policy management of these two programs should be integrated and the service carried out primarily by the local weatherization delivery network.

The need for low-income energy efficiency program consolidations is clear, and the timing is right. (See Response on page 6-9.)

Bedford-Stuyvesant Restoration Corporation (BSRC-WAP)

BSRC-WAP is the nation's first community development corporation established in 1967. It has been part of the State Weatherization Program for the past twenty-two years and has subgrantees providing weatherization services to low-income eligible clients.

At the last Policy Advisory Council (PAC) meeting, it was stated that NYSERDA and the Department of Housing and Community Renewal were in the process of coordinating their low-income weatherization initiatives, and two subgrantees representing agencies of the weatherization providers, namely the Association for Energy Affordability and New York State Community Action Association/New York State Weatherization Directors Association, will be the integrated part of the negotiation whereby the subgrantee interest will be included in the overall process. This is good news for our agency because the end result could show better coordination of the program at the State level and better services for low-income residents.

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Taking into consideration their collective experience and commitment, the Weatherization Subgrantees of agencies serving New York are the most logical service delivery mechanism. (See Response on page 6-9.)

Sunset Park Redevelopment Committee

Our organization would like to see some coordinated efforts in place between NYSERDA and the weatherization program. We would like for the weatherization network to really play a part in providing the services for our clientele. We're not advocating one department over another department. We're advocating that the decision makers remember the low-income clientele we serve and the benefits we provide these clientele. We believe that the weatherization agencies do have the personnel, do have the expertise, and have the local contacts at the neighborhood level to actually bring about really good changes in living conditions, educating people about energy. One of the things we also do is point out the health and safety measures that we find in the house. (See Response on page 6-9.)

Comlinks

Comlinks concurs with the assessments made in the position paper supported by the Association for Energy Affordability and New York State Community Action Association/New York State Weatherization Directors Association for the need of a united and uniform approach in dealing with energy conservation needs of low-income households in New York State. We encourage the Public Service Commission, when decisions are considered, to include the Weatherization network in the process and as a vehicle for service. With the U.S. Department of Energy moving under its "Weatherization Plus" initiative to introduce new technologies and methodologies into the Weatherization Assistance Program and looking to the states for leadership and allowing increased flexibility at the State level in developing this broader program that the time is right to take up DOE's challenge. With NYSERDA's technical capabilities and its research and development capacity, New York could use the increased flexibility allowed under "Weatherization Plus" to integrate the use of advanced technologies into the delivery of energy efficiency for low-income residents. (See Response on page 6-9.)

Joint Council for Economic Opportunity, Inc

New York State already has a program that offers energy services to the low-income population. The subgrantees that make up New York's Weatherization Assistance Program have been serving the needs of the low-income population for more than twenty-five years and have served the population very well. The decision that system benefits charge funds be administered by NYSERDA creates certain reservations for

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Weatherization Assistance Programs. We encourage the Energy Planning Board to develop a system that utilizes existing field expertise and service delivery mechanisms.

Response: The State Energy Plan recognizes the existing community-level expertise in providing energy-related information, services, and public benefits to low-income populations. Section 2.5, Preserving Energy Related Public Benefits Programs, discusses the Low-Income Forum on Energy (LIFE). LIFE enables the State's community-based organizations, businesses, government, and associated stakeholders to openly discuss low-income energy affordability issues. LIFE serves as a medium for exchanging information on best practices in program delivery and identifying problems and solutions to providing services to the low-income sector. The State Energy Plan also recognizes that there may have been a lack of coordination in the past among service providers of low-income energy services and recommends improved coordination. See Section 1.3.

Coordinate, Explain Consolidation Process

Northern Manhattan Improvement Corporation (NMIC)

Regarding the Energy Plan's coordination of low-income energy assistance programs and the consolidation of these programs, the NMIC believes that coordination is essential and is taking place downstate. True coordination should happen at the local level. The State Energy Plan should explain how program implementation will be affected by the consolidation process.

Response: The specifics of the consolidation process are beyond the scope of the current State Energy Plan.

Approving Comments (No responses were necessary for this section.)

Community Environmental Center (CEC)

CEC would like to recognize the good work performed under the Weatherization Assistance Program by Department of Housing and Community Renewal for the low-income population. CEC is also very excited to be part of the terrific work being done by NYSERDA for the low-income residents of the State.

CEC commends all efforts in working together for better coordination between weatherization and NYSERDA programs. It is CEC's belief that this coordination should be viewed as a transition towards consolidating all energy programs under one umbrella

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agency. Streamlining will be beneficial to everyone in the long run. Weatherization is a perpetually changing and developing field.

CDR Management Corporation, a subdivision of the Asset Management Division of Bedford Stuyvesant Restoration Corporation

Supports weatherization programs.

Low-Income Energy Costs

Consumers Union

The State should protect residential and low income consumers by requiring that blocks of residential consumption be sold by energy providers that include basic charges and a minimal level of kilowatt hours.

Response: Most, if not all, recently approved utility multiyear rate agreements provide for special delivery service rate discounts for qualifying low-income residential customers.

Jennifer Bostaph

New York State should definitely keep low income energy assistance programs. Using Energy Smart appliances will help households lower energy costs.

Response: Under its **New York Energy $mart℠** program, NYSERDA has expanded upon existing low-income programs that cover households with less than 60 percent of the State median income by offering its low-income energy affordability programs to households with less than 80 percent of the State median income.

In addition, numerous NYSERDA programs provide incentives for energy-efficient appliances and lighting and new homes. The Keep Cool program, which ran statewide last summer, offered $75 each for consumers to surrender old room air conditioners and replace them with new ENERGY STAR® models. Approximately 40,000 old, inefficient air conditioners were turned in as a result of this program.

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7. Planning and Forecasting

Regional Planning

New York City Environmental Justice Alliance

Regional planning is also essential in this State. Many energy issues, particularly electricity, are region specific. There needs to be load-pocket plans that specifically forecast how much energy will be needed in the short term and long term, . . . so that we're, in fact, looking at each load pocket to make sure there is enough energy being generated in that load pocket so they can take care of themselves.

Honorable Paul D. Tonko, Chair, Assembly Energy Committee

The State Energy Plan examines conditions and draws conclusions on a statewide basis, thus failing to provide in-depth market analyses of the energy needs of upstate and downstate. The failure to address energy requirements on a regional basis renders the Energy Plan an ineffective tool to develop solutions for individualized markets.

Response: The State Energy Plan is a statewide planning document but an assessment of the New York City and Long Island areas has been included because of the significant need for additional resources in those areas. The scenarios examined provide information about trends and needs in the various load areas throughout the State.

Sierra Club, NYC Group

The various regions of the State have differing needs, different resource problems, different pollution problems, different energy resources (wind, sun availability). Regional plans should be created that address these differences. Regional plans should also ensure that environmentally sensitive and significant areas are not included in any proposed future projects.

Response: The adequacy of generation and transmission for each locality and region needs to be regularly reviewed and consideration given to regional needs and resources. Market-based solutions will continue to form the basis for meeting energy needs within the limits set by environmental requirements. The State Energy Plan includes an assessment of the electricity system in the New York City and Long Island areas.

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Environmental Accounting and Externalities

Brett Maxwell

Most economic models are somewhat inadequate because they do not fully account for the complexity of the reality they try to reflect and, therefore, their projections are sometimes incomplete. One of the great shortcomings of energy planning is the omission of the huge military costs involved in defending our supply of oil, the omissions of costs associated with pollution and global warming, health care costs resulting from air pollution, for example rapidly increasing asthma rates, and the opportunity costs of burning oil for fuel. Section 3-6, page 3-159, states that petroleum accounts for 40 percent of New York's total energy demand. Such costs are not accounted for in that number. Significant long term savings can be achieved by replacing the demand with renewable energy sources.

Hudson River Sloop Clearwater

When trying to calculate the true cost of electricity, we would suggest that the study conducted by APT Associates forms a good basis for determining the huge social and economic cost of the current level of fossil fuel use.

We believe that internalizing these [health] costs would greatly enhance the cost benefit analysis, especially when comparing the benefits of energy efficiency or zero emissions technology versus new fossil fuel powered plants.

Green Party

The draft State Energy Plan inappropriately confuses cost with price throughout the Plan. The prices commonly attributed to coal and gas, for example, fail to reflect and incorporate the price of pollution and other travel related inefficiencies that are externalized by the state's accountants. Serious efforts must be made to account for the cost of these fuels, not simply their immediate out-of-pocket prices.

Among the fora, where these efforts need to be made is the report described on page 3-61 that NYSERDA is preparing to assess the so-called cost per kilowatt hour of renewables with conventional energy for the next three-five, ten, and twenty years. The Green Party urges the authors of this report to not confuse price with cost and to adopt an accurate accounting system that reflects the differences where they occur.

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Ann Link

Regarding page 2-24 New York's Energy Prices Compared to U.S. Averages. These prices are inaccurate because they don't reflect the full cost of energy by including health and pollution costs for petroleum, coal, and nuclear energy.

Response: The State of New York does not use environmental accounting in its analyses of the costs of fuels and energy resources because these costs are very uncertain and often difficult to agree upon. At this time, no accepted standard exists for environmental accounting procedures.

Miscellaneous Suggestions

David Stout

Providing renewable energy sources and efficiency systems for the largest sectors that use primary energy in New York State should be a key goal. A pie chart showing current percentage use of primary energy use by sector should be included in the State Energy Plan.

Response: A pie chart showing current percentages of primary energy use by sector is featured in the NYSERDA publication *New York State Patterns and Trends 2000*, Figure 1-2 "New York State Primary Consumption of Energy by Fuel Type and Sector, 2000", page 4. The State Energy Plan presents this and related information in Section 1.

Consumers Union

The State should work with New York City to conduct comprehensive planning around the electricity needs of New York City.

We believe that within the context of the 2002 Draft State Energy Plan there is a need to disaggregate areas geographically and study the particular problems in New York City and the measures needed to prevent the exercise of market power. The 1998 Energy Plan acknowledged that load pockets would be particularly vulnerable to the exercise of market power in the electric restructuring. Unfortunately this analysis was not matched by appropriate action in New York City. In addition, it is apparent that New York City has not received an equitable distribution of very limited SBC funds for demand reduction measures. Only 27 percent have been used in Con Edison territory despite serving over 40 percent of the residential population of the State. New York City residential consumers have been doubly impacted by electric market restructuring with

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high retail rates and with numerous power plants proposed and sited within this congested city. Most egregious is the failure to undertake comprehensive and thoughtful planning that considers all these factors and finds equitable and viable solutions.

Response: The solution to load pocket problems in the New York City area requires a combination of new generation, transmission reinforcements, demand response efforts, and appropriate market mitigation measures. New York State will continue to work with all the market participants to study and resolve these important issues. An assessment of the New York City and Long Island electricity systems is included in the State Energy Plan.

Ann Link

We are concerned that the Draft State Energy Plan's preoccupation with increased use of natural gas for large-scale generation is preempting appropriate attention from natural gas fired distributed generation and combined heat and power systems (CHP) in favor of other clean distributed generation technologies. In fact, one of the best measures available to extend the natural gas supply is to shift generation into CHP with its efficiencies in the 70-80 percent range. We anticipate that increased use of competitive natural gas pipelines and natural gas distribution infrastructures should make natural gas available for distributed generation and CHP engine and turbine technologies that meet emission requirements. Therefore, these technologies should not be disadvantaged in forecasts and in the identification and removal of disincentives to deployment.

Response: NYSERDA is very involved with and optimistic about the potential contributions of distributed generation and combined heat and power technologies (CHP). In fact, distributed generation is a consequential ingredient in the electricity deregulation model. Increasing distributed generation contributes to a free electricity market because it offers direct competition with energy services companies.

See Section 3.4, Electricity Assessment, of the State Energy Plan for a discussion of distributed generation. The New York State Public Service Commission has extended and expanded the system benefits charge in 2001, providing nearly $57 million over the next five years to improve the viability of distributed generation and CHP as economic energy options in New York State.

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The Joint Supporters

To assess resource potential more fully, we think the combined heat and power analysis NYSERDA has already performed, or had performed by Nexus, will be fully reflected in the State Energy Plan's analysis and resource assessments.

Response: The Energy Nexus Study is not complete. A draft report is undergoing major revisions in response to feedback from the Project Advisory Board. However, selected information from the partially revised report was used in the regional electricity load and price modeling in the State Energy Plan. See Section 3.4, Electricity Assessment.

Doug Goodman

I'm here as an individual on behalf of the propane industry. When I reviewed the State Energy Plan, I noticed the lack of involvement of the propane industry in the plan. It did not appear that there was anybody from the LPG industry that was involved in the focus group or interest group.

I would like to have the opportunity to have propane revisited as part of the Draft State Energy Plan.

Response: The State Energy Plan Petroleum Assessment includes a section addressing propane prices, supplies, and infrastructure.

Better Queens Environment (BQE)

The demand forecasts in the State Energy Plan assess only oil, gas, and coal, omitting renewables such as solar, wind, biomass, and fuel cells. Demand for renewables needs to be accounted for. BQE suggests that renewables data be provided in all demand forecasts.

Citizens Campaign for the Environment

The State Energy Plan does not provide a well-documented forecast for alternative fuel sources (only fossil fuel is covered). The State Energy Plan should provide estimates on all remaining fuel supplies similar to those provided for coal.

New York Chapter Association of Energy Engineers

Retirement and replacement of electric generation plants [by renewable resource generation] and associated impacts are not addressed in the State Energy Plan in any detail.

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Response: The demand forecasts in the State Energy Plan are stipulated by Energy Law. The statute does not require supply forecasts for renewable energy. Nevertheless, the Renewable Energy Assessment, Section 3.3, does assess current and future supplies.

New York State Environmental Justice Alliance

The Draft State Energy Plan fails to give an analysis of jobs per megawatt per year generated by fuel source. In studies we've seen, renewable generation generates far more jobs than other types of power generation.

Response: The importance of renewable generation to both the environment and the State economy is recognized and articulated in the Energy Plan. The State is striving to create a viable renewable market on both the demand and supply sides, as evidenced by the objectives and recommendations in the State Energy Plan.

Diane A. Davis

The Draft State Energy Plan should explain why New York spends more for electricity cost components than the national average when we buy the same crude and refined products as other states?

Response: This issue is addressed in Section 2.2, Energy and Economic Development, of the State Energy Plan. See, also, the year 2000 Department of Public Service publication, *Financial Statistics of the Major Investor-Owned Utilities in New York State*. A graph on page 29 of that document entitled "Average Cost per Ultimate Customer kilowatt hours" offers an updated breakdown of electricity costs in New York and the United States in general.

Oil Heat Institute of Long Island

The institute takes no position on the issue of whether or not these proposed power plants should be built or even whether their potential electric supply is needed. We take a firm stand on the issue of power plant fuel supply, particularly as it affects the supply of heating oil. Our industry position can be summed up in one sentence. In order to be licensed, these proposed new power plants should have a firm noninterruptible gas supply or they shouldn't be built. Failing that, seven to ten days on-site storage should be absolutely mandatory.

In our opinion, the Draft State Energy Plan must reflect the need to maintain reliability of supply and service in all areas of energy usage, oil, gas, and electric, without

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distinction and without undue preference. Anything less is little more than wishful thinking.

Response: The Planning Board recognizes the concerns raised by the Oil Heat Institute. As discussed in Section 2.1 of the State Energy Plan, Promoting Energy Industry Competition, an in-depth study is underway to assess the interrelationships between electricity, natural gas, and oil. While the results of that study may lead to actions by the Energy Planning Board in the future, the State Energy Plan requests the New York Independent System Operator to consider the certainty and availability of primary and back-up fuel supplies in valuing capacity from electric generators or to consider the certainty and availability of primary and backup fuels in establishing local reliability rules. See section 2.4, Energy Policy Objectives and Recommendations.

Hudson River Sloop Clearwater, Inc.

We question the use of "energy intensity" as a valid measure of energy efficiency. Energy intensity is a ratio measured as British thermal units per dollar of Gross State Product. The carrying capacity of the natural world does not recognize arbitrary economic ratios. We assume New York State's increase in total carbon output is proportional. The State Energy Plan must address cumulative impacts because this is what the environment is receiving. We request that the Energy Planning Board do a better job of looking at long-term tallies and cumulative impacts when examining environment issues.

Response: Energy Intensity is a valuable indicator of economic activity and resource requirements. While it may not be a sufficient ratio to describe the cumulative effects of energy consumption on the environment, it is a valuable index to use in setting goals.

Mirant New York, Inc.

It is fine for the State to hope for the best, but it is essential that it plan for the worst. The Draft State Energy Plan fails in this regard. Many of the recommendations and projection contained in the Draft State Energy Plan appear to be predicated on combinations of optimistic scenarios. While the projections have high and low case bandwidths, these are themselves built on layers of highly variable assumptions. What the Draft State Energy Plan fails to do is offer plans for dealing with, or better yet avoiding, the consequences of negative scenarios.

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If reliability is to be secured and prices reduced, the Draft State Energy Plan must give significantly most attention to various “what-if” scenarios. The State Energy Plan's single most important task should be to remove barriers and to offer guidance and realistic proposals for avoiding fundamental supply and price issues in case everything does not go just as we hope it will.

Niagara Mohawk Power Corporation

Perhaps the greatest flaw in the draft State Energy Plan is it promotes energy policies with limited acknowledgment of the alternatives and with little or no underlying cost analysis. The draft State Energy Plan contains a variety of policy recommendations for which costs are not quantified. What is the least cost package of policies that will satisfactorily address the State's energy needs? The draft State Energy Plan does not attempt to answer this fundamental question. In addition, it does not provide a cost benefit analysis to determine what combination of policies might provide for most or all of the needed results as determined by the stakeholders.

The absent cost analysis undermines the accuracy of an important finding of the draft State Energy Plan. Electricity prices are forecast to decline by about five percent per year for the next five years. Since the draft State Energy Plan did nothing to quantify the potential cost impacts of the various measures and policy suggestions it contains, these reductions do not reflect any such costs. If some of the policies are found to be costly, it may reduce the expected savings. Would the impact be less than one percent, more than five percent, negative? One simply cannot determine this because the draft State Energy Plan does not address cost impacts.

Donald R. White

The draft energy plan appears to assume a relatively stable supply of energy for the foreseeable future. This assumption is shown to be untenable by industry experts.

Response: The scenarios presented in the “Electricity Assessment” provide a range of possible energy futures and identify some of the impacts that one might expect. The “No Additional Construction” scenario particularly illustrates the consequences that might be expected if additional generation resources are not forthcoming. The fact is, however, that several additional market-driven resources are already under development, and others are pending. Even so, the “Promoting Energy Industry Competition” issue paper addresses how resources might be provided through State actions in the event the market should fail to deliver the necessary resources in a timely manner.

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Niagara Mohawk Power Corporation

The implications of inadequate generation supply are not adequately explored in context with the scenarios analyzed in the electricity assessment. The scenarios do identify the reserve margins that might result from various combinations of generation resources and electricity demand, extending out through 2020. Implicit in these tables are numerous assumptions, many of which bear considerable variability themselves. Coupled with the effects of variability and weather, each of these demand forecasts – high, mid-range, and low – actually have bandwidths of their own. Consequently, it is easy to become too comfortable with any scenario that shows an 18 percent reserve margin achieved in a given year. The draft State Energy Plan itself acknowledges this. However, the draft State Energy Plan does not adequately discuss the depth of exposure faced by the State due to these effects, and how adequate a combination of operating measures and market forces would be in dealing with the generation shortages that might occur. While Niagara Mohawk generally prefers market forces over State intervention, we believe that there is a gap in the draft State Energy Plan because it does not discuss these difficult policy issues.

The Business Council of New York State, Inc.

While the Draft State Energy Plan does state that New York is in need of more sources of electric generation, its projections for growth in electric power demand over the next three to five years seem unrealistically–indeed dangerously–low. The Draft State Energy Plan offers a "mid-range forecast" for peak demand growth yet peak demand has grown an average of 2.1 percent over the past five years. Peak demand has consistently grown faster than total electric consumption.

This unrealistically low forecast for peak demand leads the State Energy Plan to incorporate projections for increases in reserve margins that are overly optimistic. These low projections, in turn, point the State Energy Plan toward lower projected generation capacity than we believe is necessary for the State, and thus mask the very urgent need to bring new plants on line over the next five years. (See Draft State Energy Plan, page 3-5.)

Response: The Energy Plan projects continuing growth in demand for electricity and recognizes the need for additional generation. See the State Energy Plan, Section 3.4, Electricity Assessment. Proposed additional natural gas fueled plants will help meet the future demand as will Peak Load Reduction and other demand reduction programs discussed in the Energy Plan.

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The Business Council of New York State, Inc.

We believe the impact on the cost of energy with respect to such environmental initiatives should be studied and quantified. The State Energy Plan includes no acknowledgment of the economic cost of environmental regulations. For example, there seems to be no accounting for the impact of the Acid Deposition Reduction Program (ADRP) on energy costs or generating capacity even though the Energy Plan recognizes that some coal plants may be closed or have their operations reduced because of the ADRP.

Response: The various scenarios considered in the State Energy Plan, Section 3.4, the Electricity Assessment, include assumptions about facility modifications and retirements that could occur to comply with the requirements of the Governor's Acid Deposition Reduction Program. These assumptions were included as "givens" in the analyses. The analyses indicate that – with the modifications and retirements included – statewide average wholesale electric energy prices, based on trends in locational-based marginal prices, in the State should decline as new resources are added during the planning period. The Energy Plan does not attempt to determine the economics of operating individual units.

Long Island Coalition for Democracy

NYSERDA repeats data in its draft report from utilities and industries and other governmental agencies to make projections over 20 years without seriously trying to change the current climate of energy use in New York State.

The final Energy Plan should have performance profile graphs showing how much each of the State's utilities, over a 5 year period, spent on fossil fuels, purchased power, operation and maintenance, the size of debt for each, any new borrowings, each utility's yearly debt payment and the total amount spent annually on renewable energy.

Response: The State Energy Plan supports fuel diversity. Performance profiles for publicly-owned and investor-owned utilities can be found in *Financial Statistics of Major U.S. Publicly Owned Electric Utilities, 2000*, published by the U.S. Department of Energy, Energy Information Administration, and in the annual reports filed by the investor-owned utilities with the New York State Public Service Commission.

NRG Energy Inc.

NRG would prefer that the draft present more detailed information pertaining to its electric resource assessment.

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The Energy Plan assumes a large number of new combined cycle natural gas plants by 2005. Consideration should be given to the question of whether the State is relying too much on new generation in the State to meet the anticipated energy demand.

The Energy Plan appears to rely more so on somewhat speculative alternative and renewable fuels development and energy efficiency technology, rather than on developing policies that maintain and enhance fuel diversity.

The draft Energy Plan describes the results predicted by the Reference Resource Case and notes that the change in generation from coal and oil sources is due, in major part, to New York's Acid Deposition Initiative program. It is not clear what assumptions were used to arrive at this conclusion. Moreover, there is an inconsistency between the aforementioned conclusion and the discussion on future coal use.

Response: The State Energy Plan features consistent coal forecasts throughout the document that account for the decrease in coal burning as a result of the Acid Deposition Reduction Program.

Energy efficiency measures have had a positive impact on electricity demand. See the Energy Efficiency Assessment, Section 3.2 of the State Energy Plan. The State supports renewable energy resources and technologies, and all supply forecasts are based on proven technologies and fuels. The State supports environmentally sound re-powering of electric generation plants.

New York State Electric and Gas (NYSEG)

NYSEG believes the Draft Energy Plan is unrealistic in the following areas:

- Projections of declines in wholesale and retail electricity prices;
- Projections of declines in wholesale and retail natural gas prices;
- Projections of declining air emissions statewide associated with electricity will decline as a result of new natural gas fueled generation;
- Projections that the natural gas and electric bulk transmission system will receive the capital infusions and regulatory approvals needed to meet the growth in the State’s energy economy.

NYSEG suggests that several concerns be addressed prior to the issuance of the final Energy Plan.

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The Energy Plan needs to critically assess the likelihood that the massive capital investment in new generation in the State will come to fruition, and the impact to the Energy Plan if certain or all the projected facilities are not built.

Emission reductions cannot be met without a monumental increase in the use of natural gas. The Energy Plan forecasts of lowered electric retail electricity and natural gas prices rely completely on the assumption of stable or declining wellhead gas prices forecast in a single study by the Federal Energy Information Agency. The Energy Plan entertains no alternative scenarios.

The Energy Plan is silent on where the massive increase in gas transmission system capacity will come from. The Energy Plan fails to directly and fully assess the electric and gas system reliability issues associated with the proposed massive increase in reliance on natural gas.

Response: The scenarios presented in Section 3.4, the Electricity Assessment, of the State Energy Plan, provide a range of possible energy futures. Some of the scenarios project increased wholesale electric energy prices and emissions, while others project decreased wholesale electric energy prices and emissions. In fact, the "Reference Resource" scenario projects decreases in wholesale electric energy prices and emissions as new resources are added and then increasing wholesale electric energy prices and emissions when no new resources are added. It is unclear why the comment indicates a belief that the addition of new, more efficient resources will not off-set less efficient, more expensive resources.

The State fuel demand and retail price forecasts are based on forecast data from the Energy Information Administration's (EIA), *Annual Energy Outlook 2002 Forecasts for the Mid-Atlantic and the New York Control Area*. The forecasts assume that supplies are adequate.

Three scenarios, an Outlook, a Low, and a High case, were examined for the State Energy Plan. In developing its forecast, the EIA compared its forecast of natural gas wellhead prices in 2015 ($3.07 per thousand cubic feet in 2000$) to forecasts prepared by DRI-WEFA and the Gas Research Institute (respectively $3.23 and $2.34 per thousand cubin feet in 2000$). The comparison revealed that EIA's forecast is within the range of the forecasts prepared by these other entities. The State Energy Plan uses significantly lower overall growth in gas demand (1.3 percent per year in the Outlook Case) than the draft State Energy Plan used (2.3 percent per year) primarily because of projected

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reductions in the amount of gas needed to generate electricity. The Energy Plan identifies the need for an increase in gas transmission capacity to be provided by market participants.

The joint NYSERDA/NYISO study, *The Interaction of the Gas and Electric Systems in New York State*, examined the ability of the gas supply infrastructure to meet both core gas demands and the demands of future gas-fired generation consistent with the amount forecasted in the Energy Plan, *i.e.*, up to approximately 4,495 megawatts of new capacity by 2005. The study also incorporated a model of the current gas supply infrastructure and added, through various scenarios, up to 800 million decatherms per day of new pipeline capacity. This rather conservative approach incorporated various levels of capacity up to a maximum level that includes those pipelines that have received provisional approvals by the Federal Energy Regulatory Commission.

The results show that New York has sufficient gas capacity to deliver the minimum amount of gas required for generation under all the 2005 generation and pipeline expansion scenarios that were analyzed, including those scenarios in which pipeline expansions were limited to those currently under construction. This result is largely because the new gas-fired combined-cycle generators are more efficient than the existing gas-fired single-cycle units. In the full scenarios, *i.e.*, 800 million decatherms per day of new gas supply and 4,495 megawatts of new gas-fired generation, pipeline capacity is sufficient to meet the unrestricted demands of the new generators. Under scenarios with combinations of less pipeline expansion capacity and less additional generating capacity, a substantial portion of the maximum potential gas demands for generation can be met. Some oil needs to be burned in each case where less than 800 million decatherms per day of pipeline expansion is projected, but the total estimated amount of oil burned is less than the historical amount actually burned in 2000 and 2001.

<u>Citizens Campaign for the Environment</u>

The Energy Plan should provide estimates on all remaining fuel supplies similar to those provided for coal.

<u>Response:</u> An assessment of remaining fuel supplies is not required by the Energy Law. However, the Energy Plan estimates remaining crude oil reserves at one trillion barrels (See Section 3.6, Petroleum Assessment) and estimates of potential reserves of natural gas in the lower 48 states at 1,026 trillion cubic feet (See Section 3.5, Natural Gas Assessment). The *International Energy Outlook 2002* estimates worldwide natural gas

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reserves at 5,451 trillion cubic feet. All estimates of this type are based on the best information available at this time.

Honorable Paul D. Tonko, Chair, Assembly Energy Committee

The Energy Plan is effusive in its praise of the Governor's deregulation of electric power markets, implying that there are substantial rate reductions attributable to having created competitive markets. In truth, in much of the State the markets are not truly competitive. The plan does not obfuscate the true situation of market development. The Energy Plan mis-portrays recent energy price reductions as a result of competitive market activities. (See page 5, "In summary, ..." paragraph).

Response: Restructuring has resulted in significant savings, and an increasing number of customers are taking advantage of competitive offerings. While wholesale markets in New York City and on Long Island have not become fully competitive, the State has supported, and the Federal Energy Regulatory Commission has approved, mitigation measures to moderate price spikes due to market power. The State continues to work on infrastructure and market issues as discussed in the Electricity Assessment.

Transmission Planning

New York Independent System Operator (NYISO)

As described in the draft State Energy Plan, the long-term adequacy of the New York State bulk power system is dependent on both new supplies of electric power and on the expansion of the transmission system to deliver the power needed for New York's economy. To achieve these ends will require the implementation of a comprehensive transmission planning process and the development of an appropriate cost recovery mechanism. Currently, one of the major barriers to expanding the transmission system is the uncertainty associated with cost recovery. The NYISO's long term transmission planning objective is to ensure that New York State develops and implements an effective transmission planning process. The NYISO would encourage the State to engage actively in proceedings occurring at the regional and federal levels pertaining to transmission planning and to support market-based solutions to transmission enhancement and expansion needs.

Response: The State was a leading advocate for transmission planning long before other participants in the NYISO were willing to agree that such a NYISO-based function is appropriate. The Public Service Commission has not only advocated planning and construction of appropriate transmission facilities, but it has also advocated that a move

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to a regional common market will assist in the beneficial expansion of transmission. New York will continue to participate in regional planning proceedings.

Honorable Paul D. Tonko, Chair, Assembly Energy Committee

The draft State Energy Plan is incomplete in terms of providing the results of several ongoing studies. The plan draws its conclusions from incomplete and cursory analyses. The prime example is the in-progress study of the natural gas infrastructure and its impacts on the developing competitive electric generation market.

Response: The State Energy Plan includes the results from the joint NYISO-NYSERDA gas and electricity study, *The Interaction of the Gas and Electric Systems in New York State*, preliminary results from the *Efficiency and Renewable Energy Potential Assessment*, and the recommendations of the Department of Environmental Conservation's Environmental Justice Task Force.

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8. Transportation

Environmental Advocates of New York

There is excellent information in the Draft State Energy Plan regarding advanced technology and alternative vehicles. Environmental Advocates would like to see a systems-benefit-charge model used for vehicles. A registration fee for vehicles with a sliding scale based on fuel efficiency could be a source of income to the State to pay for additional programs. Even if the increment was not adequate to change behavior it would serve as an educational tool.

Other programs that could be implemented include clean-car labeling and marketing programs that could be offered cooperatively with the State's auto dealers. Low-interest grant programs for school districts to purchase low-emission and alternative-fuel vehicles could be offered. Programs could be developed whereby the State would give priority to procurement of clean vehicle fleets.

Response: The State is committed to the low-emission vehicle program and is enforcing its adoption. A number of programs, such as the Clean Water/Clean Air Bond Act and the Congestion Mitigation and Air Quality program in non-attainment and maintenance areas, can provide funding for the purchase of low-emission and alternative fuel vehicles and consumer education and outreach. Significant assistance for these types of activities is provided through normal transportation funding mechanisms that are administered by the New York State Department of Transportation and local transportation agencies, operating through Metropolitan Planning Organizations. At this time, the Energy Planning Board does not recommend a system benefits charge model for vehicles.

Environmental Advocates of New York

The Draft State Energy Plan has good objectives for transportation and good goals. What it doesn't have is specific numerical metrics on reaching the goals, *e.g.*, what should the modal split be, what should the vehicle miles traveled (VMT) reductions be, what do we need in terms of advanced technology vehicle inventory? There should be measurable goals in the State Energy Plan and then a menu of options on how we could get there.

Response: Trends in VMT and mode share are already reported and available. In recommending specific goals for greenhouse gas reductions and outcomes from energy efficiency improvements, the State Energy Plan establishes metrics to make all sectors,

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including the transportation sector, more energy efficient. Separate metrics for individual sectors are unnecessary.

Renewable Energy Works

Following the lead of the U.S. Department of Agriculture, New York should begin using clean-burning, renewable bio-diesel in its numerous fleets.

Response: The State Energy Plan encourages the federal government to adopt new corporate average fuel economy standards for vehicles and address vehicle energy efficiency in a way that protects driver and passenger safety. The Energy Plan supports expanding the use of bio-fuels and supports the commercialization of biofuels technology and use of biofuels as vehicle fuels. As with any fuel, including other alternative fuels, before widespread use and acceptance can be realized, questions related to issues such as availability of supplies, price differentials among fuels, and cold weather operations must be satisfactorily addressed.

Green Party Broome County

New York State should provide funds for county and municipal bus systems to convert their bus fleets to propane, hydrogen fuel cells, and other alternative, non-petroleum fuels.

However, simply converting buses to cleaner burning fuels isn't enough. The State must allocate funds to county and municipal governments for the expansion and improvement of county and municipal public transportation systems. Fleet sizes must be increased and service must become more frequent. Park-and-ride programs must be created or expanded where they already exist to incorporate suburban and rural residents in public transportation systems.

Response: As discussed in the State Energy Plan, Section 2.4, Energy and Transportation, the State is already providing funding for the conversion of county and municipal bus fleets to alternative fuels using sources of funding such as the Clean Water/Clean Air Bond Act and the Congestion Mitigation and Air Quality program in non-attainment and maintenance areas. This funding is used for building alternative fuel infrastructure and transit development. This support is expected to continue.

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Green Party Broome County

The price of gas should be raised. Increased gasoline taxes would provide much needed revenue for the State and an increase in the price of gasoline would encourage the use of public transportation.

Response: Transportation experts generally recognize that changes in the price of gasoline, including taxes, do not significantly affect driving behavior. Generally, the same level of driving occurs regardless of the price of gasoline. As evidence, it should be noted that the recent volatility in the gasoline prices has not been associated with significant changes in vehicle miles traveled. Raising gasoline taxes may have adverse effects on low-income communities and small businesses. The Energy Planning Board does not recommend raising gasoline taxes at this time.

Green Party Broome County

Bicycle racks should be installed on every block in urban areas and on the front of all buses. State funding should be provided to municipal governments to create bicycle lanes on city streets and to improve existing bicycle lanes.

Response: Bicycle lanes and bicycle racks are funded by the State, as well. The New York State Department of Transportation recently enacted a policy to allow State funding to be used for stand-alone bicycle and pedestrian projects in locally owned rights-of-way. Previously, bicycle and pedestrian projects had to be part of roadway construction projects. Municipal governments are allowed to give priority to bicycle and pedestrian projects, if they choose to do so.

Charles Sontag

I think we could do more from the State standpoint in encouraging better public transportation, such as the trams in use in Germany. I would ask the State to pursue such technologies; transportation policies are ultimately energy policies. I see this as good savings.

We should support Pennsylvania and New Jersey's rebuilding of the Lackawanna cutoff and the return of rail service to Scranton, then Binghamton and Elmira, and, possibly, points west.

Tom Salo

The State Energy Plan should adopt a funding policy that favors investment in public transportation.

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Kenya Browning

High speed rail, as outlined on page 2-81 of the Draft State Energy Plan, seems promising.

Response: The State Energy Plan, Section 2.4, Energy and Transportation, discusses the State's actions and policies with respect to public transportation. Activities include technology improvements as well as programs to promote improved service and reliability. The Energy Plan supports the contention that public transportation is energy efficient.

The State supports the return of rail service to New York. Section 2.4 describes in detail the actions the State is initiating to encourage this.

Western New York Sustainable Energy Association

Stop highway construction that promotes sprawl and increases vehicle miles driven. The Draft State Energy Plan mentions highway capital projects that decrease energy use through mobility improvements. What about highway capital projects that increase energy use by encouraging sprawl? The Draft State Energy Plan should discuss the latter type of project and call for reevaluation and reconsideration of those projects.

Response: Many factors go into the decisionmaking process before a major highway capital project is constructed. One important factor is energy use. As discussed in Section 2.4, Energy and Transportation, many of these projects decrease energy use by improving mobility. Concerns about specific highway projects should be pursued during the environmental review phase of the project that includes local public review and comment. Appropriate Department of Transportation Regional Offices should be contacted with specific concerns and comments.

Western New York Sustainable Energy Association

The Governor and the State Legislature and the Draft State Energy Plan should loudly and tirelessly insist that the CAFE standards be improved and that loopholes be closed.

Response: The State Energy Plan encourages the federal government to adopt new corporate average fuel economy standards for vehicles and to address vehicle energy efficiency in a way that protects drivers and passengers.

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Green Party Erie County

Obviously automobiles use a large supply of foreign oil. Why isn't this plan addressing with specific numbers reducing that dependence on foreign oil? Why aren't we talking about major increases in mass transit aid. CAFE and other things need to be put into place. Don't ignore the issue.

Response: The State Energy Plan encourages the federal government to adopt new corporate average fuel economy standards for vehicles and to address vehicle energy efficiency in a way that protects drivers and passengers. Section 2.4, Energy and Transportation, identifies anticipated increases in aid to public transportation.

In supporting specific goals for greenhouse gas reductions and energy efficiency improvements, the State Energy Plan establishes metrics for making all sectors, including the transportation sector, more energy efficient. Separate specific metrics for reducing the dependence on foreign oil are then unnecessary since improving the energy efficiency of the transportation sector will result in reduction in New York's dependence on foreign oil.

David Stout

Sellers of vehicles must make mid-sized, four-passenger, alternative-fuel vehicles available for purchase throughout the State. The refueling infrastructure must be accessible as well for these vehicles. A minimum miles per gallon of 30 for all new internal combustion engines should be required.

The Draft State Energy Plan must assure that there's a change in transportation pollution from use of fossil fuels and poor mile-per-gallon vehicles. We need definable goals.

Renewable Energy Works

New York should put pressure on the federal government to raise catalytic standards for all passenger vehicles.

Response: Under federal law, New York is precluded from establishing separate vehicle standards. New York's only option was to adopt California vehicle standards, which was done. For this reason, the State Energy Plan encourages the federal government to adopt new corporate average fuel economy standards for vehicles and to address vehicle energy efficiency in a way that protects drivers and passengers.

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In supporting specific goals for greenhouse gas reductions and energy efficiency improvements, the State Energy Plan establishes metrics for making all sectors, including the transportation sector, more energy efficient. Separate metrics for the transportation sector are unnecessary.

Erin Cala

The transportation section of the Draft State Energy Plan must be more aggressive and specific. We need numerical goals regarding fuel efficiency. Yes, we should meet the California low emission vehicle standards, but we need a time line and a set percentage of money devoted to these goals. We need more devoted to public transit systems and research and development so we can have a well thought out and effective public transit.

Response: In supporting specific goals for greenhouse gas reductions and energy efficiency improvements, the State Energy Plan establishes energy efficiency metrics for all sectors, including the transportation sector.

Section 2.4, Energy and Transportation, supports the idea that an effective public transit system is essential and describes how New York is accomplishing this goal through research and development and appropriate funding.

Sierra Club, Long Island Group

We should improve transportation. We need more mass transit, more trains, more public transit that relies on natural gas rather than gasoline, and government should lead the project in purchasing these types of energy-efficient vehicles for their own fleets.

Response: New York is continually striving to improve transportation. The Energy and Transportation issue report (see Section 2.4 of the State Energy Plan) describes the actions the State and other transportation providers are taking to increase transit ridership, improve service, and increase the use of alternative fuels. The State is leading by example by purchasing alternative fueled vehicles for its fleets. As described in Section 2.4, in Executive Order 111, Governor Pataki directed that State agency light-duty vehicle purchases must be at least 50 percent alternative fueled vehicles by 2005 and 100 percent by 2010.

American Lung Association of Nassau-Suffolk

We support tax credits and other incentives to purchase and use low emission vehicles such as the new electric gas hybrid vehicles and the zero emission electric cars.

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Response: The State Energy Plan calls for extending the New York Alternate Fuels Tax Credit Program and suggests that consideration be given to expanding it to include all types of alternative fueled vehicles. If this recommendation is adopted, tax credits are likely to become available for zero emission electric cars.

New York Corn Growers Association

On pages 47-48, the Draft State Energy Plan states "the substitution of ethanol for MTBE would result in over a hundred million dollars a year loss in New York State contribution to the Highway Trust Fund." Increasing ethanol in New York will reduce the Highway Trust Fund but the report doesn't provide an actual analysis of the dollar value. New York Corn Growers and the Renewable Fuels Association (RFA) are working in Washington to eliminate this problem.

Response: As described in Section 2.4, Energy and Transportation, of the State Energy Plan, the analysis is based on the projected use of ethanol to replace the existing use of MTBE (methyl tertiary butyl ether) and the $ 0.54 per gallon excise tax exemption. Estimating the impact on revenue to New York State is difficult since this is an ongoing issue in other states as well as New York that will affect the total amount of revenue generated to the Highway Trust Fund and, therefore, will affect New York State's share. For this reason, favorable tax treatment for ethanol must be addressed at the federal level. New York appreciates any assistance in determining how to resolve the problem of reduced Highway Trust Fund resources caused by the increasing use of ethanol.

Center for Clean Air Policy

On the transportation front, there are a number of opportunities to ensure that State investments minimize greenhouse gases (GHGs). For instance, the State could incorporate GHG emissions as a key decisionmaking criterion into transportation and infrastructure investments and land use planning decisions and should consider withholding funds from investments that increase vehicle miles travelled, energy use and CO_2 emissions. In addition, New York can amend SEQRA (State Environmental Quality Review Act), Long Range Transportation Plans, TIP (Transportation Improvement Programs), and STIP (Statewide Transportation Improvement Program) processes to include GHG impacts.

Key opportunities link transportation, land use, and climate change through policies that strengthen the urban core and protect the fringes to prevent suburban sprawl. The State should target open space funding to prevent suburban sprawl, promote Quality

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Communities, and protect land threatened by development. The State should complement open space protection by providing incentives for redevelopment on brownfields and encouraging infill development in urban cores across the State.

Response: New York recognizes the importance of reducing greenhouse gas emissions. Consequently, the State Energy Plan supports a statewide goal for greenhouse gas emission reductions. Achieving this goal will require emission reductions by all sectors, including the transportation sector. Many of the proposed measures are recommended in the State Energy Plan.

Center for Clean Air Policy

The State should demonstrably increase the share of transportation funding that is dedicated to improving and expanding transit, bike, and pedestrian facilities and should provide incentives to encourage use of these efficient alternatives.

Response: Transportation funding in New York now takes a balanced, multimodal approach, with funding provided for transit, rail, biking, walking, aviation, roadways, and other modes of transportation. The State Energy Plan recommends that the State redirect transportation funding toward energy-efficiency transportation alternatives, including public transportation, walking, and bicycling, and provide incentives to encourage greater use of related alternatives that improve transportation efficiency.

Environmental Defense

The State could expand alternative fuel and diesel emission control programs to garbage trucks, school buses, and other fleets.

The MTA and the New York Thruway Authority should adopt a modest congestion pricing structure to encourage shifts from use of Single Occupancy Vehicles to multi-occupant vehicles and from trucks to rail or barge. With E-Z pass technology, congestion pricing could be applied to other congested roadways that are not currently tolled in a non-intrusive way.

The State could raise energy taxes or energy greenhouse gas (GHG) offset fees. The State should adopt a steadily increasing gas or general energy GHG offset fee, perhaps two to five cents per year for the next ten to twenty years.

The State should revamp the sales tax on vehicle purchases to vary inversely with the fuel economy of vehicles.

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The “transitchek” programs provide huge potential to offer incentives to commuters to use subways, buses, commuter rail, and van services.

Suburban parts of the downstate metropolitan area and other urban areas in the State could offer employer-supported van services.

These various proposals could generate revenues for a transportation fund that could augment investments in mass transit and corporate van services and freight rail and barge. The State has huge needs in this respect.

Response: The State is now working to expand alternative fuel and diesel emission control programs to other fleets. In addition to garbage trucks and school buses, construction vehicles and ground support vehicles at airports are being considered as are technologies that reduce the need for heavy duty vehicles to idle.

The Port Authority of New York and New Jersey has adopted a congestion pricing structure for its bridge and tunnel crossings. The New York State Thruway Authority has considered such a program for the Tappan Zee Bridge. Congestion pricing is being considered in a more comprehensive manner for the New York City Metropolitan Area. Further information on this, the Transitchek and Commuter Choice programs, and van services can be found in Section 2.4, Energy and Transportation.

It is true that a huge need exists for investment in public transportation, freight rail and barge, and similar programs. A number of programs, such as the Clean Water/Clean Air Bond Act and the Congestion Mitigation and Air Quality program in non-attainment and maintenance areas, now provide funding for energy-efficient transportation programs. In addition, significant assistance for activities of this type is provided through normal transportation funding mechanisms that are administered by the Department of Transportation and local transportation agencies, operating through Metropolitan Planning Organizations. Transportation experts generally recognize that changes in the price of gasoline, including taxes, do not significantly affect driving behavior. Generally, the same level of driving occurs regardless of the price of gasoline. As evidence, it should be noted that the recent volatility in the gasoline prices has not been associated with significant changes in vehicle miles traveled. Raising gasoline taxes may have adverse effects on low-income communities and small businesses.

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Ann Link

New York needs support for a network of greenways for foot and bike traffic. Brooklyn waterfront residents are having to fight with the New York City Department of Transportation for space free of cars and trucks so we can have a walk/bikeway along the waterfront.

Response: Section 2.4 of the State Energy Plan, Energy and Transportation, describes the support the State provides for bicycle lanes and pedestrian walkways. Concerns about funding and approvals for specific bikeway projects should be addressed to the appropriate metropolitan planning organization which, through an extensive public involvement process, will determine the transportation projects to receive support and be implemented.

Sierra Club, NYC Group

The Draft State Energy Plan should include an increase in the gasoline tax dedicated solely to the funding of increased energy conservation and efficiency, including reducing the use of passenger vehicles.

Investment in public transportation systems and rail freight transport must be a part of the Draft State Energy Plan. Also, clean vehicles and other alternatives such as pedestrian-friendly areas and bicycle-friendly streets should be a part of the Draft State Energy Plan. Market-based programs should be included. The State should be required to purchase clean vehicles and, if alternate fuel vehicles are purchased, to use the alternative fuels.

Response: A number of programs, such as the Clean Water/Clean Air Bond Act and the Congestion Mitigation and Air Quality program in non-attainment and maintenance areas, provide funding for energy-efficient transportation programs and for programs to reduce the use of single occupant vehicles. In addition, significant assistance for these activities is provided through normal transportation funding mechanisms that are administered by New York State Department of Transportation and local transportation agencies, operating through Metropolitan Planning Organizations.

The issues raised in the comment regarding public transportation, rail freight transport, and bicycle and pedestrian programs are discussed in the Energy and Transportation issue report (Section 2.4) in the State Energy Plan. The State is leading by example by purchasing alternative fueled vehicles for its fleets. As described in the issue report, in Executive Order 111, Governor Pataki directed that State agency light-

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duty vehicle purchases must be at least 50 percent alternative fueled vehicles by 2005 and 100 percent by 2010.

Key Span, New York

Key Span believes the State should take a harder look at providing tax and other incentives for expansion of a number of compressed natural gas facilities in the New York City area.

We think expediting Article VII and the New York State Department of Transportation permitting processes for gas infrastructure are also critical to maintain that.

Response: To encourage the use of compressed natural gas and other forms of alternate fuels, the State Energy Plan calls for extending the New York Alternate Fuels Tax Credit Program and asks that consideration be given to expanding it to include all types of alternative fueled vehicles. The recommendation also applies to the development of alternate fuel infrastructure.

Article VII and the New York State Department of Transportation permitting processes implement State and federal law. Where appropriate, waiver provisions in the regulatory process are used. Substantive changes to the permitting process would require legislative revisions.

Doug Goodman

Speaking as an individual on behalf of the propane industry, I wholeheartedly support the alternative fuel vehicle tax credit program that you have in place, the extension of the deadline, and, specifically, the statement in there about fuel neutrality. Propane is a viable alternative to compressed or liquified natural gas throughout the United States and many governmental and private fleets rely on it. I want to voice my support for continuing the credit plan and offering propane as another alternative fuel.

Response: The comment is acknowledged and appreciated.

Environmental Advocates of New York

We believe the Draft State Energy Plan should improve transportation options to reduce environmental effects of transportation in the State, setting specific numerical targets for the transportation sector and setting out a program of investment in public transit, rail freight infrastructure, continuing promotion of clean vehicles, providing

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pedestrian and bicycling alternatives and pricing policies. Progress should be tracked by vehicle miles traveled, modal split, fuel economy, and so on.

New York's adoption of all California's LEV2 program should be supported further, including consumer incentive programs, income tax credits for clean vehicles, and marketing and labeling programs along the lines of ENERGY STAR®.

We also think there should be a fuel economy based registration fee administered by the Department of Motor Vehicles.

Response: In supporting specific goals for greenhouse gas reductions and energy efficiency improvements, the State Energy Plan establishes metrics that will cause all sectors, including the transportation sector, to become more energy efficient. Separate metrics for the transportation sector are unnecessary.

Transportation professionals generally recognize that the costs of driving (vehicle registration, gasoline, and insurance) are inelastic, *i.e.*, changes in these costs do not have a significant effect on driving behavior. Generally, the same level of driving occurs regardless of the cost of driving. Increasing registration fees and gasoline taxes may have an adverse effect on low-income communities and small businesses.

Jennifer Bostaph

Traffic needs to flow more efficiently across the Peace Bridge.

Response: Studies are ongoing with regard to the Peace Bridge. Several alternatives are being studied, including one that would “twin” the bridge. Operational enhancements are also under study for the border crossings. For example, E-Z Pass was implemented on the Peace Bridge in January 2002. Further information on these studies is available from the Department of Transportation Region 5 Office in Buffalo.

Jennifer Bostaph

NYS provides $1.7 billion in operating expenses for public transportation. The Draft State Energy Plan should show the breakdown on how much each city receives.

Response: The requested information is available from the New York State Department of Transportation website, www.dot.state.ny.us.

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Jennifer Bostaph

Public transportation is an important part of reducing energy use. There needs to be more emphasis on the benefits of using public transportation. The State needs to provide more publicity and information on these benefits.

The State needs to put more emphasis on walking and biking, and more bike parking should be made available.

Response: Energy and Transportation, Section 2.4 of the State Energy Plan, stresses the importance of public transportation, walking and biking, and other means of improving the energy efficiency of the transportation system.

Jennifer Bostaph

The Draft State Energy Plan does not address transportation issues in all areas of the State. Only New York City and Long Island are addressed.

Response: Most of the information in Section 2.4, Energy and Transportation, of the State Energy Plan is applicable to the entire State, and pages 2-59 *et seq.* discuss specific activities in upstate New York.

Lawrence D'Arco

Encouraging the use of mass transit is probably one of the fastest ways to reduce oil consumption.

The Draft State Energy Plan states that the yearly maximum set-aside for pre-tax eligibility is $780. According to the Federal Tax Code, as of January 1, 2002, the limit on nontaxable transit benefits an employee can receive was raised to $100 per month or $1,200 per year.

The Energy Plan should read that the Governor should implement the pre-tax income transit initiative.

The federal government offers both a transportation fringe payment ($65 per month) and the pre-tax for federal employees who wish to participate in the program. New York State should offer the same transportation fringe benefits to its employees.

Response: The State Energy Plan recommends the adoption of a Commuter Choice program. (See Section 2.4, Energy and Transportation.) Efforts are underway to

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bring the program to New York State employees, and discussions have begun with public employee unions to accomplish this. The correction with regard to yearly maximum set-aside is included in the State Energy Plan.

Marshah-Reaff Barrett

The Draft State Energy Plan states that "The State has become a national leader in developing new technologies to reduce emissions from diesel-powered trucks and buses." If the technology exists, why isn't it being used?

Response: Section 2.4, Energy and Transportation, and Section 2.3, Energy and the Environment, describe how the State is using new technologies such as diesel-powered trucks and buses.

Marshah-Reaff Barrett

Fuel economy standards for vehicles have the potential to be the most significant action to conserve energy and protect the environment in the transportation sector. Why doesn't NYS mandate that car companies improve on the fuel efficiency of cars?

The State must inspire car companies to meet higher engine efficiency and gas consumption efficiency, if the companies meet the new standards, they will receive a tax break or some other compensation.

Response: Under federal law, New York is precluded from establishing individual vehicle standards. New York's only option was to adopt California vehicle standards, which has been done. For this reason, the State Energy Plan encourages the federal government to adopt new corporate average fuel economy standards for vehicles and to address vehicle energy efficiency in a way that protects drivers and passengers.

To encourage the use of energy efficient vehicles, the State Energy Plan recommends extending the New York Alternate Fuels Tax Credit Program and that consideration be given to expanding it to all types of alternative fueled vehicles. The recommendation also applies to the development of alternate fuel infrastructure.

Shirley M. Victor

The Energy Plan should educate the public and encourage them to use public transportation.

Response: Section 2.4, Energy and Transportation, devotes significant discussion to public transportation. In doing so, the Energy Planning Board is trying to educate the

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public on the benefits of public transportation. Transit operators are continually advertising and marketing their services to the public.

Robert Lambert

Tax rebates should be provided to companies that provide and promote vehicles that use Ethanol.

Response: The issue of ethanol use in vehicles is a complicated one. Ethanol provides benefits by reducing reliance on foreign sources of energy and promoting economic development. However, ethanol presents air quality problems because its use increases evaporative emissions and, because it receives more favorable tax treatment than other fuels, its use negatively affects funding available to maintain and enhance the transportation system. The State Energy Plan takes a balanced approach to this issue.

Diane A. Davis

Fuel cells for cars are not truly and adequately addressed or compensated for in the Draft State Energy Plan.

Response: Fuel cells for cars are not addressed in Section 2.4, the Energy and Transportation issue report. The State Energy Plan discuss fuels cells in Section 3.3, the Renewable Energy Assessment. Use of fuel cells by the transportation sector holds great potential for increasing energy efficiency and reducing emissions. As is pointed out in the Renewable Energy Assessment, each of the fuel cell technologies under development has advantages and drawbacks and none can cheaply and efficiently replace more conventional fuel sources. At this point in time, it is premature to develop transportation energy policy based on uncertain fuel cell technology. The State supports the continued research and development of this technology, including its transportation applications.

New York Public Interest Research Group, Niagara Chapter

While the low emission vehicle program that is mentioned in Section 2, page 40, of the draft State Energy Plan is fabulous, I feel that recreational vehicles such as jet skis, boats, and motorcycles should also be given emission standards to help with the problem.

Response: New York State is taking steps to reduce emissions from off-road motor vehicles. Legislation was recently enacted calling on the Department of Environmental Conservation to establish emission standards for marine recreational vehicles such as jet-skis. Regulations are being developed and should be issued for public comment shortly. Motorcycles are regulated pursuant to federal law that prohibits states

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from setting their own emission standards for such vehicles. California is excluded from this prohibition, and New York has the option of adopting either the federal or California standards.

Brett Maxwell

The State should encourage hybrid and alternative fuel vehicles.

Kenya Browning

Alternative fuel vehicles are pricey, but worth it. Why not have all State agency vehicles as alternative fuel vehicles rather than just the light duty ones?

Response: The State Energy Plan encourages the development and use of alternative fueled vehicles in two important ways. The Energy Plan recommends extending the New York Alternate Fuels Tax Credit Program and that consideration be given to expanding it to all types of alternative fueled vehicles. The recommendation also applies to the development of alternate fuel infrastructure. The State is leading by example by purchasing alternative fueled vehicles for its fleets. As described in the Energy Plan (see Section 2.4, Energy and Transportation), in Executive Order 111, Governor Pataki directed that State agency light-duty vehicle purchases must be at least 50 percent alternative fueled vehicles by 2005 and 100 percent by 2010. Hybrid vehicles are covered under the Executive Order. Further, the Executive Order addresses medium- and heavy-duty vehicles by requiring agencies to "implement strategies to reduce petroleum consumption and emissions by using alternative fuels and improving vehicle fleet fuel efficiency." As alternate fuel technology develops for non-light-duty vehicles and as more types of vehicles are available, to fulfill the Executive Order, it is expected that State agencies will purchase more of these vehicles also.

The Business Council of New York State, Inc.

We support the Draft State Energy Plan's call for additional federal funding for transit and transportation system operations.

Response: Support for the State Energy Plan's call for additional federal funding for transit and transportation system operations is acknowledged and appreciated.

Kenya Browning

Emission reductions (described on page 2-88 of the draft State Energy Plan) should include replacement of bulbs with LEDs in traffic signals and efforts to enhance the bicycle and pedestrian programs.

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Response: Replacement of bulbs with light emitting diodes (LEDs) and enhancing bicycle and pedestrian programs are ongoing efforts that result in emission reductions. As is pointed out in Section 2.4 of the State Energy Plan, other transportation measures can be adopted that will produce larger emission reductions on a more cost-effective basis.

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9. Public Works Projects

R.G.S. Energy Group/Rochester Gas & Electric Corporation

The State Energy Plan should recommend that utility facility relocation expenses be incorporated in the cost of public works projects as an expense of the State or municipality directing the work, as is the practice in other states. The Energy Plan should also recommend that a long-term planning process be adopted by all government entities to provide utility companies with opportunities to participate in project selections and planning. This will result in vastly improved planning and coordination, greater efficiency, and a significant overall saving to the public in money and convenience.

Niagara Mohawk Power Corporation

There needs to be better coordination among municipalities, the State, and utilities with respect to infrastructure projects. Especially road projects. The State Energy Plan should include recognition of the fact that there is an opportunity for the utilities, the municipalities, and the State to work together to more cost effectively deal with these projects.

New York Gas Group (NYGAS)

NYGAS recommends that the State encourage the New York State Department of Transportation (DOT) and municipalities to consider working more closely with the utilities to minimize and, where possible, avoid relocation of facilities. NYGAS recommends that State law be reviewed and modified to provide a more equitable reimbursement policy.

NYGAS strongly supports the recommendation in the Draft State Energy Plan and asks the Energy Planning Board's help to facilitate meetings between DOT, municipalities, and utility companies.

Response: In the State Energy Plan, the Energy Planning Board recommends that the State work more closely with utility companies to better identify and, if possible, design project work around utility facilities. Further, the Energy Plan encourages State agencies to work in partnership with municipal governments to accomplish this objective for municipal projects. See Section 1.3, Energy Policy Objectives and Recommendations.

The State recognizes the expense associated with utility facility relocation and is sensitive to the issue. New York State Department of Transportation has worked with the utility industry to minimize impacts and has modified its policies, where appropriate, to

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ease the financial impacts on affected utilities. However, the State believes that the current policy is fair and balanced in that the State does not impose rental or user fees for the use of its rights-of-way by utilities.

As directed in the recommendation, the State will be working with the utilities and with municipal governments to accomplish this objective for municipal projects. In fact, meetings between affected utility organizations and New York State Department of Transportation in this regard have begun.

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10. Energy Efficiency

Conservation Contingency Plan

Honorable Eric T. Schneiderman, Senator

The State Energy Plan does make some strides toward the badly needed development of effective conservation programs.

I cannot endorse a Plan that calls for the continued increase in the use of fossil fuels. The Energy Plan outlines only one way to control electric prices – build more power plants. Energy efficiency, energy independence, and conservation must be put on an equal footing with the building of new power plants. The Energy Plan should be amended to reduce our reliance on large polluting facilities. New York needs a Conservation Contingency Plan.

Sierra Club, Atlantic Chapter

The State Energy Plan should set goals to increase investment in energy efficiency and conservation. The Energy Plan should contain a conservation contingency plan. The Energy Plan should aggressively promote development of clean renewable electric generation and reduce our dependence on nuclear power (including the closure of Indian Point). The Energy Plan should contain proposals to improve transportation options, and should promote environmental quality through prioritizing conservation.

New York City Environmental Justice Alliance

A conservation contingency plan is necessary. In times of tight reserve margins, which tend to be in the summer in New York State and in New York City, as well, high electricity demands the fastest, cheapest, and cleanest methods of ensuring adequate supplies as well as true conservation and efficiency measures. It was done effectively in California. They thought they would have blackouts occasionally, far less after they put those measures into effect.

Scenic Hudson, Inc.

New York needs a conservation contingency plan that can be implemented in time of emergency or periods of peak demand that will inevitably result in price spikes for New York. The Draft State Energy Plan should lay out such a plan.

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Sierra Club, NYC Group

A plan that would utilize conservation and efficiency measures to meet energy needs during periods of high demand and low reserves must be included in the Draft State Energy Plan. Such efforts as were shown to be highly successful in California during the recent severe energy disturbances must not be overlooked in New York State. And a proposal for a parallel plan should be included.

Sierra Club, Long Island Group

The Draft State Energy Plan should include conservation contingency to be implemented in time of emergency situations. California did it and they saved electricity in large amounts.

Federated Conservationists of Westchester County, Inc.

We do need a conservation contingency plan. If we had one in place we could move much more quickly toward the kind of savings that California was able to achieve last year.

Response: The State Energy Plan aggressively supports energy efficiency and renewable energy as a means to meet growing demand and encourage energy diversity. This commitment is evidenced by the Energy Planning Board's recommendations in Section 1.3 of the State Energy Plan. For information about those State energy efficiency programs that are similar in concept to a conservation contingency plan, see Section 3.2 of the Energy Plan. Increased energy efficiency, in effect, reduces the State's need for energy generated from coal, oil, natural gas, and other sources thereby reducing environmental emissions that would occur during the generation process.

New York's rapid efficiency deployment initiative, known as the Coordinated Energy Demand Reduction Initiative, consists of several short-term demand reduction programs developed by the New York State Public Service Commission (PSC), the New York Independent System Operator (NYISO), NYSERDA, and the State's investor-owned utilities. The rapid deployment program provides a combination of awareness activities, incentives, and assistance to help consumers reduce their electricity demand during critical peak times. The program offers direct benefits to participants while ensuring reliable electricity system operation and moderating wholesale electricity prices.

The Electricity Assessment, Section 3.4 of the State Energy Plan, describes several actions taken by the State to develop rapid efficiency deployment to meet needs during critical times. In March 2001, the PSC approved several programs designed to

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reduce peak demand for electricity in Con Edison's service area. The PSC also directed all of the State's investor-owned utilities to submit plans to implement customer incentive programs to reduce peak demand. The PSC subsequently approved these programs and tariffs to implement them. These actions allowed ESCOs and utility supply customers to take advantage of new demand reduction programs offered by the NYISO. By the end of August 2001, approximately 680 megawatts of demand reduction had registered in the NYISO's Emergency Demand Response Program that provided as much as 475 megawatts of demand reduction during system emergencies in 2001.

The NYISO's Day Ahead Demand Response Bidding Program similarly provided opportunity for relief during summer 2001, with as much as 375 megawatts of reduction available in a given hour from parties registered to participate in this program.

In addition, the System Benefits Charge programs administered by NYSERDA reduced demand by about 80 megawatts. Additional savings resulted from plans developed to reduce government energy usage during peak periods, from public appeals, and from implementation of other utility programs.

The PSC also required utilities to prepare detailed public awareness plans describing their steps to raise awareness and inform customers on the load and capacity status and describing actions that consumers can take to control their energy use. Special focus was on the business community where the greatest results are expected in the shortest amount of time.

Specific Energy Efficiency Recommendations

Renewable Energy Works

The State Energy Plan fails to adequately address very important energy issues. Ninety-five percent of the State's primary energy is imported amounting to a seventeen billion dollar drain on the economy. The distribution system is vulnerable to devastating weather events and terrorist attack. The burning of fossil fuels for generation and transportation is responsible for air pollution, mounting health problems, acid rain, and global climate change. U.S. DOE reports that our energy distribution system is woefully inefficient, wasting roughly half of our energy inputs. All these deficiencies could be resolved with currently available energy conservation and renewable energy technologies. The Energy Plan should address these important issues. The first step in addressing these issues should be energy efficiency because it is the fastest and most cost-effective approach. Deregulation, while attempting to reduce utility rates, has done

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little to advance the state of energy efficiency in the State. The Energy Plan must change this situation.

Examples of steps to be taken include reinstatement of energy efficiency rebate programs for simple and effective appliance upgrades, such as old inefficient refrigerators and washing machines. New York's voluntary ENERGY STAR® standards reduce a new home's energy consumption by 30 percent. These standards should become the new state energy standards. The low-income weatherization program should be expanded and opened to higher-income families on a cost-shared basis, perhaps with funds from a natural gas system benefits charge.

Great Lakes United

The Draft State Energy Plan should provide financial incentives for energy companies to undertake conservation programs, financial penalties for failure to meet targets, research and development on new efficiency opportunities and a time line for phasing in the highest achievable appliance and equipment efficiency standards, subsidies to support retrofits through, for example, a systems benefit charge.

Ashok K. Trikha

The draft energy plan does not have the short term and the long term vision to grapple with the reality of a dwindling fossil supply. The situation shows a lack of advance planning, a failure to conserve, as well as a failure to install new (energy) sources.

New York will need to change the Plan to show vision, leadership and determination to provide clean and affordable energy. The loudest message to the Draft Energy Plan is to increase energy efficiency in every sector of the economy.

Natural Resources Defense Council (NRDC)

The challenge is to think in a more integrated fashion about the role that demand side measures can play in providing reliable electricity at low cost while protecting the environment. NRDC believes it is very, very important that we fully integrate demand side strategies into our energy policy. That is not happening at this point.

Response: Energy efficiency can contribute to energy security, improve fuel diversity, and reduce environmental emissions. As discussed in Section 3.2, Energy Efficiency Assessment, the State Energy Plan aggressively supports using energy efficiency to help New York State deal with these difficult issues.

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New York is already taking some of the steps laid out as examples.

- Numerous programs in New York State provide incentives for energy-efficient appliances, lighting and new homes. The Keep Cool program, which was offered statewide last summer, offered $75 for each consumer who surrendered their old room air conditioner and replaced it with a new ENERGY STAR® model. Approximately 40,000 old, inefficient air conditioners were turned in as a result of this program.
- New York is in the process of amending its Energy Conservation Construction Code. When the amendments are adopted in summer 2002's energy code for commercial and residential buildings will be among the most progressive in the country.
- NYSERDA has also expanded upon the existing low-income programs that cover households with less than 60 percent of State median income by opening its low-income energy affordability programs up to households with less than 80 percent of State median income.

Utilities are required to collect a System Benefits Charge from electricity transmission and distribution customers. The SBC is collected from all investor-owned utilities, and the majority of the funding is administered by NYSERDA. This approach ensures a more cohesive set of energy efficiency programs than could be offered by individual energy companies.

Citizens Campaign for the Environment

New York State should implement sensible energy efficient outdoor lighting policies.

Green Party Broome County

Thermostats should be set lower in state buildings.

Response: Governor Pataki's June 2001 Executive Order 111 calls for energy efficiency improvements in all State agencies. These entities are required to seek ways to reduce energy use by 35 percent by 2010 relative to 1990 levels. The Executive Order calls for the implementation of efficiency practices for buildings operations and maintenance. These practices could include tuning heating, ventilation, and air conditioning equipment so that it operates more efficiently. Additional information on the Executive Order can be found on in Section 3.2, Energy Efficiency Assessment, of the State Energy Plan.

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Innovative Energy Solutions (IES)

IES feels there should be increased incentives for corporations through rebates or tax incentives to get the people of the State to reduce their energy consumption. Rather than developing new processes to generate power for these communities, controls should be put in all facilities in the State of New York, a regulatory committee set up to provide a benchmark for these people and guide to follow in updating and retrofitting existing facilities. Many people would be put to work doing this.

Response: Several programs offered in New York State provide incentives to encourage the adoption of energy efficiency measures or practices. From 1990 to 2001, more than $2.9 billion were spent on energy efficiency programs aiming to reduce energy consumption in all major sectors, including corporations. Section 3.2 of the State Energy Plan provides specific information on these programs and their achievements.

The University at Binghamton

Is there a Governor's executive order or something similar to the order signed in 1992 by Harry Spendelar [Sp.?] that sets heat and light levels for university buildings. That would be a great deal of help, because if you can pull out a state-signed piece of paper, that helps a lot.

Response: The New York State Energy Conservation Construction Code establishes design conditions for heat and light in all buildings in the State except those in New York City, which has its own building and energy code. For example, the code's lighting power limits set the maximum watts per square foot for buildings. The code also sets maximum and minimum indoor design temperatures for heating and cooling.

Mike Mercincavage

The University at Binghamton has worked with an inventor who has developed an electronic ballast that consumes about 40 percent of what a standard wound transformer ballast uses and has monitoring capabilities in the form of photo diodes or cells that can monitor the ambient light level in the room and automatically adjust. I would like to see a closer relationship between NYSERDA and inventors trying to create something like that.

Response: NYSERDA’s Lighting Research and Development (R&D) program works closely with inventors to develop such products and works with New York State manufacturers to develop innovative and energy-efficient lighting products. The Lighting R&D program has helped commercialize over a dozen new lighting technologies. The

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R&D program also helps fund demonstration, testing, and evaluation efforts that would otherwise not be affordable for small to medium-sized companies. In this way, the Lighting R&D Program addresses both technical, informational, and financial barriers to new product commercialization activities.

Frank Bertoni

I believe a program similar to California that gives away energy saving bulbs as well as solar and wind incentives should be a major part of conserving our energy and reducing our dependence on foreign oil.

Response: Several of the energy efficiency programs currently offered in New York State promote the use of compact fluorescent light bulbs. Examples include NYSERDA's Residential Appliances and Lighting and Home Performance with ENERGY STAR® programs and Long Island Power Authority's Residential Lighting and Appliances program. These programs are based on the concept of market transformation or market development. Therefore, rather than simply giving away free light bulbs, these programs promote consumer awareness of the benefits of more efficient lighting and offer incentives to mid and upstream market participants to encourage the purchase of high-efficiency compact fluorescent light bulbs. This approach is expected to lead to greater, more widespread benefits than a simple give-away program.

Several of the energy efficiency programs currently offered in New York State also offer incentives for renewable technologies like photovoltaics (PV). For example, the **New York Energy $mart℠** Loan Fund provides reduced-interest financing for residential and business customers to purchase and install PV systems. The **New York Energy $mart℠** program also trains and assists installers of photovoltaic systems.

Binghamton Mayor Richard Bucci

Binghamton is involved in several energy efficiency projects that were partially funded through system benefits charge programs such as a regional power purchasing alliance of municipalities and various energy reduction strategies such as high efficiency traffic signals. Binghamton encourages you to continue to build on these programs, expand them if you can, and especially in the area of making power generated outside our borders available.

Response: NYSERDA is building on the energy efficiency programs offered during the initial SBC funding period. In January 2001, the Public Service Commission approved another five years of SBC programs (through June 30, 2006) and increased

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funding to $150 million annually. NYSERDA will continue to offer Technical Assistance programs, including rate analysis and aggregation projects to assist government, schools and other customers with installing metering and other equipment to enable aggregated commodity purchase.

Cancer Action

The word conservation does not appear very frequently in the State Energy Plan. Specifics are lacking in the State Energy Plan . For example, agriculture and dairy farming are not addressed. If New York State government were to provide tax credits for the infrastructure changes that are made by farmers to conserve energy, something specific and significant would be addressed.

There should be an educational feature in the State Energy Plan, educating people of the need to conserve. For each school group, grade one through grade twelve, one additional teacher would be hired for every 75 students to teach a class in Environmental Science, Conservation, and Ecology – whatever would be appropriate at their level of understanding.

Response: Energy conservation is covered extensively in the State Energy Plan's discussion of energy efficiency, Section 3.2.

Energy efficiency in agriculture and dairy farms is addressed through the SBC-funded Technical Assistance Program and Loan Fund. Farmers are provided with cost-shared professional studies to help identify opportunities to improve efficiency and reduced-interest financing to install energy efficiency measures like variable speed drives and plate precoolers.

Several of the State's energy efficiency programs have an educational component. An SBC-funded New York solar schools program will provide $1.75 million to install 50 small photovoltaic systems on schools and develop curricula on solar panels. This program will also involve a coordination system for schools with PV systems to exchange data on how these systems are operating. NYSERDA makes materials available to classroom educators on energy efficiency education for New York State's K-12 children.

Peter King

I would favor a really aggressive approach toward funding for energy efficiency in buildings, especially throughout the State university system.

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Response: All the major energy efficiency programs currently operating in New York State aggressively support energy efficiency in buildings and building systems. The schools and universities of the State University of New York (SUNY) are eligible for assistance through NYSERDA-administered system benefits charge programs and have participated in numerous projects. The State EnVest program is currently involved with projects at several State university campuses, including those at Cobleskill, Geneseo, Stonybrook, and Delhi. State EnVest provides energy efficiency improvements to these facilities through energy performance contracting. For more information on these programs and assistance for educational facilities, refer to NYSERDA's web site at www.nyserda.org.

The New York Power Authority has invested nearly $110 million in more than one hundred energy efficiency projects at SUNY and City University of New York campuses and at community colleges.

Raise Per Capita Spending for Energy Efficiency

Environmental Advocates

The Draft State Energy Plan should call for an investment in energy efficiency conservation and demand management at a level of $25 per year, per capita, through the system benefits charge, utility programs, and programs of the New York Power Authority and Long Island Power Authority.

Peter Zadis

The final Energy Plan should increase investment in energy efficiency and clean power.

Western New York Sustainable Energy Association

We should close the gap between New York and other states by raising efficiency spending to at least $25 per person per year. We're now around thirteen in New York State.

UPROSE

The Draft State Energy Plan needs to address the need for reduction, conservation, and increased funding for energy efficiency and conservation programs. The State Energy Plan encourages NYPA and others to build more power plants, instead of concentrating on reducing energy use. New York spends less than half of what

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Massachusetts, Connecticut, and New Jersey spend on a per capita basis on these programs.

Green Party of New York State

We support the establishment of specific goals within the Draft State Energy Plan for energy efficiency including investing at least $25 per year per capita or approximately 450 million for energy conservation and demand management.

Environmental Advocates

The Draft State Energy Plan should call for an investment in energy efficiency conservation and demand management at a level of $25 per year, per capita, through the system benefits charge, utility programs, and programs of the New York Power Authority and Long Island Power Authority.

Response: The various states investing in energy efficiency programs have different populations, different baseline levels of energy efficiency, and different program portfolios. Therefore, investments cannot be strictly compared on a per capita basis. New York's investments may be lower on a per capita basis, but the State has a large population, is already the most energy efficient in the continental U.S. (on a per capita basis), and is investing in many commercial and industrial market transformation programs that have significantly larger gains for the investments versus rebate-based programs.

Incentive and SBC Programs

Annie Wilson Miquet

I believe that the energy demand is increasing by one and one half percent and that NYSERDA's budget should be increased to meet or exceed that need.

Battery Park City Authority

Battery Park City believes SBC charges should be increased.

Response: In January 2001, the New York State Public Service Commission extended the system benefits charge (SBC) programs through June 2006 and increased funding from $78.1 million to $150 million a year. At this time, the Energy Planning Board is making no recommendations regarding extending and increasing SBC charges.

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New York Chapter Association of Energy Engineers

The State Energy Plan should make a reasoned case for clearly quantified goals and progress milestones for energy efficiency and renewables based on a minimum of $750 million in system benefits charge (SBC) funding through 2006 and leverage two to three times this amount in private finance. Goals should be expressed clearly in terms of electrical capacity to be achieved (megawatts and gigawatt hours)

Response: Section 3.2 of the State Energy Plan, the Energy Efficiency Assessment, provides megawatt and gigawatt hour projections for the system benefits charge (SBC) funding through 2006. Experience to date with the SBC-funded **New York Energy $mart℠** program indicates that the ratio of external spending to **New York Energy $mart℠** funds is 3.1 to 1. (See ***New York Energy $mart℠*** *Program Evaluation and Status Report: Report to the System Benefits Charge Advisory Group – Initial Three Year Program*, January 2002.) For every dollar of SBC funds spent by the **New York Energy $mart℠** program, an additional 3.1 dollars of external investment in energy efficiency is leveraged. While the ratio of external spending to SBC funds cannot be predicted with certainty through 2006, it is expected to be comparable to the first three years of the program.

In addition to the projected program achievements discussed in the Draft State Energy Plan, the State Energy Plan includes measurable goals for energy efficiency for all sectors and fuels of 25 percent below 1990 levels by 2010. The goal for energy efficiency is specified in trillions of Btus of primary energy use per unit of Gross State Product.

New York Chapter Association of Energy Engineers

We recommend that you create a system benefits charge for natural gas. There is no efficiency program for natural gas.

Response: The issue of whether a system benefits charge (SBC) should be created for natural gas was aired and is pending before the New York State Public Service Commission in Case 00-M-0504 – Proceeding on Motion of the Commission Regarding Provider of Last Resort Responsibilities, the Role of Utilities in Competitive Energy Markets, and Fostering the Development of Retail Competitive Opportunities. Electric SBC funds currently support energy efficiency programs to reduce the use of natural gas and petroleum when linked to projects that reduce electricity consumption.

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Executive Order 111

Western New York Sustainable Energy Association

We should strengthen Executive Order 111. Our concern is that it will not be fully and aggressively implemented. The guidelines have weakened in one key respect. The executive order says that all state agencies should reduce energy consumption by 35 percent by the year 2010 compared to 1990, and the guidelines remove that pressure on each agency to do that and just says the State. That's a very big difference. Each agency should be held to that standard.

Better Queens Environment (BQE)

The Governor's Executive Order 111, which requires State facilities to operate with ten percent renewables by 2005 and 20 percent by 2010, is a step in the right direction, but firmer strides need to be taken. The ten and 20 percent goals should apply to all energy generation and consumption, public and private.

Western New York Sustainable Energy Association

The recently released Guidelines for Executive Order 111 are not commensurate with the Order itself. For example, the Guidelines do not apply the Executive Order's requirement that State agencies achieve a 35 percent reduction in energy use by 2010 (compared to 1990) to each agency. This failure eliminates a critical measure of compliance. Also NYSERDA may not be adequately staffing the Executive Order program or conveying to State agencies the requirement that they fully comply with the Order. The great potential of the Governor's directive will be achieved only if the Guidelines are revisited and the program given some real teeth.

Response: Although the energy reduction numbers from each State entity subject to the Executive Order will be rolled up into an overall State average, each entity's performance will be individually reported to the Department of Budget and the Governor’s office each year. The 35 percent statewide reduction target is very aggressive and will require the full participation of all State entities that are subject to the Order. Each State entity will be expected to seek these targets individually. The Department of Budget and the Governor’s Office will then respond to any State entity that is delinquent in fulfilling the requirements of the Order.

The Executive Order, as issued by the Governor, defined NYSERDA’s role as Chair of the Advisory Council. The tasks of the Advisory Council include developing Guidelines and coordinating fulfillment by each State entity subject to the Order.

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With respect to policing implementation of the Order, the Order did not empower NYSERDA to act in that capacity. The Division of the Budget and the Governor's office together will undertake that task during implementation. NYSERDA's role is very clearly stated and is limited to coordinating and facilitating implementation with individual agencies.

Consumption and Other Reductions

Honorable Harriet D. Cornell, Rockland County legislator

A basic flaw of the Energy Plan is underestimating the will of the people and their desire to conserve energy. Specific goals must be stated in the Energy Plan for reduction in energy demand. (See Response on page 10-15.)

Torne Valley Preservation Association

Conservation goals that will have a significant impact on demand should be set with real dates for meeting the goals. (See Response on page 10-15.)

Natural Resources Defense Council (NRDC)

It's important to recognize that there's just nothing in the Draft State Energy Plan that commits the state or directs the State towards a real sustainable energy future. The State should make a commitment to energy efficiency. We should reduce our electricity consumption by at least ten percent by the year 2010. (See Response on page 10-15.)

Scenic Hudson, Inc.

The State should make a commitment to energy efficiency. We should reduce our electricity consumption by at least ten percent by the year 2010. (See Response on page 10-15.)

Great Lakes United

Energy efficiency and conservation is another category we want to address. In terms of conservation, New York State should commit to at least a ten percent reduction in statewide energy demand by 2010, along with interim targets. (See Response on page 10-15.)

Environmental Advocates of New York

Environmental Advocates urges that the Draft State Energy Plan set some specific goals, such as at least ten percent reduction of statewide energy demand relative to the

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2001 by the year 2010. The State Energy Plan should indicate how the goal will be met. (See Response on page 10-15.)

Sustainable Energy Alliance of Long Island

New York State must target more concrete and realistically attainable energy efficient and conservation targets for Long Island as well as New York State. The State must start with an overhaul of residential and commercial building codes that are seriously outdated and contribute to the enormous energy rate that is partially responsible for escalating energy demand in commercial and residential sectors.

The bulk of this initiative must target the growing number of low-income communities throughout the State to reduce and reverse the vicious cycle of energy loss in poorly insulated and maintained homes and apartments. (See Response on page 10-15.)

Sierra Club, Long Island Group; Environment Advocates of New York

The Draft State Energy Plan should include a list of energy goals and specific goals with strategies for reaching them. The goals should increase investment in and stress energy efficiency and conservation. The goals set should be reducing energy demand by ten percent over the next 10 years. It should be expanding investment in energy efficiency, conservation, and demand management.

A portion of this investment, perhaps a third, should be designated for the low-income sector. (See Response on page 10-15.)

Tom Salo

The State Energy Plan should double funding for energy efficiency, conservation and renewable energy sources. (See Response on page 10-15.)

Jo Ann Arcarese

The State Energy Plan should commit to a ten percent reduction in State energy demand. (See Response on page 10-15.)

Sierra Club, NYC Group

The Draft State Energy Plan does not place sufficient emphasis on the use of efficiency and conservation processes. A goal of at least ten percent reduction by 2012 of energy demand should be included. The investment in this program should also have significant portion designated for the low-income market. (See Response on page 10-15.)

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Long Island Neighborhood Network

The Governor should adopt a policy that sends a message to every municipality in the State of New York. Goals should be set to reduce energy usage by 10 or 20 percent, in a graduated way over a series of years. Streetlights could be retrofitted and improved. Government buildings could be retrofitted with geothermal. (See Response on page 10-15.)

Environmental Advocates of New York

The first thing the plan needs to do is increase investments in energy efficiency and conservation. A measurable goal of at least ten percent reduction in statewide energy demand by 2010 should be set through significantly expanding its programs and energy efficiency.

Investments should be made in energy efficiency, conservation, and demand management through the System Benefits Charge, utility programs, etc. A portion of this should be targeted specifically for the low-income sector. (See Response on page 10-15.)

Hudson River Sloop Clearwater, Inc.

The State Energy Plan should include a target of overall energy reduction by 35 percent and 20 percent of electricity generation from renewable resources should be included.

Response: In 2000, energy efficiency program spending in New York State was approximately $203 million. With the approval of a second round of SBC programs, and the continuation of several existing programs other than the SBC, funding for energy efficiency is expected to rise in upcoming years. In fact, funding for SBC, NYPA and LIPA programs alone is projected to be about $280 million in 2002. This funding alone is 38 percent more than was spent on all major programs in 2000.

The State Energy Plan includes measurable statewide outcomes for energy efficiency (including improvements in all sectors and all fuels) of 25 percent below 1990 levels by 2010. The expectation is expressed in trillions of Btus (tBtus) of primary energy use per unit of Gross State Product (GSP). This addresses energy efficiency for all sectors and primary fuel used in the State while allowing for continued sustainable economic growth. Achieving this expectation will require significant reductions in energy use and demand. This outcome is expected based on activities that are underway and planned and have a real expectation of being realized.

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The SBC program includes energy efficiency and demand management programs. Nearly 15 percent of the eight-year SBC program budget is allocated to low-income energy efficiency and affordability programs.

Buildings; Building Codes and Standards

Cooperative Coalition to Prevent Blackouts

The State Energy Plan should encompass the objective to educate residents regarding electric capacity in the State. It should support opportunities for residential electric consumers, including those living in multifamily buildings, to form a residential electricity curtailment infrastructure capable of responding to supply and distribution emergencies, and it should stimulate technological and institutional solutions that promote price responsive load management and load control technologies within the multifamily sector.

Response: The Energy Planning Board concurs with the suggestions in the comment. Numerous recommendations in the State Energy Plan support them. See Section 1.3, Energy Policy Objectives and Recommendations, in the Energy Plan.

David Stout

Buildings use about 36 percent of all primary energy in New York State. This use must be included in the Energy Plan . There's no discussions on that subject in the Energy Plan .

The Draft State Energy Plan should require new and renovated buildings in New York State to meet the insulation requirements of the U.S. DOE as shown in their publication called Energy Savers.

New York needs a program to encourage the installation of solar hot water systems on all buildings that use hot water or heated water or processed steam.

Response: New York State recognizes the significance of building energy use. As described in Section 3.2 of the State Energy Plan, New York is currently in the process of amending its Energy Conservation Construction Code. Once the latest amendments are adopted in summer 2002, New York's building energy code will be among the most progressive in the country.

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NYSERDA's **New York Energy $mart℠** programs encourage and provide incentives for the installation of solar hot water systems. The long payback periods on these systems is a barrier that NYSERDA continues to address.

Natural Resources Defense Council (NRDC)

With respect to tighter air-conditioner standards, the State has weighed in on that issue but the State needs to do a lot, lot more than just sending a letter. In terms of the legislative, administrative, and legal struggles going on to get tougher air conditioner standards, the State really needs to step up to the plate on that issue.

Response: The State supports the U.S. Department of Energy's rule setting residential air conditioner standards at the SEER 13 level. In addition, NYSERDA, in consultation with the New York State Office of General Services, is developing minimum efficiency standards for State purchasing. These State standards will cover residential air conditioning equipment purchased by New York State.

NYPA and LIPA Should Commit to SBC Spending

New York Public Interest Research Group

The State Energy Plan laid out why energy efficiency is needed for New York State through demand management programs. LIPA and NYPA need to invest in energy efficiency, conservation, and renewables programs. What I didn't see in the Energy Plan was a call for more energy efficiency funding. Where do we find the money? Through the New York Power Authority and the Long Island Power Authority. The Governor, through the Public Service Commission, practically doubled the systems benefits charge and we should see that mirrored through LIPA and NYPA because these types of programs have worked.

NYPIRG suggests that the New York Power Authority be required to spend 150 million dollars a year, excluding the clean boilers programs for schools, for demand-side management or energy efficiency programs. LIPA should commit $50 million a year in demand-side management programs developed through collaborative processes with the community, with local energy experts, and with groups – businesses and residents – here on Long Island.

This Energy Plan encourages NYPA and LIPA to build more mini power plants that do not have to go though the formal approval process. To retain an adequate buffer between supply and demand we must increase the funding for energy efficiency and

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conservation programs and renewable power generation from the New York Power Authority and the Long Island Power Authority to $150 million and $50 million per year respectively.

Star Foundation

We think Long Island Power Authority should be encouraged to increase funding to produce energy efficiency, conservation, and renewable energy production.

New York State Sustainable Energy Coalition (NYS-SEC) *et al.*; Stop the Barge

New York must increase the funding for energy efficiency and conservation programs and renewable power generation from the New York Power Authority (NYPA) and the Long Island Power Authority (LIPA) to $150 million and $50 million per year, respectively. On a per capita basis, Massachusetts, Connecticut, and New Jersey spend more than twice as much as New York on such programs.

Response: The State Energy Plan calls for NYPA and LIPA each to increase annual investment for energy efficiency programs by 25 percent and suggests that NYSERDA, NYPA, and LIPA continue to coordinate program offerings and delivery of energy efficiency services. See Section 1.3, Energy Policy and Recommendations.

Miscellaneous Recommendations

Pace University School of Law; Pace Energy Project

One of several big questions that the Draft State Energy Plan does not address and that it is imperative that the State Energy Plan answer is how much energy efficiency there should be.

The State Energy Plan should determine the correct amount to be spent on energy efficiency by calculating the costs and benefits on the margin. As long as the private and public benefits of energy efficiency exceed the costs, New York realizes benefits from each additional dollar invested. All the highly significant, but non-monetized, advantages of energy efficiency discussed above should be taken into account. The updated study of New York energy efficiency opportunities being conducted by NYSERDA should be useful in such a calculation.

Response: NYSERDA is conducting an energy efficiency potential study that will determine the technical, economic, and achievable potential for energy efficiency. The technical potential is defined as the upper limit for capacity and output theoretically

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possible, without regard for cost, market barriers, or market acceptability. The economic potential is defined as the cost-effective portion of the technical potential. The achievable potential represents the amount of the economic potential that can be expected under various cases, from the base case that is defined as naturally-occurring efficiency only, to the maximum achievable case that is defined as the most aggressive and ambitious policy support for energy efficiency. The results of this study will help State policy makers determine the correct amount to be spent on energy efficiency. The study is currently underway, but the preliminary technical potential results only are available and will be included in the State Energy Plan.

New York Chapter Association of Energy Engineers

Of particular note is the sharp decline in investment in energy efficiency after 1994 (see Table 3, page 3-16). Since 1994, the fall off in such investment has been precipitous. Even with the addition of SBC funds (see Table 5, page 3-18), investment is no more than 50 percent of 1992 and 1993. Comparing these two tables suggests that projected investment is not sufficient to replace the retirement of previously installed measures with assumed ten-year lives. In other words, the Energy Plan actually shows a decline in electric reductions realized through energy efficiency through 2006. Certainly this implication of the Plan is contrary to policy objectives and requires specific address.

Response: Investments from the early 1990s cannot be compared to those post-1998. The nature of energy efficiency programs changed significantly with the advent of the System Benefits Charge. Programs in the early 1990s, and before, focused on demand-side management and one-time transactions, whereas the market transformation programs beginning in the late 1990s focus on building the supply chain and increasing consumer demand to bring about more widespread adoption of sustainable energy efficiency products and services. For example, the majority of projected electricity savings shown in the State Energy Plan for NYSERDA System Benefits Charge programs include only direct program participants. The more widespread energy efficiency work that is expected once markets are fully developed would have to be added to the savings shown once these data are available. Therefore, once markets are fully developed, the actual electric reductions realized through energy efficiency through 2006 and beyond could be greater than those achieved in the early 1990s.

Alix Cooper

The State's long term energy plan must be one that focuses on energy conservation and efficiency rather than excess reliance on oil and nuclear power.

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Response: The State Energy Plan aggressively supports continued investments in energy efficiency and renewable energy. Increased energy efficiency and renewable energy will ultimately result in greater energy diversity and will reduce the risks associated with single fuel dependency and price volatility. Although aggressive in its support for energy efficiency and renewables, the State also supports the continued safe operation of nuclear, coal, natural gas, oil and hydroelectric generation as part of a diverse portfolio of electricity generation resources.

Better Queens Environment (BQE)

SBC money also funds "Environmental Monitoring and Analysis," with a budget of $2.4 million per year. The current focus is on emissions from combustion technology and on "understanding the role of local . . . air pollution . . .so that more equitable control strategies can be developed." Which we understand to mean funding for university research projects. Cumulative effects of power plant and other emissions must be included in any attempt at understanding the issue and promoting equity. If community groups are not made partners in these SBC-funded ventures, they cannot succeed. BQE recommends that community groups share a role with funded university researchers in the creation of research agendas.

Response: NYSERDA welcomes input from community groups in developing its research agenda for the Environmental Monitoring, Evaluation, and Protection (EMEP) program. In September 2001, NYSERDA held a conference in Albany that was attended by over 200 people, including many public interest, environmental, and advocacy groups. At this conference NYSERDA held a scoping session to develop a research agenda for the EMEP program. NYSERDA then posted the draft EMEP research plan on the NYSERDA Web site (www.nyserda.org) for public comment. Although the due date noted in the EMEP posting has passed, NYSERDA would still welcome your comments as the research plan is meant to be an evolving document. NYSERDA also meets once a year with environmental public interest groups to discuss programs and opportunities for collaboration.

The EMEP program has a strong advisory structure that includes several public interest groups and organizations involved in community environmental issues, including the Center for Clean Air Policy, the Pace Energy Project, and the Northeast States for Coordinated Air Use Management (NESCAUM). In addition, through EMEP, NYSERDA is launching a new program to develop low-cost air quality monitors to address local and regional air pollution issues. NYSERDA expects to issue a solicitation in this area in June 2002. This effort is being done in coordination with the California Air

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Resource Board, who is similarly interested in providing better data on air pollution. As part of this study NYSERDA is looking at effective ways of communicating air quality monitoring data to the general public. Several EMEP projects include aggressive community outreach and involvement. Included are an ongoing study of asthma in New York City that involved several meetings with community groups and a new study looking at nitrogen pollution in the northeast. The latter effort has sizable resources dedicated to communicating findings to the general public through a variety of outlets. NYSERDA and NYPA contributed to a major NESCAUM Clean Air Community Program at the Hunts Point Market Truck Stop to reduce local pollution through truckstop electrification. NYSERDA also teamed up with Clean Air Communities for a natural gas delivery truck program for Manhattan Beer Distributors.

Critical Comments

Diane A. Davis

With respect to the Green Buildings and FlexTech Programs, the Draft State Energy Plan does not mention the additional 10 to 30 percent cost to owners who are implementing these programs. What are the incentives to use these programs?

Response: In most cases, energy efficiency upgrades come with additional up-front costs. However, many incentives are available to implement energy efficiency measures.

First, both the FlexTech and **New York Energy $mart℠** New Construction Program (including Green Buildings) offer incentives to help defray the additional up-front costs. The FlexTech Program provides cost shared technical studies to help building owners to identify potential energy efficiency upgrades. If the owner decides to implement the recommended energy efficiency measures, they will be reimbursed for their share of the study costs. Owners choosing to implement the energy efficiency measures recommended by the FlexTech study can also receive financial incentives or reduced-interest financing through NYSERDA's other programs. Under the **New York Energy $mart℠** New Construction Program, NYSERDA provides technical assistance to building owners and financial incentives to cover up to 80 percent of the incremental cost for high efficiency measures in buildings that qualify as green under the federally established Leadership in Energy and Environmental Design (LEED™) program.

Perhaps the most important incentive, however, is the long-term cost effectiveness of implementing energy efficiency upgrades. All of the measures supported

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by the **New York Energy $mart℠** program have been screened for cost effectiveness. Therefore, any additional up-front costs that are not defrayed by SBC incentives will be recouped by the building owner over the lifetime of the energy efficiency measures.

Diane A. Davis

The Leadership in Energy and Environmental Design (LEED™) Program is adding ten percent to 30 percent to the cost of construction projects thus costing jobs among design community professionals.

Response: Adding high-efficiency measures to qualify for the LEED™ program can increase the initial cost of construction projects. However, these additional up-front costs will be paid back by the cost savings that accrue due to decreased energy consumption over the lifetime of the measures. Incorporating high-efficiency measures into building design is a value-added service that architecture and engineering firms can provide to their clients, thereby increasing their overall profitability. Demand for energy efficiency can actually help to create and retain jobs. For example, the $201 million committed during the first three years of the **New York Energy $mart℠** program is expected to result in annual bill reductions of nearly $120 million and the creation or retention of more than 2,300 jobs. These jobs are in the service and retail sectors and will be sustained for the lifetime of the energy efficiency measures.

Mirant New York, Inc.

Demand-side management ultimately is something that should be undertaken by market participants in response to proper price signals. Recognizing that there may be reason for government to encourage demand-side management at this time, the Draft State Energy Plan should look toward the future and recommend ways to phase out government's role in this area.

Response: As noted in the Energy Efficiency Assessment of the State Energy Plan, the demand-side management programs of the investor-owned utilities have been phased out and replaced with System Benefits Charge programs that primarily focus on market transformation. The **New York Energy $mart℠** market transformation programs, including Premium Efficiency Motors, New Construction, and Home Performance with ENERGY STAR®, aim to build long term consumer demand for energy efficiency while developing the infrastructure of energy efficiency product and service providers. Where DSM programs provided incentives for one-time transactions, market transformation programs build networks of allies and build awareness and knowledge among consumers with the ultimate goal of changing practices so that energy efficient

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practices are adopted by the market. The **New York Energy $mart℠** market transformation programs include baseline measurements and follow up studies to assess the level to which energy efficiency is being adopted by market participants. Exit strategies are also considered for when market is fully developed and the level of energy efficiency can be sustained in the absence of government intervention.

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11. Renewables

Wind

New York State Tug Hill Commission

The Public Service Commission order regarding the merger of Niagara Mohawk and National Grid sets the stage for a possible additional power line to the Tug Hill Region to handle potential wind energy development. There is considerable local interest in the proposal proceeding. To assist in this matter, the Tug Hill Commission is ready to work with NYSERDA and others in further assessment of the wind energy development potential of the Tug Hill region.

Response: The State Energy Plan includes numerous recommendations for promoting and supporting renewable resources and technologies and wind generation, in particular. NYSERDA has made a major commitment to wind generation and welcomes opportunities to work with public and private partners.

New York State Tug Hill Commission

The provision to allow local taxing jurisdictions to opt out of the wind and solar property tax exemption of section 487 of the State's Real Property Tax Law and the provision for local taxing jurisdictions to opt out of the exemption provide two policy extremes for wind energy development *i.e.*, either provide for total exemption or tax fully. Payments in lieu of taxes (PILOTs) provide a middle ground that is economically feasible for the sorts of wind projects recently built in the State and those now being proposed for Tug Hill. Section 487 does not provide clear authorization for PILOTs, and such authorization might facilitate wind energy development, especially in multiple taxing jurisdiction situations. The State Energy Plan might incorporate such a recommendation.

Response: Changes in tax law are under the purview of the State Legislature. Research is being conducted by the New York State Department of Tax and Finance into the feasibility of providing a tax credit for investment in renewable electric generation capacity.

Jennifer Bostaph

More information is needed on the Madison County Wind Farm in the Draft State Energy Plan. (See page 2-166.) There should be information on how the public reacted to having a wind farm built in their community, where in the community it was built, and

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how much energy is given off. Making more information available would help increase the growth of wind farms across the State.

Response: Information on the Madison County Wind Farm is available at NYSERDA's web site (www.nyserda.org) and at Wind Power New York (www.awea.org/WPNY). The references are included in the State Energy Plan.

Lake Shore Environmental Action of Wolcott

Wind power should receive at least the level of tax subsidy as photovoltaics in New York.

Response: Tax subsidies or tax credits require legislative action. Consideration is being given by the New York State Department of Tax and Finance with respect to the feasibility of providing a tax credit for investment in renewable electric generation capacity.

Green Party

With respect to wind power, the draft State Energy Plan, on page 3-42, notes that bird collisions are one of five potential impacts of windmills. This statement about windmills is obsolete. All new wind farms are more carefully sited to significantly mitigate any effects on local bird populations.

Response: The comment is correct that, when new generation technologies are used, bird collisions are no longer barriers to siting of wind power. The State Energy Plan reflects this understanding. See Section 3.3, Renewable Energy Assessment.

American Wind Energy Association (AWEA)

We should set a State goal of 1,000 megawatts of wind by 2010. It is not a sustainable policy for us to adopt a plan when it calls for a 72 percent increase in natural gas usage, a 24 percent increase in coal usage, and a 21 percent increase in gasoline. Let's not adopt those.

Response: Rather than single out specific renewable energy resources, the State Energy Plan makes numerous recommendations to increase the availability of renewable-generated energy, including wind. The Planning Board expects the State's share of renewable energy, as a percentage of primary energy use, to increase from ten percent in 2000 to 15 percent by 2020. In addition, recommendations that New York Power Authority and Long Island Power Authority competitively solicit electric capacity from

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renewable energy resources specifically mention wind generation. See Section 1.3 of the State Energy Plan.

American Wind Energy Association (AWEA)

At the federal level, New York should be on the record supporting an extension of the production tax credit for large-scale wind development and, in changes to the Federal Clean Air Act, should support an allocation of emission credits under the cap-and-trade program for renewables.

Response: The State and other partners have supported both a production tax credit for large-scale wind development and changes to the Federal Clean Air Act that would allocate emissions credits under a cap-and-trade program for renewables.

Offshore Wind

Star Foundation

Our organization has been going around doing some missionary work [on offshore wind projects]. There's overwhelming support for this energy generation down here, and, hopefully, the State will provide some guidance, leadership, and money for it. There's going to be a little bit of a regulatory quagmire with the various regulatory agencies. We hope the Draft State Energy Plan could address that and also do things to facilitate [offshore wind].

Response: The potential for off-shore wind is addressed in the *Efficiency and Renewable Energy Potential Assessment* referred to in Section 3.3, Renewable Energy Assessment, of the State Energy Plan. NYSERDA is actively promoting wind energy development in New York by providing support to developers interested in finding possible wind sites. Technical and financial assistance are available.

Bald Eagle Power Company

In this entire 350 page document [the draft State Energy Plan], there is only one mention of offshore wind energy, and that is in a footnote on page 3-61. Bald Eagle recommends the following:

- End users who buy green power should receive a New York State tax credit of 1.5 to 2 cents per kilowatt hours for a period of ten years. The average customer who is not investing in expensive photovoltaics or fuel-cell equipment should be able to benefit by simply being a purchaser of green power.

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- The State Energy Plan should mandate that LIPA spend a meaningful percentage of its R & D funds for major offshore wind energy development, in proportion to what they have spent on other renewable technologies.
- The public has little understanding of renewable energy. We would like to see the inclusion of a more aggressive public education program regarding renewables and in particular the potential of offshore wind power.

Response: Wind energy, whether developed on land or off shore, is important to the State and is being supported. Many strategies for increasing the supply of and demand for renewable energy are represented in the State Energy Plan. NYSERDA has targeted more than $91 million for renewable energy resources and technologies through the system benefits charge program. More than half of that sum will be used for development of various types of wind energy technologies. With respect to public education, NYSERDA has recently introduced a $1.5 million program to assist the renewable industry with marketing and education about renewable energy. The program will develop a web site, offer technical seminars and consumer education publications, fund research papers addressing specific renewable energy issues, and conduct general outreach and awareness forums.

Wind energy producers currently receive a federal production tax credit and beginning in 2003, wind energy producers will be eligible for the NOX set aside program. Through this program, each 1.33 gigawatt hours of electricity produced will be certifiable as a one-ton NOX allowance that may be sold on the open market at the prevailing market price. New York State is unlikely to offer a tax credit to purchasers of green power. However, in the near future electricity customers will be informed about the environmental attributes of the power being supplied to them. The information will appear on utility bills and compares nitrogen oxides (NOX), sulfur dioxide (SO_2), and carbon dioxide (CO_2) emissions from generation of the power sold by the customer's supplier with the statewide average. The information will stimulate suppliers to add green power to their mix.

Hydropower

The University at Binghamton

Hydroelectric and biomass and coal co-fired projects that are put into operation after December 31, 2001 should be included as part of the ten percent green energy required by Executive Order 111.

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Diane A. Davis

The Plan is way too myopic and irresponsible in its lack of direction for hydropower.

The University at Binghamton

The State Energy Plan should rethink disallowing hydropower from consideration as a new source of green power, also coal, renewables, wood, and wood paper products.

David Bradbury

The State should encourage development of clean hydropower.

Ashok K. Trikha

It is suggested that a second look at the costs and benefits of hydropower be included in the State Energy Plan.

Response: The Energy Planning Board supports development of all energy resources that are cost effective and meet applicable environmental and other requirements. The Board supports use of indigenous resources, in particular. To the extent that water resources are available, the development of clean hydropower is certainly included as one of the resources that should be considered. The results of the technical assessment portion of NYSERDA's *Efficiency and Renewable Energy Potential Assessment* study are incorporated in the State Energy Plan.

Tidal (Estuary) Power

New York State Sustainable Energy Coalition (NYS-SEC) *et al.*

New York State has one of the largest estuaries in the continental United States. The Hudson River estuary has tidal flows daily upriver to the Troy dam above Albany, New York. The Hells Gate area of the Hudson Bay has the strongest tidal flows in the entire estuary and actually creates a vortex. Yet, there is absolutely no mention in the State Energy Plan of researching tidal flow power generation in the Hudson River estuary.

This method of producing power would produce completely pollution free power with no fuel consumption or costs. The only costs to produce power in this manner are the original capital costs and infrastructure maintenance.

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Power generation platforms could be located offshore using vast space for combined solar, wind, and tidal flow power generation.

Response: Tidal power is a viable renewable energy resource that at this point in time has numerous problems associated with its use. For example, tidal power suffers from problems matching the supply and demand for the electricity. Depending on the climate, electricity demands peak at particular times throughout the day, often in the morning and in the evening. Because the tides are sinusoidal, matching the possible power output with the times of peak demand is difficult. As a result, tidal power plants usually require a backup system to meet the demand when the tidal plant cannot. These backup plants often operate on fuel oil or natural gas. When the cost of the tidal plant and the backup plant are combined, the option of tidal power becomes quite expensive.

One of the major problems facing the construction of tidal power plants, or barrages, is finance. Once built, a barrage will generally take several decades to repay the investment costs. With conventional power plants, construction is expensive but a significant portion of the overall cost is the cost of fuel, which cost is incurred after the plant has been built. Consequently, some of the cost is deferred until after the plant has started providing income. With renewable power plants, such as tidal plants, nearly all the costs are capital costs. It is often harder to find investment sources when the cost must be covered entirely up front, before any income is returned.

The construction of a large barrage across an estuary would clearly have an effect on the local ecosystem. The most obvious potential impact would be the wildlife, such as the fish and birds. The turbine blades would kill fish if they swam through the water passages of the barrage. Also, estuaries often play host to migratory birds who feed on worms and other invertebrates that are on the exposed mud flats. On the other hand, tidal power plants have a positive effect by reducing the possibility of flooding.

Tidal power stations are already being used in Canada, France, Russia, and China. The largest, on the Rance River in France, generates 320 megawatts of electricity.

Solar, Photovoltaics

Power Light Corporation

Power Light feels there are things that need to be in place for more widespread deployment of photovoltaic (PV) technologies in New York.

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With respect to buy-down money, in order to encourage the private sector to invest in PV, buy down money – money to buy down the initial cost of the system – is the most effective way of getting the private sector involved. NYSERDA has money available, but it is not across the board. We believe a small amount of money, for example, $30 million for the next five years, be set aside so there is a buy down available at all times. This would encourage about ten megawatts of PV installations per year.

Response: Financial incentives for commercial photovoltaic (PV) systems are available through several NYSERDA programs including PV on Buildings ($1 million a year budget), the New Construction Program ($3 million a year reserved for PV), and the **New York Energy $mart**[SM] Loan Fund. NYSERDA's programs are designed to develop the infrastructure necessary for PV and other renewable energy technologies to be deployed effectively and not to provide directed investment in projects. At an installed cost of $10,000 per kilowatt, a direct investment of $30 million in PV generation would procure merely three megawatts of installed photovoltaic capacity. $30 million will provide substantial assistance in expanding the renewable energy resources industry through leveraging private investment and training. More information about NYSERDA's renewable programs is available from www.nyserda.org.

Power Light Corporation

With respect to State procurement of photovoltaic electric generation, direct State procurement over the next five years from the New York Power Authority (NYPA) and the Long Island Power Authority (LIPA) would provide a predictable and stable market for the industry. If we know that market was in place, industry would make investments in manufacturing and marketing in New York. But we need to have that predictability.

Response: The State Energy Plan contains recommendations that NYPA and LIPA competitively solicit bids for long-term contracts for the purchase of 100 megawatts each of renewable energy resources. See Section 1.3.

Green Party Binghamton

New York should lead the way and force the million solar roofs initiatives to speed up their projected time lines, developing jobs and businesses in New York to service solar powered customers and producers.

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Jennifer Bostaph

More information should be provided on the Million Solar Roofs Initiative discussed on pages 3-57 of the draft State Energy Plan. Where are the 10,000 roofs going to be installed? Can residential dwellings be part of this initiative?

Response: The Million Solar Roof Initiative is a federal program that promotes solar technologies for commercial and institutional applications. In New York State, Long Island Power Authority has committed to installing 10,000 solar roofs by 2010. As part of its participation in this program, LIPA is working to develop a certification process for PV installers. As part of its **New York Energy $mart**SM programs, NYSERDA developed the Residential PV Program and the **New York Energy $mart**SM Loan Fund to provide incentives for the purchase of residential PV systems and to build the support infrastructure for the technology. Information on the Million Solar Roofs Initiative can be found at www.eren.doe.gov/millionroofs/.

American Lung Association of Nassau-Suffolk

We support the development and deployment of wind and solar. The State should develop a plan to use these sources of energy as well as encouraging programs and policies to make it easier for residents to adopt renewable energy technologies. The State can encourage economic growth by providing funding for manufacturers to locate in New York State.

Response: Section 3.3, the Renewable Energy Assessment, of the State Energy Plan describes NYSERDA's Solar Electric and Wind Product Development Program, that is funded at approximately $1 million per year and supports New York State manufacturers of renewable energy products with incentives and technical assistance. The State Energy Plan makes numerous recommendations that support renewable energy resources and technologies. See Section 1.3.

David Stout

When considering energy sources, the energy of the sun has to be recognized as the only long-term energy source. A supply assessment in your report needs to be created for that source. The actual use or primary energy source, the sun, and its effects using energy efficient devices must be advocated.

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Pace University School of Law, Pace Energy Project

I would implore you to make the Draft State Energy Plan as customer friendly for solar as possible. We need more dealers, installers. We need to grow the infrastructure in the State. We need to get the word out. We need as much help as we can to make the interconnection process smoother.

Response: The use of solar energy – the sun – via photovoltaics technologies is discussed in the Renewable Energy Assessment, Section 3.3 of the State Energy Plan. The State Energy Plan fully endorses expansion of the State's solar industry through increased research and development and building the solar industry support infrastructure.

Jennifer Bostaph

Passive solar energy is mentioned on pages 3-68. How much is passive solar energy used in NYS? What is the potential for this use? Information on this matter should be distributed to homeowners.

Response: The extent of passive solar energy use in New York State is unknown but there is anecdotal evidence that many passive homes exist, particularly in rural, off-grid settings. This relatively simple technology has broad applicability in residential settings but interested builders and homeowners face problems obtaining conventional financing.

The State Energy Plan calls upon the State to expand its efforts to improve the efficiency of energy generation and encourage use of indigenous and renewable energy resources. One recommendation addresses low-cost, passive building efficiency measures, including passive solar design.

Interconnection Standards

New York Public Interest Research Group

The interconnection and exit fees are exorbitant and need to be eliminated or completely restructured.

Power Light Corporation

With respect to interconnection standards, we need very simple, low, or no cost interconnection to the utility grid. It's a major obstacle. We've fought battles on literally every system we've put in.

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Plug Power, Incorporated

In terms of things that can happen in the energy system, it's important that we look for ways to change the interconnection standards. The most efficient way to operate distributed generation is in parallel with the utility system. This raises a number of regulatory issues that can present barriers to entry for the distributed generation. New York State must eliminate these barriers or risk losing the environmental benefits associated with distributed generation and fuel cells.

Response: The Public Service Commission's (PSC) Standardized Interconnection Requirements for installations with a capacity of 300 kilowatts or less connected to radial distribution systems were finalized in 1999. The document provides for a standard application and contracts along with technical requirements for interconnection with utility systems. The PSC is now proposing several revisions to the standards to further simplify the process, in particular for small photovoltaic systems that are eligible for net metering.

Interconnections within network systems and for facilities greater than 300 kilowatts are more problematic. The PSC staff is monitoring efforts at the national level to standardize and streamline interconnection standards for units larger than 300 kilowatts. While the Energy Planning Board supports further efforts to simplify interconnections, care must be taken before allowing interconnections that compromise public and worker safety and system reliability.

Net Metering

Alfred University

The barriers to installation and connection of residential renewable energy systems ideally should be seamless. Net metering, tax incentives, and rebates for residential photovoltaic systems are welcome, but none of these incentives can be implemented without a signed contract with the utility. I hope the State can reevaluate its net metering law and allow wind generation. (See Response on page 11-12.)

New York Public Interest Research Group

The net metering policy for solar energy should be extended to include wind. (See Response on page 11-12.)

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Harbec Plastics, Inc.

Depending on the size of the distributed generation plant, you need net metering. (See Response on page 11-12.)

Connie Fargnoli

We own a small wind turbine and we've been pushing for net metering for it. (See Response on page 11-12.)

Western New York Sustainable Energy Association

The first recommendation is to accelerate green power development by removing barriers to net metering. Net metering should be expanded to include wind and the ten kilowatt cap should be removed. (See Response on page 11-12.)

Power Light Corporation

Power Light is a leading developer of commercial PV systems in the U.S. Power Light feels there are things that need to be in place for more widespread deployment of PV in New York. (See Response on page 11-12.)

With respect to net metering, the current net metering bill has a cap of ten kilowatts. Ten kilowatts is tiny and, really, in the commercial world, is meaningless. If we want to reach our goals, we need to raise our cap. We suggest it should be raised to one megawatt standard, as was done in California. There is legislation on the federal level in place for one megawatt net metering. It costs the State nothing, it is just a regulatory change. (See Response on page 11-12.)

Green Party Binghamton

A barrier built into the draft State Energy Plan restricts the freedom of New York's electricity customers to participate in net metering programs. While New York is one of 35 states that require utilities to allow residents to participate in net metering programs, New York's net metering program established by the Solar Choice Act of 1997 is limited to 0 .1 percent of the 1996 peak demand. In contrast, Vermont and Ohio have limits ten times greater and twenty states have no limits. New York needs to catch up with the states that do not inhibit the freedom of their citizens to make power.

The draft State Energy Plan states that the New York State Public Service Commissioner will review the current limitations on net metering in 2005. The Green Party urges that this review be moved to the present, near the fifth anniversary of the Solar Choice Act.

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New York's net metering program should be extended to wind energy. (See Response on page 11-12.)

Renewable Energy Works

Removing barriers to net metering should be a major point of the State Energy Plan. Several flaws in the net metering law are responsible for the fact that very few systems have been deployed. The net metering program should be extended to clean, renewable wind power, and the cap of 0.1 percent of the utility's capacity should be eliminated. (See Response on page 11-12.)

Hudson River Sloop Clearwater, Inc.

A more inclusive net metering law should be introduced. Connecticut allows both residential and commercial with no limit.

Response: Net metering was adopted by the New York State Legislature, and the ten kilowatts per unit and the overall capacity cap are set by Law. Any change, including inclusion of wind power, would require legislative action. It may be incorrect to say that increased net metering would cost the State nothing because the benefits that the net metering customers would receive could result in added costs for other ratepayers. The Legislature would need to consider whether it wishes to change the law to increase the overall capacity cap. The Governor currently has a program bill to expand net metering to digesters. In the State Energy Plan, the Energy Planning Board recommends expanding net metering.

Hydrogen

Mike Mercincavage

There's been a lot of hype about a hydrogen-based economy. The hydrogen-based economy described in the State Energy Plan will rely on natural gas. All the natural gas reserves are owned by oil companies. It's a primary source of cheap heating and energy right now. If it were used for powering cars as well as for home heating, the supply and demand curves would show we're going to have a terrific increase in the cost of home heating. There are alternatives to natural gas for the production of hydrogen. We need a cheap way to provide the electricity to break down water. The State Energy Plan could set the direction to find a better way to create hydrogen, through the universities through the State.

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Response: While the goal is an important one, the level of funding necessary to reach technical success is beyond the scope of a single state. The U.S. DOE is devoting research funds in the development of biological and chemical methods to produce hydrogen.

At this point in time, electrolysis of water is an expensive way to make hydrogen. It is technically feasible, but uneconomical without low-cost electricity.

Koganeya Toshiyuki

There should be more emphasis on hydrogen-based energy systems (such as fuel cells) since hydrogen emits water, not carbon dioxide, when burnt.

Response: New York State has made a significant contribution to promotion of fuel cells through NYSERDA's partnership with pioneering Plug Power, LLC. From 1992 to 1997, NYSERDA invested over $3 million in fuel cell research. In addition, NYSERDA has completed a $6 million project jointly funded by the Clean Air/Clean Water Bond Act and Plug Power, LLC to manufacture, evaluate and field demonstrate 80 Plug Power fuel cell power systems at various State-owned facilities and locations. The final project report *Field Demonstration of Plug Power PEM Fuel Cell Systems* will be released to the public in June 2002.

Fuel Cells

Key Span

Key Span is the largest servicer of fuel cells in the country. We take issue with references in the study that fuel cell technology is not yet mature. The NASDAQ sign outside this building is operating on 200-kilowatt fuel cells installed and serviced by Key Span. We have two units that have been operating since 1996. They have gone over 40,000 hours now without incident. While we do think that there have been some challenges at different sizes, we don't want to lose the fact that we have had real success.

Response: Although fuel cells are technologically viable, their commercialization potential is currently limited by a number of barriers including their high initial cost. The Energy Planning Board looks forward to, and expects, fuel cells to be commercially viable in the near term. Fuel cells are discussed in detail in Section 3.3., Renewable Energy Assessment, of the State Energy Plan.

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Plug Power, Incorporated

In the Draft State Energy Plan, you talk about solid oxide [fuel cells] as an investment. Plug Power believes that it is more important to invest in Proton Exchange Membrane technology.

Response: The Energy Planning Board in the State Energy Plan does not advocate for specific technologies. Therefore, the reference to the investment potential of solid oxide fuel cells was removed from the Energy Plan.

MTI Micro Fuel Cells Inc.

MTI MFC is dedicated to rapid development and commercialization of direct methanol micro fuel cells. We are pleased to see fuel cells play such a visible role in the draft State Energy Plan. We would request that the focus of fuel used in fuel cells be expanded to more than just gaseous hydrogen and hydrogen rich reformate (see page 3-69 of the draft State Energy Plan). Although hydrogen has long been connected with fuel cells, it is erroneous to assume that hydrogen is the only viable fuel to be used. We respectfully request that direct methanol fuel cells be included in the listing of fuel cell technologies.

Response: Methanol is a viable alternative to natural gas for fuel cells and can be used in conventional fuel cells. However, since methanol currently costs more than natural gas, it is not an economic alternative to natural gas for use in fuel cells that can use either fuel. MTI and others are working on direct methanol fuel cells that could reduce the initial cost and make the product competitive despite the higher cost of the fuel. At the current time almost all work on direct methanol fuel cells is with fuel cells that are extremely small, *i.e.*, cell phone battery size.

Biomass

Diane A. Davis

The State Energy Plan should encourage small business to collect grass and shrubbery cuttings as well as agricultural waste for the use as a steady supply of fuel in biomass cogeneration facilities to produce steam for electricity generation.

Response: NYSERDA's forthcoming *Efficiency and Renewable Energy Potential Assessment* regarding the potential contribution to New York State's energy mix of biomass co-fired with coal and of municipal solid waste-to-energy technologies will be

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finalized in the late summer of 2002. This study will address the economic potential for a number of renewable technologies, including bio-power.

The Energy Planning Board encourages all reasonable efforts to establish a biomass industry in New York State including innovative uses of agricultural and other waste products.

Jerry Michael

New York State has closed all but one of its wood pulp plants, and this is a mixed blessing. From an environmental standpoint, it's probably good news. From an economic standpoint, it's bad news. Is anybody examining the use of biomass for electric generation and to support another important industry – the timber industry -- in the State? Is anyone looking at the impact using biomass as a fuel for electric generation has on the environment?

Response: There are two wood burning power plants in the State and two utilities that are interested in co-firing wood with coal. These plants use clean waste wood products from timber stand improvement activities and the forest products industry. In addition, NYSERDA is working with companies to develop technologies to convert wood into high value fuels and chemicals.

The impact of biomass power on the environment has been explored from a number of different perspectives. The power plant must receive a permit from NYSDEC and thus meet all applicable air quality regulations. Because wood is a renewable resource, generating electric power from wood is considered to have no impact on greenhouse gas emissions. When a clean waste wood resource is used to generate power, the waste is put to an economic use as opposed to being placed in a landfill. With proper forest management, harvesting wood for energy can provide an outlet for low quality trees and provide an incentive for a landowner to take better care of the forest land as opposed to harvesting only the most valuable timber.

Landfill Gas and Methane

Robert Lambert

Methane production from farms and sewage treatment plants should be encouraged as part of the Draft State Energy Plan.

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Diane A. Davis

Do not develop methane from landfills as this will add hydrocarbons into the ambient atmosphere, create additional greenhouse gases and contribute to acid precipitation and global warming.

Response: NYSERDA currently supports methane production on farms and has worked to modify the net metering legislation to include farm-based electricity from methane and to reduce stand-by rates. NYSERDA is also in the process of assessing the potential for generating electricity from sewage treatment plants.

Jennifer Bostaph

The use of landfill gas is discussed in pages 3-66. How many landfills are in NYS? What is their energy potential?

Response: The number of sites and energy potential appears in Section 3.3 of the State Energy Plan. Analyses conducted since distribution of the draft State Energy Plan have identified 18 operational sites, two more than was indicated in the Draft State Energy Plan. A preliminary estimate of total landfill gas electricity generating capacity is 53 megawatts, changed from the figure of 46 megawatts that appeared in the Draft State Energy Plan.

Landfill gas-to-energy projects capture the methane that would otherwise be released into the atmosphere and use it to produce electricity. If not burned or used in some way, methane is a greenhouse gas that produces a negative impact on global warming 21 times greater than that produced by CO_2.

Waste-to-Energy

Integrated Waste Services Association (IWSA); Covanta Energy Corporation

Our concerns are that the Draft State Energy Plan does not include waste-to-energy as an eligible technology for any of the initiatives contained in the plan. [See comments for list of reasons why waste should be considered renewable.]

This March, in fact United States Environmental Protection Agency is due to release an emissions data base of actual emissions from every waste-to-energy plant in the country. We are the only industry to have this kind of data base, and they have told us that the data show that the control technology has exceeded the U.S. EPA's estimates for mercury and dioxin.

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American Ref-Fuel

The State Energy Plan should be compatible with federal statute in relation to waste-to-energy as a sustainable, indigenous power source. Section 3.5 of the Draft Plan should expressly include waste-to-energy (WTE) as renewable. It should either be included as a subset of biomass or be included in the definition of renewable energy or both.

Response: A discussion of waste-to-energy has been added to the Electricity Assessment, Section 3.4 of the State Energy Plan. The State does not consider waste-to-energy renewable at this time.

Integrated Waste Services Association (IWSA)

IWSA is also concerned because the Draft State Energy Plan states that no any new capacity additions will come on line in the State in the foreseeable future. But, in fact, within the last six months, a plant in Onondaga County has expanded its capacity over 50 percent, and more plants in the State are planning to do so. We feel it is very important for the State to include this indigenous, nondepletable energy source in any incentives that the State proposes.

Response: Waste management is an important industry that has yet to fully realize its potential. A recent NYSERDA study, entitled *Internal Working Survey of Landfill Gas-to-Energy Projects in New York State, 2001*, suggests that an additional 18 megawatts of landfill gas generation could be developed. The Energy Planning Board does not categorize waste-to-energy as a renewable energy resource, and while waste-to-energy plants are neither encouraged nor discouraged in the Energy Plan, siting such facilities is subject to applicable State and local laws. Waste-to-energy is included in the Electricity Assessment of the State Energy Plan as a potential resource for New York State.

Independent Power Producers of New York, Inc. (IPPNY)

The State Energy Plan acknowledges that renewables are an important part of the generating mix in New York, but IPPNY believes the benefits of large scale renewable projects need to be emphasized. Waste-to-energy, biomass, wind, and hydropower projects should be encouraged throughout the state. In particular, waste-to-energy technology should not be overlooked.

Response: The technologies mentioned in the comment are the major ones that New York will likely rely on to help meet future energy needs. Mechanisms for

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developing large scale projects are currently being explored or in development. Moreover, the State has established an environmental disclosure program. Through the program, an environmental disclosure label will be attached periodically to utility bills and will show the environmental attributes of the power purchased by the consumer. This is expected to further spur private investment in large-scale renewable projects. As discussed in the previous response, the Planning Board does not categorize waste-to-energy as a renewable energy resource.

Through the system benefits charge program, NYSERDA is working to bring large wind power into the market. NYSERDA programs involve building the demand and the supply of green power by partnering with private companies interested in the renewables market.

New York Power Authority (NYPA) Renewables Projects

Better Queens Environment (BQE)

With respect to New York Power Authority (NYPA) and renewables –

- The Draft State Energy Plan notes that NYPA is prohibited from selling energy for profit in New York State. BQE would like to know whether NYPA is permitted to sell energy for profit outside New York State.
- BQE recommends that NYPA contribute SBC funds to NYSERDA to promote energy efficiency and renewables and to assist low-income citizens. To exempt almost one-quarter of the State's generating capacity from fully supporting these programs, while creating redundant parallel programs, is an inefficient use of the State's resources.

Response: The New York Power Authority (NYPA) is a State-owned, non-regulated utility. It must act in accordance with applicable State and federal legislation. It is permitted to sell power outside New York under Federal Energy Regulatory Commission guidelines as supplies and pricing permit. The State Energy Plan recommends that NYPA increase its annual spending on energy efficiency by 25 percent and cooperate with NYSERDA and the Long Island Power Authority in offering and delivering programs. With respect to SBC contributions, NYPA is not regulated by the State Public Service Commission, the body that has authority over the SBC. NYPA has its own SBC-equivalent programs offered in collaboration and cooperation with NYSERDA.

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Funding for Renewable Technologies

Better Queens Environment (BQE)

With respect to funding for renewable technologies programs, of $38 billion spent every year on energy in New York State, funding for renewables programs is $11.6 million per year. This amounts to less than 0.3 percent. According to the Draft State Energy Plan, neighboring states allocate $68-102 million for renewables. A comparison with European energy priorities is also enlightening. Individual states in Germany (Schleswig-Holstein) and Spain (Navarra) produce 19 and 22 percent, respectively, of their energy from wind alone.

Response: As indicated in Section 3.3 of the State Energy Plan, NYSERDA will spend $77.5 million between 2001 and 2006 on renewable energy resources and technologies. This is in addition to funds spent on renewables by LIPA and NYPA. NYSERDA's renewable energy programs are designed to address development from multiple perspectives. Rather than directly funding projects, technical and market barriers are addressed. Among major impediments to full implementation of renewable energy resources are lack of demand for green power and lack of a green market infrastructure. For example, at an installed cost of $10,000 per kilowatt, a direct investment of $30 million would procure merely three megawatts of installed photovoltaic capacity. $30 million will provide substantial assistance in expanding the renewable energy resources industry through leveraging private investment and training.

It should be noted that a high percentage of energy from wind generation might be possible in states and regions of the country that have low loads and unlimited land for installation of wind production. This is not the case in New York State.

Better Queens Environment (BQE)

The **New York Energy $mart**^{SM} programs, which are funded by the system benefits charge, fail to adequately promote renewables. It is our understanding that the **New York Energy $mart**^{SM} programs offer loans and direct incentives to industry but only tax incentive based programs for private homeowners. Only 179 homes have participated in the first year of the program. BQE feels that loans and grants should be made available to qualifying low-income participants.

Response: NYSERDA is working to develop the infrastructure for manufacturing renewable technologies and supporting the renewable industry rather than simply providing rebates or one-time incentives. The State is supporting development of

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photovoltaic systems that are of high quality and that engender positive public response as opposed to systems that fail, leading to negative publicity. Section 3.3, Renewable Energy Assessment, contains information about State programs and contains a table showing the distribution of funding for various sectors. Incentives are provided for all sectors.

Diane A. Davis

New York State must give more incentives for owners and designers to use, such as cheaper construction loans, tax credits, etc. What about legislation requiring all new and retrofit residential and small commercial projects to incorporate solar collector panel technology?

Response: The **New York Energy $mart℠** Loan Fund Program, described in Section 3.3, Renewable Energy Assessment, of the State Energy Plan, provides interest reductions on loans for residential and commercial customers who install energy efficiency improvements and renewable energy systems. The Home Performance with ENERGY STAR® program also provides reduced interest on loans for energy efficiency improvements and renewable energy systems for one- and two-family homes.

Gaining support for legislation mandating solar collector panels might be problematic because the costs of such systems currently exceed conventional systems and would increase housing costs. This is an issue for the State Legislature to address.

Diane A. Davis

Tax credits should be instituted for non-polluting alternative energy sources .

Environmental Defense

The State should expand its tax credit program to foster construction and retrofitting of the most energy efficient buildings with renewable generating capacity.

Response: While New York does not offer a tax credit for energy-efficient retrofits, a 25 percent tax credit is available for photovoltaic systems. Consumers can also use the **New York Energy $mart℠** Loan Fund to finance energy efficiency and renewable energy projects.

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Renewable Targets

Great Lakes United

Great Lakes United sees no statewide targets for renewables unless it is the 1.9 percent by the year 2020 which is laughable. The consensus goal of many groups working on this across the Great Lakes region is 20 percent renewables by 2020. This does not include hydropower, which, because of its many impacts on the fresh water ecosystem, must be treated separately.

Erin Cala

In the Draft State Energy Plan there's a goal for New York State to have only one percent of its energy provided by renewable energy by 2020. This is unacceptable. This percent must be drastically increased. Governor Pataki's Executive Order 111 requires that State agencies purchase 20 percent of their power from renewable sources by 2010. The Draft State Energy Plan is in direct contradiction to this objective.

Lois M. Sturm

This State Energy Plan pays lip service to renewable energy, but in fact only projects an increase in renewable energy's production from one percent to two percent by 2020. And ninety percent of that renewable energy is hydroelectric, which energy experts do not consider sustainable.

UPROSE

The Draft State Energy Plan needs to commit to renewable power, such as wind and solar, which are clean and sustainable sources. Two percent of all power generated in New York coming from renewables is not adequate or acceptable.

Response: Expanding the supply of renewables requires an increase in demand for renewable energy. With the Governor's Executive Order 111, New York State is leading by example in creating market demand.

NYSERDA is working to bring green power marketers into New York and to build new renewable power supplies. Moving into a competitive retail power market will enable consumers to select the electric power mix that has the attributes they desire.

The State Energy Plan includes several recommendations that address this issue. The possibility of an investment tax credit for renewable electric generation capacity is also under consideration by the State.

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The State Energy Plan includes as an expected outcome a 50 percent increase in primary energy use from renewable energy resources by 2020.

Green Pricing

Alfred University

Alfred University would like to see a statement supporting utility green pricing programs similar to the program that was recently announced by Niagara Mohawk and encouragement for other utilities to offer green power to their customers.

Janet Allen

We need to have the opportunity to purchase green energy. We need to provide tax and other incentives for consumers to choose clean, renewable energy and to conserve. Please make conservation and clean renewable energy the focus of New York State's Energy Plan.

American Wind Energy Association (AWEA)

NYPA should incorporate wind energy into its overall portfolio by seeking competitive bids for the purchase, through long-term contracts, of the output of large-scale wind turbines.

R.G.S. Energy Group/Rochester Gas & Electric Corporation

The State should encourage the development of renewable technologies that are reliable, sustainable, and price competitive with other energy products. Consistent with New York's goal of reducing energy costs, the State Energy Plan should not encourage the financing of these developments through market preferences, consumption supply quotas, or energy taxes and assessments.

Response: The State Energy Plan presents a balanced assessment of the resources available today and those that may be available in the future. The Energy Plan clearly supports development and deployment of clean renewable and demand reduction technologies that are cost effective, in the public interest, and sustainable without long-term subsidies.

The Energy Planning Board supports all programs that will make green power options available for customers. Programs such as those offered by Niagara Mohawk, coupled with the Public Service Commission's Environmental Disclosure program, and other proposals identified in the State Energy Plan, will encourage private-sector

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investment in renewable technologies. In particular, the Energy Plan establishes a renewables expectation for the State, recognizes the Governor's Executive Order 111 calling for purchases of renewable energy by State Government buildings, and calls for both the New York Power Authority and Long Island Power Authority to solicit renewable power from the competitive market.

Miscellaneous Recommendations

Ashok K. Trikha

During the 1990s, wind became the world's fastest growing renewable energy source, expanding at an average annual rate ranging from 22.6 percent to 30 percent. The Draft State Energy Plan does not show a similar growth rate for renewable energy at the present time or in the future.

Response: An assessment of the technical, economic, and achievable potential of all renewables is provided in the *Efficiency and Renewable Energy Potential Assessment* referred to in Section 3.3 of the State Energy Plan.

Koganeya, Toshiyuki

A change should be made to "3. Increasing energy diversity in all sectors of the State's economy through greater use of energy efficiency technologies and alternative fuels" (page 1-12) should be changed to "3. Increasing energy diversity in all sectors of the State's economy through the greater use of energy efficiency technologies and alternative energy resources " The word "fuels" is inadequate when it involves solar and wind energy.

Response: The recommended change appears in the State Energy Plan.

Diane A. Davis

There is no mention of the Stirling engine in the Draft State Energy Plan.

Response: Stirling engines are adaptable to using many types of energy inputs. All they require is a heat source that could be a solar collector or a burner fueled by low-quality digester gas. Stirling engines also have the highest theoretical efficiency of any engine yet devised. Implementation of the technology has been challenging because of cost and other factors, but various companies are active in continued development efforts. To date the best applications for Stirling technology have been in situations where the Stirling's "omnivorous" appetite for heat, combined with its high efficiency, have made it

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uniquely capable for a specific application. When Stirling engines have tried to compete head-to-head with conventional engines using conventional fuels, the Stirlings typically have lost because they tend to be larger, heavier and more expensive. NYSERDA has sponsored numerous projects that employ Stirling engines and continues to evaluate proposals that use this technology.

Babylon Greens, Town of Babylon

You have crunched a lot of numbers but there are no projections for possible wind energy, possible geothermal, for possible solar in here [the draft State Energy Plan].

Response: The potential contributions of wind, geothermal, and solar energy to New York State's energy mix are currently being evaluated as part of NYSERDA's *Efficiency and Renewable Energy Potential Assessment*. The impact of wind energy is addressed in the Electricity Assessment, Section 3.4 of the State Energy Plan.

General Support for Renewables

Susan Caumont

We are at the end of an era, the oil era, and at the beginning of a new era, the era of renewable energy. Now is the time to turn to build energy sustainability. There are technologies we can grow at home and export nationally and internationally. New York State can be a leader in renewable energy technologies. (See Response on page 11-26.)

Citizens Campaign for the Environment

New York State should offer the opportunity for members of the private sector to partner with the State in the purchase of renewable power, thereby increasing the cost advantages and market development potential. (See Response on page 11-26.)

Melanie Golden

It’s clear a great amount of time and effort went into developing the State Energy Plan and I applaud many of its conclusions and recommendations. The State Energy Plan does not go far enough in outlining ways renewables can become part of our future. It does not go far enough in stating ways we can accomplish this. (See Response on page 11-26.)

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Citizens Campaign for the Environment

New York State should offer the opportunity for members of the private sector to partner with the State in the purchase of renewable power, thereby increasing the cost advantages and market development potential. (See Response on page 11-26.)

Great Lakes United

The State Energy Plan presents no collaborative strategies for changing regulations that currently do not favor renewables or for overcoming barriers including interconnection and higher costs of renewables.

New York State should commit to removing the blocks and providing the incentives that could even the playing field for renewable energy. Strategies could include support for low or no interest loans to finance new renewable energy based construction and manufacturing, tax incentives on renewable energy components requiring energy producers to use full-cost accounting including environmental and social externalities and revisiting the stranded asset and stranded debt calculations used to bail out the nuclear industry. (See Response on page 11-26.)

New York State should establish building code guidelines that will accommodate and provide for a renewable future such as passive solar. (See Response on page 11-26.)

EnergyPlus Cooperative of the Southern Tier and Finger Lakes

The State Energy Plan mentions the need for increasing the use of renewable energy sources, no clear targets are set and no mention is made of the need to develop the demand side of the renewable market. (See Response on page 11-26.)

The State Energy Plan should address the need for public resource support in creating the market for green energy. (See Response on page 11-26.)

Mary Griffin

Education about renewables is important and ENERGY STAR® Programs are crucial. (See Response on page 11-26.)

Irmgard Seidler

Develop renewable energy plants in New York. (See Response on page 11-26.)

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Wedlyne Guerrier

New York State should increase the funding for research in the field of renewable energy. With more research, the cost of renewable energy will decrease. (See Response on page 11-26.)

Ron Kamen

Move away from fossil fuel and nuclear power towards renewable energy sources. (See Response on page 11-26.)

Elizabeth Cunningham Smyth

I want research and development of alternative, sustainable, and non-polluting energy sources. (See Response on page 11-26.)

Leah Rosenburg

Why are we relying so heavily on fossil fuel in our energy plan when the ideas of solar power and wind power are in the air? Why are we not putting our resources and funding into researching these alternative power sources? (See Response on page 11-26.)

Ashok K. Trikha

New York should consider alternative sources of renewable energy and plan the same to avoid a situation of installing the natural gas fired generating plants. (See Response on page 11-26.)

Ann Link

The State should put its biggest efforts in solar and wind power since they are least harmful to the environment. (See Response on page 11-26.)

Chenango North Energy Awareness Group

We advocate phasing out fossil fuel use and retiring nuclear power. The State Energy Plan makes a lot of words endorsing energy conservation but it doesn't translate them into reality. Specifically we must promote photovoltaics, small-scale hydroelectric plants, tidal power, wind power, solar thermal systems, and fuel cells.

Response: At this point in time, non-hydropower renewable energy resources provide less than two percent of the electricity generated in New York State. The State Energy Plan supports aggressive promotion of renewable generation, primarily wind. With the advent of retail choice in electricity, however, customers will be able to buy a given resource, including renewables, if they desire. A major goal of the State Energy

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Plan is to ensure a reliable supply of power through use of diverse energy resources including fossil fuels and nuclear.

The State Energy Plan repeatedly calls for promotion of renewable energy resources.

- Renewable energy as a percentage of primary energy use is expected to increase from ten percent in 2000 to 15 percent by 2020.
- The State should competitively solicit 60 to 120 megawatts of renewable electricity generation to meet the requirement of the Governor's Executive Order No. 111 that up to ten percent of State facilities' electricity to be provided from renewable resources by 2005 and 20 percent by 2010.
- The New York Power Authority (NYPA) and the Long Island Power Authority (LIPA) should competitively solicit bids for long-term contracts for the purchase of 100 megawatts each from renewable energy resources and that they each increase their annual investment on energy efficiency by 25 percent.
- NYSERDA should examine the feasibility of a statewide renewable portfolio standard (RPS) for electricity generation, assess its economic impacts, determine how it would work in restructured, competitive electricity markets, and explore how it would contribute to the goals enunciated in the State Energy Plan.
- Increased use of indigenous fuels and renewable-based electricity generation should be encouraged through appropriate regulatory reform initiatives, application of net-metering programs, continued reviews of interconnection requirements, consolidation and expansion of tax incentives, and development of the renewable fuels industry.

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12. Renewable Portfolio Standard

Environmental Advocates

What would be the effect of implementing a Renewable Portfolio Standard in New York? What would be the concerns for price and liability? Other mechanisms for reaching a ten percent goal for new renewables should be examined and analyzed and the effects looked at. (See Response on page 12-6.)

American Wind Energy Association (AWEA)

The State should move as quickly as possible on instituting a Renewable Portfolio Standard, either through the Public Service Commission or, if necessary, through amendment of State statutes. (See Response on page 12-6.)

Alternative Power, Inc.

The government needs to implement a Renewable Portfolio Standard. (See Response on page 12-6.)

Hudson River Sloop Clearwater, Inc.

The Energy Planning Board should implement an aggressive Renewable Portfolio Standard. Only by doing so will the Planning Board motivate energy companies to shift to renewable, sustainable energy generation. (See Response on page 12-6.)

Annie Wilson Miquet

I would suggest that New York State increase the Renewable Portfolio Standard to a level that would displace the demand need. (See Response on page 12-6.)

Alfred University

Executive Order 111 is essentially a mini-Renewable Portfolio Standard (RPS), and we should expedite a larger RPS for the State. (See Response on page 12-6.)

Environmental Advocates of New York

One of the best ways to ensure that we make progress towards renewable energy growth is to have a Renewable Portfolio Standard (RPS) like twelve other states. The State Energy Plan should include a recommendation at the very least an analysis of how an RPS could be implemented and what the effects of implementing it in New York State would be. (See Response on page 12-6.)

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Environmental Advocates of New York

New York needs a Renewable Portfolio Standard (RPS). The twelve other states that have RPSs should be studied and specific recommendations adopted. We believe a requirement that ten percent of electricity sold in New York should be from renewable sources. (See Response on page 12-6.)

Scenic Hudson, Inc.

Scenic Hudson, Inc. believes New York needs a Renewable Portfolio Standard with a requirement that ten percent of electricity sold in New York should be from renewable sources. (See Response on page 12-6.)

New York City Environmental Justice Alliance

The State Energy Plan was extremely disappointing in that there is no Renewable Portfolio Standard. (See Response on page 12-6.)

Fred Elmer

We favor renewable energy sources. The potential is greater than in California and New York State has so far made a puny beginning. One way to set things straight is to introduce a Renewable Portfolio Standard. Other policy options that should be considered are State power purchase agreements, small wind energy net metering and tax credits, emission credits, and easy transmission access. (See Response on page 12-6.)

Renewable Energy Works

Clean renewable energy can replace a significant portion of our imported energy, provide local jobs, and stimulate the State's economy. Distributed renewable energy has the added benefit of reducing our vulnerability to potentially devastating power interruptions. New York should join with twelve other states in implementing a Renewable Portfolio Standard (RPS) and New York's RPS should commit the State to getting at least ten percent of its electricity from new, local, non-hydro renewable energy resources by 2010. (See Response on page 12-6.)

Environmental Advocates

Environmental Advocates would like to see ten percent of New York State electricity needs be met by new renewable sources, or if you count existing hydropower, between 25 and 30 percent by 2012. At the very least, this should be analyzed in the plan. (See Response on page 12-6.)

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New York Public Interest Research Group (NYPIRG)

The draft State Energy Plan does not go far enough in creating steps and mechanisms to increase the use of renewable energy technologies beyond two percent by the year 2020. New York needs a Renewable Portfolio Standard (RPS). NYPIRG and the environmental community are calling for a ten percent RPS. (See Response on page 12-6.)

Western New York Sustainable Energy Association

The first recommendation is to accelerate green power development by implementing the renewable portfolio standard (RPS) and that you look for ten percent of our electricity from renewables as a result of an RPS by the year 2010. (See Response on page 12-6.)

Natural Resources Defense Council (NRDC)

The State should really make a commitment through an Renewable Portfolio Standard or any mechanism that we get at least ten percent of our electricity from renewable energy sources by 2010. (See Response on page 12-6.)

New York Public Interest Research Group

It would be wise to use the State's abundant untapped renewable energy resources by instituting a ten percent renewables portfolio standard that would require ten percent of the State's electricity to be generated by new technologies such as wind and solar. (See Response on page 12-6.)

Sierra Club, Long Island Group

New York should follow suit with the twelve other states that have established a Renewable Portfolio Standard or requirement to energy marketers and distributors including a set percentage of electricity from clean renewables of perhaps ten percent of the portfolio standard by the year 2012. (See Response on page 12-6.)

New York State Sustainable Energy Coalition (NYS-SEC) *et al.*

The Draft State Energy Plan relies heavily on traditional fossil fuel technology while by 2021 renewable technologies are projected to constitute less than two percent of all power generated in New York. New York should institute a ten percent Renewable Portfolio Standard like other states that would require ten percent of the State's electricity to be generated using alternative technologies such as wind, photovoltaics, and fuel cells. (See Response on page 12-6.)

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Sierra Club, NYC Group

Numerous other states have developed programs to promote the development of clean renewable electric generation, the Renewable Portfolio Standard. New York State should also establish this requirement, and it should mandate that at least ten percent of the energy sold in New York should come from clean, renewable sources such as wind, solar, and sustainable biomass within 10 years. (See Response on page 12-6.)

Environmental Advocates

Executive Order 111 calls for ten percent of the State facilities' electricity to come from renewable resources by 2005 and 20 percent by 2010.

Why not set a similar goal for all the State's electricity?

New York needs a Renewable Portfolio Standard that requires that by 2012 ten percent of the electricity sold in the State be from new, clean, and renewable sources, such as wind, solar, and sustainable biomass.

The State Energy Plan should recommend a Renewable Portfolio Standard for New York. (See Response on page 12-6.)

Bald Eagle Power Company

The State must adopt a renewables portfolio standard requiring Long Island Power Authority and other utilities to use renewable energy sources. The RPS should apply to New York State agencies. Renewables should not have to compete on price with traditional power. The State Office of General Services (OGS) told Bald Eagle that is the State policy to accept only the lowest bid on all energy. With the OGS policy in place, it is unlikely that the Governor's mandate for 20 percent renewable energy will be met. (See Response on page 12-6.)

Stop the Barge

The Draft State Energy Plan relies heavily on traditional fossil fuel technology to generate electricity while, by 2021, renewable technologies are projected to constitute less than two percent of all power generated in New York. New York should institute a ten percent Renewable Portfolio Standard (RPS).

According to one of the technical advisors of Communities United for Responsible Energy (CURE), fuel cell technology could provide up to 1000 megawatts of power at the eleven sewage treatment plants alone in New York City and, at the same

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time, recycle methane that is now burned off. Alternative technologies like wind and solar could provide new businesses and jobs with an incentive program at the State level. With these sorts of straightforward renewables, we could achieve a greater than ten percent RPS in the next twenty years. This provision should be included in the State Energy Plan. (See Response on page 12-6.)

Power Light Corporation

Power Light supports a Renewable Portfolio Standard (RPS), but, for solar, it has to have some kind of solar mandatory component in order for it to be worthwhile to us. Some RPSs we think are good are those in Texas and Nevada. (See Response on page 12-6.)

Melanie Golden

The State Energy Plan should include a specific recommended Renewable Portfolio Standard. (See Response on page 12-6.)

Rockland Close Indian Point

Rockland Close Indian Point supports a Renewable Portfolio Standard. (See Response on page 12-6.)

Jo Ann Arcarese

The State Energy Plan should commit to ten percent of the State's electricity from renewable energy sources. (See Response on page 12-6.)

Wheelabrator Technologies, Inc.

Wheelabrator supports the renewable initiatives discussed in the draft State Energy Plan but the Plan should go further to incentivize renewable energy sources by establishing a renewable energy portfolio standard. (See Response on page 12-6.)

Star Foundation

One of the things we see as the most glaring and obvious problem with this Plan is that in the front it acknowledges renewable energy and how renewable energy needs public support. But then it goes on to not require renewable energy portfolios or anything to advance those goals, and we think that's really probably the single largest problem with this Plan. (See Response on page 12-6.)

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New York State Environmental Justice Alliance

Despite voluminous verbiage spent on renewables, neither a Renewable Portfolio Standard nor realistic useful tools to prod individuals into installation of distributed generation opportunities, including photovoltaics, wind power, and fuel cells, exists in the plan. (See Response on page 12-6.)

Pace University School of Law, Pace Energy Project

The best way to ensure energy self sufficiency for New York is by investing in clean, renewable energy sources such as solar energy, hydropower, wind power, and fuel cells.

I encourage the New York Public Service Commission to make New York State the leader in this capacity and a reasonable goal is to set a goal of at least ten percent of our State's energy to come from renewable sources by the year 2010. (See Response on page 12-6.)

Lisa Catapano *et al.*

The plan should meet or exceed the standards set in the Kyoto Protocol, reduce particulates, commit to a ten percent reduction in statewide energy demand by expanding energy efficiency programs, commit to getting at least ten percent of the State's energy from renewable resources (over the next ten years), promote regulatory incentives for utilities that encourage customers to be energy efficient; and reduce vehicle emissions. (See Response on page 12-6.)

Tom Salo

Ten percent of energy should come from renewable resources by 2012. (See Response on page 12-6.)

Mary Griffin

A Renewable Portfolio Standard and a statewide energy efficiency standard should be instituted.

Response: Many parties have urged that the Energy Planning Board recommend establishment of a portfolio standard for renewable generation (RPS), particularly for wind energy, and some parties have asked that conservation and clean energy be made the focus of the Plan. The State Energy Plan, recognizing that a portfolio standard may not be consistent with development of a competitive market, suggests that the issue be studied further. The State Energy Plan calls for NYSERDA to examine and report on the

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feasibility of a statewide RPS for electricity generation and assess the economic impact of such a standard. The study will examine how the standard could work in a restructured and competitive electricity market. (See Section 1.3 of the State Energy Plan.)

The Energy Plan indicates an expectation that there will be a 50 percent increase in the use of renewable generation in the State by 2010 from the current level of ten percent of primary energy use to 15 percent of primary energy by 2020. To accomplish this increase, the State Energy Plan calls for the State to solicit competitively 60 to 120 megawatts of renewable electricity generation to meet the requirements of the Governor's Executive Order No. 111, which requires that ten percent of State facilities' electricity needs be provided from renewable resources by 2005 and 20 percent by 2010. In addition, the State Energy Plan recommends that the New York Power Authority and the Long Island Power Authority each solicit competitive bids for long-term contracts for the purchase of 100 megawatts of electricity from renewable energy resources. The State Energy Plan calls for particular emphasis on wind generation in upstate areas and on Long Island and on photovoltaic generation in the New York City metropolitan area. In general, the costs of renewable technologies are expected to become significantly more competitive with conventional fuels than they are at the present time.

Renewable Energy Bond Act

Citizens Campaign for the Environment

New York State should develop renewable energy portfolio standards and consider a Renewable Energy Bond [Act].

Long Island Coalition for Democracy

A statewide referendum should take place calling for a $4 billion Renewable Energy Bond Act.

Response: A renewable energy bond act would require action of the New York State Legislature. The Energy Planning Board does not support a renewable energy bond act at this time.

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13. Nuclear

Immediately Close Nuclear Power Plants

Stacy Crandell

I want to see the nuke plants closed. As a taxpayer, I want my taxes to go towards renewable resources, towards smarter energy.

Chenango North Energy Awareness Group

We must retire nuclear power.

Michelle Teneyck

I would like to register my opposition to nuclear power.

New York Public Interest Research Group

This State Energy Plan also re-licenses all nuclear power plants in New York State. Given the potential for catastrophe, these plants should be closed down until proven safe.

Irmgard Seidler

No more nuclear and coal fired plants, and no more subsidies to polluting power producers.

Ann Link

Where is the section on nuclear energy? Indian Point should be decommissioned for two reasons: [1] poor safety records and [2] potential as a terrorist target. Indian Point is located twenty-five miles north of New York City. Twenty million people [8 percent of the U.S. population] live within a 50 mile radius of the plant. Brooklyn is especially vulnerable since we're on an island. Imagine over two million Brooklyn residents trying to evacuate south over the Verazzano Narrows Bridge in the event of a disaster from the north!

Environmental Advocates of New York

We feel the State should reduce its dependence on nuclear power and close Indian Point.

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Elizabeth Cunningham Smyth

Close down Indian Point Nuclear Power Plant.

Ron Kamen

Close down Indian Point Nuclear Power Plant.

Elinor Yahm

Close down Indian Point Nuclear Power Plant.

Green Party

The present draft State Energy Plan irresponsibly gives short shrift to the present dangers of nuclear energy generation. Instead, the immediate shutdown of the Indian Point Nuclear Station is recommended as a way of enhancing the draft State Energy Plan's accuracy.

Sierra Club, Long Island Group

The cost of the consequences of failing to manage the risks from these nuclear power plants is incalculable. We urge the closing of Indian Point power plant. Eight percent of the U.S. population live within a 50 mile radius of this plant and the evacuation plans only include a ten mile radius. That's ludicrous.

Riverkeeper, Inc.

The State Energy Plan should outline a strategy for the immediate closure and orderly decommissioning of the Indian Point nuclear power station.

Honorable Paul Feiner, Supervisor, Town of Greenburg

Close down Indian Point.

Scenic Hudson, Inc.

The Draft State Energy Plan should outline a scenario in anticipation of the closure of Indian Point. The State Energy Plan should analyze and lay out the steps necessary to provide adequate clean and uninterrupted power to Westchester County and New York City if Indian Point were to go off line.

Response: In light of the importance of the existing nuclear power plants to New York's electricity system, the Energy Plan calls for the continued safe operation of these facilities. See Section 1.3, Energy Policy Objectives and Recommendations, and Section 3.4, Electricity Resource Assessment, of the State Energy Plan.

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The State has limited regulatory authority with respect to nuclear power plants. The plants are licensed and regulated for health, safety, and environmental radiation protection purposes by the U.S. Nuclear Regulatory Commission. The State has traditionally regulated certain non-safety aspects of nuclear power plants, except those owned by New York Power Authority, through the Public Service Commission's regulation of electric utilities. However, within the last three years, all but one of the six operating nuclear power plants in the State have been sold to independent power producers.

The State Energy Plan establishes a vision for New York's future that supports economic growth and ensures a safe, healthy environment. In general, meeting the State's economic needs will require the equivalent of 5,000 to 7,000 megawatts more electricity generating capacity than is available today. While some of these requirements can be met through demand reduction measures and renewable energy resource electricity generation, the near-term closure of the State's nuclear power plants would seriously increase the need for new resources and dramatically weaken the reliability of New York's electricity system.

In brief, nuclear power produced about 20 percent of the electricity consumed in the State in 2000, or about 31,500 gigawatt hours of electricity. Nuclear power plants also provide about 5,000 megawatts of summer electricity generating capacity, which represented nearly 14 percent of the in-State capacity in 2000.

Nuclear power plants also contribute importantly to energy diversity, mitigating the State's dependence on fossil fuels, particularly imported petroleum. The growing concern regarding the State's dependence on natural gas for electricity generation is discussed in Section 3.5, Natural Gas Assessment, of the Energy Plan. Over-dependence on natural gas would be a problem if natural gas supplies were suddenly curtailed by events affecting either the production areas or the limited number of pipelines which transport this fuel to New York State. Also, natural gas prices have been particularly volatile, as witnessed during the winter of 2000-2001, when energy prices increased. Closing nuclear plants would likely exacerbate such concerns.

The two operating Indian Point nuclear power plants (Indian Point 2 and 3) have a combined summer electricity generation capacity of 1,935 megawatts. This represents 5.3 percent of the current total in-State summer electricity generation capacity and more than four times the generating capacity of the eleven gas turbines installed by the New York Power Authority in 2001. If both plants operate at maximum output for an entire year,

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they are capable of generating over 17,000 gigawatt hours of electricity, or approximately 11 percent of New York State's electricity requirements in 2000. Loss of these plants would seriously affect the State's ability to meet its generation capacity reserve margin requirement in the near term.

The State Energy Plan and the Energy Planning Board recognize the importance of ensuring that the State's nuclear power plants operate in the cleanest, safest manner possible. One of the State Energy Plan's five principal policy goals is the pledge to support the continued safe, secure, and reliable operation of the State's energy infrastructure. To this end, the Energy Plan calls for a study of the security of New York State energy infrastructure that will include a risk and vulnerabilities assessment. This effort has already begun. The State's new Office of Public Security, with the assistance of the Federal Bureau of Investigation, evaluated security at the Indian Point nuclear power plants and found security at the plants to be robust. The NRC is also conducting its own security reviews throughout the United States.

Federated Conservationists of Westchester County, Inc.

We believe the Indian Point 2 needs to be shut down and that shutdown has got to be factored into your planning. You cannot assume that plant is going to be there for as long as you have it in your projections.

Response: The State Energy Plan supports continued safe operation of nuclear power plants in the State.

Phase Out, Don't Re-license, Reduce Dependence on Nuclear Power Plants

Western New York Sustainable Energy Association

We must more closely scrutinize and reduce reliance on nuclear power. The Draft State Energy Plan suggests we will have the same amount of nuclear power capacity for the next twenty years, presumably from the same nuclear power plants which are already middle-aged. They're going to be older, less reliable. There's the danger of risk to the public health by safety problems. The plants are now in the hands of private owners who run them for profit and may cut corners on operation. And then there's concern about terrorism. I think there needs to be much greater scrutiny and concern about nuclear power. (See Response page 13-6.)

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Green Party Erie County

Please do as they did in Germany and call for the phase out of nuclear power within twenty years. It's imperative that we get away from this dirty and overly expensive power production. (See Response page 13-6.)

Cathy Cardell

I am a member of the Citizens Awareness Network and I am against nuclear power. I would like to see the State become really focused on developing alternative technologies. (See Response page 13-6.)

Sustainable Energy Alliance of Long Island

The Draft State Energy Plan should strive on a long-term basis to close down all existing nuclear power facilities over the next twenty years and replace their power generation with sustainable, clean, and safe alternative energy supplies such as solar, wind, biomass, and geothermal. (See Response page 13-6.)

Sierra Club, NYC Group

The Draft State Energy Plan does not include a much-needed program to eliminate our dependence on nuclear power. Nuclear power is known to be both costly and dangerous. Waste and radioactive emissions from these plants can cause serious environmental degradation and human, and other life-form, injury. Risk management in this area is extremely expensive; at times, it is even impossible. The Indian Point Plant should be closed and other nuclear plants should be phased out over time. (See Response page 13-6.)

Wendy Harris

The State really needs to provide clearer leadership and more tangible policy recommendations in terms of conservation, renewables, the cleaning up of current coal facilities, and the shutting down ultimately of nuclear in the State of New York.

There is no way you can defend against a suicide bomber's attack on it [nuclear power plant]. We need to eliminate the continuing use of nuclear and conservation is what I would hope that you approach in a meaningful way in policy in your Plan. I'm hoping you can bring more policy mandates to the State and its agencies and to industry in general in terms of conservation, renewability, and cleanliness. (See Response page 13-6.)

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L. A. Harris

The State Energy Plan relies too heavily on fossil fuels and nuclear power, while disregarding new, cleaner technologies. The State Energy Plan does nothing to phase out polluting power plants. (See Response page 13-6.)

Great Lakes United

New York State should commit to the phase out of nuclear and coal power stations on an accelerated schedule with phase out complete by 2020, beginning with the oldest and dirtiest stations first. No new construction of nuclear or coal stations should be permitted in the State or the region. (See Response page 13-6.)

Shawn McConnell

I do not think that our nuclear power plants [in the Oswego area] should be re-licensed. (See Response page 13-6.)

Erin Cala

We should not re-license nuclear power plants. Security issues are more important than ever and in order to have secure sources of energy, we must stop using nuclear power. Instead of relicensing nuclear plants and investing in clean coal technologies, we need to devote more money to sustainable renewable energy. (See Response page 13-6.)

Better Queens Environment (BQE)

BQE proposes a phase out for all nuclear facilities in the State, which now provide 9.2 percent of New York's energy, and a phase in of increased renewables to ten percent of the State's energy needs. (See Response page 13-6.)

Dr. Nina Evans, Dr. Richard Evans

We question the assumption by the State Energy Plan that the State's six commercial reactors will be re-licensed by the National Regulatory Commission (NRC).

The State Energy Plan must provide information about the safety and performance of nuclear facilities. With the initiatives already taken by the State in areas of renewables and efficiency we can create a sound policy that challenges the need for nuclear energy to meet our electric energy needs.

Response: See the State Energy Plan, Section 3.4, Electricity Resource Assessment, and the response on page 13-2 for discussions of the importance of nuclear-powered electricity generation to New York's energy future. As noted in the above cited

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Assessment, in formulating a Reference Resource Scenario, it was assumed that all operating nuclear power plants in New York would continue to operate during the full 20-year energy planning period. This assumption was based in part on the fact that 8 of the 103 operating nuclear power plants in the United States have already received 20-year license extensions from the U.S. Nuclear Regulatory Commission (NRC). Further, the Nuclear Energy Institute, a nuclear industry trade organization, has stated that almost all operating U.S. nuclear plants will eventually apply for such license extensions. Such license extensions are predicated on a finding by the NRC that the particular plant seeking license extension can and will continue to operate in a manner that fully protects public health and safety, and the environment.

Nuclear Power Plants – Security Concerns

Sierra Club, NYC Group

Security analyses for each of the State's nuclear power plants are necessary and should be conducted without further delay.

Riverkeeper, Inc.

The New York State Energy Planning Board must be vigilant on nuclear safety and security issues and make recommendations for improving safety performance and security measures.

Riverkeeper supports the State Energy Planning Board's objective to initiate a study of the security of New York's energy infrastructure. However, we feel that the State Energy Plan should incorporate basic steps to better protect the State's nuclear power plants.

We understand that the NYS Office of Public Security has already issued a number of recommendations. It is unclear whether the NYS Office of Public Security was contacted for their recommendations on protecting the State's nuclear power plants for inclusion in the Draft State Energy Plan. We recommend that the NYS Office of Public Security's findings on nuclear power plant security be presented in the State Energy Plan.

Stop the Barge

The uncovered and unfortified spent rod pools that have been planned on being evacuated to Yucca Mountain for the past ten years must be considered. Each of these uncovered pools is a potential disaster. Nowhere on the East Coast is there enough distance from a plant to ignore the possibility of a nuclear disaster in a terrorist attack.

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We must be 100 percent sure that the reactors can withstand dynamite, airplane attack, and other forms of disaster before nuclear power plants are re-licensed.

Response: The Energy Planning Board explicitly recognizes the need to take a hard look at the security of the State's energy infrastructure, as evidenced by the State Energy Plan's recommendation that the State initiate a study of the security of New York's energy infrastructure used for production, storage, and delivery, and that the study include a risk and vulnerabilities assessment and make recommendations for appropriate actions. The Planning Board suggests that the study be conducted cooperatively by the Office of Public Security, the Energy Planning Board agencies, and major energy market participants.

But even before this recommendation was formulated, the State had begun to address security at the nuclear power plants. See the discussion in Section 3.4, Electricity Resource Assessment, for more details. As noted there, an evaluation of security at the Indian Point nuclear power plants was performed by the New York State Office of Public Security, with the assistance of the Federal Bureau of Investigation. The results of that assessment have been provided to State and federal authorities, including members of the State Energy Planning Board. A press release, describing the general findings and some of the areas addressed by the evaluation, was issued on December 12, 2001 and is available on the New York State web site (www.state.ny.us/index.html). For necessary security and safeguard purposes, the details of that report have not been publicly released.

Emergency Preparedness at Nuclear Power Plants

Star Foundation

The emergency planning law needs to be overhauled and modified because right now emergency planning on Eastern Long Island is a joke. Eastern Long Island is just outside the ten mile radius [for the Millstone Nuclear Plant site]. No specific plans for that area and it's laughable because Long Islanders are extremely aware of that and the lack of planning is really egregious.

New York Public Interest Research Group

In the wake of the terrorist attacks on September 11, New York State needs to seriously reevaluate the safety of the communities surrounding these plants. Serious examination of the effectiveness of their evacuation plans needs to be undertaken.

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New York State Sustainable Energy Coalition (NYS-SEC) *et al.*; Stop the Barge; State Environmental Justice Alliance

The draft plan proposes relicensing all nuclear power plants in New York State. Given the terrorist attacks of September 11, New York needs to seriously reevaluate the safety of communities living near nuclear facilities, which includes a serious examination of the effectiveness of the evacuation plans at nuclear facilities. Given the potential for catastrophe, these plants should be closed until proven safe.

Honorable Kathryn Ellsworth, Mayor, Village of Montebello

The village supports legislation that would continue to evaluate the Indian Point evacuation plan.

Response: The U.S. Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA) have established comprehensive emergency preparedness requirements for nuclear power plants which include close coordination between the plant operators and local and State government emergency response organizations. Since 1980, each operator of a commercial nuclear power plant in the United States has been required to have both an on-site and off-site emergency response plan as a condition for obtaining and maintaining a license to operate the plant. On-site emergency response plans are approved by the NRC. Off-site plans (which are closely coordinated with the utility's on-site emergency response plan) are evaluated by the FEMA and the results are provided to the NRC. The State regularly participates in emergency drills for these plans, as do all the affected counties. Such drills are periodically evaluated by NRC and FEMA, which agencies have approved the emergency plans for all of the nuclear power plants in the State and the Millstone plants in Connecticut.

The New York State Emergency Management Office (SEMO) and the New York State Department of Health serve as the lead State agencies for nuclear power plant emergency preparedness. In light of the September 11, 2001 terrorist attacks on the United States, SEMO has requested NRC and FEMA to conduct a comprehensive review of federal standards for emergency plans at nuclear power plants.

Specific Recommendations – Nuclear Power

Great Lakes United

Nuclear utilities should be required to set aside funds now for waste management and decommissioning.

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Response: Nuclear power plant operators are required by the U.S. Nuclear Regulatory Commission (NRC), as a condition for licensing and operation, to establish and maintain the financial capability to safely terminate operation and decommission their respective facilities. All of the nuclear power plants in New York State have established dedicated funds for this purpose. The plant operators also pay a fee, related specifically to the amount of electricity generated, into the federal High-Level Waste Fund to support the development and operation of repository for spent nuclear fuel.

Riverkeeper, Inc.

The State Energy Plan conspicuously omits any discussion of the New York nuclear power industry. One of the objectives of the State Energy Plan is to provide "broad statewide energy policy direction." However the Draft State Energy Plan provides energy policy makers with no direction on nuclear energy policy.

The little nuclear energy related information that the State Energy Planning Board has divulged is the assumption that the State's six commercial reactors will be re-licensed by the Nuclear Regulatory Commission.

The State Energy Plan must provide existing information to the State's energy policy makers about the State's nuclear power industry and provide the means for which more information on nuclear safety performance, environmental and public health externalities, and nuclear plant security can be gathered and presented. The State Energy Plan Board should not simply rely on federal regulators to monitor the two commercial power reactions at Indian Point nuclear power station and New York's other four commercial reactors. Nor should the State Energy Plan Board or any State agency rely on the private operators to police themselves.

Response: A discussion of the role of nuclear power plants in the State electricity system and related issues is included in Section 3.4, Electricity Resource Assessment, of the State Energy Plan.

Star Foundation

The most glaring omission [in the State Energy Plan] in the area of nuclear power is that there needs to be more financial oversight by the State. Reactors are primarily being bought up by and owned by limited liability corporations, and the State needs to take a much larger role in overseeing these and making sure that financial due diligence is pursued. We need to take this seriously because there are going to be so many layers of

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protection for these people that ultimately it's going to be the taxpayers of the State left holding a big part of that bag.

Response: The State has traditionally regulated financial aspects of nuclear power plants through the New York State Public Service Commission's (PSC) regulation of electric utilities. Within the last three years, all but one of the six operating nuclear power plants in the State have been sold to independent power producers. These sales were reviewed and approved by the PSC as prudent actions and consistent with the State's objective of establishing a competitive wholesale electricity market. Nuclear power plants continue to fall under the jurisdiction of the PSC even after being sold.

The nuclear power plant sales were also reviewed and approved by the U.S. Nuclear Regulatory Commission (NRC) which specifically evaluated the new owners' financial ability to meet the NRC regulatory requirements for protecting public health and safety. The NRC also requires that each plant owner establish and maintain dedicated funds sufficient to safely close and decommission the plants, even if such closure occurs before its previously scheduled date.

New owners have a strong incentive to make safety their primary focus. Failure to adequately maintain facilities and procedures may lead to interruptions in plant operations, thereby producing no revenue to offset continued, expensive operating costs. Experience to date suggests that new owners have improved the work practices of the existing labor force as evidenced by recent improvements in plant safety, reliability, and production performance. In the past, when nuclear plant operation faltered due to ineffective management, lengthy and costly prudence proceedings were held to determine whether ratepayers overpaid for their electricity. Today, nuclear plant owners no longer have the protection offered by traditional rate regulation. In New York State, nuclear plants must cover all costs by revenues received.

Convert Indian Points 2 and 3 to Natural Gas

Green Party

That is something we definitely need to look into, the concept of converting Indian Point into a gas powered facility.

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Westchester County Board

The Board presented a petition to direct the Public Service Commission and NYSERDA to immediately begin a feasibility study leading to the conversion of Westchester County's Indian Point 2 and 3 nuclear power plants to natural gas or an alternative source of energy.

Dani Glaser

I second the comments of the Westchester County Board [regarding the request for a feasibility study for converting Indian Point 2 and 3] and also requests that the study include the Millennium pipeline project.

Response: An analysis of the conversion of the Indian Point nuclear power plants would most appropriately be undertaken by the facilities owner, Entergy Nuclear Operations, Inc., an independent electric power producer. A feasibility study would presumably evaluate the desirability of such conversion from the owner's perspective. It should be noted that Entergy is currently considering co-locating two natural gas fired plants on the Indian Point site with its two existing nuclear plants.

In regard to such a conversion, it seems likely that most of the support facilities (*e.g.*, switchyards) and functions (*e.g.*, maintenance, site security) could be used for an alternative-fuel-fired facility – natural gas, coal, or petroleum – however, it is not clear that other critical facilities, such as steam turbines and electric generators, could be easily used with state-of-the-art combined cycle gas turbine plants. Also, if feasible, a conversion would likely push the State toward even greater dependence of natural gas thereby minimizing desirable energy supply diversity.

Support Continued Operation of Nuclear Power Plants

IST Imaging & Sensing Technology Corp.

We have reviewed the Draft State Energy Plan and compliment the authors on an excellent presentation and data analysis. However, we feel there is a serious flaw that must be addressed.

The assumption that there will be a continuous supply of natural gas and petroleum at reasonable prices for the report period is simply too risky to base New York State's future energy plans and needs on. With nuclear power potentially declining, as shown in your data, and with the growth in demand for energy, also shown in your data,

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the inescapable conclusion is that New York State must purchase ever increasing amounts of natural gas and electricity from Canada or other parts of the United States.

The tenuousness of the Middle East situation casts a serious doubt on that region's viability as a predictable and reliable source of affordable energy. As these supplies of natural gas and petroleum are disrupted, as they surely will be, New York State will either fact serious shortfalls in energy or have to pay ever increasing prices.

Nuclear electric power generation is a safe and efficient means for New York State and the rest of the United States to reduce the dependency upon foreign sources for its future energy.

It is our opinion that New York State should work closely with the federal government and private industry to create more nuclear power generation in our State. (See Response on page 13-14.)

Independent Power Producers of New York, Inc. (IPPNY)

The Draft State Energy Plan acknowledges the importance of these facilities [nuclear power plants], and State policy makers, while mindful of the security needs of these nuclear plants, should not heed misguided calls to close them down. (See Response on page 13-14.)

Diane A. Davis

With respect to siting of 80 megawatt power plants in size subject to Article X of the Public Service Law, discussed on page 2-50 *et seq.* of the draft State Energy Plan, find a suitable site and build two or three reactors that could produce the equivalent of all the fossil fuel utilities in the State. We would not have to worry about sulfur dioxide, nitrogen oxides, carbon dioxide, etc.

We should develop incentives that encourage co-partnering with existing utilities to expand and help ease the siting and permitting process for two or three new fission reactors using the latest state-of-the-art fission technology.

We should incorporate the U.S. Army Corps of Engineers into any hydropower and nuclear power plant project which will ease and aid the construction and licensing process.

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New York's electricity costs could be contained by building three thermonuclear power plants instead of nine coal-fired power plants to meet future anticipated demand. (See Response on page 13-14.)

The Business Council of New York State, Inc.

The Draft State Energy Plan should stress the need for a diverse generation fuel mix which includes not just renewables but also coal and nuclear. The State Energy Plan needs to encourage State policies that encourage fuel diversity and avoid creating a situation in which we become overly dependent on one type of generation. The State Energy Plan needs to realize the importance of fuel diversity by encouraging both renewables as well as fossil fuel fired generation such as coal.

The Draft State Energy Plan should express a commitment to this state's six nuclear facilities and more opportunities to maintain and upgrade the State's 43 coal plants.

Response: In order to reduce the risks associated with single fuel dependency and price volatility, the State Energy Plan supports increased energy diversity in all sectors of the economy through investments in technology and infrastructure development for indigenous and renewable fuels, demand reduction techniques, and energy efficiency. The State Energy Plan also supports the continued safe operation of nuclear, coal, natural gas, oil, and hydroelectric generation as part of a diverse portfolio of electricity generation resources.

The State Energy Plan does not address the addition of new nuclear power plants to the State’s energy mix. With the restructuring of the electricity industry and the associated establishment of a wholesale electricity market, new electricity generation is being provided, for the most part, by independent power producers who compete for the sale of electricity.

Nuclear Power – Health Issues

Riverkeeper, Inc.

It is in the economic interest of New York State and the public health and safety interests of New York residents that the State's nuclear power industry be supervised by the State Energy Planning Board and member agencies. The Department of Health should also be involved in this process.

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The Draft State Energy Plan should recommend that a study be funded to measure levels of cancer causing radioactive Strontium-90 in deciduous baby teeth from counties that host or are adjacent to New York's six commercial reactors to gather the clinical evidence necessary to determine whether internally ingested, manmade, low level radiation is affecting public health and contributing to America's cancer epidemic.

The State Energy Plan should document the environmental and public health externalities associated with the State's six commercial reactors.

Radiation Public Health Project (RPHP)

The RPHP are health researchers and scientists who examine the health risks of living near nuclear reactors – the health risks of nuclear accidents and the health risks of routine emissions from nuclear plants.

RPHP specifically urges the New York State officials to include these risks in the Draft State Energy Plan, which has not happened before. It looks at risks of other emissions, such as from fossil fuels, but not from nuclear plants.

Accidents, whether caused by terrorist attacks or mechanical failure, would be cataclysmic disasters in terms of public health.

Nuclear power plants are not emission free. They don't emit like fossil fuels, like the other power plants do, but they do emit a mix of over 100 radioactive chemicals that are only produced in nuclear reactors and in atomic bomb explosions.

Response: As discussed in Section 3.4, Electricity Assessment, of the State Energy Plan, nuclear power plants are primarily regulated by the federal government, more specifically by the U.S. Nuclear Regulatory Commission (NRC), for the purposes of protecting public health and safety and the environment. However, staff from the New York State Departments of Public Service, Health (DOH), and Environmental Conservation (DEC), the New York State Emergency Management Office, and NYSERDA regularly monitor activities at nuclear power plants in the State through interaction with plant operators and the NRC. NYSERDA’s President serves as the Governor’s designated State Liaison Officer with the NRC for this purpose.

DOH routinely monitors the environment around nuclear power plants, sampling milk, water, soil, vegetation, air, and direct radiation. The milk samples, in particular, are measured for Strontium-90. DOH reports no evidence of increased Strontium-90 levels.

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DEC regulates most non-radiological emissions from nuclear power plants in the State through the State Pollution Discharge Elimination System, air permitting, and under the federal Resource Conservation and Recovery Act.

The risks and environmental impacts of nuclear plants are documented in the NRC-required Safety Analyses and Environmental Impact Statements that support the licensing and continued operation of these plants. A specific summation and detailed analysis of such issues is beyond the scope of the State Energy Plan.

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14. Article X and Power Plant Siting

Support Article X Process (No response is necessary for this section.)

Senator James W. Wright

The process for siting new generation as outlined in Article X of the Public Service Law has been instrumental in encouraging the construction of efficient and minimally polluting generation. I support reauthorization of Article X and will be examining ways it can be made more responsive to the State's evolving energy needs.

Recommendations for Reform and Improvement to Article X Process

New York City Clergy for Justice Association

We are concerned about the dangers to the health of our community that we reach and we minister to in our pastoral care. We noticed that scientific studies have shown that the PM 2.5 is related to significant health problems. When siting new facilities, the impacts must be minimized and the emissions completely offset or the facility should not be built at all. The study should take into account all existing levels of PM 2.5, the health conditions of nearby residents, the amount of emissions from the facility, and the health conditions in the affected communities. (See Response on page 14-16.)

Better Queens Environment (BQE), Pace University School of Law; Pace Energy Project

BQE recommends the following: The Siting Board should be expanded to include non-Agency members including one independent expert on Environment and Health, one member of the State Assembly, and one member of the State Senate from the district concerned, along with four local residents.

Article X intervenor funds should not be subject to restrictions that prevent their use for legal counsel.

Fast tracking is not a long-term solution and should be phased out, not expanded to include “other public policy goals” apart from “environmental performance standards.”

BQE proposes a moratorium on all power plant construction and approval until the New York Metropolitan area is brought into compliance with the Clean Air Act and the Article X process is so constituted that it is able to adequately address issues of health and environmental justice. (See Response on page 14-16.)

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Melanie Golden

The Power Plant siting process in Article X needs serious reform. Article X should include integrated and regional planning similar to the concept in the State's Open Space and Conservation Plan. (See Response on page 14-16.)

The Business Council of New York State, Inc.

In the area of plant siting, the Business Council agrees with the Draft State Energy Plan that Article X of the Public Service Law needs to be extended. The Business Council does not recommend a wholesale revision of Article X, but rather a careful reexamination of the provisions that have caused the most problems in the siting of plants by private developers. Additionally, we believe that Article VII of the Public Service Law must be renewed and, to some degree, improved in order better to foster the development of the State's electricity transmission system. (See Response on page 14-16.)

Honorable Kathryn Ellsworth, Mayor, Village of Montebello

Article X must be amended to allow for the increased intervenor funding overall, more control is required at the local municipal and level when a site proposal is submitted, and improved forums for siting hearings.

Power plants should not be clustered and no power plant should be sited on an aquifer. (See Response on page 14-16.)

Stop the Barge

One of the requirements of the Draft State Energy Plan should be that local suggested zoning plans be respected. Communities should be consulted. (See Response on page 14-16.)

Torne Valley Preservation Association

Article X should be rewritten so that power plant builders are required to show the need and alternate sites for analysis. Local zoning should not be overridden. Community sentiment should be seriously considered. (See Response on page 14-16.)

Honorable Harriet D. Cornell, Rockland County legislator

Article X must be amended to require New York State to adopt a master plan identifying sites that would be appropriate for various types of power plants. The master plan, among many things, should define standards for different types of power plants. (See Response on page 14-16.)

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Pace University School of Law; Pace Energy Project

The State Energy Plan should consider the relationships between and among existing and proposed power plants from an environmental and reliability standpoint. The current Article X process is essentially applicant-driven. This process is not designed to and is not effective at addressing in a comprehensive and broadly participatory fashion New York State's future energy needs. (See Response on page 14-16.)

Honorable Ellen Jaffee, Rockland County legislator

It is imperative that the Energy Plan require that ongoing air monitoring be conducted where power plants are located and where they are proposed.

Article X must be revised to allow for meaningful public input earlier in the process, the use of intervenor funding for legal costs and no waiving of local laws. (See Response on page 14-16.)

Rockland County Conservation Association

An abbreviated Article X process is not commensurate with the resulting impacts to a community. By obviating home-rule local communities are limited in their ability to rebuke the idea of a nuclear facility being built. (See Response on page 14-16.)

League of Women Voters

Article X should be revised so as not to have each application considered in isolation from all others. (See Response on page 14-16.)

New York State Sustainable Energy Coalition (NYS-SEC) *et al.*; Stop the Barge; New York State Environmental Justice Alliance

The Draft State Energy Plan recommends super fast tracking the approval process for building new power plants on brownfield sites. The Article X process is already so flawed that more fast tracking will only further stifle a community's ability to participate meaningfully in the process. Instead, New York needs to improve public participation in the approval process by, among other things, providing more information to the public during the pre-application process, setting fair and adequate time frames to allow for public review and preparation for hearings, and expanding intervenor funds to include legal representation. (See Response on page 14-16.)

Sierra Club, NYC Group

The statements in the plan about the benefits of Article X to the State totally ignore the concerns of community residents who have been excluded from input into the

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siting of plants in their neighborhoods. Article X appears to have been created to bypass the concerns of communities in which plants are proposed. The siting process should include, at a minimum, the following: needs analysis, health effects assessments, analysis of PM 2.5, an environmental justice analysis, and a well-documented cumulative impacts review. Prior to reauthorization of the law, it should include the elimination of the grandfather clause applicable to plants built before 1977. These plants are the largest stationary sources of pollutants that have been shown to cause, among other things, smog, haze, mercury, acid rain, and contribute to global warming. (See Response on page 14-16.)

Brentwood-Bay Shore Breast Cancer Coalition

In Brentwood, the Pilgrim State Hospital site is becoming a fossil energy farm. Mini power plants are popping up like mushrooms, bypassing environmental review and dismissing consideration of different alternatives. We would like to put the power plants on hold for a year and promote energy efficiency in Brentwood. Conservation measures that require a wide range of skills provide business opportunities and jobs all over Long Island, rather than the short-term construction jobs at a few sites followed by new technical jobs at power plants. (See Response on page 14-16.)

New York Public Interest Research Group (NYPIRG)

With respect to Article X, New York Public Interest Research Group has strong opposition to the following:

- Creating a six-month approval process, or a shortened approval process for brownfields development, or for brownfield sites, would be a major mistake because [1] we are putting one of New York's major sources of pollution, power plants, on already contaminated sites and expediting the process. The State has not dealt with the real issues of brownfield cleanup and liability.
- The approval process should not be shortened. Communities have a hard time keeping up with the one-year schedule. Any further shortening of the process would take away the voice of the public further.
- A further decrease in the threshold for Article X would be a mistake. With the current threshold of 80 megawatts there is a major problem. We now have turbines popping up everywhere that are a lot less efficient than larger facilities. They may be peakers but they are operating on the hottest days of the year which means we're going to have of the worse ozone concentrations.

To improve the Article X process, the following should be recommended:

- To improve public participation, local officials should appoint members of the siting board.

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- Intervenor funds should be expanded and increased and allowed to be used for legal fees.
- The cumulative impact of existing and proposed facilities should be considered. We don't want 500 less efficient facilities when we can have a 1000 megawatts facility that will put out less pollutants, take up less water, and have less of an environmental impact on the community.

(See Response on page 14-16.)

New York Public Interest Research Group, Niagara Chapter

In the Draft State Energy Plan, the State lays out a variety of recommendations for reforming the siting law.

NYPIRG feels that intervenor funding needs to be increased and expanded in two ways. It should be available for legal fees and it should be available through the pre-application process. It is during this time that developers are more willing to make changes to their proposals.

NYPIRG supports the language that would recommend cumulative impact analysis and Environmental Justice analysis. We think this should be expanded to include cumulative public health impacts of the proposed project.

We also support the Energy Plan's language to include PM 2.5 analysis.

NYPIRG feels the siting process should be used for problems with older generation. facilities that were built in the 1950s and '60s that are still on line. NYPIRG strongly opposes language that would give priority to brownfield projects if it would mean shortening the siting process.

Mini power plants with less than 88 megawatts should not be exempted from the siting process unless they have a nameplate generation capacity of less than 15 megawatts.

NYPIRG feels the Energy Planning Board should recommend a four pollutant approach to cleaning up existing generators. (See Response on page 14-16.)

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Erin Cala

Environmental justice issues such as siting and cleaning up existing power plants through repowering methods must be considered. Article X should provide compensation for attorney fees so citizens can be fairly represented. (See Response on page 14-16.)

UPROSE

The Energy Plan needs to establish comprehensive cleanup standards for existing facilities. Instead of proposing and building so many new power plants, the plan needs to implement cleaning up the existing facilities in order to protect those who live near the plans.

New York needs to expand the intervenor funding to include some legal fees.

The draft plan and the Article X process do not facilitate public participation and limits community empowerment and must be reformed to include complete and serious community consultation. It must set fair time lines that are adequate for community groups to properly review documents.

We filed a lawsuit against New York Power Authority for building these power plants in our communities of color. They didn't do any community consultation and no environment impact studies.

Fast tracking the approval process for these facilities would seriously strangle the community's ability to participate. (See Response on page 14-16.)

North Fork Environmental Council

On page 1-30, in points 2 and 4, the Plan talks about expediting procedures for building new facilities. Our organization does not agree with that. In this case, streamlining review is not even a euphemism. It really belies the purpose of what we want to do. You can't streamline in this case. You'll be eliminating review. (See Response on page 14-16.)

Sierra Club, Long Island Group

Sierra Club Long Island urges the reform of Article X. The siting process should include environmental justice analysis, an analysis of fine particulate effects, the assessment of health effects, and a needs analysis. It should allow for earlier public input and not waive local laws. Reauthorization of the siting law should be linked to clean up of existing old grandfathered plants. We need to integrate decision making into the Draft

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State Energy Plan, and that means we don't want power plants built in areas that were already designated for open space or over a major water aquifer. (See Response on page 14-16.)

Pace University School of Law; Pace Energy Project; Wedlyne Guerrier

Essential changes to the State Energy Plan should include reestablishment of the "needs" determination as a fundamental element in demonstrating that a proposed project is in the public interest. The Article X process should be structured to allow decision makers to take a hard look at how a proposed generation facility fits into the existing and planned gas and electric transmission infrastructure rather than simply deferring to the judgement of the market participants. (See Response on page 14-16.)

Environmental Advocates of New York

Article X needs to be reformed. Article X leaves significant things out. One thing is Environmental Justice analysis. Also lacking is an analysis of fine particulate matter, an assessment of health effects, and a needs assessment.

Article X should allow the use of intervenor funds for legal costs. (See Response on page 14-16.)

New York Public Interest Research Group

In the Energy Plan, I don't recall seeing a section that talked about the declaration of need and how the declaration of need has changed from a more regulated monopoly to this deregulated, restructured market. There obviously has been a change in the definition of need. I think we should still be doing an old style declaration of need, particularly in the siting process.

In the declaration of need process, we should go beyond statewide to looking at different load pockets and having regional public input. So there is regional coordinating on this issue before we have to deal with siting of a power plant. So to restructure the old declaration of need and to reinstate it in the context of regional analyses of the load pocket.

That's obviously a huge issue in the New York Metropolitan area where the closeness of demand to supply led to huge price spikes and large concern over blackouts or brownouts in New York City. The blackouts and brownouts were avoided, the price spikes were not. (See Response on page 14-16.)

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Star Foundation

With respect to the Article X process, the Draft State Energy Plan states that the Article X has benefitted the State and provided environmental protection. On Long Island we have a sole source aquifer that is very important to Long Island. For an Article X Siting Board to be able to come down and just ignore local regulations and local government is just plain wrong. Moreover, we think there should be a required demonstration of need in that process. (See Response on page 14-16.)

East River Environmental Coalition

The Lower East Side Community has been participating in the Article X process for the last two years.

- There is no way we were able to participate meaningfully in this process without legal representation.
- Our funding did not allow our studies to be extensive. We did not have time to do the kind of studies that would stand up against Con Edison's studies, when they had years and years to present them.
- We tried and failed to work with State agencies to gain mitigations by cleaning up the existing power plant before siting the new one, but Article X does not provide for this. This needs to be changed.
- We need to be allowed to present testimony on cumulative effects to show the real health impacts on our community.

We need funding for legal representation and time and funding for meaningful studies. (See Response on page 14-16.)

Environmental Advocates

Environmental Advocates is hoping that the final version of the Energy Plan will have specific recommendations on a wide range of issues but specifically that you'll consider some of the frustrations of community residents who face power plant proposals in their communities. (See Response on page 14-16.)

North Fork Environmental Council

With respect to Article X, we have found that, even if we choose not to fight the plant that is proposed for our neighborhood, just to work with the other parties in the siting process is going to cost us tens of thousands of dollars in legal fees that we don't have. Our community has found it almost impossible to have an effective voice in the energy development process once it has begun. We look to this Draft State Energy Plan to work on Article X and make some changes. Intervenor funds needs to be expanded for legal assistance and not just for technical assistance. Funds must be available during the pre-application phase when there's still room for changes. The Article X process should not be expedited. It's fast as it is. (See Response on page 14-16.)

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Better Queens Environment (BQE)

Decision making regarding both the Draft State Energy Plan and the actual siting of power plants in our city is controlled by administrative personnel, some appointed by the Governor. Elected representatives, except to be participants in the hearing, are excluded and have no input into the work of the agencies and commissions. Although we are dealing with public utilities, public citizens do not really have a say. (See Response on page 14-16.)

Sustainable Energy Alliance of Long Island

Article X is deficient in several glaring respects–

- The power to supercede local rulings and regulations is unacceptable. For example, a local law to protect the sole source of drinking water may be bypassed.
- Article X doesn't provide for regional overview. Also, a power plant sited to increase competition may economically damage the region by not allowing other industries nearby because the PSC allowances are used up by that power plant. Do possible marginal rate decreases outweigh fewer businesses, higher unemployment, and arrested development in an area near a power plant?
- Allowance is not made for existing environmental problems, such as being a designated non-attainment region. The Energy Master Plan should accommodate health compromised regions such as Long Island, by specifying only suitably sited new generations that would meet the region's electrical needs, not excess generation.
- The Siting Board could be skewed to approving them.
- The two ad hoc locals on the Siting Board are chosen by the County Executive and can be political appointees so their objectivity may be in question.
- The Governor appoints all members of the Siting Board.
- The time allotted for public input and comments is too short.
- The time allotted for Siting Board decisions is too short.
- Intervenor funds must be available for studies before signing off on stipulations.
- No mention is made of the Long Island Power Authority, a State entity, being used as an adjunct to the PSC in the Draft Master Plan. LIPA is uniquely qualified to determine power plant need and siting on Long Island. It is familiar with the complex issues and local laws. Section 1020G of the LIPA Act specifies what criteria are for power plant siting and emphasizes renewables, energy conservation, state-of-the-art and new technologies. Serious consideration should be given to incorporating this section into the Draft State Energy Plan.

(See Response on page 14-16.)

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New York Public Interest Research Group

Right now the Draft State Energy Plan fast-tracks the approval process for building new power plants on brownfields. While this is a good idea, New York needs to improve public participation by expanding the intervenor funds to include legal representation so that the communities could be better represented when a power plant is proposed in their area. There are more than twenty new proposals for preliminary scoping here on Long Island that LIPA is currently pushing through. And this is just a horrible situation where you continue to have the community at the mercy of a public power authority that's supposed to answer to the people and currently doesn't. (See Response on page 14-16.)

Fred Elmer

Article X of the Public Service Law should be changed as follows: The siting process needs to allow for public input and assessment of health hazards and an environmental justice analysis. Reauthorization should be linked to cleaning up older grandfathered power plants that were built before 1977 and which now violate the clean air standards. Cleanup should result in reduction of sulfur dioxide approximately 50 percent, nitrogen oxides about 50 percent, and caps for the carbon dioxide emissions. (See Response on page 14-16.)

Independent Power Producers of New York, Inc. (IPPNY)

The State Energy Plan should unequivocally endorse the Article X power plant siting process. The siting process should be renewed and could be improved. The siting board and agencies involved should:

- Tighten the hearing and permitting schedules.
- Shorten the overall power plant approval time frame.
- Shorten the approval time frame for any development project reusing an industrial site.

The State Energy Plan should remind policy makers that the goal of Article X is to efficiently site new generation in the state, not to discourage the siting of new generation. (See Response on page 14-16.)

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Moratorium on Power Plant Siting

Sierra Club, NYC Group

No new power plants should be built until the other recommendations of the Sierra Club, NYC Group, are implemented. This should become a fundamental part of the State Energy Plan. No repowering projects should be permitted unless they substantially reduce pollution and mandate the use of new technologies that will reduce the overall pollutant levels. (See Response on page 14-16.)

Riverkeeper, Inc.

The State Energy Plan should promote the siting of new electricity generation capacity only where the replacement of older destructive technologies is guaranteed. (See Response on page 14-16.)

New York City Environmental Justice Alliance

The Alliance would like to see a moratorium on power plant siting except for repowering projects until the recommendations [in the Energy Plan] relating to the electricity sector are implemented, including the form of power plant siting, clean up of existing plants, investment in efficiency and new technologies, and implementation of renewable energy technologies through the Renewable Portfolio Standard. There should be a moratorium unless the project will result in a direct reduction of overall pollution due to the repowering of an older plant with new technologies or fuel switching. Construction of new plants has a long-term effect on New York's electricity sector and should only be done in the context of an overall balanced energy plan.

The State Energy Plan should address how reform of siting procedures should take place. Reform should fast track good plans for repowering, fast track clean renewable technologies – not burned-garbage waste plants, good wind power, photovoltaics, biomass, that type of thing. (See Response on page 14-16.)

Consumers Union

The State should evaluate the need for public power plants. (See Response on page 14-16.)

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Against Grandfathering Older Plants

Environmental Advocates of New York

Older plants should not be grandfathered. The siting law should be linked to clean up of existing older plants that avoid current emission standards. These old polluting plants should be required to clean up using a four pollutant approach to reduce sulfur dioxide by 75 percent, NOx by 50 percent, mercury by 90 percent, and place caps on carbon dioxide emissions. (See Response on page 14-16.)

Annie Wilson Miquet

A mechanism could and should be the decommissioning of the grandfathered power plants. I would suggest that any new power plant proposals would be prohibited unless they are a true repowering of an existing facility. (See Response on page 14-16.)

General Siting Issues

Consolidated Edison Company of New York

The parallel tracks of the siting board review and the DEC permit review remain confusing and unwieldy and provide increased opportunity for delays and uncertainty. Con Edison thinks there ought to be better coordination between the siting board and the DEC permit review process and we urge the Draft State Energy Plan to consider this. (See Response on page 14-16.)

A.E.S. Ltd.

We should work prudently to ensure that New York continues to meet its energy needs using generating facilities that are located in and pay taxes in New York. (See Response on page 14-16.)

Innovative Energy Systems (IES)

IES wants emphasized in the Energy Plan the regional aspects of energy policy in New York. In developing an energy policy, a lot of generation should not be sited and provided with incentives for siting in the western part of the State. IES' concern is that, in the absence of new transmission resources, power generated in the western part of the State will only add to the increased capacity in the western part of the State and not satisfy capacity needs in the eastern part of the state. (See Response on page 14-16.)

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Streamline the Article X Siting Process

Mirant New York, Inc.

The State must streamline and expedite its siting processes and remove government imposed obstacles in order to facilitate the building of new energy infrastructure including additional generating plants and natural gas pipelines while retaining existing low cost generating facilities.

It is not enough for the Draft State Energy Plan to recommend renewal of the current Article X siting law. It must advocate for an improved and expedited process. The purpose of the Article X law was to facilitate the siting of electric generation, not to be a vehicle for those who would oppose it.

The State Energy Plan should contain recommendations to enhance, streamline, and facilitate the implementation of the Article X and Article VII siting laws. The Energy Planning Board may wish to consider any or all of the following:

- Better coordination with federal agencies
- Accommodation and expedition of the siting of new and expanded facilities where the level of net air emissions upon completion of the project would be the same or lower than current levels
- Reallocation or dedication of current State agency staff to assist the Siting Board
- Reduction or elimination of intervenor funding, the availability of which may inadvertently delay opportunities to expedite the siting process
- Combining Article X and VII processes.

(See Response on page 14-16.)

Environmental Energy Alliance of New York

Absent from discussion in the Energy Plan is the Article VII transmission line licensing process. The Plan should include an objective to develop a method where State and federal regulators would coordinate more closely to ensure that approvals of Article VII and Article X licensing projects are completed in parallel among all agencies. (See Response on page 14-16.)

Multiple Intervenors

The Article X process must be expedited. Load must be allowed to participate in wholesale markets. Barriers to distributed generation and co-generation facilities must be eliminated.

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The State Energy Plan must include recommendations that ensure a secure supply of energy. The Article X siting process must be expedited. (See Response on page 14-16.)

New York State Electric and Gas (NYSEG)

NYSEG suggests streamlining the siting and approval process for electric generating plants, adding to the State's electric transmission capacity, and the creation of a Regional Transmission Organization that includes the New England, New York, and Pennsylvania-New Jersey-Maryland ISOs. (See Response on page 14-16.)

New York Public Interest Research Group (NYPIRG)

NYPIRG fully supports the six-month approval process for repowering projects. Repowering is really the way that New York State should be going as far as meeting its energy needs. In true repowering, we are decreasing emissions, increasing output, and decreasing the amount of water facilities use. (See Response on page 14-16.)

Niagara Mohawk Power Corporation

The draft Energy Plan correctly notes that the Article X process has been a useful tool for review of proposed new generating facilities and points out that the process should be enhanced to enable it to conclude more rapidly. The Article VII process, by which major electric and gas transmission facilities are certified, would also benefit from some improvement. When new generating facilities are proposed, better coordination of the Article VII and Article X processes would be beneficial. Since federal permits often delay construction, improved coordination between State and federal regulators during the siting and permitting processes would also be worthwhile. (See Response on page 14-16.)

Key Span

Under Article X, we applaud the initiatives for repowering opportunities, but we think a hard look should be taken at brownfield opportunities, where generation can actually be undertaken on brownfield sites. Key Span, of course, is a very large property owner in the New York City and Long Island areas, and brownfields are a very important issue for those regions. Certain generation opportunities at brownfield sites should get preferential treatment on some expedited basis. (See Response on page 14-16.)

New York Independent System Operator (NYISO)

To allow Article X to lapse or to install a radically different regulatory process for siting new generation would be devastating at this time.

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The NYISO makes the following specific recommendations on how the Article X process can be improved: (a) Once an application has been certified, shorten the time frame for approval from 12 months to 6 months or less. (b) further streamlining the process for power plant developers building on "brownfields" (*i.e.,* existing industrial use sites) while remaining cognizant of the need to continue developing greenfield sites. (See Response on page 14-16.)

The Manufacturers Associations of Central New York and the Greater Syracuse Chamber of Commerce

Competitively priced and reliable energy is paramount to the success of businesses here in central New York and across the State. New York needs more capacity to increase competition, to keep prices down, and to successfully position our businesses for growth. We recommend improving the Article X siting process. New York State must continue to make adjustments to streamline this bureaucratic process to ensure the development of a more competitive wholesale electric market. (See Response on page 14-16.)

Sunset Article X

Roger Downs

I think only one person has come forward and said that Article X should sunset in 2002 and I thought I would come and make that two people.

I think that amendments [to Article X] are unnecessary. I think every applicant can have a fast track if they are choosing a good site. I think the Athens plant took three years to permit because it was a pathetic site.

I would like to offer a power plant beauty contest. I would like to see them compared using certain criteria such as repowering, brownfields, historic site, environmental impact, and Environmental Justice issues. (See Response on page 14-16.)

Sustainable Energy Alliance, Suffolk County Electrical Agency, Long Island Coalition for Democracy

No extension of Article X. It should sunset. It's already damaged a number of communities and been highly costly in terms of forcing municipalities to determine to challenge them. It seems we should go back to the old methods and require all generating plant companies to be forced to comply with full SEQRA from the very beginning. (See Response on page 14-16.)

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Mini Power Plants

New York Public Interest Research Group

We believe that eighty megawatts is too high. The original number we would start off with is fifteen megawatts. (See Response on page 14-16.)

Pace University School of Law; Pace Energy Project

An essential changes in the Article X process should include lowering the generation capacity threshold for Article X applicability. Article X applicability should be based on a proposed plant's nameplate capacity. (See Response on page 14-16.)

Stop the Barge

A major flaw of the Article X process is the wiggle room that allows the power development entities to use the law to their own advantage. The 79.9 vs. the 80 megawatts issue is absurd. There is no reason to assess the megawatt capability of a turbine that is capable of producing far more than 80 megawatts at an arbitrarily low megawattage to satisfy the SEQRA/Article X division. The entire regulatory agenda vis-à-vis chemical emissions is the ceiling, the potential to emit, not an arbitrary number of tons per year that the company wishes to be held responsible for to meet an application ceiling. Why is that no the regulatory mandate of the energy industry?

PM 2.5 is a huge issue in our community because of the heavy asthma burden. While our community does have several monitors to measure PM 2.5, we are not satisfied that generic 2.5 monitors provide the basis for the modeling that will be used to determine our futures. Even if five months of on-site monitoring is not the U.S. EPA protocol, we would like it to become a format standard for the Article X process.

Response: In the State Energy Plan, the Energy Planning Board endorses reauthorization of the Article X Power Plant Siting Law, and it recommends that the Legislature give consideration to modifications that would streamline the process while continuing public participation. The Board recognizes that decisions concerning any extension of Article X are legislative prerogatives and, as such, the parties' recommendations concerning modifications are available for review by the Legislature. The comments from the parties are numerous, covering many areas of the Article X process.

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Non-Article X Issues – NYPA and LIPA

Independent Power Producers of New York, Inc. (IPPNY)

The New York Power Authority should not continue to insert itself into the competitive electricity marketplace. When New York City faced a severe supply shortage, rather than allowing or encouraging the competitive market to solve the problem, NYPA went forward with the turbine project. NYPA should be required to divest those units as soon as possible.

Response: The units installed by the New York Power Authority (NYPA) were crucial for maintaining a reliable electric system during summer 2001, and they will continue to be crucial for the next several years. When the decision had to be made concerning these units, the competitive market had not been established to the degree necessary to allow the forces of competition to control. As the competitive market and new programs for demand reduction mature over the next few years, the need for market interventions should decline. The ability of NYPA to intervene when necessary is an important asset for New York State.

New York State Sustainable Energy Coalition (NYS-SEC) *et al.*

The Draft State Energy Plan encourages the New York Power Authority and the Long Island Power Authority to rely more on so-called mini-power plants which do not have to go through the formal approval process, particularly in the New York City Metropolitan area. It must be recognized that these smaller power plants have significant environmental and health impacts on a community and, in almost all cases, are targeted for low-income communities of color.

Response: The Energy Plan does not encourage New York Power Authority and Long Island Power Authority to rely on mini-power plants. The Plan acknowledges the existence and benefits of such facilities and discusses efforts under way to construct several additional facilities to meet system needs. The output from these facilities is essential at least until new base-load generation, transmission interconnection, and effective load-reduction measures are available. The State, especially in the New York City and Long Island areas, needs additional resources of supply and demand reduction; the NYPA and LIPA facilities are meeting those needs.

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Jesse Moore

Our community, which is Williamsburg, has a number of power plants and a new one which was built by the New York Power Authority last year. The speed with which the plants were sited that the NYPA built last year really prevented the community effectively from involving itself in the process.

Assemblyman Felix W. Ortiz

Assemblyman Ortiz is from the Sunset Park area of Brooklyn. He submitted both oral and written statements regarding their problems with New York Power Authority. "NYPA has made itself an unwanted neighbor in our community . . . they ignored pre-existing health concerns in our community, produced an inadequate Environmental Impact Statement, and have shown consistent reluctance in working with our community.

New York Public Interest Research Group (NYPIRG)

New York should not move forward with the building of new facilities until there's an adequate plan in place, especially with the proposed building of ten new turbine generators here on Long Island. These generators completely circumvent the Article X process by siting two plants on some sites that are designated for 80 megawatts. This problem is going to continue unless there is a plan that specifies specific actions that Long Island Power Authority has to adhere to, and currently they do not have to adhere to the Energy Plan.

Ann Link

With reference to page 2-8 of the Draft State Energy Plan, mini power plants in New York City should not be exempt from the Article X process. These plants can have very negative consequences for concentrated populations from increased pollution, noise, and traffic.

Response: The small units installed or being installed by NYPA and LIPA, while not subject to Article X of the Public Service Law, were required to meet applicable State and local requirements, and public comments were solicited as required. The Energy Plan is not the proper forum to review the siting decisions made for such facilities.

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Parks, Recreation and Historic Preservation

New York State Office of Parks, Recreation and Historic Preservation

The State Energy Plan calls for State Parks to become a statutory party in every certification process under Article X of the Public Service Law (PSL). The State Energy Plan indicates that statutory parties to the certification process are required to submit expert testimony if they determine that a proposed facility impacts a resource under their jurisdiction. This is inaccurate. Section 166 of the PSL only requires that Department of Environmental Conservation and Department of Public Service staff participate in the certification process. No such requirement is placed on other statutory parties contained in that section including the departments of Agriculture and Markets, Health, and Economic Development and New York NYSERDA. In cases where a federal permit is necessary, §14.09 requires that the Commissioner issue an impact determination in the context of §106 and the federal historic preservation review process. To the extent that the Commissioner can consult with State agencies to the certification process she has done so and will continue to do so, but should not be called upon to offer testimony in the State process. The benefit however to listing State Parks as a statutory partner under Article X is that it will receive notification of proposed facilities and will receive documentation in a timely manner.

Response: The State Energy Plan has been modified to reflect the correct language.

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15. Infrastructure

Senator James W. Wright

Equally important to continuing the progress that has been made in siting new generation is enhancement of the systems in place for delivering energy. A key element of the State Energy Plan's energy policy must be provision of incentives to the owners and operators of transmission and distribution systems to maintain and upgrade facilities. New generation will not be effective in responding to the State's energy needs if the systems necessary to delivery power to users are not safe and reliable. It has been fairly observed that the State's energy needs are as much a matter of distribution as generation. The bottleneck that prevents the transmission of electricity to the areas of highest demand warrants attention. So, too, do the deficiencies in the natural gas distribution system. We believe that clean, efficient natural gas is important for the economic vitality of rural areas like ours and will continue to look for means to extend service where needed.

Independent Power Producers of New York, Inc. (IPPNY)

The State must encourage development of the infrastructure necessary to support competitive markets. The State Energy Plan must encourage improvements in the bulk electric transmission system. Article VII of the Public Service Law, which governs transmission line siting, should be reviewed with an eye towards streamlining the process.

Independent Power Producers of New York, Inc. (IPPNY)

We are still unable to efficiently transport electricity from where it is generated to where it is needed.

Independent Power Producers of New York, Inc. (IPPNY)

The Draft State Energy Plan supports the extension of natural gas pipelines to meet growing demand but must also encourage improvements in the bulk electric transmission system. Article VII of the Public Service Law which governs transmission line siting should be reviewed with an eye towards streamlining the process much as Article X has for power plant siting. We are still unable to efficiently transport electricity from where it is generated to where it is needed. The Energy Plan should address this issue.

Niagara Mohawk Power Corporation

The Article VII process, by which major electric and gas transmission facilities are certified, would also benefit from some improvement. When new generating facilities

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are proposed, better coordination of the Article VII and Article X processes would be beneficial.

R.G.S. Energy Group/Rochester Gas & Electric Corporation

The financial stability of the transmission and distribution (T&D) companies is critical to the world class reliability we have come to expect and demand in New York. The statewide T&D system was constructed over many decades. This vast and complex system demands constant maintenance and reconstruction to meet the daily demands of a modern economy. Capital reinvestment is more critical than ever, but remnants of the old regulatory system strain company finances and keep energy prices high.

The State Energy Plan should identify hold-over statutory and regulatory policy that may impact the financial integrity of the T&D companies, increase the cost of energy, and detract from the ability of these companies to maintain and improve system reliability.

Response: The Energy Planning Board concurs that the infrastructure necessary to support competitive markets must be maintained and expanded where appropriate. The Energy Planning Board defines "infrastructure" to include existing, new, and upgraded central station and distributed power supply resources, existing, new, and upgraded transmission and distribution facilities, and existing, new, and improved demand reduction techniques and measures. Each of these resources is important in the development and expansion of competitive markets. In the long term, each of these must be self sustaining on its own merits based on the desires of consumers.

Similarly, the Energy Planning Board supports efforts to eliminate barriers to the introduction and expansion of energy resources that will be in the public interest. The State Energy Plan supports extension of Article X of the Public Service Law. The Energy Planning Board urges that the Legislature give consideration to any changes that would benefit the process and be in the public interest. With regard to Article VII of the Public Service Law, which addresses transmission line siting, The Energy Planning Board also concurs that streamlining should be considered if any changes would be beneficial and if the changes support coordination with the Article X process. No party, however, has indicated what, if any, specific changes are necessary. The Public Service Commission will certainly consider changes to the Article VII procedures if need should be demonstrated. Similarly, coordination of Article VII and Article X proceedings can be accomplished by the applicants if they submit their proposals in a timely manner and

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keep the parties and the Judges in both proceedings adequately informed of scheduling requirements.

Natural Resources Defense Council (NRDC)

On page 1-35, the draft State Energy Plan calls for efforts to improve the efficiency of energy generation; that's a step in the right direction. The Long Island Power Authority, in particular, should aggressively pursue power strategy (*i.e.*, repowering existing plants to make them more efficient) for all their plants.

Response: In general, the Long Island Power Authority does not own generation plants but purchases power, primarily from Key Span but also from other generators. Even so, as the energy market becomes more competitive, the natural action of market forces will likely impel all power generators to replace and upgrade inefficient units. In the State Energy Plan, the Energy Planning Board supports ongoing development of the emerging energy market.

Dani Glaser

Regarding the Draft State Energy Plan, I want to point out what I saw as one tremendous omission, which is the impact of construction [of infrastructure projects]. There was much discussion of the benefits of deregulation but at what price do these benefits come? To not have addressed the impact of construction of a project such as the Millennium pipeline, I feel is irresponsible. It will have a devastating effect on the Hudson River and on the New York City watershed. Millennium has totally underestimated the rock blasting that will occur and 50,000 trees will come down in the county. These are issue of construction that were not addressed. The omission of the concept of what construction will do with new plants, new projects, and new gas pipelines, is something that really needs to be looked into.

Response: Construction impacts occur whenever transmission and generation projects are built. The certification and permitting processes for such facilities, therefore, must (and do) consider such impacts in relation to other costs and the benefits of the projects. Procedures exist in those processes to address any significant omissions in the record that may be found. The Energy Planning Board urges parties to use the processes that have been established for review of specific projects. The State Energy Plan is designed to address long-range policies and is not the proper forum to consider the impacts of specific projects.

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Green Party

The Millennium pipeline should be stopped at Indian Point and not continued down to Mount Vernon. The continuation of the pipeline into Mount Vernon raises a lot of issues. It's a heavily populated area. There is a large environmental justice issue. The pipeline would impact many minorities and people of very low income.

I read the brief discussion of the Millennium pipeline in the draft State Energy Plan, it didn't cover my concerns at all.

Response: The State Energy Plan provides factual information describing pipeline projects but does not take a position on the issues pending in proceedings to consider applications to construct any individual pipeline. The Millennium pipeline is subject to the approval of the Federal Energy Regulatory Commission, and routing issues are being considered in that proceeding.

Marshah-Reaff Barrett

The infrastructure for natural gas must be expanded with the intention of phasing out coal as much as possible.

Response: The Energy Planning Board concurs that the natural gas infrastructure needs to be expanded. While additional use of natural gas will tend to offset less efficient facilities, including less efficient coal units, the Energy Planning Board supports the continued safe operation of existing generation facilities, to the extent they can continue to meet environmental and health and safety standards, as part of a diverse portfolio of electricity generation resources. The Energy Planning Board and the Energy Plan support advanced coal technologies where they contribute to the State's fuel diversity.

Mirant New York, Inc.

The Energy Planning Board should retain flexibility and reserve judgment, where appropriate, beyond submission of the State Energy Plan if necessary to consider the findings of the joint NYSERDA-NYISO gas and electricity study on the State's natural gas infrastructure and its interaction with the electric system infrastructure.

Building on the work being undertaken by the study, The Energy Planning Board should examine New York's energy related policies for their impacts on the ability of power producers to continue operating existing facilities fueled by sources other than natural gas, the ability of power producers to install new base load generation within the

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State that is not fueled by natural gas, and the ability of utilities to delivery energy from a variety of generation sources seamlessly throughout the region.

Response: The findings of the joint NYSERDA/NYISO gas and electric study, *The Interaction of the Gas and Electricity Systems in New York State*, are incorporated in the State Energy Plan. The full text of the study will be published in summer 2002.

Mirant New York, Inc.

The State Energy Plan should endorse and promote an environment that encourages the maintenance and expansion of transmission and distribution systems by:

- Including assurances of financial recovery and fair return on investment
- Facilitating short amortization periods
- Provide stable financial opportunities for market participants
- Offer streamlined approval for projects and avoid artificial financial constraints
- Recognize the importance of maintaining and enhancing the system relative to minimizing end user prices.

New York State Electric and Gas (NYSEG)

The State Energy Plan fails to detail the process and new policies by which it expects much needed New York State electric transmission system infrastructure improvements to be made. The Energy Plan needs to address and identify specific policies that will facilitate economic transmission investment.

Response: The Energy Planning Board supports the maintenance of the State's transmission and distribution systems and expansion of those systems when in the public interest. The New York Independent System Operator is currently working to address issues that might otherwise deter necessary and beneficial system expansions. Accordingly, The Energy Planning Board will await the outcome of that work before considering if the State should establish its own policies and processes.

Kenya Browning

Pipeline projects mentioned on pages 3-137 and 3-139 are refreshing to see. Natural gas should take over where fossil fuels leave off.

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Stop the Barge

An assessment of the grid should be a mandate of the Draft State Energy Plan. A revision of the grid should be implemented as part of the Energy Plan.When suitable, non-residential properties are identified for the placement of new power plants, an update of the changes needed for the grid can be determined. Most grid 247 KV lines run through once industrial neighborhoods. This must be changed.

Response: Technical assessments of the transmission grid are performed regularly by transmission owners, by the New York Independent System Operator, and by the Northeast Power Coordinating Council. The State supports the performance of such assessments, monitors the results, and also participates in the approval of any new major transmission lines, as required by Article VII of the Public Service Law.

New York Gas Group (NYGAS)

NYGAS encourages the Energy Planning Board to recommend the development of policies to ensure the timely licensing and approval of natural gas transmission infrastructure projects to support future increase in demand for natural gas in New York State. The State Energy Plan should reinforce the need for policies to encourage the capital investments that will be needed to support the demands placed on the State's energy delivery infrastructure over the next 20 years.

NYGAS believes the Energy Plan should address the concern of ensuring that pipelines fully add the capacity and swing capability necessary to serve much higher gas fired generation loads.

Response: The Federal Energy Regulatory Commission (FERC) is responsible for the licensing and approval of most natural gas transmission lines. State agencies have encouraged and will continue to encourage the FERC to approve needed pipeline projects in a timely manner. The State Energy Plan requests the New York Independent System Operator to consider the certainty and availability of primary and back-up fuel supplies in valuing capacity from electric generators or to consider the certainty and availability of primary and backup fuels in establishing local reliability rules. Policies adopted pursuant to this recommendation should encourage gas-fired generators to invest in pipeline capacity.

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New York Gas Group (NYGAS)

Another key issue regarding adequacy of supply and reliability of service is the Public Service Commission's desire to have local distribution companies exit the merchant function. NYGAS urges the State to reconsider this objective and ensure that it will not conflict with the need to preserve reliability of service.

Response: The Public Service Commission (PSC) is considering the future role of utilities in Case 00-M-0504, Proceeding on Motion of the Commission Regarding Provider of Last Resort Responsibilities, the Role of Utilities in Competitive Energy Markets, and Fostering the Development of Retail Competitive Opportunities. In its Policy Statement on the Future of the Natural Gas Industry, the Commission stated that no compromise in reliability would be permitted and that an exit of Local Distribution Companies (LDCs) from the merchant role would not be allowed until continued reliability is assured. The Commission also stated that reliability issues should be addressed through collaboration. The PSC staff has established a Natural Gas Collaborative and a Natural Gas Reliability Advisory Group to address reliability issues, on which NYGAS is well represented.

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16. Regional Transmission Organization

Independent Power Producers of New York, Inc. (IPPNY)

The State Energy Plan should encourage the State to work cooperatively with the Federal Energy Regulatory Commission in its efforts to develop a regional transmission organization.

The State Energy Plan should firmly endorse the concept of increasing the size of electric markets in which New York participates. As the federal government continues to encourage larger markets across the country, New York must take these developments into consideration when adopting any New-York-only regulations.

A.E.S. Ltd.

A.E.S. supports the State Energy Plan's recommendation with respect to the northeast RTO and has the following concerns:

- Maintaining system reliability
- Development of market best practices
- Single independent governing body
- Need to develop fair, but less intrusive, market monitoring and mitigation procedures.

New York Public Interest Research Group

We should not be moving to a Regional Transmission Organization or regional approach. Other states would have decisionmaking power over New York but do not have New York's interests at heart. The link between the consumer and the decision maker is further blurred.

Sustainable Energy Alliance, Suffolk County Electrical Agency, Long Island Coalition for Democracy

No regional Independent System Operator. Keep the New York State Independent System Operator in place.

Better Queens Environment (BQE)

Regionalization of transmission should be linked with regional cooperation to reduce pollution downwind of participating states. Joint efforts by states in the region to equalize tax rates of fossil fuels will also assist in the retention of local industries and jobs. BQE proposes that all regional coordination efforts address pollution reduction and fossil-fuel taxes.

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American Ref-Fuel

The State Energy Plan should work with the Federal Energy Regulatory Commission in its efforts to develop an effective Regional Transmission Organization.

New York State Electric and Gas (NYSEG)

NYSEG strongly supports a 3-region Regional Transmission Organization.

Response: The Energy Planning Board in the State Energy Plan supports working expeditiously toward a regional market in the Northeast. The Planning Board recognizes the concerns raised by some parties that decisionmaking power under an expanded regional market approach might be moved further from New York State's control and calls for the State to continue to participate in negotiations to bring about a regional market to ensure the incorporation of best practices and fair representation on the part of market participants, including affected State governments, in the common market governance structure. Any system for merging the NYISO into an expanded market must incorporate appropriate State and local reliability requirements and ensure that the reliable operation of New York's electric system. A future system must allow full participation of demand management resources in the competitive procurement process.

Supporting Comments (No responses are necessary in this section.)

New York Independent System Operator (NYISO)

With respect to the draft State Energy Plan's recommendations for a Regional Transmission Organization (RTO), NYISO is currently exploring the costs and benefits of a merger with the ISO-NE and the formation of a northeast RTO that may at some point include the eastern Canadian provinces. In response to the concerns expressed in the draft State Energy Plan, any such organization formed would in fact be operated in accordance with best practices and would be designed to incorporate local reliability requirements and, indeed, not shortchange the reliable operation of New York's integrated electric system. To accomplish these objectives, stakeholder working groups on market design and system implementation are being formed as part of the RTO Development Review Process.

Consolidated Edison Company of New York

Con Edison supports the Draft State Energy Plan's position that New York State support the development of a Regional Transmission Organization. We think that a well-functioning RTO will include in it a planning process that allows ample opportunities for

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market-based generation, transmission projects, and demand side measures to be used to meet the growing energy needs of the State.

We think consumers will benefit from the enhanced competition that will result from larger markets, but the pursuit of savings cannot come at the cost of degraded system reliability.

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17. Distributed Generation

Natural Resources Defense Council (NRDC)

The NRDC is very adamant about getting the electric utilities incentives correct. Currently they have incentive to block distributed energy projects or energy efficiency. And as long as utilities have an adversarial relationship with these good public benefit projects, it's going to be like pulling teeth every time you want to promote these technologies.

It's very important to address regulatory barriers, address the regulatory incentives that utilities have so they can become partners with the state and the citizens in achieving a really balanced and sustainable and clean energy future.

Environmental Advocates

In the section of the State Energy Plan on distributed generation and renewable fuels, a bullet mentions regulatory barriers to distributed generation and at the technical briefing environmental regulations were mentioned as a barrier to renewable energy. If there are environmental regulations that are barriers to renewable energy, then they should be discussed in the State Energy Plan and recommendations put forward for overcoming those barriers.

Sierra Club, NYC Group

The State has actively supported programs for energy efficient appliances, machinery, and buildings. New technologies for power generation should also be supported. These have the potential to create heat and electricity with reduced pollution and decreased resource use. Such technologies include fuel cells, geothermal, clean distribution, renewable energy, and others. The creation of many new jobs is likely to result from employment of these technologies. The Draft State Energy Plan should analyze this possibility.

Response: The Energy Planning Board in the State Energy Plan acknowledges and details policy objectives concerning the development and use of distributed generation and combined heat and power technologies. Throughout the Energy Plan, distributed generation is acknowledged as a major way to address system reliability concerns that, in tandem with demand management strategies, will ensure adequate and diverse supplies of energy.

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The New York State Department of Environmental Conservation (DEC) is currently developing emissions standards for distributed generation technologies, and NYSERDA is working with DEC and various groups to ensure that the standards are rational and fair. NYSERDA is collecting data to characterize the emissions from distributed generation equipment through its *Efficiency and Renewable Energy Potential Assessment*. In the State Energy Plan, the Energy Planning Board sets national leadership in deployment of clean distributed generation technologies as the State's goal. In particular, the Energy Plan calls for continuing research and development for distributed generation and CHP technologies in connection with renewable energy resources and facilitating interconnection of distributed generation and CHP into the electricity system. Investment tax credits are recommended as a means of spurring private investment in these technologies. See Section 1.3 of the Energy Plan.

The Joint Supporters

The 2002 Draft State Energy Plan needs to go further than it does in setting objectives and in measuring progress toward the goals of developing and securing indigenous resources and realizing energy independence for North America.

More effort is needed by the State and in the Draft State Energy Plan to recognize the State's continuing interest in promoting market transformation in demand resources.

The definition of energy facilities should include fuel facilities (transport and storage), generation (large, small, combined heat and power, renewables), transmission, distribution, and on-site facilities (on-site generation, meters, energy management systems, and communications and energy usage systems). Building codes also need further reform.

The Draft State Energy Plan should be dramatically expanded in the final Plan to include numerous distribution and transmission upgrades, *e.g.*, the numbers should be tripled to 75 or more across the State. LIPA should adhere to a similar standard.

Interconnection is another area where New York's position as a market leader has been overshadowed by inertia.

Response: The State Energy Plan is a plan for New York State and not North America. Nevertheless, the Energy Plan recognizes the important roles played by surrounding states and the northeastern states in general in addressing regional and national energy issues. The State Energy Plan supports the State's continued commitment

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to energy efficiency and renewable energy development and to transformation of energy markets toward self-sustaining energy efficiency and demand management. The State Energy Plan supports and encourages investment in energy and transportation infrastructures, including transmission and distribution, distributed generation and alternative energy development, roadways and public transportation, among other areas, as recommended in Section 1 of the State Energy Plan. Regarding interconnection issues, the Energy Plan supports easier interconnection and standardization of interconnection procedures, while recognizing that many complex issues need to be resolved before transparent interconnection can be realized.

Plug Power, Incorporated

We are enthusiastic about the increased interest generated in the area of distributed generation and are encouraged that it is referenced in the Draft State Energy Plan. We need the State to do more.

Robert Lambert

The overall plan should allow for the location of electric generating plants so that existing distribution systems could carry newly generated power, electric (with steam to follow) for the immediate community.

Currently operating generating plants using fossil fuels to should be converted and upgraded to cogenerating units where excess steam can supply surrounding communities with heating, cooling, refrigeration, and electricity at greatly reduced rates.

Lake Shore Environmental Action of Wolcott

The present plan seems to favor large inefficient centralized producers. Cogeneration should be encouraged.

Response: The State Energy Plan encourages the implementation of combined heat and power (cogeneration) facilities. The recommendation that existing facilities be converted is, in general, infeasible because of location and technology constraints. Currently, most existing, large-scale electric generation plants are located in remote areas. The cost of piping thermal energy in the form of steam and hot water to end users would be prohibitive. In addition, the local use of thermal energy is usually very small when compared with the amount of thermal energy generated by a typical large power plant.

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For years New York State and NYSERDA have supported the development of highly efficient combined heat and power (cogeneration) systems where the generating equipment is appropriately located and the thermal energy output is well matched to the needs of a single customer or group of customers. In addition to ConEdison's longrunning CHP steam generation system, a more recent success story in cogenerated, district energy is Jamestown, New York, a project supported by NYSERDA.

Ann Link

We are concerned that the Draft State Energy Plan's preoccupation with increased use of natural gas for large-scale generation is preempting appropriate attention from natural gas fired distributed generation and combined heat and power systems (CHP) in favor of other clean distributed generation technologies. In fact, one of the best measures available to extend the natural gas supply is to shift generation into CHP with its efficiencies in the 70-80 percent range. We anticipate that increased use of competitive natural gas pipelines and natural gas distribution infrastructures should make natural gas available for distributed generation and CHP engine and turbine technologies that meet emission requirements. Therefore, these technologies should not be disadvantaged in forecasts and in the identification and removal of disincentives to deployment.

Response: NYSERDA is very involved with and optimistic about the potential contributions of distributed generation and combined heat and power technologies (CHP). In fact, distributed generation is a consequential ingredient in the electricity deregulation model. Increasing distributed generation contributes to a free electricity market because it offers direct competition with energy services companies.

See Section 3.4, Electricity Assessment, of the State Energy Plan for a discussion of distributed generation. The New York State Public Service Commission has extended and expanded the system benefits charge in 2001, providing nearly $57 million over the next five years to improve the viability of distributed generation and CHP as economic energy options in New York State.

The Joint Supporters

To assess resource potential more fully, we think the combined heat and power analysis NYSERDA has already performed, or had performed by Nexus, will be fully reflected in the State Energy Plan's analysis and resource assessments.

Response: The Energy Nexus Study is not complete. A draft report is undergoing major revisions in response to feedback from the Project Advisory Board. However,

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selected information from the partially revised report was used in the regional electricity load and price modeling in the State Energy Plan. See Section 3.4, Electricity Assessment.

Battery Park City Authority

The State's energy planners can encourage more energy efficiencies by making certain that on-site generation, for example, can proceed without red tape and an endless bureaucracy.

New York Gas Group (NYGAS)

NYGAS conditionally supports the statement in the Draft State Energy Plan that the State should support and encourage the development and use of distributed generation and combined heat and power. However, the State Energy Plan should avoid policies that subsidize development.

Lake Shore Environmental Action of Wolcott

Co-generation should be encouraged.

Battery Park City Authority

The State's energy planners can encourage more energy efficiencies by making certain that on-site generation, for example, can proceed without red tape and an endless bureaucracy.

Response: The State Energy Plan reflects a major commitment by the Energy Planning Board to distributed generation and combined heat and power systems, sometimes referred to as cogeneration, because these technologies significantly contribute to increasing the State's energy diversity and facilitating economic development. Section 3.B. of Section 1.3 of the State Energy Plan contains recommendations that enunciate New York's goal of becoming a national leader in the deployment of clean distributed generation technologies. The State Energy Plan calls for the State to continue with research and development of these technologies, support new installations, improve interconnections with the electricity system, and consider investment tax credits for environmentally-sound, cost-effective distributed generation and combined heat and power systems.

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Don Neuroth

I'm a little annoyed that we cannot generate our own power on a micro basis because of some of the rules and regulations. We cannot generate power for ourselves without being penalized for it. If you want to have true competition, that would be one political way you could have it come about, by moving some of these roadblocks so we can generate our own power.

Response: Impediments to self-generation are being examined by the New York Public Service Commission and, to the extent that public and worker safety can be assured and inappropriate subsidies can be avoided, those impediments are being removed.

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18. Standby Rates

Alfred University

The issue of standby rates and net metering, as barriers to promoting distributed generation and renewable technologies from wind, solar, and combined power, should be confronted or at least mentioned in the State Energy Plan.

Harbec Plastics, Inc.

Harbec Plastics, Inc. was happy to see the draft State Energy Plan encourage distributed generation. However, the standby rates, if adopted by Rochester Gas & Electric Corporation, would kill distributed generation.

American Wind Energy Association (AWEA)

Utilities should exempt on-site renewable powered generation from standby rates.

The Joint Supporters

Standby rates should not be designed in a way that artificially increases rates. They should reflect the cost of service. The collection of so-called strandable costs in some areas of the State in standby rates is sufficient to render an otherwise economic project uneconomic.

Although the Public Service Commission approved a generic decision in October 2000, at this point considerable work needs to be done to implement reasonable rates for small generation in the real world.

Response: The Public Service Commission issued its generic *Opinion and Order Approving Guidelines for the Design of Standby Service Rates, No. 01-4*, in Case 99-E-1470, dated October 26, 2001. These guidelines specify the parameters of cost-based rates for standby delivery service, in compliance with which all utilities are required to file new standby rates. Rates previously filed by Rochester Gas & Electric Corporation prior to the release of this order have been cancelled. In compliance with this order, all standby rates currently in effect or previously filed by the utilities will be replaced with new rates during 2002.

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19. Energy Costs

Independent Power Producers of New York, Inc. (IPPNY)

We encourage an examination of the impact of New York State's specific taxes on energy prices and regional competitiveness, with an eye toward reducing the burden on consumers and businesses.

R.G.S. Energy Group/Rochester Gas & Electric Corporation

Local property taxes, including the special franchise tax, continue to be one of the most significant factors driving energy costs in New York. Current practices are clearly inconsistent with the State policy of reducing energy costs. The local tax system discourages investment and penalizes utility companies and their customers for improvements made to the energy system. The Draft State Energy Plan should recommend an overhaul of these policies, including the practices used to value utility property for real property and special franchise tax purposes.

Response: Section 2.2 of the New York State Energy Plan, Energy and Economic Development, presents discussions of the effects of New York's taxes on energy prices and describes policies the State has established to reduce energy prices. The Energy Planning Board supports efforts to reduce the impact of taxes on energy prices in the State.

Renewable Energy Works

Since the onset of deregulation, an alarming trend has been allowed for utility rate structures. Monthly service charges have been allowed to increase in exchange for keeping unit energy costs down. Those who conserve energy are penalized while those who waste energy are rewarded. These new rate structures also put new companies trying to market clean, renewable energy at a competitive disadvantage. The State Energy Plan should address rate structures as an important no-net-cost means for advancing energy efficiency and renewables.

Independent Power Producers of New York, Inc. (IPPNY)

In order for competition to flourish fully, consumers must have the opportunity to recognize and respond to the true costs of their consumption. This requires retail rate designs, for example, time of pricing, that send proper price signals to consumers and the development of policies that reward users who reduce consumption at times of peak demand.

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Response: Current utility rate structures are changing in recognition of the fact that the industry is in transition from offering fully regulated bundled services to offering a combination of unbundled "competitive" commodity and retailing services and "regulated" delivery services. In the future, utilities will continue to provide fully regulated retail delivery services to all customers using commodity services, whether purchased from the utility or from another provider.

Conservation principles are most directly linked to the "commodity" portion of the consumer's traditionally bundled utility service. The investments and resources (*i.e.*, costs) required to build and maintain the delivery service infrastructure, including wires, pipes, poles, and transformers, are driven primarily by the maximum degree to which customers might individually or coincidentally use the service, rather than its average or ongoing use. Hence, delivery system costs tend to be more fixed in nature, not varying much with changes in customer demand from day to day or season to season as do commodity costs and prices. Therefore, in order to move utility delivery rate designs in a direction that better reflects costs, increases in the fixed charge components of the rates, particularly for the lower-use customer classes, have been necessary. Such changes are not intended to signal customers to consume the "commodity services" wastefully or excessively.

Jamestown Board of Public Utilities (JBPU)

Jamestown is a municipally owned electric utility. The development of the New York Independent System Operator has dramatically expanded our cost in providing service to our community. Without obvious benefit, the NYISO charges have raised costs to supply electricity to our economically depressed community by 25 to 30 percent. We recommend that the State Energy Plan examine these costs seriously and assess the propriety of such costs.

Response: Tariffs and Federal Energy Regulatory Commission orders add to the cost of electricity generation, transmission, and distribution. The additional charges could come from any portion of the total electricity cost.

New York State Environmental Justice Alliance

Residential consumers should be allowed to aggregate their purchase of electricity by geographical area. This would enable a city or county to purchase a large amount of electricity at more favorable large customer rates.

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Consumers should be able to choose innovative energy packages that include efficiency and renewables.

Consumers Union

The State should assist residential consumers to aggregate their purchasing power to achieve the thus-far illusory benefits of market competition.

Response: All customers of regulated utilities are, and have been, allowed to aggregate their purchases of electricity and natural gas. Cities, counties, and other interested organizations can render valuable services to their citizens and members by facilitating aggregation. The Department of Public Service provides information and assistance to organizations and individuals that wish to provide or use aggregation services and NYSERDA provides assistance through its **New York Energy $mart**[SM] programs .

Alternative Power, Inc.

Some of the things that could really help get more business and more clean energy in New York City would be financial incentives for the distribution companies. With respect to connection to the grid, if there was a financial incentive for a distribution company to allow the loss of revenue to be somehow, through the State or through increased rates afterwards, depending on how they have been impacted, it would be great. Because they will lose business.

Western New York Sustainable Energy Association

The recommendation has to do with establishing efficiency incentives for electric distribution companies. When electricity was deregulated in New York State, not only were efficiency funds for rate payer programs slashed, but the efficiency incentives that utility companies had were also eliminated. There were rate adjustment mechanisms that would reward as well as hold harmless utility companies when they actively promoted efficiency.

Those incentives are gone, and, consequently, the electric utilities make more money by selling or delivering more electricity, and the more we use and the more we waste, the more money that goes into their pockets.

That's contrary to public interest, and there needs to be a decoupling of revenues from sales so that the utility companies can be partners with rate payers and with NYSERDA and others who are looking for a much more energy efficient State.

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Mirant New York, Inc.

In the larger context of costs, there is another raised by the Draft State Energy Plan that needs to be addressed. The Draft State Energy Plan contains a recommendation that "The State should examine the feasibility of effectively aligning public policy interests in energy efficiency, combined heat and power, and indigenous renewable based electricity generation, with the financial interests of utility shareholders and ratepayers." (Recommendation 5.A.)

To the extent that this recommendation is intended to support the concept of revenue decoupling as that is understood, it is outdated, unnecessary, incompatible with competitive energy markets, and we would oppose it.

Environmental Advocates

There are interconnection barriers, insurance costs, exit fees, back-up charges that are serving as barriers to the development of on-site clean distributed generation. The State Energy Plan should present specific recommendations for overcoming those barriers. The most effective approach will be to de-link the utilities revenue from the volume of sale in order to remove their underlying incentive to block clean distributed generation.

Response: As mentioned elsewhere in the responses to comments, the unbundling or decoupling of delivery and commodity services provides an opportunity to restructure rate designs to better link prices and costs. Transferring delivery service recoveries from variable (per kilowatt hour) to fixed monthly charges in and of itself produces no particular incentive to use more or less of the delivery. In fact, once a customer's access to the delivery system is established, the amount of actual energy (commodity) delivered becomes strictly subject to the commodity price.

Allowing commodity prices to vary with the market enables customers with discretionary uses to either pay or avoid higher prices, depending on their individual energy needs and financial circumstances. Commodity prices can vary on a monthly basis for classes of customers with low levels of use, *e.g.*, residential and non-demand metered commercial customers, or on an hourly basis for high use customers.

Revenue decoupling mechanisms were tried in the late 1980s and 1990s in an effort to encourage regulated utilities to become promoters of customer energy conservation and demand-side management measures. They may be less effective in achieving the desired price signaling to customers than the rate decoupling currently in

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progress as we transition to more competitive service environments. The State Energy Plan suggests that the Public Service Commission study how best to align public policy goals with the interests of utility rate payers and shareholders. (See Section 1.3, Energy Policy Objectives and Recommendations.)

Ann Link

New Yorkers spent $38 billion on energy in 2000. [too high]

New York is the fourth largest petroleum fuel market in the U.S. and largest market for home heating oil. [too high]

Response: Competition in energy markets will provide consumers with choices among their sources of energy and with choices among methods for reducing their demand for energy. As consumers begin to exercise these options, they will be able to shop for lower energy prices and take advantage of new technologies designed to reduce energy use.

Alternative Power, Inc.

One of the big things that we think can really help us out would be to have a green credit or a trading mechanism available to us, some kind of platform where the green credits that we make, through the green energy that we supply, can somehow be valued, which will help our customers and help us as a business.

Response: Using System Benefits Charge (SBC) funding instituted by the Public Service Commission, NYSERDA is offering several programs through its **New York Energy $mart**[SM] program to promote green energy. One of these programs is the Environmental Attribute Accounting and Trading System (REACTS) Program. NYSERDA has funded contractors to explore the viability of a system that will facilitate the unique sale and purchase of environmental attributes associated with energy sold and purchased through the Location Based Marginal Pricing market of the New York Independent System Operator.

Mirant New York, Inc.

Extraordinarily, the Draft State Energy Plan offers almost nothing to address one of the most fundamental components of energy prices: government-added costs. Government-added energy costs must be reduced, not increased as they would under the Draft State Energy Plan and as a result of other State actions that are incompatible with the goal of more competitive prices. New York State energy companies have consistently

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lowered their costs and frozen or reduced their prices. Those reductions continue to be largely negated by government-imposed costs: environmental mandates like the pending NOx and SO2 emissions regulations, social and other public programs, off-budget support for State agencies, inappropriate and inefficient facilities relocation practices. (See Response on page 19-7.)

Multiple Intervenors

It is imperative that the Draft State Energy Plan not include any recommendations that will increase energy costs in New York State.

Any recommendations in the State State Energy Plan pertaining to Article X and the siting of power plants should recommend expediting the siting process not imposing additional requirements that will delay construction or increase the cost of new power plants.

The Board should delete any recommendations pertaining to alternative fuels that will increase the price of electricity in New York State. One example is the recommendation that the New York Power Authority and Long Island Power Authority should competitively solicit bids for long-term contracts for the purchase of electricity from renewable energy resources.

The recommendation relating to the development of an indigenous biofuels industry in New York and an expansion of biofuels research and development activities should not be included in the State Energy Plan.

The recommendation that the State significantly increase the amount of renewable energy resources also be deleted from the State Energy Plan. (See Response on page 19-7.)

Multiple Intervenors

Multiple Intervenors lauds the Draft State Energy Plan for recommending the State move expeditiously to a fully competitive electric retail market. The failure to include lower energy prices as an objective of the Plan is inexplicable.

The final Plan must emphasize the need for lower energy prices in New York State. The State Energy Plan should include a specific reduction projection for each year. The Plan's forecast that electric prices will decrease over the Planning Period is overly

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optimistic. The Plan does not recognize the important role of economic development programs in retaining and attracting business to the State.

The draft State Energy Plan does not emphasize the need to move to a fully competitive electric market expeditiously. (See Response on page 19-7.)

Niagara Mohawk Power Corporation

The draft State Energy Plan places a disproportionate emphasis on energy efficiency and renewables relative to their potential contributions to meeting the State's energy requirements. We are even more concerned that the draft State Energy Plan suggests various forms of subsidies and mandates in support of these technologies. Niagara Mohawk is working with marketers of renewable energy products and the Department of Public Service to launch a program that will help promote renewable energy markets. The draft State Energy Plan should emphasize such market based approaches in preference over subsidies and mandates.

Response: New York State has undertaken extensive efforts to reduce its portion of the costs of energy to consumers in the State. Section 2.2 in the State Energy Plan, Energy and Economic Development, addresses some of the steps that the State has taken and some of the steps that still need to be taken. It must be understood, however, that some government-imposed costs are necessary and in the public interest.

Environmental Advocates of New York

We believe there is a need for a conservation contingency plan. No specifics are laid out in the plan for what would happen in case of a fuel cut off for some catastrophic reason.

Response: The State Energy Plan aggressively supports energy efficiency and renewable energy as a means to meet growing demand and encourage energy diversity. This commitment is evidenced by the Energy Planning Board's recommendations in Section 1 of the State Energy Plan. For information about those State energy efficiency programs that are similar in concept to the conservation contingency plan, see Section 3.2 of the Energy Plan. Increased energy efficiency, in effect, reduces the State's need for energy generated from coal, oil, natural gas, and other sources thereby reducing environmental emissions that would occur during the generation process.

The Electricity Assessment, Section 3.4 of the State Energy Plan, describes several actions taken by the State to develop rapid efficiency deployment to meet needs

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during critical times. In March 2001, the PSC approved several programs designed to reduce peak demand for electricity in Con Edison's service area. The PSC also directed all of the State's investor-owned utilities to submit plans to implement customer-incentive programs to reduce peak demand. The PSC subsequently approved these programs and tariffs to implement them. These actions allowed ESCOs and utility supply customers to take advantage of new demand reduction programs offered by the NYISO. By the end of August of 2001, approximately 680 megawatts of demand reduction had registered in the NYISO's Emergency Demand Response Program, which provided 456 megawatts of demand reduction during system emergencies in 2001.

The NYISO's Day Ahead Demand Response Bidding Program similarly provided opportunity for relief during summer 2001, with as much as 171 megawatts of reduction available in a given hour from parties registered to participate in this program.

In addition, the System Benefits Charge programs administered by NYSERDA reduced demand by about 90 megawatts. Additional savings resulted from plans developed to reduce government energy usage during peak periods, public appeals, and other utility programs.

The PSC also required utilities to prepare detailed public awareness plans describing their steps to raise awareness and inform customers on the load and capacity situation and describing actions that consumers can take to control their energy use. Special focus was on the business community where the greatest results are expected in the shortest amount of time.

Pace University School of Law; Pace Energy Project

The Draft State Energy Plan fails to address the fundamental barrier to greater retail choice – the prevailing "shopping credit" or "price to compare." With current utility rates, small consumers have no financial incentive to migrate from default service. The New York PSC and the State Energy Plan should seriously consider options to be pursued in the event that few customers are inclined to leave the regulated utilities.

Another issue that receives scant attention in the Draft State Energy Plan is whether there will be sufficient price responsive load to produce workably competitive markets. Many analysts have concluded that only ten to 20 percent of the total load or demand needs to be price responsive in order to capture most of the price reductions that are possible. However, there is no evidence that New York will be able to achieve that level of price responsiveness. The State Energy Plan should examine this issue

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thoroughly because it is of great consequence in terms of prices and the exercise of market power.

Further, the State Energy Plan should consider the consequences and alternatives in the event that adequate price responsiveness is not forthcoming from the market. We should have a reasonably good idea of how much price responsiveness can be achieved after the next two years' experience with the NYISO's economic day ahead price response program. If that program fails to gain a five to ten percent peak price responsiveness, using its significant incentives, then there should be considerable doubt about the market's ability to provide adequate price responsiveness. The State Energy Plan should address this possibility, consider its implications, and perhaps being to develop alternatives.

The State Energy Plan should evaluate and adopt policy options for addressing the meager choices and mediocre service currently available to residential and small commercial consumers.

Another issue that should be discussed is competitive bidding for the role of default supplier. The default service function should not inevitably devolve to the distribution utility but instead be subject to competitive bid.

Response: The matters raised by Pace are currently the subject of ongoing proceedings taking place at the Public Service Commission. Consequently, it would be premature to attempt to address these matters at this time. The PSC currently has a proceeding underway to unbundle utility rates. Out of this proceeding will come the appropriate charges for commodity and related commodity services. This proceeding will also determine the future course of retail competition in New York State, including the several issues raised by Pace.

With regard to the price responsiveness programs, efforts are underway to expand on the benefits achieved in 2001. If the market chooses not to provide the necessary demand responsiveness, additional generation resources may be required.

Wedlyne Guerrier

I think instead of the State having little direct control over wholesale price of energy, the State should petition to U.S. Congress to have more control over the situation, not necessarily total control, but enough to have a significant impact on the competitive market.

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Response: As noted elsewhere in the responses to comments, effective competition in the natural gas and electricity markets, where practical, is the policy of the State. The policies and recommendations forming the State Energy Plan are based on this concept, and the State Energy Plans, since 1994, have embraced the idea that competition has the potential to reduce energy costs, increase customer choices and satisfaction, promote economic development, enhance system reliability, improve environmental quality, and promote technological growth. In the past, regulatory controls were inadequate to protect consumer against volatile and inefficient prices of energy. The Energy Planning Board believes that, in the long run, market forces are the best mechanism to control wholesale prices.

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20. Electric Markets

A.E.S. Ltd.

Dependence on market interventions versus allowing market dynamics to provide investment incentive will only slow market development and result in a longer than necessary transition to a mature stage of our market.

Independent Power Producers of New York, Inc. (IPPNY)

The electric markets in New York, as administered by the New York Independent System Operator, must be allowed to continue developing without undue government intervention.

During the transition to newer, more efficient generation sources, existing sources of electricity must not be forced out of business.

Response: The Energy Planning Board in the State Energy Plan supports long-term policies that allow market dynamics to provide investment incentives. To protect consumers, however, short-term market interventions are necessary, until sufficient numbers of new competitors enter the market and demand side programs have more fully developed. If done correctly, such intervention will not delay the maturation process, and the Planning Board believes that an approach that prevents price spikes for consumers will lead to the appropriate long-term result.

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21. Coal and Propane

Coal

A.E.S. Ltd.

The Draft State Energy Plan states specifically that the State should support clean coal technology, research, demonstration, and commercialization. This should include working closely with the energy industry to create incentives that lead to the retrofit of existing brownfield sites and potential new coal-fired generation.

Response: The State Energy Plan calls for the State to support research, demonstration, and commercialization of advanced electricity generating technologies, which would include advanced coal technologies, and encourages the retrofit and repowering of existing generating facilities in the State to maintain the State's energy diversity. The recommendations for the promotion of a cleaner and healthier environment include developing a program that allows businesses to enter into voluntary agreements to meet certain energy efficiency objectives and reduce greenhouse gas emissions. To assist businesses in meeting such voluntary goals, the State Energy Plan recommends that the State offer, where appropriate and necessary, technical assistance, expedited regulatory permit review, financial incentives, and public recognition.

A.E.S. Ltd.

To alleviate the need to develop greenfield sites, the State should further develop appropriate procedures that would provide for the expansion of the State's generation infrastructure through the modification of, or repowering of, existing facilities. This should include direct incentives for expansion of new, clean-coal generation projects.

Response: The State Energy Plan calls for the State to support research, demonstration, and commercialization of advanced electricity generating technologies, which would include advanced coal technologies, and encourages the retrofit and repowering of existing generating facilities in the State to maintain the State's energy diversity.

Center for Energy and Economic Development, Inc.

Coal transport and generation provide vital contributions to the New York State economy. Maintaining and providing opportunities to expand household income and employment attributable to coal transport and generation in New York State should be among the central objectives of the State Energy Plan.

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Response: The Energy Planning Board recognizes the important contribution of coal transportation revenue to the upstate rail industry and the importance of coal-fired electric generation to the State's fuel diversity. These issues are addressed in the State Energy Plan. (See Section 2.2, Energy and Economic Development, and Section 3.7, Coal Resource Assessment.) The State Energy Plan calls for the State to support research, demonstration, and commercialization of advanced electricity generating technologies, which would include advanced coal technologies, and encourages the retrofit and repowering of existing generating facilities in the State to maintain the State's energy diversity. The Energy Plan also supports continued operation of all existing generation in the State that meets applicable permit requirements.

R.G.S. Energy Group/Rochester Gas & Electric Corporation

The State Energy Plan should promote clean-coal technology in general, not specifically promoting any particular technology.

Response: Implementation of advanced coal technologies has been, and will continue to be, important for to achieving the State's energy, economic, and environmental goals. In recent years, technological advancements have led to substantial reductions in the cost of controlling sulfur dioxide (SO_2) and nitrogen oxides (NO_X) emissions. Some of the most successful advancements are low-NO_X burners, selective catalytic reduction and scrubbers. Also, advanced coal technologies under development show promise of being environmentally superior to the technologies in common use today. The State Energy Plan does not promote particular technologies as superior to others.

American Wind Energy Association (AWEA)

The only clean-coal technology the State should support is integrated gas combined cycle with carbon sequestration.

Response: Integrated gas combined cycle technologies are one of several innovative advanced coal technologies that are more environmentally benign that many systems in common use today. Most are the products of research conducted over the last 20 years. New pollution control devices, such as advanced scrubbers, clean pollutants from flue gases before they exit the plant's smokestack. New combustion processes, such as circulating fluidized bed combustion, improve efficiency and control emissions. Integrated gasification combined cycle technology converts coal to a gaseous form similar to natural gas before it is burned. The Energy Plan does not promote particular technologies as superior to others.

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Environmental Advocates

All the coal plants in New York should be required to meet modern standards. The State Energy Plan should specifically analyze the impact on electricity markets if all plants were upgraded to meet modern control standards. You could have a birthday provision that on the 30th birthday of these plants they must be required to meet modern standards.

Response: The Governor's Acid Deposition Reduction Program, announced in 1999, is expected to result in regulations that will require New York's electricity generation plants to reduce sulfur dioxide (SO_2) emissions by 50 percent below the levels required by the federal Clean Air Act amendments of 1990. The initiative will also require such plants to implement year-round controls for nitrogen oxides (NO_X). This represents a substantial extension of the five-month summer ozone season controls required under current federal and State regulations. The first full year of fully-implemented NO_X controls is expected to be 2005, and SO_2 controls are expected to be fully phased in by January 2008. The State will review the recommendations of the Governor's Greenhouse Gas Task Force and implement appropriate recommendations in a timely manner. In addition to these initiatives that are specific to New York, the State also supports new source review standards.

Ann Link

Clean coal is an oxymoron. There is no such thing for the following reasons: [1] even with new technology, burning coal will pollute the air, [2] there is a hidden cost to coal, the health costs of respiratory disease including asthma, [3] coal mining causes destruction of small towns and the surrounding environment in Virginia, West Virginia, and Kentucky.

Response: A major consideration in the use of coal as a fuel in electricity generation is the emission of sulfur dioxide, nitrogen oxides, particulate matter, and carbon dioxide. Advanced coal technologies offer utilities options for making substantial reductions in acid rain and greenhouse gas emissions, while providing health benefits from improved air quality and energy, security, and reliability benefits through contributions to energy diversity. Emissions of sulfur dioxide and nitrogen oxides from coal plants using advanced coal technologies are expected to be 80 percent to 90 percent lower than those from typical existing coal plants.

As noted in the State Energy Plan, coal mining can have significant negative effects on land and water resources. Soil subsidence and erosion are long-standing

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problems associated with underground and surface mining. These are addressed by the Surface Mining Control and Reclamation Act of 1977 and the Abandoned Mine Reclamation Act of 1990. Water resources are degraded by mining and coal preparation. The Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977 both contain provisions to limit water pollution and run-off from coal extraction and processing.

Better Queens Environment (BQE)

The Draft State Energy Plan's analysis of demand predicts that demand for coal will decrease in the immediate future but that coal will make a comeback as nuclear facilities are retired and gas displaces oil. Rising gas prices will then make coal more economically attractive. Coal currently produces 4,000 megawatts of New York State's power (8 percent). Compare this with the 48 megawatts now produced by wind, and we see how the Draft State Energy Plan, rather than promoting a “balanced portfolio of energy resources” heavily promotes fossil fuels to the detriment of clean, renewable energy sources.

Nor is this plan coherent. New York Power Authority's Clean Air for Schools Program, which replaces coal burning furnaces with gas, is cited as reducing emissions by 911,200 pounds annually. Yet the demand for coal is predicted to increase by either 24.09 or 38.5 percent in the next 20 years. The school program, while positive and certainly symbolic, hardly tips the scales. Indeed, its gains stand to be buried in a pile of coal. Is this what we want for our children?

The Draft State Energy Plan also calls for an expansion of research and development of “clean coal technology.” This is highly unnecessary and redundant. New York State could easily supply all its energy needs with technologies, such as wind and solar, that are known to be clean.

Response: The State has made significant progress in reducing emissions that cause acid deposition and soon will adopt stringent new standards for power plants to further reduce these emissions. The State Energy Plan calls for the State to support research, demonstration, and commercialization of advanced electricity generating technologies, which would include advanced coal technologies, and encourages the retrofit and repowering of existing generating facilities in the State to maintain the State's energy diversity. Emissions control technologies emerging from research and development in the 1980s and 1990s have moved into the utility and industrial marketplace and now provide cost-effective measures for reducing pollution.

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New York State is making significant progress compared to other states in promotion of renewable energy. Higher costs for renewable energy will continue to be a barrier to widespread adoption of renewable energy technologies. The State will continue to take actions to bring renewable energy costs more in line with national energy prices and promote renewable energy development.

Environmental Energy Alliance of New York

The State Energy Plan should include [a discussion of] the interrelationship of coal use, the availability of low cost rail service, and health of the upstate economy.

Response: These interrelationships are described in the State Energy Plan, Section 3.7, the Coal Resource Assessment.

Brett Maxwell

Increase investments in clean-coal technologies and increase the emphasis on quick-growing biomass fuel sources such as willow (Section 3-III, page 3-55).

Response: NYSERDA currently is conducting an *Efficiency and Renewable Energy Potential Assessment* which is looking at the potential of renewable energy sources and technologies and will provide specific data regarding the effects of co-firing biomass with coal.

NYSERDA has partnered with the SUNY College of Environmental Science and Forestry and more than 20 other organizations to form the Salix Consortium to undertake a multi-year project to grow and harvest willow for co-firing with coal.

Mary Griffin

A graph comparing natural gas emissions to coal plants using clean coal technology would be helpful.

Response: In Section 3.7, the Coal Resource Assessment, Table 10, Emission Rates for Electric Generation, has been expanded to include estimated emission rates for sulfur dioxide, nitrogen oxides, carbon dioxide, and mercury for natural gas combined-cycle plants compared to estimated emission rates for coal plants that burn low-sulfur coal, plants with advanced emission controls, and plants that have incorporated two new advanced coal technologies.

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Propane

Paraco Gas

Both federal and State data report propane stocks and prices as distinct from petroleum, we suggest that, beginning with this report, propane be broken out and discussed separately.

Response: The Petroleum Assessment in the State Energy Plan includes a section addressing propane prices, supplies, and infrastructure.

Paraco Gas

In the past, we recommended that storage be increased in the State by removal of barriers to siting. Section 379 of the Executive Law allowed local governments to adopt more restrictive standards for construction and fire protection. While local governments are supposed to act only upon good cause, the NYS Fire Prevention and Building Code Council has failed to enforce the requirements of the statute for adoption of such local standards. We recommend that 379 be altered to bar all local laws unless and until they are approved by the council imposing legally required review of such requests.

Response: With respect to Section 379 of the Executive Law, such issues are the purview of the State Legislature. The Energy Planning Board has not studied this issue in sufficient depth to offer guidance.

Paraco Gas

To promote greater safety and educational training, we suggest that New York establish a State-level Propane Education and Research Council to be used to expand programs and promote research and development of efficient propane applications. Funds could also be used for consumer education.

Response: Establishment of a State-level Propane Education and Research Council would require that legislation be enacted by the New York State Legislature. Absent legislation, there is, at the present time, nothing that prevents the propane industry from establishing an education and research council with voluntary contributions from industry participants.

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Doug Goodman

I'm here as an individual on behalf of the propane industry. When I reviewed the draft State Energy Plan, I noticed the lack of involvement of the propane industry in the plan. It did not appear that there was anybody from the LPG industry that was involved in the focus group or interest group.

I would like to have the opportunity to have propane revisited as part of the Draft State Energy Plan.

Response: The State Energy Plan, Section 3.6, Petroleum Assessment, includes a section addressing propane prices, supplies, and infrastructure.

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22. Evening Hearings and Access

Evening Hearings

The following individuals and organizations in their comments suggested that hearings be held in the evening:

New York Public Interest Research Group
Chenango North Energy Awareness Group
Green Party
New York State Environmental Justice Alliance
Babylon Greens, Town of Babylon
Ann Link
Sierra Club, NYC Group
UPROSE

Marah Hall

I would like to commend the Energy Planning Board for having so many hearings. I do hope that in the future at least one of the hearings will be held at a time that is a little more accessible to a majority of New York's working public.

Response: While the legislation governing the State Energy Plan calls for three public hearings, nine were held at various sites across New York State to permit the widest possible response to the Draft State Energy Plan. No hearings on previous State Energy Plans were held in the evening. The Energy Planning Board is sensitive to the value of such sessions. One major problem associated with holding hearings in the evening concerns security for the panel and for the attendees. The Energy Planning Board will consider this issue in preparing for future public hearings on the State Energy Plan and other public planning documents.

Access – Libraries

Green Party

Copies of the draft State Energy Plan should be more widely distributed to the public by sending copies to New York's libraries.

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Response: Copies of the draft State Energy Plan were sent to 1300 New York libraries in early January 2002, and copies of the State Energy Plan will be distributed to the same mailing list shortly after it is approved by the Energy Planning Board.

Publicize Better – Importance of Publicity

Riverkeeper, Inc.

The Energy Planning Board should involved the public to the greatest extent possible. However, with regard to the public process, there have been a number of glaring inadequacies. Indeed, it appears fairly obvious that the Energy Planning Board is either disinterested in public comment on the State Energy Plan or is actively discouraging public input.

For example, when the draft State Energy Plan was released in December 2001, we were informed that the Energy Planning Board had produced only enough copies of the plan to distribute to the few members of the public that had participated in the scoping process. Other interested citizens and groups were told they had to download and print the more than 300 page long document from the NYSERDA web site. Further, the Energy Planning Board's technical briefing and nine public hearings were scheduled at either 9:00 AM and 1:00 PM or 10:00 AM and 2:00 PM on weekdays. As a result, the vast majority of the general public were unable to attend because of conflicting employment obligations. Such timing, of course, presents no barriers to energy industry representatives. Speakers were limited to five minutes each. No hearings were held in the Hudson Valley, although that region bears a disproportionate burden in terms of existing power plants and new facility proposals.

As a result, New York State Sustainable Energy Campaign organized the People's Energy Forum for the evening of March 14, 2002 in Rockland County. It is particularly telling that ordinary citizens have had to take it upon themselves to organize a public hearing which was incumbent on the Energy Planning Board to hold.

Response: As noted elsewhere, the Energy Planning Board held nine public hearings rather than the three that are called for in the legislation governing the State Energy Plan. The Energy Planning Board made every effort to ensure reasonable access by all the citizens of New York. Two hearings were held in Manhattan and Brooklyn, which were accessible by public transportation and within easy driving distance of most sites in Westchester County. Evening hearings will be considered by the Energy Planning Board for future State Energy Plans and other public planning documents. Speakers were

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allotted ten minutes each and in numerous instances were allowed to make additional comments as time permitted. Also, an extensive period was available for submission of written comments, which were not limited in size. Over 2,350 copies of the draft State Energy Plan were distributed to interested parties and to individuals upon request. Another 1,300 were distributed to public libraries across New York State. Extensive public outreach was conducted throughout development of the draft and State Energy Plans, as described in Section 1.1 of the State Energy Plan.

Timothy McCorry

The meeting was not well attended by residents. Other, more well-attended meetings, were better publicized and held in the evening.

Babylon Greens, Town of Babylon

I just happened to get this [notice about the hearings] because I get certain emails from the State Green Party. I haven't seen anything about this on the Island.

Pat DeAngelis

I can't stress enough the fact that we need to have been information going out to people about hearings.

Green Party

It is clear that the State needs to assume greater leadership in bringing New Yorkers into the decisions made about our energy sources.

Energy decisions should not be made by fast-track decisions as stated in the intro of the Draft State Energy Plan. These decisions should be thoroughly thought through and must include public comment opportunities at all levels of decision making.

Response: The Energy Planning Board's goal is to obtain the widest input from organizations and individuals across the State. While some of the publication processes are mandated by regulations and legislation, other are undertaken in the spirit of inclusion. The following steps were undertaken by the Board in publicizing the State Energy Plan:

- A Notice was published in the *New York State Register* on December 26, 2001.
- The draft State Energy Plan were posted the web sites of all the Energy Planning Board member agencies.
- More than 2,350 copies of the draft State Energy Plan were distributed with the Notice of Technical Briefing and Hearings.

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- A press release was issued on December 11, 2001.
- A Public Notice of Planning Proceeding appeared in the *New York State Register* on April 18, 2001.
- Media advisories and press releases were distributed for each hearing locale in advance of the hearings.
- Copies of the draft State Energy Plan were sent to 1300 New York libraries in early January 2002.
- In addition, the Energy Planning Board agencies' staff participated in a two and one-half hour live television broadcast "Peoples Forum on Energy" held at the Ramapo Town Hall to discuss and receive comment on the draft State Energy Plan.

Hold in Westchester County

Westchester County Board

Perhaps for the next State Energy Plan, you might consider Westchester County. Obviously it has critical energy needs as much as the entire State does, and it would provide an opportunity for some Westchester residents to comment directly.

Dani Glaser

I also respectfully request that a meeting such as this be held in Westchester County. We are home to Indian Point nuclear power plant. We are home of the proposed Millennium pipeline project and home of many other energy projects and infrastructures, and the residents of Westchester deserve to have their own forum.

Green Party, New York

I do feel there is an unfortunate oversight that you did not include Westchester County in placing these hearings. There are a lot of people in Westchester County that would have like to have had a hearing in our neighborhood.

Response: The Energy Planning Board held nine public hearings rather than the three that are called for in the legislation governing the State Energy Plan and made every effort to ensure reasonable access by all the citizens of New York. Two hearings were held in Manhattan and Brooklyn which were accessible by public transportation and within easy driving distance of most sites in Westchester County, and the Energy Planning Board agencies' staff participated in a two and one-half hour live television broadcast "People's Forum on Energy" held at the Ramapo Town Hall to discuss and receive comment on the draft State Energy Plan.

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New York State Energy Plan and Final Environmental Impact Statement
June 2002

Response to Comments

State of New York
George E. Pataki, Governor

New York State
Energy Planning Board
William M. Flynn, Chairman

FORECAST APPENDIX
NEW YORK STATE ENERGY PLAN - JUNE 2002

ALL FUELS DEMAND AND PRICE FORECAST METHODOLOGY

INTRODUCTION

Twenty-year forecasts of energy demand and prices for electricity, natural gas, petroleum, and coal were developed for the State Energy Plan. The base year for forecasting is 2000. Forecasts include: (1) an Outlook Case, (2) a High Economic Growth Case, and (3) a Low Economic Growth Case, for a total of three forecast scenarios.

The Energy Plan forecasts are consistent with and derived from forecasts published in the *Annual Energy Outlook (AEO) 2002* by the U.S. Department of Energy (DOE) Energy Information Administration (EIA). The Middle Atlantic *AEO 2002* forecast, which includes the states of New York, Pennsylvania, and New Jersey, serves as the basis for the Energy Plan forecasts. Electricity demand projections were derived in part from the *AEO 2002* electricity forecast developed specifically for the New York Control Area (NYCA). This forecast was adjusted to reflect energy efficiency and demand reductions in New York not factored into the AEO forecast. This adjusted forecast was input to the NYCA Market Assessment and Portfolio Strategies (MAPS) electricity market model, which then calculated the specific primary fossil fuel use required to meet electricity demand. Fossil fuel use projected from the MAPS model was added to the AEO 2002-based forecasts of other sector fossil fuel use to derive total statewide fossil fuel demand.

FORECAST METHODOLOGY

New York projections were derived from the EIA Middle Atlantic Region all fuels demand and price forecasts and the NYCA Electricity Market Module demand and price forecasts. EIA produces regional forecasts under various economic and price scenarios. EIA uses the National Energy Modeling System (NEMS)[1] energy market projections of the *AEO 2002*.

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[1] NEMS is a computer-based, energy-economy modeling system for U.S. energy markets, using an integrated modular approach to represent macroeconomic activity, international energy supply availability, and end-use consumption sectors. For each fuel and consuming sector, the model balances energy supply and demand while accounting for competition among various energy fuels and sources. NEMS projects the production, importation, conversion, consumption, and consumer prices of energy based on macroeconomic and financial factors, world energy markets, resource availability and costs, market behavior, cost and performance of technologies, and demographic assumptions.

The Energy Plan forecasts represent a reasonable range of possible future energy demand and prices as a basis for assessing energy markets and future market needs. Macroeconomic variables, used by EIA for its Outlook, High, and Low Economic Growth Cases, affect forecasts of future capital investment, productivity gains, and technology and market development, among other modeling parameters. Growth rates for key economic variables determine energy demand growth in both the EIA national and New York's forecasts. The primary growth rates for determining economic activity are provided in Table 1.

Table 1

Annual Average U.S. EIA Growth Rates (2000-2020) of Economic Variables			
	High Case	Outlook Case	Low Case
Productivity	2.4%	2.2%	1.9%
Labor Force	1.0%	0.8%	0.6%
GDP	3.4%	3.0%	2.4%
World Oil Price	0.4%	-0.5%	-2.3%

These economic variables are measured by EIA at a national level, but interact differently with regional variables in the ten census division (NEMS) economic modules. The High Economic Growth Case incorporates population, labor force, and productivity growth rates that are higher than the Outlook Case. Productivity gains result in lower inflation and interest rates. The Low Economic Growth Case assumes lower population, labor force, and productivity gains than the Outlook Case, with higher interest and inflation rates.[2]

Method Overview

The New York forecasts were derived from EIA's Middle Atlantic fuel demand and price forecasts, by determining the historic relationships between fuel demand and prices in New York and those in the Middle Atlantic region. New York's energy use as a percentage of Middle Atlantic energy use has remained fairly stable over the last four decades. Thirty-nine years (1960-1999) of New York fuel use, expressed as a percentage of the Middle Atlantic region's fuel use, defines the historic relationship between the two, by end-use sector. Only twenty nine years of Middle Atlantic State prices were available. Twenty nine years (1970-

[2] EIA Assumptions to the Annual Energy Outlook 2002, pg 58

1999) of New York fuel prices, expressed as a percentage of Middle Atlantic prices, by sector, define the historic relationship used to modify the Middle Atlantic forecasts. These demand and price relationships were projected into the future using linear regression and a univariate time series forecast. The forecasted percentages were then applied to the EIA Middle Atlantic regional forecasts to obtain 20-year New York forecasts. The 2000 New York forecasted data were then replaced with actual 2000 data reported in New York State Energy Research and Devlopment Authority's (NYSERDA) *Patterns and Trends 2000.*

SYSTAT® 9.0 for Windows® was used to generate year-to-year New York forecasts. Regression analysis and univariate time-series metholodogies were used. The regression analysis model produces a more dynamic forecasted ratio of New York to Middle Atlantic, but in the cases where the historical trend flucuates and history is determined to not be an accurate predictor of the future, the time-series model is used. The time-series model is preferred in this case because it weighs recent years more heavily than years past.

To predict New York as a percentage of the Middle Atlantic using regression analysis, the SYSTAT® program fits an equation into to a set of data in order to best describe the relationship between the variables. In this case, the relationship established between the ratio of New York data to Middle Atlantic for a given fuel and over a specified period of time, was linear. The relationship between New York and Middle Atlantic was fairly stable for most fuel prices and demands by sector. Test statistics revealed the historical ratio was a positive predictor of the future, and therefore acceptable.

The SYSTAT® program ran a time-series projection using an Autoregressive Integrated Moving Average (ARIMA) model[3] to determine New York's growth trend in relation to that of the Middle Atlantic region. The historical data series used to generate New York demand and price forecasts for electricity, natural gas, petroleum, and coal satisfied standard statistical tests, and were deemed to capture the relationship sufficiently between all of the New York energy demand and prices and those of the Middle Atlantic region.[4]

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[3] ARIMA models use either past values (the autoregressive model), past errors (the moving average model), or combinations of past values and past errors to create an accurate projection. A Box-Jenkins univariate time series model is the specific ARIMA model used. The Box-Jenkins ARIMA modeling process occurs in three stages: Identification, Estimation, and Diagnosis.

[4] The autoregressive (AR) model addresses serial correlation of errors. For example, a residual from the model reveals an autocorrelation statistic of .953. Correlation coefficients can be squared to reveal the proportion of variance, or in this case, the variation in error terms. This means that over 89% of the variation in error from predicting New York's percentage of Middle Atlantic in one year can be accounted

Petroleum Demand Forecasts

The petroleum demand forecasts for New York are based on the historical relationships between New York's petroleum use and the EIA Middle Atlantic regional petroleum use for distillate, residual, propane, kerosene and motor gasoline. The demand forecasts include the following petroleum products by sector:

- Residential use of distillate, propane, and kerosene.
- Commercial use of distillate, residual oil, propane, and kerosene.
- Industrial use of distillate, residual oil, and propane.
- Transportation use of diesel, jet fuel, residual oil, propane, and motor gasoline.
- Electric Generation use of distillate and residual oil.
- Total distillate, residual oil, propane, kerosene, motor gasoline, jet fuel, and Statewide total petroleum demand.

As shown in Figure 1, a strong correlation exists between variations in historical New York petroleum demand and variations in historical Middle Atlantic regional demand, indicating that the Middle Atlantic petroleum demand forecast could serve as a predictor for future New York petroleum use. These historical relationships were measured for each of the end-use sectors. Figure 2 compares the results of demand predicted using the statistical method with the actual petroleum consumed in New York from 1960 to 1999.

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for by the error in predicting the previous year's percentage. Where serial correlation was found in plotted residuals, the appropriate number of AR parameters were added to eliminate their influence on the forecast.

Figure 1

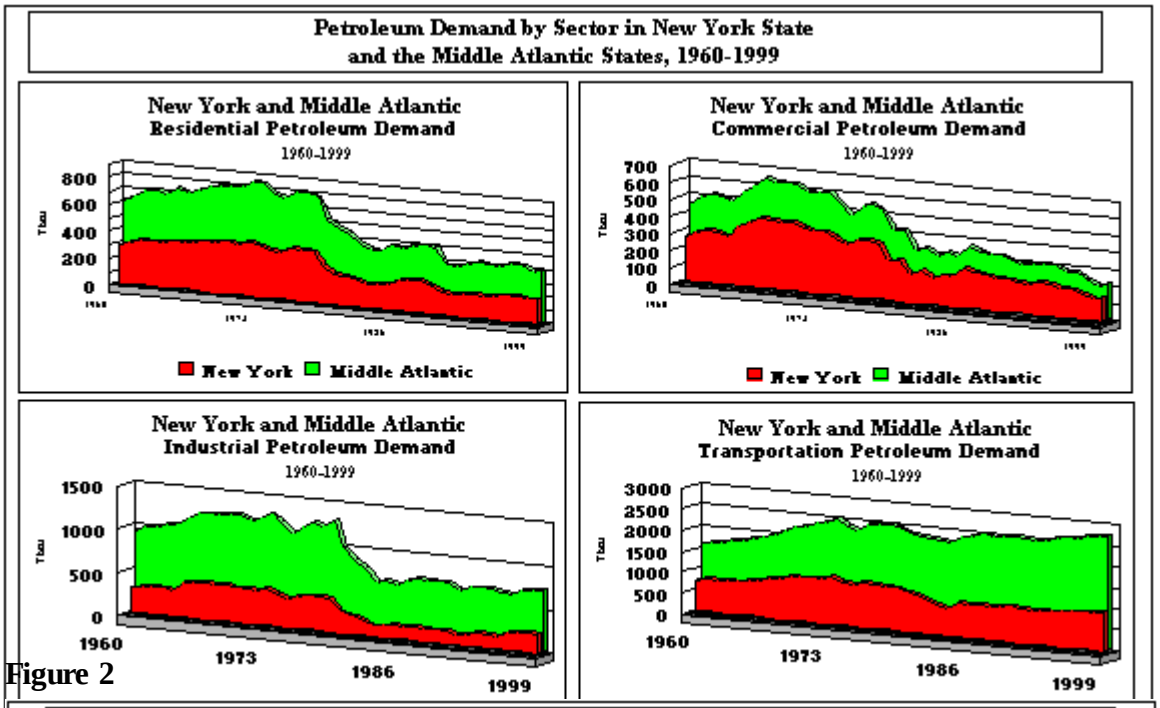
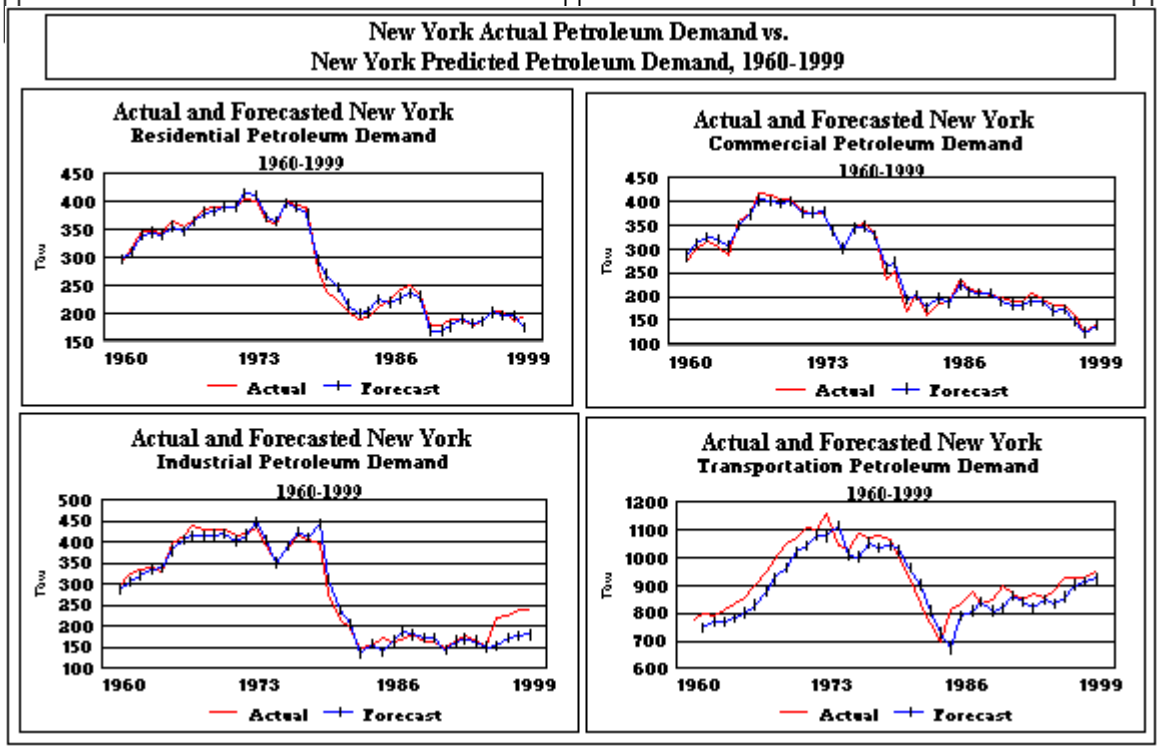
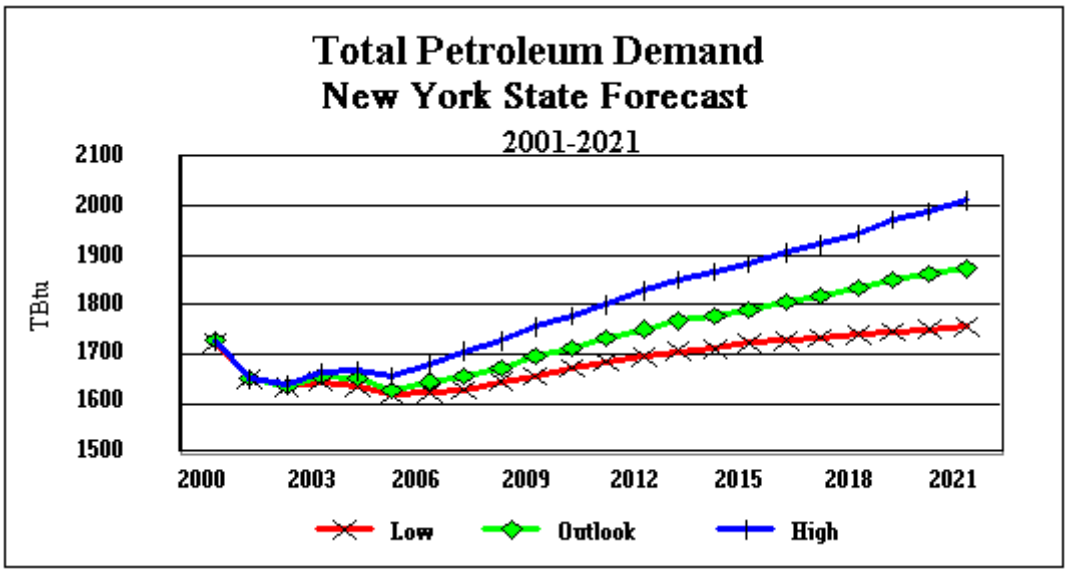


Figure 2



Petroleum use in the electric generation sector came from the MAPS model, as did all fuel demand forecasts in the Electric Generation sector. Figure 3 presents the high, outlook, and low annual forecasted petroleum demand for New York. Tables for the high, outlook, and low forecasted annual petroleum demand and total growth rates are the presented at the end of this appendix.

Figure 3



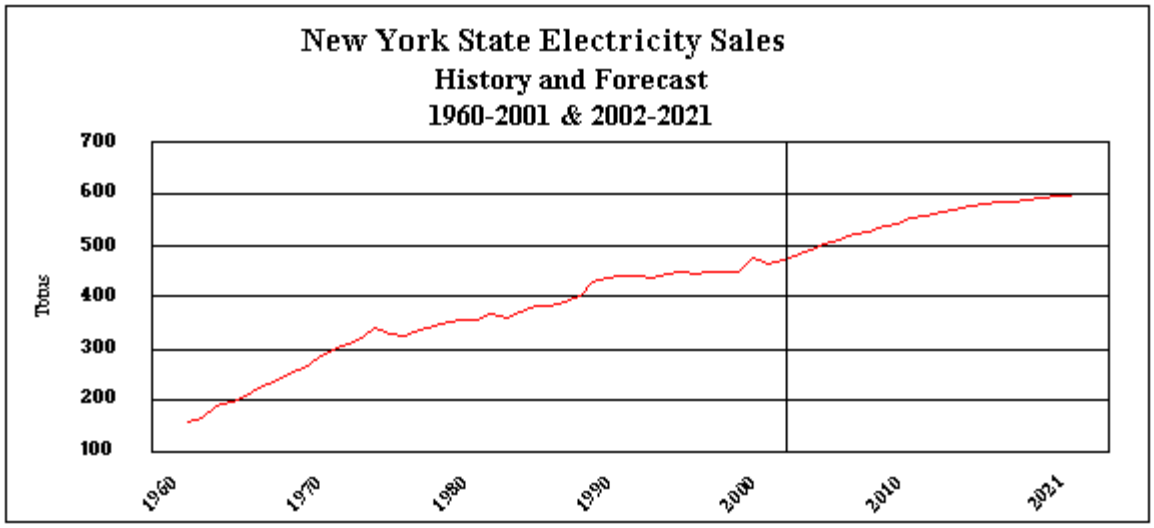
Electricity Demand Forecast

Electricity demand forecasts were derived from EIA's NEMS-based Electricity Market Module (EMM) forecast of the New York Control Area (NYCA), published in the *AEO 2002*. The Electricity Market Module comprises four sub-modules: electricity capacity planning; electricity fuel dispatching; load and demand-side management; and electricity finance and pricing. It includes non-utility capacity and generation, electricity transmission, and trade.[5] Year 2000 and 2001 weather-normalized, actual data supplant the quantity forecasted for those years, leaving future electricity forecasted quantities unaffected. It is estimated that demand side management and energy efficiency programs, firm and temporary, reduced electricity demand by as much as 1,583 MW in Summer 2001. The entire amount of load relief is not reported in this electricity forecast. Only permanent load reductions have been considered.

[5] The purpose of the electricity market module is to determine the lowest cost way to supply electricity, within environmental and operational constraints. New York is a self-contained supply region within the model. Twenty-nine capacity types are represented. Cost and performance characteristics of new electricity generating technologies change according to the assigned technological learning parameters. These parameters vary with economic growth. Distributed generation technology takes the form of peaking capacity and base-load capacity.

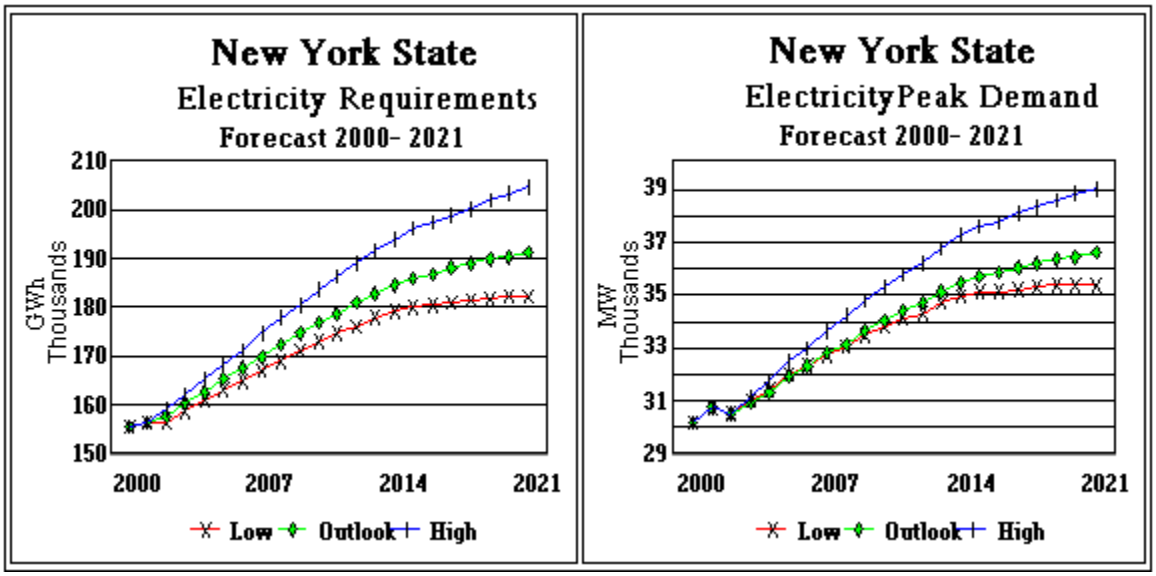
The electricity requirements and demand forecasts were developed with data taken from EIA's *State Energy Data Report 1999*, NYSERDA's *Patterns and Trends 2000*, and the New York Control Area forecast from Table 64 in the *AEO 2002*. Figure 4 shows historical electricity sales in New York, from 1960 through 2001, graphed with the electricity sales forecast for the years 2002-2021.

Figure 4



EIA's NYCA electricity sales forecasts were consistent with the historical data trend**.** Figure 5 shows both New York's electricity requirements and peak demand forecast, for the period 2000-2021. Sector-specific electricity forecast tables are presented at the end of this appendix.

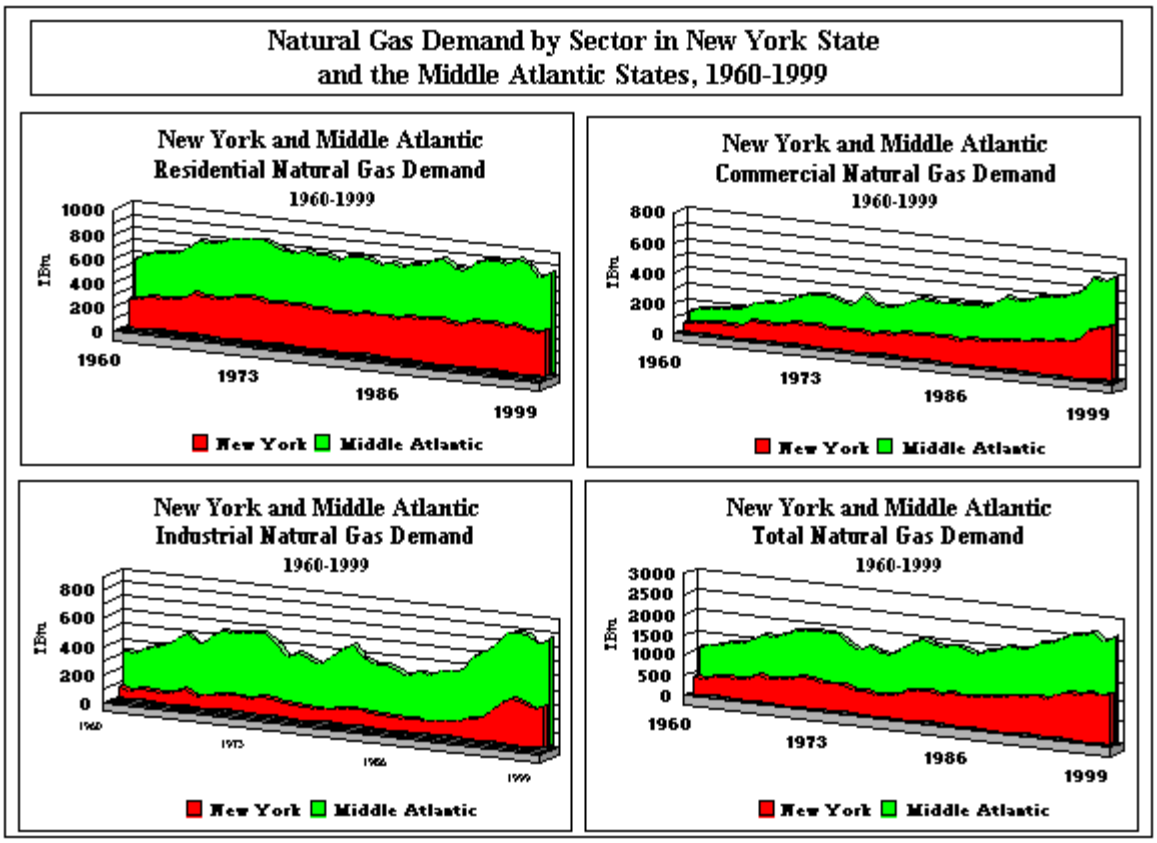
Figure 5



Natural Gas Demand Forecasts

The natural gas demand forecasts were developed in a manner similar to that used to develop the petroleum forecasts. Variations in historical natural gas demand remained consistent between New York and the Middle Atlantic regional fuel sectors. Therefore, statistically valid forecasts of New York natural gas demand could be constructed using EIA's NEMS-based Middle Atlantic region forecasts, published in the *AEO 2002*. Fuel demand in the Electric Generation sector was created using the MAPS program in conjunction with EIA-based electricity requirements and peak demand forecasts. New York and Middle Atlantic region natural gas use data from 1960 to 1999**,** EIA'S *State Energy Data Report 1999*, are shown in Figure 6 for the residential, commercial, and industrial sectors.

Figure 6



Regression analysis and time series models were developed to formulate the relationship of natural gas demand in New York to that of the Middle Atlantic region. New York natural gas forecasts were created by applying the resulting coefficients to corresponding EIA NEMS-based *AEO 2002* Middle Atlantic forecasts. This method was proven to be acceptable by statistical standards. Applying the forecast equation coefficients to the Middle

Atlantic historical aggregate yielded an approximation of New York historical data. Graphs of predicted and actual historical natural gas use in New York from 1960 to 1999 are shown in Figure 7.

Figure 7

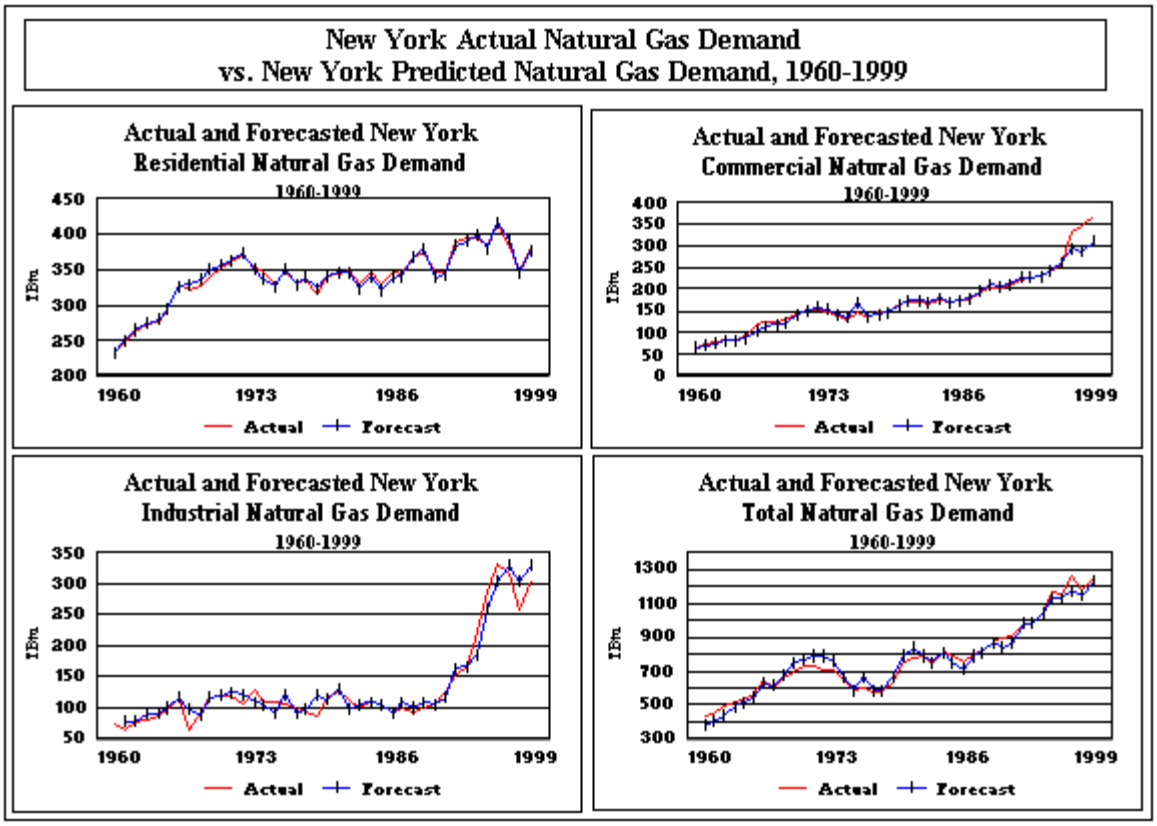
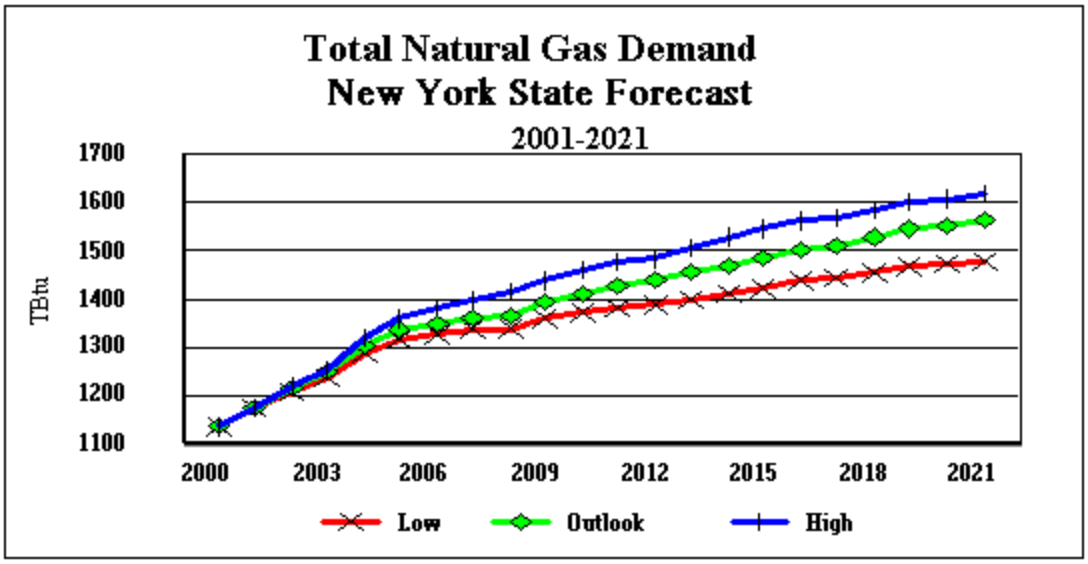


Figure 7 shows that, historically, variations in New York natural gas demand change consistently with variations in Middle Atlantic natural gas demand. The historical New York natural gas demand forecast maintained that consistency throughout the planning period. Statistical analysis yielded acceptable results as well. The sector coefficients were applied to EIA's NEMS-based Middle Atlantic regional natural gas demand forecasts, by sector. The New York natural gas demand forecasts are the result of this process. Figure 8 presents the high, outlook, and low annual forecasted natural gas demand for New York. Sector-specific natural gas forecast tables are presented at the end of this appendix.

Figure 8



Coal Demand Forecast

The coal demand forecasts were developed in the same way as the petroleum and natural gas demand forecasts. The process began with an analysis of historical data. The historical Middle Atlantic regional coal demand sector aggregate from 1960 to 1999, was taken from EIA's *State Energy Data Report 1999*. That data is graphed with New York historical coal demand in Figure 9. Electric Generation demand is a result of the MAPS program and the *AEO 2002* modified NYCA electricity requirements and peak demand forecasts. New York's coal demand represents only a small portion of the total Middle Atlantic regional demand.

Variations in regional coal use for Middle Atlantic over the historical period, 1960 to 1999, were closely correlated with variations in New York coal use over the same period. It was determined that the relationship between historical New York and Middle Atlantic served as a good predictor of the future relationship between New York and Middle Atlantic regional demand. Therefore, statistically valid forecasts of New York coal demand could be constructed from EIA's Middle Atlantic regional forecasts. Time series and regression analysis models were used to model the relationship of New York to the Middle Atlantic region. Coefficients were developed for each sector and applied to the corresponding historical EIA Middle Atlantic coal demand aggregate. A historical New York coal demand forecast, high, outlook, and low was created and compared to actual historical coal use data. The 1960 to 1999 comparison is shown in Figure 10.

Figure 9

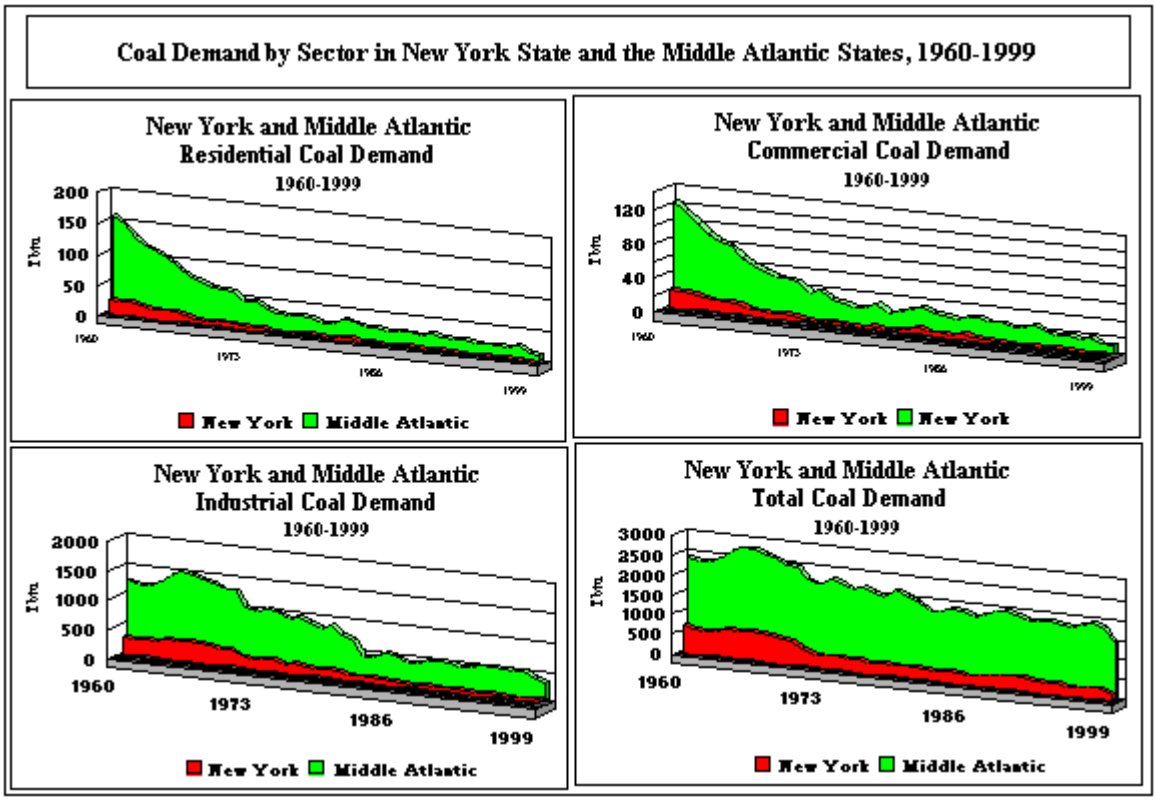
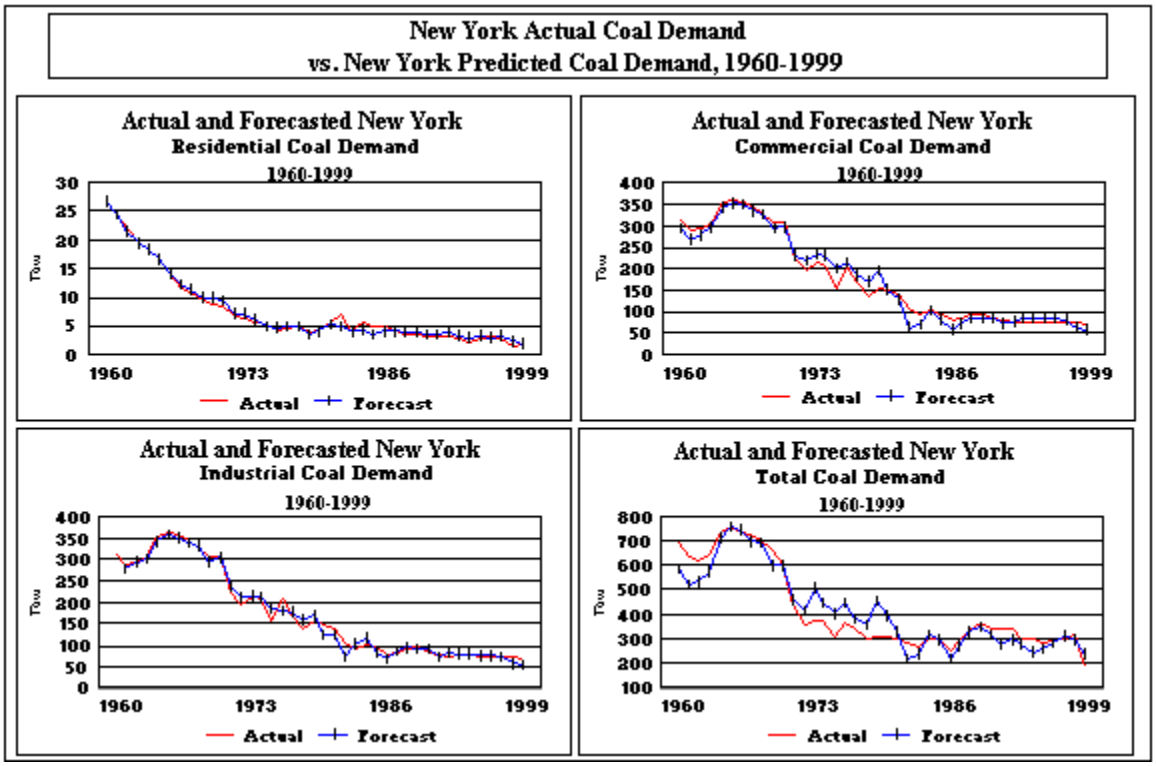
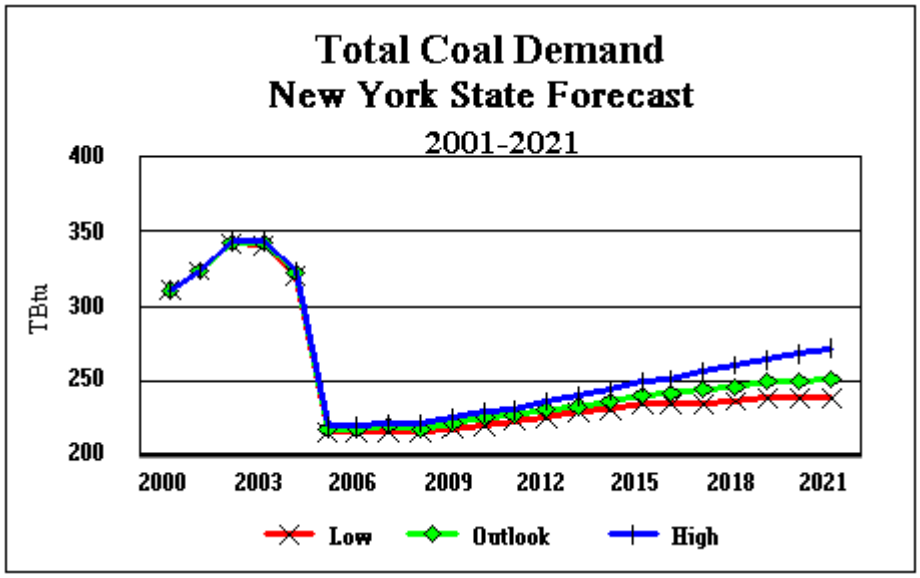


Figure 10



The high and low macroeconomic cases were also based on high, outlook, and low national economic forecasts developed by EIA and published in the *AEO 2002*. Coal forecasts include demand for anthracite and bituminous coal products. Figure 11 presents the high, outlook, and low annual forecasted coal demand in New York. The annual forecast is presented in the tables at the end of this appendix.

Figure 11



<u>Price Forecast Method Overview</u>

To determine the fuel price forecasts for New York, the historical relationships between New York prices and the Middle Atlantic region prices were analyzed. Regression analysis and time series forecasting methodologies were used. Historical New York price data for residential, commercial, industrial, and transportation fuels came from NYSERDA's *Patterns and Trends 2000*. The Middle Atlantic regional prices were taken from EIA'S *State Energy Price and Expenditure Report 1999*, which provides fuel price and expenditures by sector through 1999.

For each of the fuel prices forecasted, the sum of nominal fuel expenditures in New York, New Jersey, and Pennsylvania was divided by total fuel demand in the three states to obtain a regional fuel price in dollars per million Btu. Changes in nominal New York prices have closely matched changes in nominal Middle Atlantic regional prices over the 1970 to 1999 period.

The coefficients of the time series equations express the historical relationships between New York and Middle Atlantic prices. These coefficients were applied to EIA'S NEMS-

based forecasts of Middle Atlantic regional prices to obtain the New York price projections. Final forecasts were expressed in year 2000 dollars per million Btu. The high and low New York fuel price forecasts are based on high, outlook, and low economic growth scenarios taken directly from the *AEO 2002* national price forecast.

Petroleum Prices

Price forecasts were developed for the following petroleum products and sectors:

- Residential distillate, propane, and average petroleum products
- Commercial distillate, residual oil, and average petroleum products
- Industrial distillate, residual oil, propane, and average petroleum products
- Transportation gasoline, diesel jet fuel, residual oil, propane, and average petroleum products
- Electric generation distillate, residual oil, and average petroleum products
- Statewide distillate, residual oil, propane, and average petroleum products

Figure 12 demonstrates how closely-matched New York and Middle Atlantic prices have been over the 1970-1999 period. Clearly, forecasting New York prices as a percentage of Middle Atlantic prices, based on 20 years of data, results in a reasonable forecast, as shown in Figure 13. The specific ratios of historical New York price data to historical Middle Atlantic average prices by fuel and sector, were selected using linear regression and time series forecasting methodologies.

Figure 12

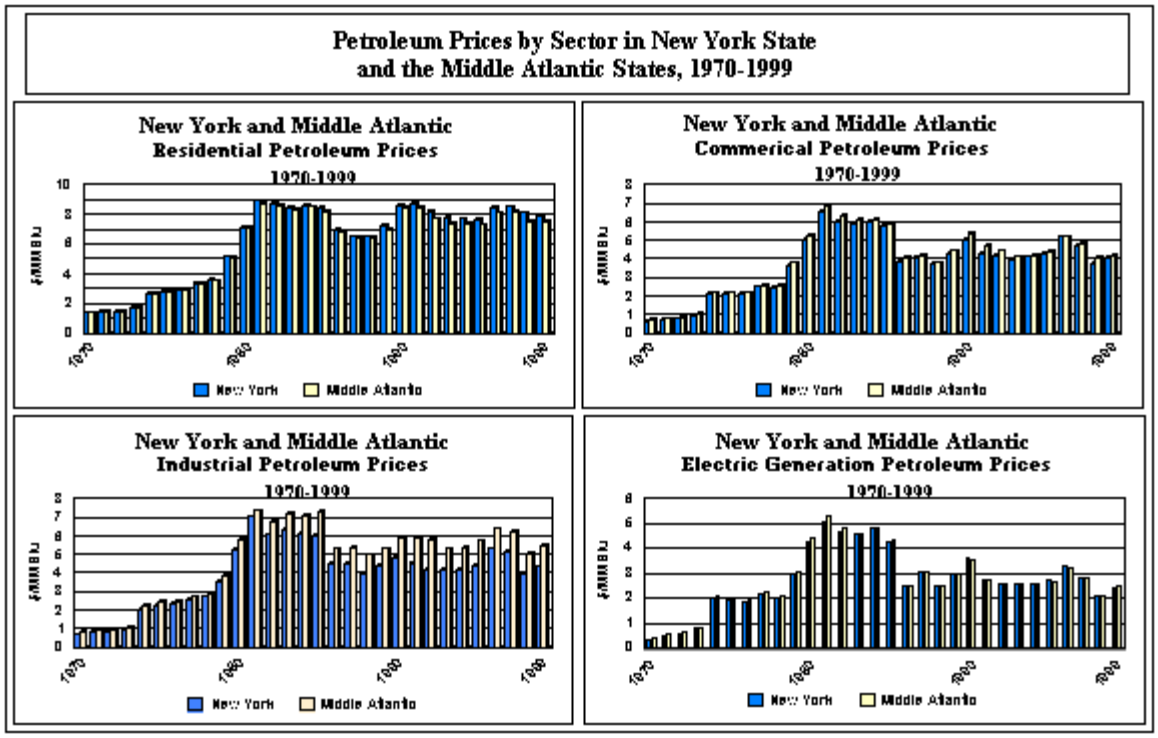
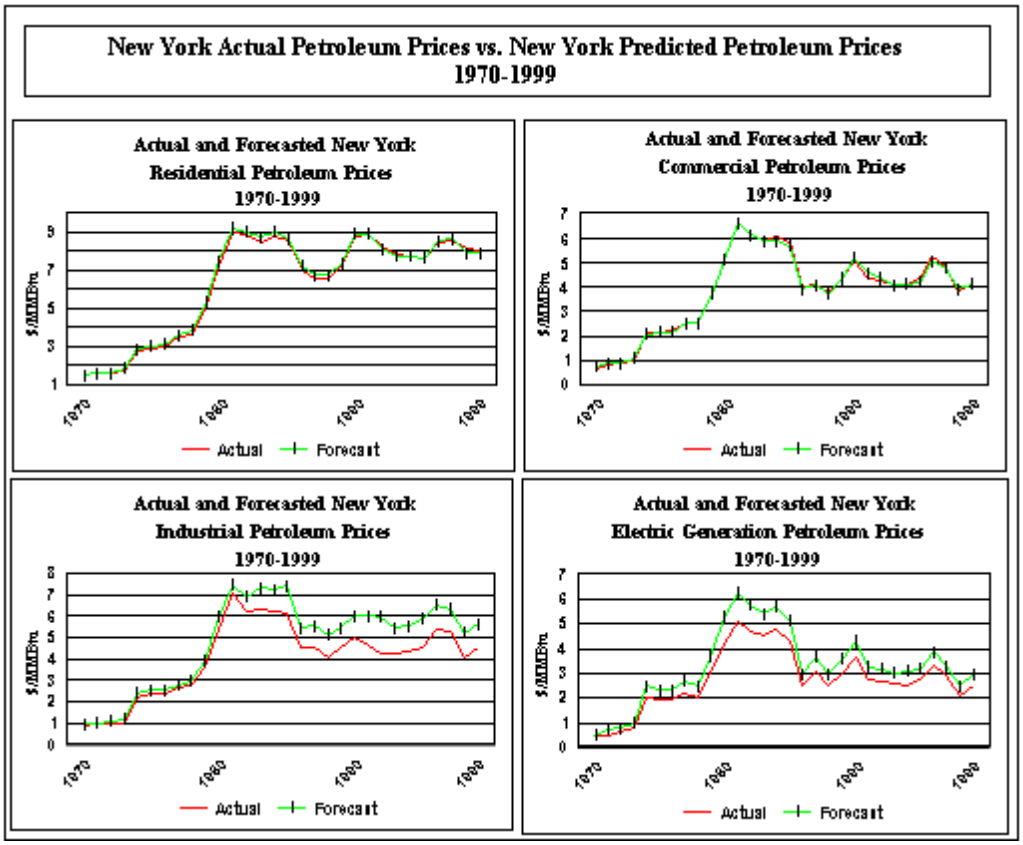
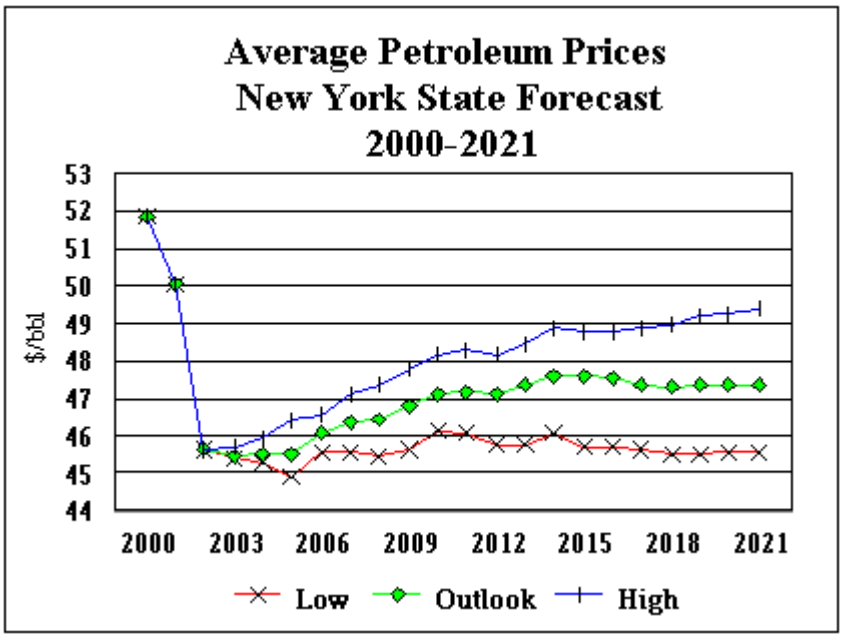


Figure 13



Time series forecasts weigh recent years more heavily than years of the distant past. Accuracy may be greater in the forecast than in a historical re-creation if the relationship between New York and Middle Atlantic prices, by fuel and sector, changed significantly over time. The high and low forecasts were created using EIA's NEMS-based high, outlook, and low national petroleum price forecasts. Figure 14 shows the resulting high, outlook, and low total petroleum price forecasts for New York. Forecasted petroleum

Figure 14

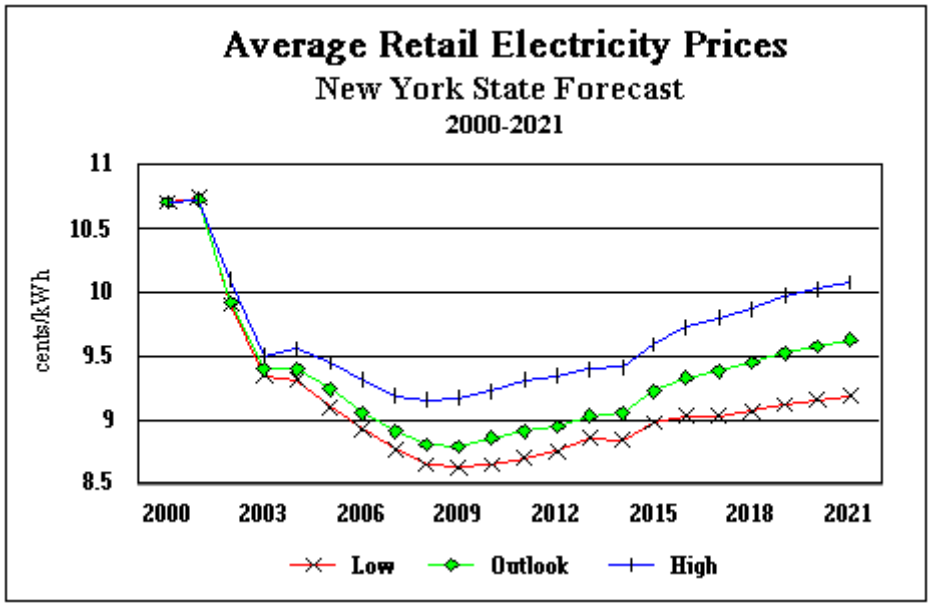


retail prices are presented by sector in the forecast tables at the end of this appendix.

Electricity Prices

Retail electricity prices are a product of the NEMS Electricity Market Module (EMM). The EMM models a national electrical landscape, incorporating the effects of trading and borders on regional prices. New York sector electricity prices were taken directly from the NYCA forecast, published in Table 64 of the *AEO 2002*. These forecasts predict the long-term trend of average electricity prices. It is not a function of the EMM to predict price spikes. Price volatility is precipitated by resource scarcity, and artificial scarcity created by transmission constraints. Fuel supply, generation availability, and electricity transmission were analyzed in depth in other fuel assessments published in the 2002 State Energy Plan. Figure 15 shows a drop in prices over the long-term for all levels of economic growth. Forecasted electricity retail prices are listed by sector in the forecast tables at the end of this appendix.

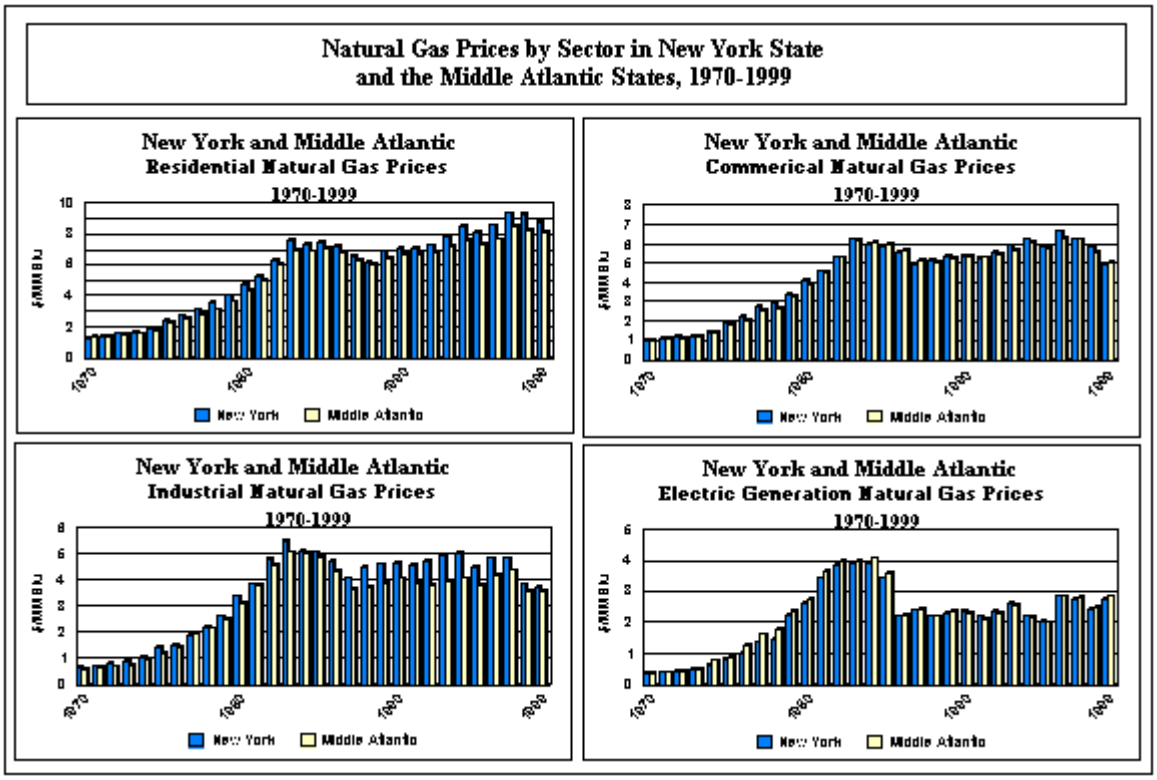
Figure 15



Natural Gas Prices

Natural Gas price forecasts were derived from EIA *AEO 2002* Middle Atlantic forecasts. The same linear regression and time series forecasting techniques used to create petroleum price forecasts were utilized. Figure 16 demonstrates the similarity of New York and Middle Atlantic price variations.

Figure 16



The coefficients derived from the statistical analysis were applied to historical Middle Atlantic average prices, compiled from the *State Energy Data Report 1999*. The historical New York price forecast is graphed with the actual data to illustrate the accuracy of the forecasting formula. The historical New York natural gas price forecast is presented by sector in Figure 17.

The formulas used to re-create historical New York prices from Middle Atlantic average prices were deemed acceptable by statistical standards. Consequently, they were applied to EIA's NEMS-based Middle Atlantic natural gas price forecasts published in *AEO 2002*. The high and low bandwidths were also derived using EIA's NEMS-based *AEO 2002* high, outlook, and low national natural gas price forecasts, by sector. The New York natural gas forecasts are graphed in Figure 18. Annual sector-specific price forecasts are presented in the tables at the end of this appendix.

Figure 17

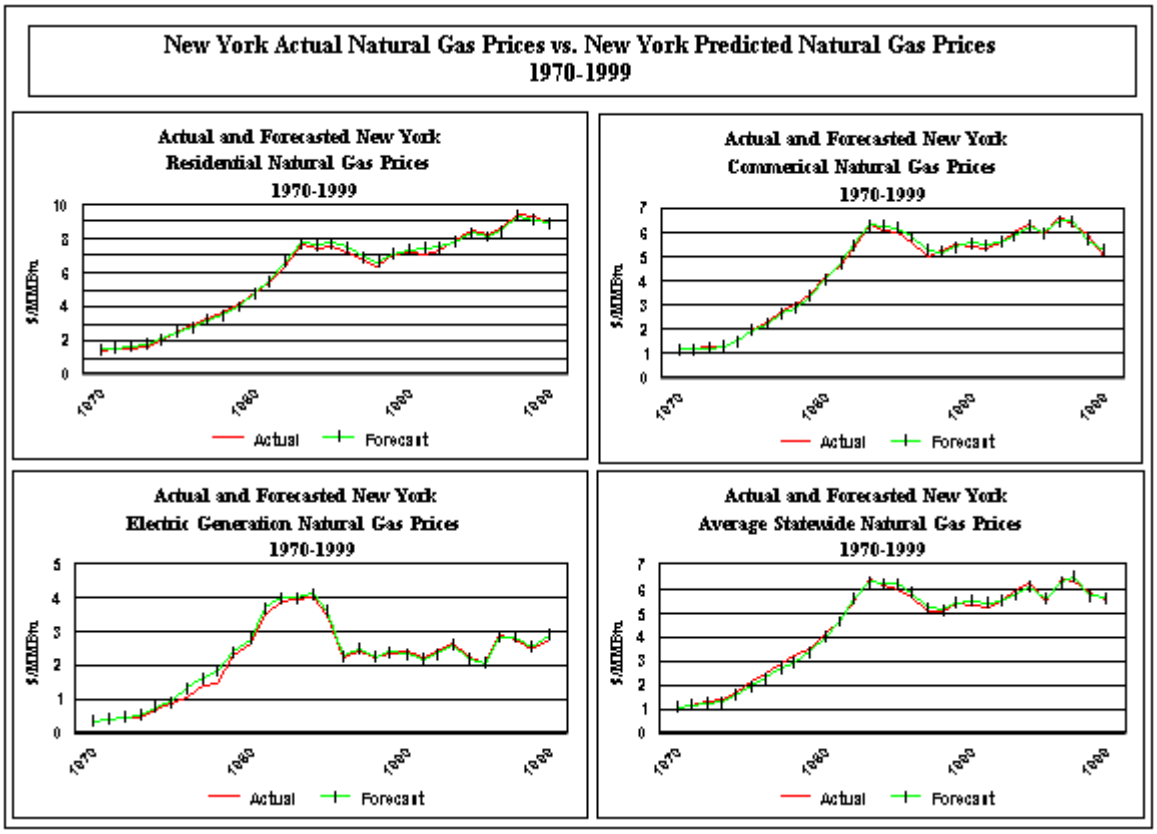
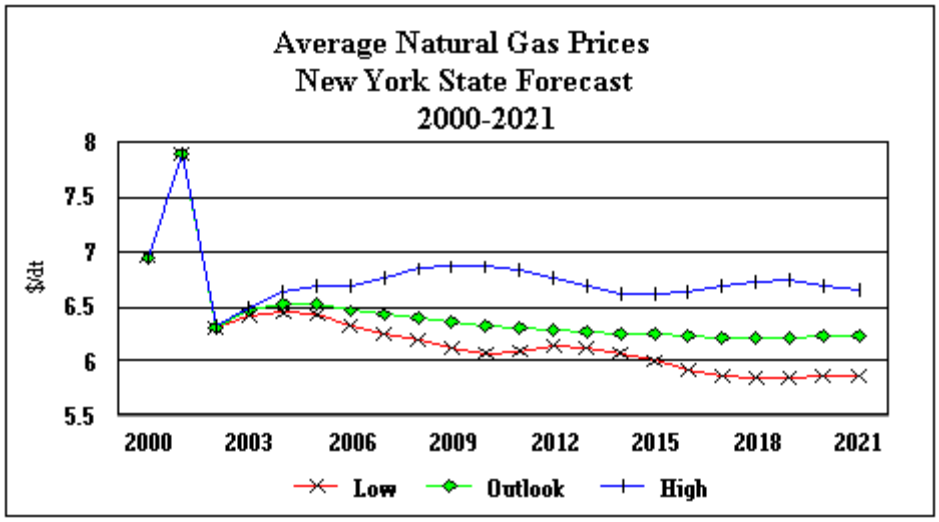


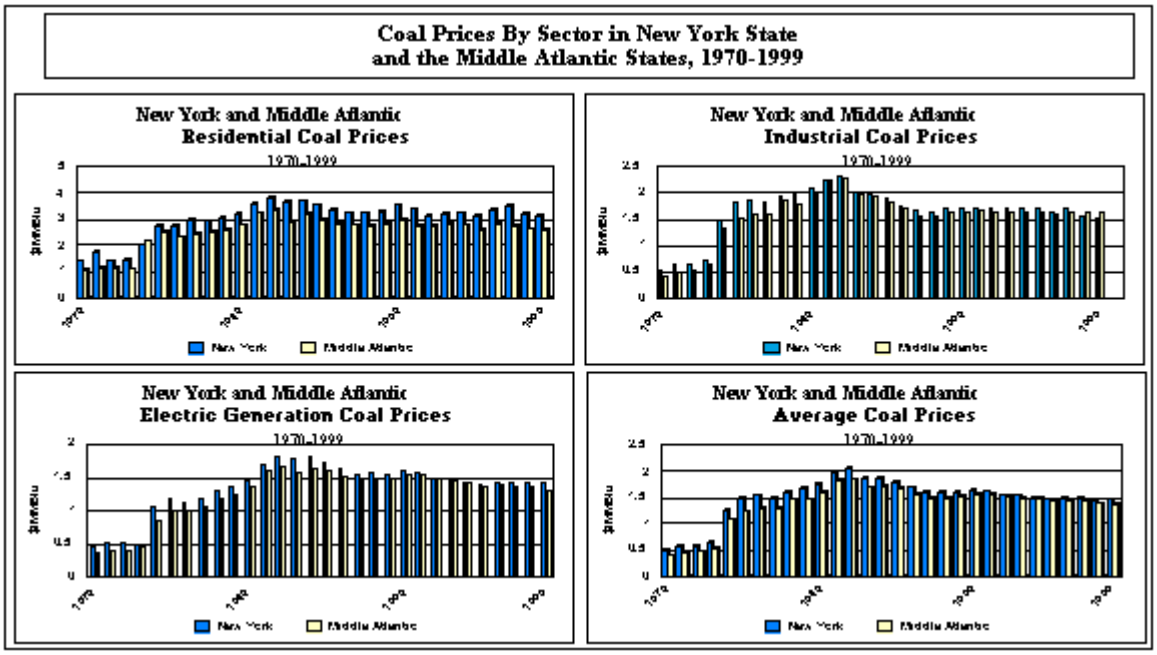
Figure 18



Coal prices

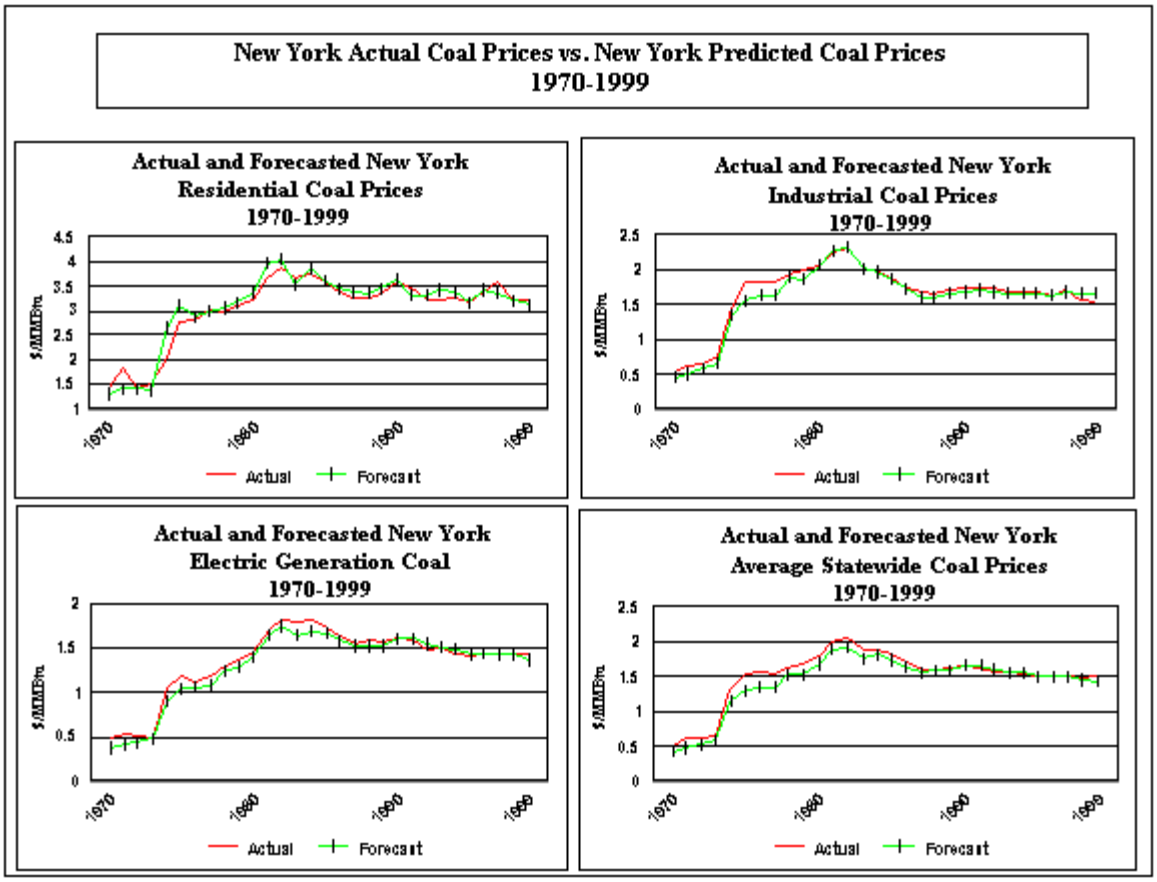
Coal prices were derived from EIA's NEMS-based, *AEO 2002* Middle Atlantic forecasts in the same manner as petroleum and natural gas price forecasts. Historically, fluctuations in New York sector coal prices have tracked the changes in corresponding Middle Atlantic sector coal prices in both direction and magnitude. New York is a small portion of total Middle Atlantic coal use, and as a result, forecasted coal prices are higher in New York. Figure 19 illustrates the similarity between New York and Middle Atlantic coal prices by sector.

Figure 19



Because variations in New York coal prices have tracked changes in Middle Atlantic coal prices, formulas describing the relationship between New York and the Middle Atlantic could be developed. These formulas, a product of time series and regression analysis, were also used to compare historical New York coal prices with forecasted prices for those years. The coefficients of the formulas, derived for each sector, were applied to historical Middle Atlantic average coal prices, compiled from the *State Energy Data Report 1999*. Beyond satisfying statistical requirements, using the forecasting formulas in this way provides a visual approximation of their accuracy. The historical New York coal price forecast, from 1970 to 1999, is shown in Figure 20.

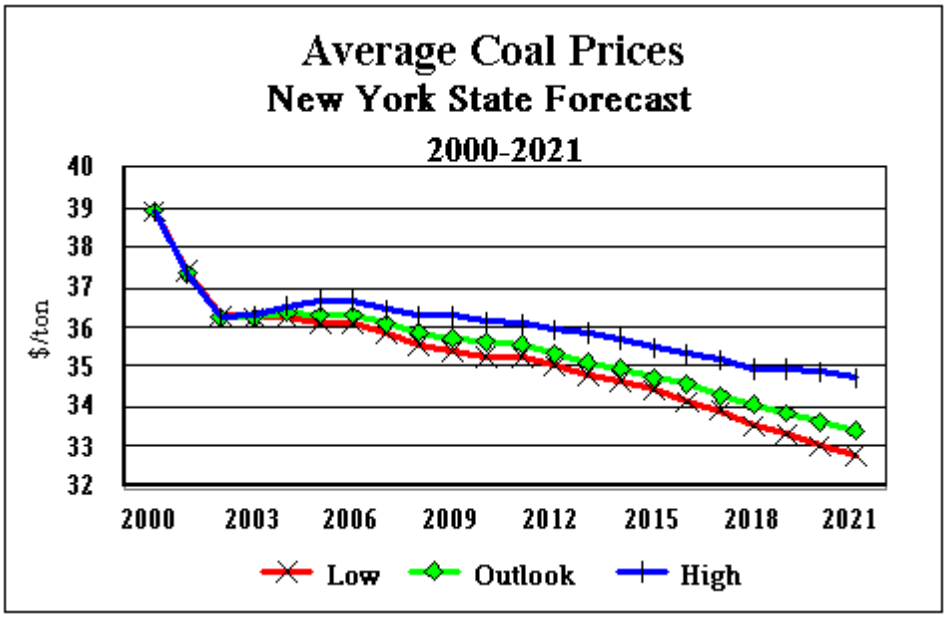
Figure 20



Through statistical analysis and graphical demonstration, it was determined that New York can be accurately predicted as a percentage of Middle Atlantic. The forecasting coefficients were applied to EIA's NEMS-based Middle Atlantic coal forecasts, published in the *AEO 2002*. Long-term, average price annual forecasts were created by sector. High and low forecasts were derived from the high, outlook, and low national economic forecasts published in the EIA's *AEO 2002*. Figure 21 shows the New York average total coal price forecast, bounded by a high and low economic forecast.

Forecasted annual retail prices and total growth rates for coal are listed in the forecast tables at the end of this appendix .

Figure 21


Average Coal Prices
New York State Forecast
2000-2021
$/ton
40
39
38
37
36
35
34
33
32
2000
2003
2006
2009
2012
2015
2018
2021
Low
Outlook
High

SECTION 1

NEW YORK STATE ENERGY DEMAND

This section presents data on forecasted (primary and net) energy consumption in New York, by sector and fuel type, from 2000 through 2021. The 2000 data are actual.

Energy is shown by fuel type, in TBtus. Total forecasted *primary* energy use by sector (residential, commercial, industrial, transportation, and electric generation) is presented for the 21-year forecast period.

Electricity generation data does not include station use. End-use by apartment buildings and institutional facilities is included in the commercial sector.

New York State Forecast of Primary Energy Use by Fuel Type, 2000-2021

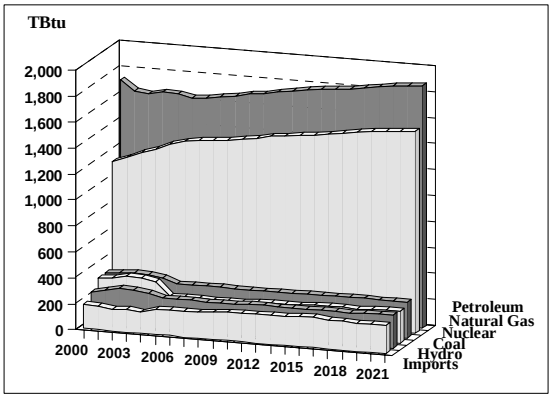


Table 1-1 (in trillion Btu)

Year	Coal TBtu	Natural Gas TBtu	Petroleum Products TBtu	Hydro TBtu	Nuclear TBtu	Other TBtu	Net Imported Electricity TBtu	Total TBtu
2000	311.3	1135.1	1725.0	242.9	315.8	32.3	186.3	3948.7
2001	325.0	1174.0	1647.9	268.1	321.7	33.9	180.6	3951.0
2002	343.0	1214.6	1634.0	293.5	327.7	35.5	174.9	4023.2
2003	342.6	1246.3	1653.4	289.1	323.9	35.5	185.5	4076.4
2004	322.1	1299.4	1646.1	275.6	310.3	35.6	164.1	4053.1
2005	217.5	1331.7	1628.6	247.9	277.4	35.5	195.9	3934.6
2006	218.1	1346.0	1641.9	246.6	275.7	35.6	199.6	3963.4
2007	218.7	1357.3	1655.9	245.4	274.0	35.6	203.2	3990.3
2008	218.5	1362.1	1673.5	244.3	272.4	35.6	206.9	4013.3
2009	221.5	1388.0	1694.3	245.9	273.9	35.6	212.8	4071.9
2010	224.4	1404.0	1712.7	247.7	274.5	35.6	218.9	4117.9
2011	227.5	1422.6	1731.0	249.3	275.8	35.6	224.8	4166.6
2012	230.4	1430.9	1747.2	250.6	277.9	35.6	230.7	4203.3
2013	233.4	1446.1	1764.1	251.7	278.8	35.6	231.6	4241.3
2014	237.2	1462.0	1778.3	252.8	279.7	35.6	232.5	4278.1
2015	241.1	1477.7	1791.1	253.8	280.6	35.6	233.4	4313.3
2016	242.5	1494.5	1805.9	254.9	281.4	35.6	234.3	4349.0
2017	244.3	1506.4	1819.4	255.3	281.7	35.6	231.1	4373.9
2018	246.5	1520.9	1833.5	255.7	282.1	35.6	228.0	4402.2
2019	248.7	1535.3	1851.0	256.1	282.4	35.6	224.8	4433.8
2020	249.6	1545.4	1863.0	256.4	282.7	35.6	221.6	4454.4
2021	250.5	1555.5	1875.1	256.8	283.0	35.7	218.4	4475.1
Total Growth	**-19.52%**	**37.03%**	**8.70%**	**5.75%**	**-10.38%**	**10.38%**	**17.22%**	**13.33%**

New York State
Forecast of Primary Use of Refined Petroleum Products, 2000-2021

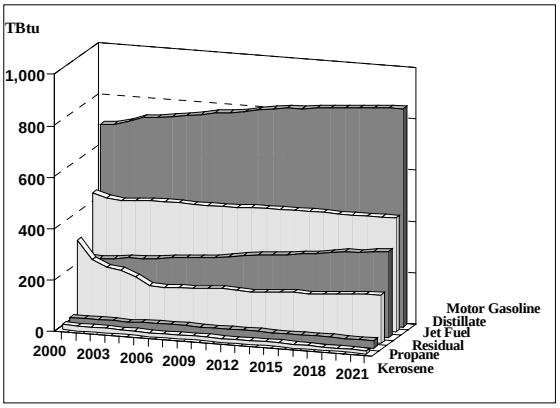


Table 1-2 (in trillion Btu)

Year	Distillate TBtu	Residual TBtu	Kerosene TBtu	Propane TBtu	Motor Gasoline TBtu	Jet Fuels TBtu	Total Petroleum Products TBtu
2000	449.4	304.6	19.6	28.9	696.7	225.3	1725.0
2001	435.7	240.4	19.9	29.2	702.9	219.8	1647.9
2002	430.7	211.5	19.8	29.5	717.4	225.2	1634.0
2003	434.8	205.3	18.9	29.8	733.4	231.3	1653.4
2004	436.6	183.5	18.2	30.0	742.1	235.5	1646.1
2005	437.7	151.5	17.7	30.3	750.8	240.5	1628.6
2006	438.1	153.4	17.3	30.7	757.5	244.9	1641.9
2007	438.2	155.1	17.0	31.0	765.3	249.3	1655.9
2008	439.3	155.9	16.8	31.3	774.7	255.6	1673.5
2009	439.3	160.1	16.5	31.6	784.4	262.4	1694.3
2010	439.7	162.5	16.2	31.9	793.2	269.2	1712.7
2011	442.5	161.8	16.1	32.1	802.0	276.5	1731.0
2012	444.6	161.5	16.0	32.2	810.2	282.8	1747.2
2013	445.2	164.5	15.8	32.4	817.4	288.8	1764.1
2014	445.4	167.2	15.6	32.5	822.8	294.8	1778.3
2015	445.0	169.5	15.4	32.7	827.7	300.8	1791.1
2016	445.6	171.8	15.3	32.9	832.9	307.4	1805.9
2017	445.7	174.0	15.1	33.0	837.6	314.1	1819.4
2018	446.1	176.9	14.9	33.2	841.8	320.5	1833.5
2019	446.4	183.0	14.8	33.4	846.5	326.9	1851.0
2020	446.8	185.8	14.7	33.6	849.7	332.5	1863.0
2021	447.3	188.5	14.7	33.7	852.8	338.1	1875.1
Total Growth	**-0.59%**	**-38.10%**	**-25.19%**	**16.71%**	**22.41%**	**50.08%**	**8.70%**

New York State Forecast of Primary Energy Use by Sector, 2000-2021

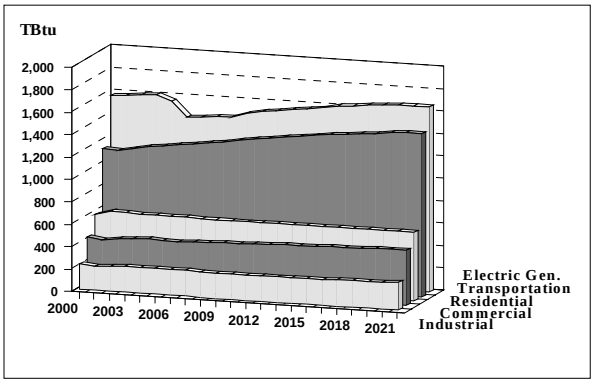


Table 1-3 (in trillion Btu)

Year	Residential TBtu	Commercial TBtu	Industrial TBtu	Transportation TBtu	Electric Generation TBtu	Total Primary TBtu
2000	593.1	424.7	234.5	1126.6	1569.9	3948.7
2001	620.0	409.5	212.3	1126.2	1583.2	3951.0
2002	624.8	425.6	223.9	1150.4	1598.4	4023.2
2003	626.6	436.8	231.5	1177.8	1603.7	4076.4
2004	626.8	443.5	233.9	1195.1	1553.9	4053.1
2005	622.6	445.3	236.2	1213.2	1417.4	3934.6
2006	620.8	448.3	236.1	1227.4	1431.0	3963.4
2007	617.5	451.7	232.7	1243.3	1445.0	3990.3
2008	616.8	455.1	233.0	1262.5	1445.9	4013.3
2009	612.8	458.5	233.8	1283.0	1483.8	4071.9
2010	610.3	463.1	233.6	1302.4	1508.5	4117.9
2011	610.5	467.8	232.1	1322.7	1533.5	4166.6
2012	612.2	472.4	232.4	1340.3	1546.0	4203.3
2013	610.6	476.4	233.9	1356.2	1564.2	4241.3
2014	611.0	479.5	234.8	1369.8	1583.0	4278.1
2015	610.5	482.6	235.8	1382.5	1601.8	4313.3
2016	612.4	485.4	236.9	1396.2	1618.2	4349.0
2017	611.1	487.7	238.2	1409.2	1627.7	4373.9
2018	611.8	489.8	238.5	1421.5	1640.6	4402.2
2019	612.4	492.1	241.7	1434.1	1653.5	4433.8
2020	614.7	495.0	244.8	1443.8	1656.1	4454.4
2021	617.0	497.9	247.8	1453.5	1658.7	4475.1
Total Growth	**4.04%**	**17.25%**	**5.69%**	**29.01%**	**5.66%**	**13.33%**

New York State Forecast of Electricity Sales by Sector, 2000-2021

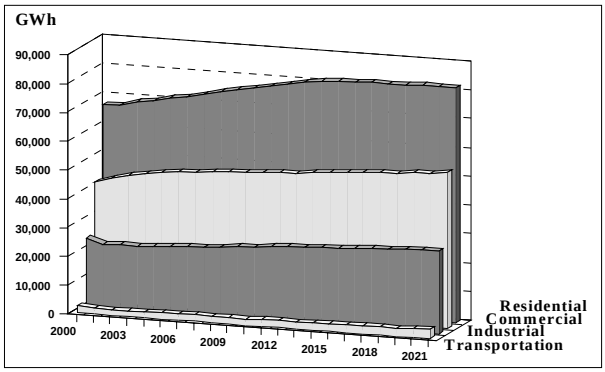


Table 1-4 (in gigawatt hours)

Year	Residential GWh	Commercial GWh	Industrial GWh	Transportation GWh	Total GWh
2000	41970	67075	24109	2600	135754
2001	43640	67094	22576	2663	135974
2002	44881	68646	22746	2726	138998
2003	46364	69695	22735	2796	141590
2004	47013	70819	23128	2864	143825
2005	47572	72012	23518	2927	146030
2006	48019	73137	23753	2989	147897
2007	48460	74409	24133	3044	150046
2008	48873	75594	24558	3100	152125
2009	49235	76704	24998	3164	154102
2010	49545	77775	25531	3229	156080
2011	49846	78792	26063	3296	157998
2012	50208	79785	26363	3375	159731
2013	50630	80634	26723	3453	161440
2014	51112	81079	27031	3524	162746
2015	51601	81282	27372	3618	163874
2016	51958	81417	27696	3712	164782
2017	52361	81506	28004	3804	165675
2018	52790	81600	28309	3918	166618
2019	53259	81691	28598	4032	167581
2020	53728	81776	28793	4139	168436
2021	54196	81861	28988	4246	169291
Total Growth	**29.13%**	**22.04%**	**20.24%**	**63.65%**	**24.70%**

New York State Forecast of Energy Use by Sector and Total, 2000-2021

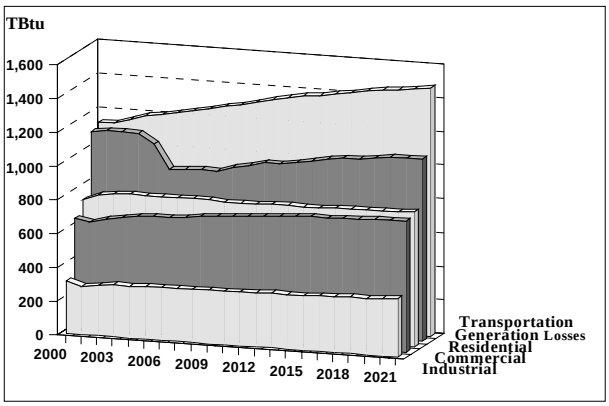


Table 1-5 (trillion Btu)

Year	Residential TBtu	Commercial TBtu	Industrial TBtu	Transportation TBtu	Total Use TBtu	Electric Generation Losses TBtu	Primary Demand TBtu
2000	736.2	653.4	316.9	1135.5	2613.8	1334.9	3948.7
2001	769.3	642.5	289.5	1135.3	2603.6	1347.5	3951.0
2002	778.3	663.6	301.7	1159.7	2665.4	1357.8	4023.2
2003	785.2	678.5	309.2	1187.3	2718.6	1357.8	4076.4
2004	787.5	688.9	313.0	1204.9	2748.9	1304.2	4053.1
2005	785.3	694.7	316.6	1223.2	2770.4	1164.2	3934.6
2006	785.0	701.4	317.3	1237.6	2788.1	1175.3	3963.4
2007	783.3	709.1	315.3	1253.7	2803.9	1186.3	3990.3
2008	783.9	716.5	317.0	1273.1	2829.1	1184.1	4013.3
2009	781.2	723.4	319.3	1293.9	2852.8	1219.1	4071.9
2010	779.8	731.4	320.9	1313.5	2877.2	1240.7	4117.9
2011	781.0	739.4	321.3	1334.0	2582.7	1583.9	4166.6
2012	783.9	747.2	322.6	1351.9	2930.7	1272.6	4203.3
2013	783.8	753.9	325.2	1368.1	2953.5	1287.8	4241.3
2014	785.8	758.4	327.3	1381.8	2974.5	1303.7	4278.1
2015	786.9	762.0	329.5	1394.9	2993.9	1319.4	4313.3
2016	790.1	765.1	331.7	1408.9	3016.0	1333.0	4349.0
2017	790.2	767.7	334.0	1422.3	3034.1	1339.8	4373.9
2018	792.3	770.0	335.3	1435.0	3052.4	1349.9	4402.2
2019	794.6	772.6	339.5	1447.9	3074.0	1359.8	4433.8
2020	798.5	775.7	343.2	1457.9	3094.7	1359.7	4454.4
2021	802.4	778.8	347.0	1468.0	3115.3	1359.7	4475.1
Total Growth	**8.99%**	**19.19%**	**9.48%**	**29.28%**	**19.19%**	**1.86%**	**13.33%**

New York State Electric Generation, Forecast of Fuel Use by Type 2000-2021

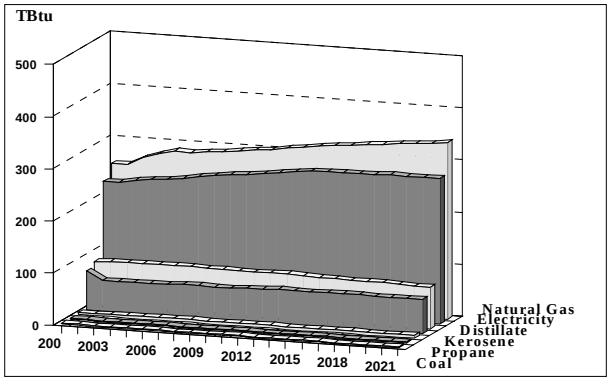


Table 1-6a (in trillion Btu)

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Residual TBtu	Total Petroleum TBtu	Hydro TBtu	Nuclear TBtu	Other TBtu	Imports TBtu	Total TBtu
2000	251.1	381.2	11.6	148.6	160.2	242.9	315.8	32.3	186.3	1569.8
2001	268.2	389.4	8.4	112.7	121.1	268.1	321.7	33.9	180.6	1583.1
2002	285.4	397.5	1.9	82.1	84.0	293.5	327.7	35.5	174.9	1598.4
2003	285.1	406.9	1.6	76.0	77.6	289.1	323.9	35.5	185.5	1603.7
2004	264.7	448.8	1.8	53.2	54.9	275.6	310.3	35.6	164.1	1553.9
2005	160.1	478.6	1.5	20.4	21.9	247.9	277.4	35.5	195.9	1417.4
2006	160.9	489.9	1.1	21.6	22.7	246.6	275.7	35.6	199.6	1431.0
2007	161.7	501.3	1.0	22.7	23.8	245.4	274.0	35.6	203.2	1445.0
2008	161.7	501.3	1.0	22.7	23.7	244.3	272.4	35.6	206.9	1445.9
2009	164.9	523.2	0.9	26.6	27.5	245.9	273.9	35.6	212.8	1483.8
2010	168.1	534.2	1.0	28.6	29.5	247.7	274.5	35.6	218.9	1508.5
2011	171.3	545.2	1.0	30.5	31.5	249.3	275.8	35.6	224.8	1533.5
2012	174.5	545.2	1.0	30.5	31.5	250.6	277.9	35.6	230.7	1546.0
2013	177.8	554.5	1.0	33.1	34.1	251.7	278.8	35.6	231.6	1564.2
2014	181.9	563.8	0.9	35.7	36.7	252.8	279.7	35.6	232.5	1583.0
2015	186.0	573.1	1.0	38.3	39.3	253.8	280.6	35.6	233.4	1601.8
2016	187.7	582.4	1.0	41.0	41.9	254.9	281.4	35.6	234.3	1618.2
2017	189.7	589.6	1.0	43.7	44.7	255.3	281.7	35.6	231.1	1627.7
2018	192.2	599.1	1.1	47.0	48.1	255.7	282.1	35.6	228.0	1640.6
2019	194.6	608.5	1.1	50.4	51.5	256.1	282.4	35.6	224.8	1653.5
2020	195.8	611.0	1.1	51.8	52.9	256.4	282.7	35.6	221.6	1656.1
2021	197.0	613.6	1.1	53.2	54.3	256.8	283.0	35.7	218.4	1658.7
Total Growth	**-21.55%**	**60.95%**	**-90.44%**	**-64.22%**	**-66.12%**	**5.75%**	**-10.38%**	**10.38%**	**17.22%**	**5.67%**

Table 1-6b (in trillion Btu) **High Economic Case**

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Residual TBtu	Total Petroleum TBtu	Hydro TBtu	Nuclear TBtu	Other TBtu	Imports TBtu	Total TBtu
2000	251.1	381.2	11.6	148.6	160.2	242.9	315.8	32.3	186.3	1569.8
2006	161.8	515.3	1.9	25.8	27.7	247.2	275.7	36.1	217.1	1480.9
2011	173.3	586.0	1.3	35.2	36.5	248.8	275.8	36.4	264.5	1621.3
2016	193.9	614.0	1.1	45.4	46.4	254.2	281.4	36.7	267.9	1694.6
2021	214.0	603.7	2.1	60.8	62.9	260.3	283.0	37.2	239.0	1700.1
Total Growth	**-14.76%**	**58.37%**	**-81.90%**	**-59.08%**	**-60.74%**	**7.19%**	**-10.38%**	**15.24%**	**28.26%**	**8.30%**

Table 1-6c (in trillion Btu) **Low Economic Case**

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Residual TBtu	Total Petroleum TBtu	Hydro TBtu	Nuclear TBtu	Other TBtu	Imports TBtu	Total TBtu
2000	251.1	381.2	11.6	148.6	160.2	242.9	315.8	32.3	186.3	1569.8
2006	159.8	468.6	0.0	18.3	18.3	246.1	75.7	31.9	178.1	1178.5
2011	168.5	513.0	0.0	27.0	27.1	247.8	275.8	32.0	200.3	1464.4
2016	181.9	549.0	0.3	37.4	37.7	253.0	277.2	32.5	218.9	1550.2
2021	187.8	571.0	0.3	46.9	47.2	255.5	278.7	33.3	196.7	1570.2
Total Growth	**-25.21%**	**49.79%**	**-97.41%**	**-68.44%**	**-60.74%**	**5.19%**	**976.03%**	**3.01%**	**5.57%**	**0.03%**

New York State Forecast of Residential Energy Use by Fuel Type, 2000-2021

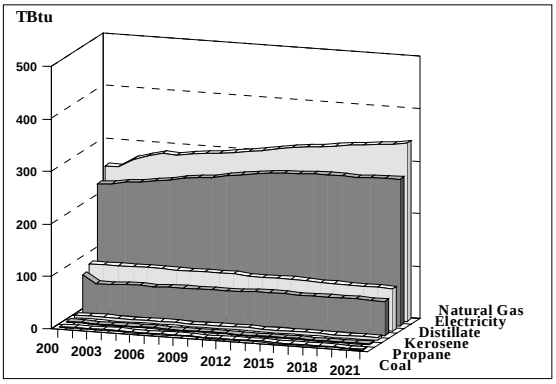


Table 1-7a (in trillion Btu)

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Kerosene TBtu	Propane TBtu	Total Petroleum TBtu	Electricity TBtu	Total TBtu
2000	1.7	361.9	196.7	13.3	19.5	229.5	143.5	736.6
2001	1.5	405.5	179.6	13.6	19.8	213.0	149.2	769.3
2002	1.6	411.4	178.3	13.5	20.0	211.8	153.5	778.3
2003	1.7	415.9	176.2	12.6	20.3	209.1	158.6	785.2
2004	1.7	419.6	173.0	11.8	20.6	205.5	160.8	787.5
2005	1.8	419.1	169.6	11.3	20.9	201.7	162.7	785.3
2006	1.8	419.8	167.1	10.9	21.2	199.2	164.2	785.0
2007	1.8	420.2	163.6	10.5	21.5	195.5	165.7	783.3
2008	1.9	422.0	160.9	10.2	21.8	192.9	167.1	783.9
2009	1.9	421.7	157.2	9.8	22.1	189.1	168.4	781.2
2010	2.0	422.6	153.8	9.5	22.4	185.7	169.4	779.8
2011	2.0	424.1	152.5	9.3	22.6	184.4	170.5	781.0
2012	2.0	427.0	151.4	9.2	22.7	183.2	171.7	783.9
2013	1.9	427.4	149.5	8.9	22.9	181.3	173.2	783.8
2014	1.9	429.3	148.1	8.7	23.0	179.9	174.8	785.8
2015	1.9	430.8	146.0	8.5	23.2	177.7	176.5	786.9
2016	1.9	433.8	145.0	8.4	23.4	176.7	177.7	790.1
2017	1.9	434.3	143.2	8.2	23.5	175.0	179.1	790.2
2018	1.9	436.2	141.9	8.1	23.7	173.7	180.5	792.3
2019	1.9	438.0	140.7	8.0	23.9	172.5	182.1	794.6
2020	1.9	440.7	140.3	7.9	24.0	172.2	183.7	798.5
2021	1.8	443.3	139.9	7.8	24.2	171.9	185.3	802.4
Total Growth	**8.79%**	**22.50%**	**-28.88%**	**-41.48%**	**24.08%**	**-25.11%**	**29.13%**	**8.93%**

Table 1-7b (in trillion Btu)

High Economic Case

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Kerosene TBtu	Propane TBtu	Total Petroleum TBtu	Electricity TBtu	Total TBtu
2000	1.7	361.9	196.7	13.3	19.5	229.5	143.5	736.6
2006	1.8	420.9	167.0	10.8	21.1	199.0	163.8	812.5
2011	2.0	425.0	152.9	9.3	22.5	184.6	170.8	805.5
2016	1.9	440.1	145.4	8.4	23.3	177.1	179.5	816.4
2021	1.8	451.6	140.5	7.8	24.1	172.4	188.6	828.8
Total Growth	**8.79%**	**41.50%**	**- 28.57%**	**-24.86%**	**24.79%**	**24.88%**	**31.68%**	**12.57%**

Table 1-7c (in trillion Btu)

Low Economic Case

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Kerosene TBtu	Propane TBtu	Total Petroleum TBtu	Electricity TBtu	Total TBtu
2000	1.7	361.9	196.7	13.3	19.5	229.5	143.5	736.6
2006	1.8	418.6	167.3	10.9	21.2	199.3	162.7	782.5
2011	2.0	419.8	152.8	9.4	22.6	184.7	167.6	774.1
2016	1.9	423.9	145.6	8.5	23.5	177.6	173.2	776.7
2021	1.8	427.3	140.3	7.8	24.4	172.5	179.3	780.9
Total Growth	**8.79%**	**18.07%**	**-28.68%**	**-41.13%**	**25.09%**	**-24.84%**	**25.18%**	**6.06%**

New York State Forecast of Commercial Energy Use by Fuel Type, 2000-2021

Table 1-8a (in trillion Btu)

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Residual TBtu	Kerosene TBtu	Propane TBtu	Total Petroleum TBtu	Electricity TBtu	Total TBtu
2000	2.4	254.4	84.2	75.2	5.4	3.1	167.9	229.4	654.1
2001	2.2	254.7	85.7	58.4	5.4	3.1	152.6	229.5	639.0
2002	2.2	269.3	85.9	59.7	5.4	3.1	154.1	234.8	660.4
2003	2.2	278.8	86.9	60.3	5.5	3.1	155.8	238.4	675.2
2004	2.3	284.5	87.2	60.9	5.5	3.1	156.7	242.2	685.7
2005	2.3	285.8	87.1	61.5	5.5	3.1	157.2	246.3	691.6
2006	2.3	288.4	87.0	61.9	5.6	3.1	157.6	250.1	698.4
2007	2.3	291.5	86.9	62.3	5.6	3.1	157.9	254.5	706.2
2008	2.3	294.5	86.8	62.8	5.6	3.1	158.3	258.5	713.7
2009	2.3	297.7	86.4	63.3	5.7	3.1	158.4	262.3	720.8
2010	2.4	302.1	85.9	64.0	5.7	3.1	158.6	266.0	729.0
2011	2.4	306.3	85.5	64.7	5.8	3.1	159.0	269.5	737.2
2012	2.4	310.5	85.2	65.4	5.8	3.1	159.5	272.9	745.3
2013	2.4	314.3	84.8	66.0	5.9	3.1	159.7	275.8	752.2
2014	2.4	317.8	84.0	66.4	5.9	3.1	159.3	277.3	756.8
2015	2.4	321.3	83.4	66.5	5.9	3.1	158.9	278.0	760.6
2016	2.4	324.5	82.9	66.5	5.9	3.1	158.5	278.4	763.8
2017	2.4	327.3	82.5	66.4	5.9	3.1	157.9	278.7	766.4
2018	2.4	330.0	82.1	66.2	5.9	3.1	157.3	279.1	768.8
2019	2.4	332.9	81.6	66.2	5.9	3.1	156.8	279.4	771.5
2020	2.4	336.2	81.1	66.3	5.9	3.1	156.4	279.7	774.7
2021	2.4	339.5	80.6	66.4	5.9	3.1	156.0	280.0	777.9
Total Growth	**0.0%**	**33.47%**	**-4.26%**	**-11.75%**	**9.19%**	**0.00%**	**-7.10%**	**22.04%**	**18.93%**

Table 1-8b (in trillion Btu) **High Economic Case**

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Residual TBtu	Kerosene TBtu	Propane TBtu	Total Petroleum TBtu	Electricity TBtu	Total TBtu
2000	2.4	254.4	84.2	75.2	5.4	3.1	167.9	229.4	654.1
2006	2.3	287.6	87.1	62.3	5.6	3.1	158.1	272.7	720.7
2011	2.4	305.6	86.9	66.0	5.9	3.1	162.0	297.8	767.7
2016	2.5	329.4	85.0	68.7	6.0	3.2	162.8	313.5	808.3
2021	2.5	348.0	83.2	69.2	6.1	3.2	161.7	316.0	828.2
Total Growth	**4.04%**	**36.80%**	**-1.19%**	**-7.96%**	**12.64%**	**3.12%**	**-3.70%**	**37.75%**	**26.62%**

Table 1-8c (in trillion Btu) **Low Economic Case**

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Residual TBtu	Kerosene TBtu	Propane TBtu	Total Petroleum TBtu	Electricity TBtu	Total TBtu
2000	2.4	254.4	84.2	75.2	5.4	3.1	167.9	229.4	654.1
2006	2.3	287.8	86.8	61.3	5.5	3.1	156.8	271.1	717.9
2011	2.3	304.1	85.1	63.3	5.7	3.1	157.2	290.7	754.3
2016	2.4	318.6	82.7	64.3	5.8	3.0	155.9	299.9	776.7
2021	2.4	329.0	79.8	63.2	5.7	3.0	151.8	298.1	781.2
Total Growth	**0.0%**	**29.33%**	**-5.24%**	**-15.89%**	**6.16%**	**-3.25%**	**-9.61%**	**29.95%**	**19.43%**

New York State Forecast of Industrial Energy Use by Fuel Type, 2000-2021

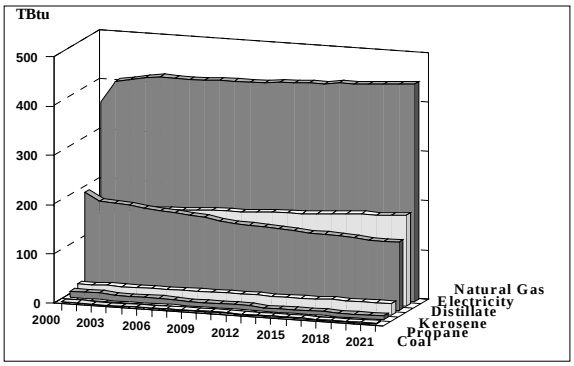


Table 1-9a (in trillion Btu)

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Residual TBtu	Propane TBtu	Total Petroleum TBtu	Electricity TBtu	Total TBtu
2000	56.1	137.0	18.3	16.0	6.2	41.4	82.5	316.9
2001	53.0	123.6	18.3	10.3	6.2	35.7	77.2	289.5
2002	53.8	135.4	18.2	9.4	6.2	34.7	77.8	301.7
2003	53.6	143.6	18.4	8.8	6.2	34.3	77.8	309.2
2004	53.5	145.2	18.6	9.5	6.2	35.2	79.1	313.0
2005	53.3	146.8	18.9	10.0	6.2	36.0	80.4	316.6
2006	53.1	146.3	19.0	10.6	6.2	36.7	81.2	317.3
2007	52.9	142.6	19.1	11.0	6.2	37.2	82.5	315.3
2008	52.6	142.4	19.3	11.6	6.2	38.0	84.0	317.0
2009	52.3	143.2	19.5	11.6	6.2	38.2	85.5	319.3
2010	52.0	142.9	19.7	11.7	6.2	38.6	87.3	320.9
2011	51.8	144.6	20.0	8.6	6.2	35.7	89.1	321.3
2012	51.5	145.8	20.1	7.8	6.2	35.1	90.2	322.6
2013	51.2	147.3	20.3	7.8	6.2	35.3	91.4	325.2
2014	51.0	148.5	20.4	7.8	6.2	35.4	92.4	327.3
2015	50.7	149.7	20.7	7.6	6.2	35.4	93.6	329.5
2016	50.5	151.0	20.9	7.5	6.2	35.5	94.7	331.7
2017	50.3	152.3	21.0	7.4	6.2	35.6	95.8	334.0
2018	50.0	152.6	21.3	7.4	6.2	35.9	96.8	335.3
2019	49.8	152.7	21.6	10.4	6.2	39.2	97.8	339.5
2020	49.5	154.3	21.8	11.9	6.2	40.9	98.5	343.2
2021	49.2	155.9	22.0	13.5	6.2	42.7	99.1	347.0
Total Growth	**-12.23%**	**13.79%**	**20.35%**	**-15.53%**	**0.0%**	**3.20%**	**20.24%**	**9.48%**

Table 1-9b (in trillion Btu)

High Economic Case

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Residual TBtu	Propane TBtu	Total Petroleum TBtu	Electricity TBtu	Total TBtu
2000	56.1	137.0	18.3	16.0	6.2	41.4	82.3	316.9
2006	55.1	150.1	19.8	11.0	6.5	38.2	87.5	331.0
2011	55.4	150.3	21.4	9.2	6.8	38.4	99.2	343.3
2016	54.6	159.1	22.6	8.0	7.0	38.7	106.9	359.3
2021	54.8	169.9	24.5	14.2	7.1	46.9	115.5	387.1
Total Growth	**-2.38%**	**24.05%**	**34.11%**	**-11.31%**	**14.21%**	**13.29%**	**40.34%**	**22.15%**

Table 1-9c (in trillion Btu)

Low Economic Case

Year	Coal TBtu	Natural Gas TBtu	Distillate TBtu	Residual TBtu	Propane TBtu	Total Petroleum TBtu	Electricity TBtu	Total TBtu
2000	56.1	137.0	18.3	16.0	6.2	41.4	82.3	316.9
2006	51.6	143.7	18.5	10.3	6.0	34.8	81.6	311.8
2011	49.6	139.9	18.9	8.6	5.8	33.3	87.5	310.2
2016	47.4	142.9	19.3	7.1	5.7	32.1	90.7	313.2
2021	45.2	146.0	19.7	10.8	5.4	35.9	92.6	319.7
Total Growth	**-19.38%**	**6.59%**	**7.46%**	**-32.62%**	**-12.40%**	**-13.29%**	**12.46%**	**0.88%**

New York State Forecast of Transportation Energy Use by Fuel Type, 2000-2021

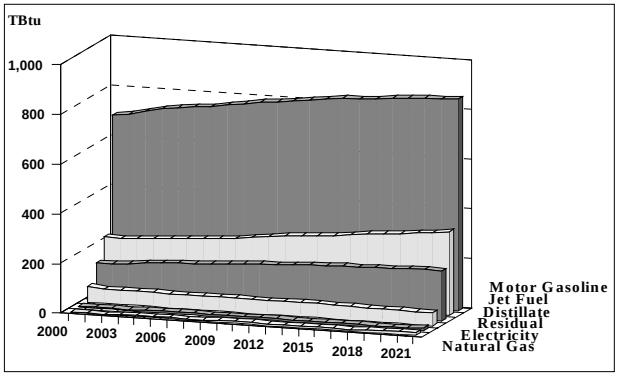


Table 1-10a (in trillion Btu)

Year	Distillate TBtu	Residual TBtu	Motor Gasoline TBtu	Jet Fuels TBtu	Propane TBtu	Total Petroleum TBtu	Compressed Natural Gas TBtu	Electricity TBtu	Total TBtu
2000	139.1	64.8	696.7	225.3	0.1	1126.0	0.6	8.9	1135.5
2001	143.7	58.9	702.9	219.8	0.1	1125.4	0.8	9.1	1135.3
2002	146.4	60.4	717.4	225.2	0.1	1149.4	1.0	9.3	1159.7
2003	151.6	60.2	733.4	231.3	0.1	1176.6	1.2	9.6	1187.3
2004	156.0	59.9	742.1	235.5	0.1	1193.7	1.3	9.8	1204.9
2005	160.6	59.6	750.8	240.5	0.2	1211.7	1.5	10.0	1223.2
2006	163.9	59.4	757.5	244.9	0.2	1225.8	1.6	10.2	1237.6
2007	167.6	59.1	765.3	249.3	0.2	1241.5	1.8	10.4	1253.7
2008	171.3	58.8	774.7	255.6	0.2	1260.6	1.9	10.6	1273.1
2009	175.4	58.6	784.4	262.4	0.2	1281.0	2.1	10.8	1293.9
2010	179.3	58.3	793.2	269.2	0.2	1300.2	2.2	11.1	1313.5
2011	183.6	58.0	802.0	276.5	0.2	1320.4	2.3	11.3	1334.0
2012	186.8	57.8	810.2	282.8	0.2	1337.9	2.5	11.6	1351.9
2013	189.7	57.6	817.4	288.8	0.2	1353.6	2.6	11.8	1368.1
2014	192.0	57.3	822.8	294.8	0.2	1367.1	2.7	12.1	1381.8
2015	194.0	57.1	827.7	300.8	0.2	1379.8	2.8	12.4	1394.9
2016	195.9	56.8	832.9	307.4	0.2	1393.3	2.9	12.7	1408.9
2017	197.9	56.6	837.6	314.1	0.2	1406.3	3.0	13.0	1422.3
2018	199.7	56.3	841.8	320.5	0.2	1418.5	3.0	13.4	1435.0
2019	201.3	56.0	846.5	326.9	0.2	1431.0	3.1	13.8	1447.9
2020	202.5	55.8	849.7	332.5	0.2	1440.6	3.1	14.2	1457.9
2021	203.6	55.5	852.8	338.1	0.2	1450.3	3.2	14.5	1468.0
Total Growth	**46.39%**	**-14.36%**	**22.41%**	**50.08%**	**134.77%**	**28.80%**	**428.93%**	**63.35%**	**29.28%**

Table 1-10b (in trillion Btu) **High Economic Case**

Year	Distillate TBtu	Residual TBtu	Motor Gasoline TBtu	Jet Fuels TBtu	Propane TBtu	Total Petroleum TBtu	Compressed Natural Gas TBtu	Electricity TBtu	Total TBtu
2000	139.1	64.8	696.7	225.3	0.1	1126.0	0.60	8.9	1135.5
2006	167.9	59.5	767.5	251.6	0.2	1246.7	1.67	10.2	1258.6
2011	192.4	58.4	823.6	291.1	0.2	1365.7	2.42	11.3	1379.4
2016	208.9	57.3	864.2	328.4	0.2	1459.0	3.07	12.7	1474.8
2021	223.8	56.1	894.0	369.5	0.3	1543.7	3.46	14.5	1561.7
Total Growth	**60.91%**	**-13.40%**	**28.32%**	**64.01%**	**155.16%**	**37.10%**	**476.46%**	**62.92%**	**37.53%**

Table 1-10c (in trillion Btu) **Low Economic Case**

Year	Distillate TBtu	Residual TBtu	Motor Gasoline TBtu	Jet Fuels TBtu	Propane TBtu	Total Petroleum TBtu	Compressed Natural Gas TBtu	Electricity TBtu	Total TBtu
2000	139.1	64.8	696.7	225.3	0.1	1126.0	0.60	8.90	1135.5
2006	161.8	59.3	750.8	242.5	0.2	1214.6	1.54	10.27	1226.4
2011	177.4	57.8	785.6	268.0	0.2	1289.0	2.17	11.45	1302.6
2016	185.5	56.4	804.4	290.4	0.2	1336.8	2.70	12.94	1352.5
2021	188.2	54.8	812.2	309.1	0.2	1364.5	2.94	14.90	1382.3
Total Growth	**35.28%**	**-15.43%**	**16.58%**	**37.18%**	**127.5%**	**21.18%**	**389.87%**	**67.36%**	**21.74%**

SECTION 2

NEW YORK STATE ENERGY PRICES

This section presents data on retail energy prices for 2000 through 2021. Average Statewide energy prices are provided by fuel type in real year 2000 dollars per physical unit. Prices are also provided by fuel type for the residential, commercial, industrial, transportation, and electric generation sectors.

New York State Average Fuel Prices Forecast in Real Dollars, 2000-2021

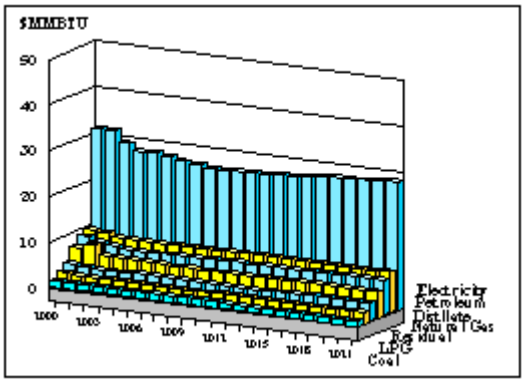


Table 2-1a (in physical units)($/2000)

Year	Coal $/ton	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Propane ¢/gal	Petroleum Products $/bbl	Electricity ¢/kWh
2000	38.89	6.95	123.81	25.36	132.20	51.86	10.71
2001	37.36	7.90	112.14	24.04	122.10	50.04	10.73
2002	36.22	6.31	106.62	22.30	120.09	45.63	9.93
2003	36.20	6.45	100.06	23.36	131.77	45.45	9.41
2004	36.36	6.53	100.25	23.52	133.36	45.52	9.39
2005	36.33	6.54	100.43	23.60	132.54	45.52	9.24
2006	36.33	6.47	101.53	23.66	132.82	46.08	9.04
2007	36.11	6.42	103.09	23.75	133.13	46.34	8.90
2008	35.87	6.39	103.84	23.86	133.41	46.46	8.80
2009	35.70	6.35	105.26	23.97	133.72	46.81	8.79
2010	35.60	6.31	106.71	24.07	134.93	47.12	8.85
2011	35.58	6.30	106.90	24.14	135.18	47.19	8.92
2012	35.36	6.28	106.67	24.27	136.15	47.11	8.95
2013	35.13	6.27	108.14	24.41	135.71	47.38	9.03
2014	34.99	6.25	109.38	24.54	135.98	47.62	9.05
2015	34.74	6.24	109.64	24.68	135.68	47.59	9.23
2016	34.60	6.22	109.82	24.81	135.39	47.57	9.34
2017	34.31	6.21	108.77	24.94	135.08	47.34	9.38
2018	34.03	6.22	108.63	25.09	135.36	47.33	9.44
2019	33.81	6.21	108.82	25.26	135.66	47.36	9.52
2020	33.60	6.22	108.82	25.40	135.94	47.35	9.57
2021	33.40	6.23	108.82	25.54	136.21	47.33	9.62
Total Growth	**-14.27%**	**-10.38%**	**-12.10%**	**0.68%**	**3.04%**	**-8.71%**	**-10.13%**

Table 2-1b (in physical units) **High Economic Case**

Year	Coal $/ton	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Propane ¢/gal	Petroleum Products	Electricity ¢/kWh
2000	38.89	6.95	123.81	25.36	132.20	51.85	10.71
2006	36.65	6.69	103.25	23.98	134.47	46.59	9.31
2011	36.11	6.83	110.76	24.76	138.94	48.31	9.31
2016	35.33	6.63	113.36	25.78	137.17	48.78	9.74
2021	34.75	6.65	113.68	26.80	139.09	49.37	10.08
Total Growth	**-11.15%**	**-4.29%**	**-8.18%**	**5.67%**	**5.21%**	**-4.79%**	**-5.89%**

Table 2-1c (in physical units) **Low Economic Case**

Year	Coal $/ton	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Propane ¢/gal	Petroleum Products $/bbl	Electricity ¢/kWh
2000	38.89	6.95	123.81	25.36	132.20	51.85	10.71
2006	36.10	6.32	99.84	23.25	131.55	45.58	8.92
2011	35.23	6.09	103.90	23.42	131.23	46.04	8.70
2016	34.15	5.91	104.06	23.75	128.69	45.71	9.04
2021	32.80	5.86	104.24	24.10	128.53	45.59	9.19
Total Growth	**-16.13%**	**-15.71%**	**-15.87%**	**-5.00%**	**-2.78%**	**-12.08%**	**-14.19%**

New York State Residential Energy Prices Forecast in Real Dollars, 2000-2021

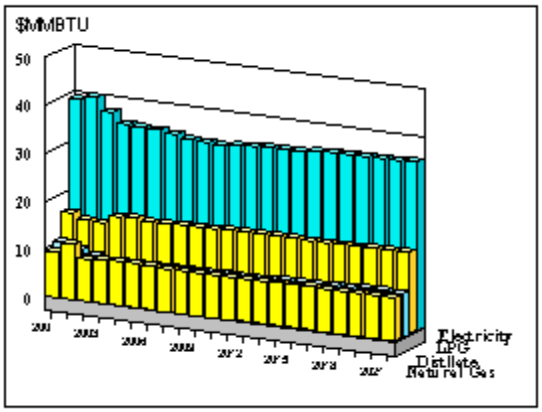


Table 2-2a (in physical units)($/2000)

Year	Natural Gas $/dt	Distillate ¢/gal	Propane ¢/gal	Petroleum Products $/BBL	Electricity ¢/kW
2000	9.59	152.56	140.09	59.66	13.37
2001	11.73	136.13	130.08	55.65	13.73
2002	9.79	125.44	128.10	48.43	12.80
2003	10.01	115.67	142.40	46.67	12.08
2004	10.12	116.27	143.99	46.90	12.06
2005	10.10	116.57	143.17	46.95	11.96
2006	9.96	116.51	143.46	46.96	11.73
2007	9.85	116.02	143.76	46.81	11.55
2008	9.77	116.13	144.05	46.86	11.44
2009	9.66	118.49	144.35	47.70	11.47
2010	9.55	119.93	145.57	48.26	11.56
2011	9.50	120.18	145.82	48.30	11.65
2012	9.44	120.64	146.78	48.45	11.69
2013	9.38	123.12	146.35	49.23	11.75
2014	9.32	126.23	146.62	50.27	11.75
2015	9.27	126.55	146.32	50.33	11.87
2016	9.21	126.82	146.03	50.37	11.95
2017	9.16	127.10	145.73	50.41	11.96
2018	9.15	127.37	146.00	50.48	11.99
2019	9.14	127.67	146.30	50.55	12.03
2020	9.14	127.94	146.58	50.61	12.04
2021	9.14	128.22	146.86	50.68	12.06
Total Growth	**-4.71%**	**-15.96%**	**4.83%**	**-15.06%**	**-9.78%**

Table 2-2b (in physical units) **High Economic Case**

Year	Natural Gas $/dt	Distillate ¢/gal	Propane ¢/gal	Petroleum Products $/BBL	Electricity ¢/kWh
2000	9.59	152.56	140.09	59.66	13.37
2006	10.26	117.46	145.19	47.41	12.12
2011	10.07	121.28	149.59	49.06	12.23
2016	9.62	128.84	148.62	51.19	12.56
2021	9.54	131.10	150.50	51.82	12.78
Total Growth	**-0.55%**	**-14.07%**	**7.43%**	**-13.14%**	**-4.45%**

Table 2-2c (in physical units) **Low Economic Case**

Year	Natural Gas $/dt	Distillate ¢/gal	Propane ¢/gal	Petroleum Products $/BBL	Electricity ¢/kWh
2000	9.59	152.56	140.09	59.66	13.37
2006	9.78	114.93	142.27	46.43	11.56
2011	9.26	118.09	142.40	47.31	11.34
2016	8.87	123.09	140.28	48.65	11.50
2021	8.79	124.84	140.40	48.97	11.45
Total Growth	**-8.36%**	**-18.17%**	**0.22%**	**-17.93%**	**-14.35%**

New York State Commercial Energy Prices Forecast in Real Dollars, 2000-2021

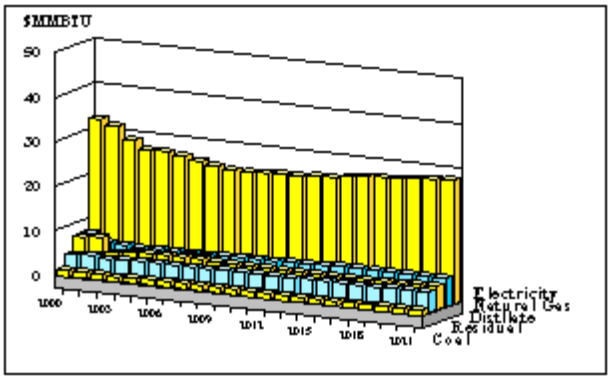


Table 2-3a (in physical units)($/2000)

Year	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Petroleum Products $/bbl	Electricity ¢/kWh
2000	7.56	108.44	28.15	33.94	11.17
2001	8.03	89.22	28.64	32.54	10.77
2002	6.17	85.76	26.55	30.96	9.84
2003	6.45	81.59	27.59	30.20	9.27
2004	6.58	82.19	27.79	30.41	9.19
2005	6.56	82.50	27.89	30.49	8.94
2006	6.45	82.44	27.99	30.51	8.73
2007	6.35	81.95	28.11	30.40	8.56
2008	6.27	82.06	28.23	30.45	8.41
2009	6.14	84.44	28.37	31.08	8.38
2010	6.03	85.89	28.49	31.47	8.45
2011	5.99	86.14	28.57	31.53	8.52
2012	5.93	86.62	28.71	31.66	8.56
2013	5.87	89.11	28.84	32.30	8.66
2014	5.81	92.26	28.98	33.10	8.68
2015	5.77	92.58	29.12	33.18	8.91
2016	5.70	92.86	29.26	33.27	9.06
2017	5.64	93.13	29.40	33.37	9.12
2018	5.58	93.41	29.54	33.47	9.22
2019	5.52	93.71	29.72	33.58	9.32
2020	5.47	93.99	29.88	33.68	9.39
2021	5.43	94.26	30.03	33.78	9.46
Total Growth	**-28.23%**	**-13.07%**	**6.67%**	**-0.48%**	**-15.35%**

Table 2-3b (in physical units) **High Economic Case**

Year	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Petroleum Products $/bbl	Electricity ¢/kWh
2000	7.56	108.44	28.15	33.94	11.17
2006	6.66	83.41	28.33	30.87	9.01
2011	6.42	87.08	29.23	32.03	8.93
2016	6.01	94.92	30.30	34.01	9.49
2021	5.71	97.26	31.41	34.85	9.96
Total Growth	**-24.55%**	**-10.31%**	**11.57%**	**2.69%**	**-10.91%**

Table 2-3c (in physical units) **Low Economic Case**

Year	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Petroleum Products $/bbl	Electricity ¢/kWh
2000	7.56	108.44	28.15	33.94	11.17
2006	6.31	84.03	28.43	30.99	8.87
2011	5.81	88.70	29.37	32.41	8.76
2016	5.45	97.64	30.46	34.86	9.37
2021	5.15	97.71	31.61	35.15	9.93
Total Growth	**-31.83%**	**-9.90%**	**12.30%**	**3.56%**	**-11.11%**

New York State Industrial Energy Prices Forecast in Real Dollars, 2000-2021

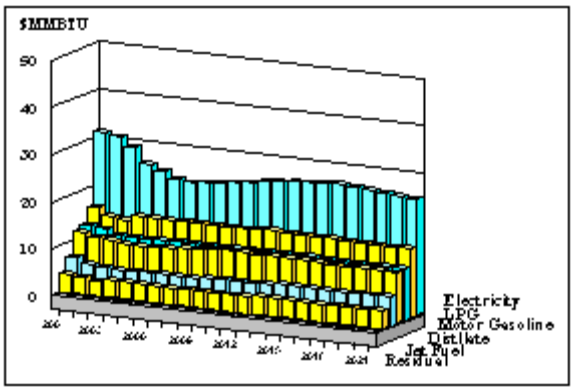


Table 2-4a (in physical units)($/2000)

Year	Coal $/Ton	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Propane ¢/gal	Petroleum Products $/bbl	Electricity ¢/kWh
2000	37.94	5.96	107.52	28.15	107.42	37.78	4.90
2001	39.04	6.33	83.70	33.23	96.98	31.19	4.94
2002	36.91	4.95	80.51	25.31	94.87	29.62	4.61
2003	36.60	4.95	77.41	26.25	98.37	30.24	4.54
2004	36.55	4.93	77.97	26.45	99.96	30.54	4.76
2005	36.48	4.97	78.25	26.55	99.14	30.61	4.80
2006	36.65	4.86	78.20	26.66	99.43	30.83	4.79
2007	36.31	4.87	77.74	26.78	99.74	32.15	4.82
2008	35.97	4.87	77.85	26.90	100.02	32.50	4.89
2009	35.85	4.93	80.05	27.03	100.33	33.23	4.90
2010	35.77	4.99	81.38	27.15	101.55	34.32	4.97
2011	35.31	5.01	81.62	27.24	101.80	34.83	5.02
2012	35.18	5.03	82.05	27.37	102.77	35.15	5.06
2013	35.11	5.08	84.36	27.51	102.33	35.68	5.14
2014	34.91	5.10	87.26	27.65	102.61	36.17	5.17
2015	34.74	5.13	87.56	27.79	102.30	36.27	5.32
2016	34.62	5.16	87.82	27.93	102.02	36.46	5.40
2017	34.37	5.19	88.07	28.07	101.71	35.98	5.44
2018	34.20	5.23	88.33	28.21	101.99	36.39	5.50
2019	33.91	5.27	88.60	28.39	102.29	36.44	5.58
2020	33.67	5.31	88.86	28.54	102.57	36.25	5.64
2021	33.43	5.35	89.11	28.69	102.85	36.07	5.70
Total Growth	**-11.89%**	**-10.26%**	**-17.12%**	**1.94%**	**-4.26%**	**-4.55%**	**16.34%**

Table 2-4b (in physical units) **High Economic Case**

Year	Coal $/Ton	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Propane ¢/gal	Petroleum Products $/bbl	Electricity ¢/kWh
2000	37.94	5.96	107.52	28.15	107.42	37.78	4.90
2006	36.81	5.02	79.11	27.55	100.63	31.19	4.95
2011	35.56	5.25	82.50	29.20	104.15	35.39	5.32
2016	35.09	5.40	89.76	29.45	105.61	37.26	5.71
2021	34.40	5.63	91.94	30.21	107.57	37.22	6.07
Total Growth	**-9.33%**	**-5.55%**	**-14.49%**	**7.32%**	**0.14%**	**-1.50%**	**23.74%**

Table 2-4c (in physical units) **Low Economic Case**

Year	Coal $/Ton	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Propane ¢/gal	Petroleum Products $/bbl	Electricity ¢/kWh
2000	37.94	5.96	107.52	28.15	107.42	37.78	4.90
2006	36.37	4.69	76.76	26.22	98.16	30.34	4.70
2011	34.86	4.77	78.58	26.54	98.14	33.63	4.87
2016	34.02	4.81	82.07	26.82	96.04	34.27	5.19
2021	32.91	4.90	85.48	27.20	95.68	34.04	5.39
Total Growth	**-13.26%**	**-17.77%**	**-20.50%**	**-3.37%**	**-10.93%**	**-9.90%**	**9.91%**

New York State Transportation Fuel Prices Forecast in Real Dollars, 2000-2021

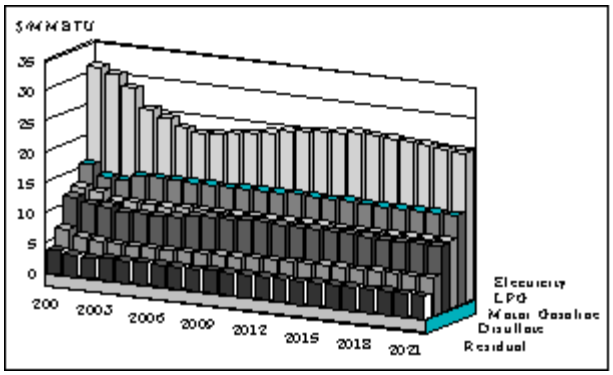


Table 2-5a (in physical units)($/2000)

Year	Motor Gasoline $/gal	Distillate ¢/gal	Jet Fuels ¢/gal	Residual $/bbl	Propane ¢/gal	Petroleum Products $/bbl	Electricity ¢/kWh
2000	1.59	160.87	94.22	24.90	137.55	57.42	10.76
2001	1.54	152.72	80.64	23.47	122.39	56.29	10.45
2002	1.39	150.71	77.26	21.51	120.26	51.50	9.83
2003	1.41	144.04	75.52	23.30	129.39	51.58	8.73
2004	1.41	143.68	75.86	23.49	130.68	51.58	8.36
2005	1.40	143.76	76.24	23.57	129.53	51.56	7.93
2006	1.43	147.42	75.84	23.66	129.51	52.40	7.75
2007	1.43	153.27	76.41	23.77	129.52	52.79	7.85
2008	1.42	155.50	76.60	23.88	129.54	52.92	7.97
2009	1.43	156.28	78.97	24.00	129.59	53.15	8.12
2010	1.43	158.64	80.57	24.11	130.57	53.39	8.29
2011	1.43	158.86	81.95	24.17	130.57	53.46	8.45
2012	1.42	157.35	82.11	24.30	131.29	53.26	8.57
2013	1.42	158.11	83.66	24.43	130.58	53.36	8.70
2014	1.42	157.08	85.16	24.57	130.60	53.36	8.78
2015	1.41	157.40	86.01	24.70	130.04	53.26	8.87
2016	1.41	157.53	85.95	24.84	129.50	53.19	8.85
2017	1.41	153.69	85.73	24.97	128.93	52.81	8.76
2018	1.41	152.81	85.90	25.10	128.95	52.73	8.71
2019	1.41	152.92	86.09	25.28	128.97	52.72	8.62
2020	1.41	152.49	86.26	25.43	128.96	52.67	8.52
2021	1.41	152.06	86.43	25.57	128.96	52.61	8.42
Total Growth	**-11.42%**	**-5.47%**	**-8.27%**	**2.71%**	**-6.25%**	**-8.38 %**	**-21.76%**

Table 2-5b (in physical units) **High Economic Case**

Year	Motor Gasoline $/gal	Distillate ¢/gal	Jet Fuels ¢/gal	Residual $/bbl	Propane ¢/gal	Petroleum Products $/bbl	Electricity ¢/kWh
2000	1.59	160.87	94.22	24.90	137.55	57.42	10.76
2006	1.44	150.22	77.20	23.95	131.63	53.08	7.97
2011	1.46	165.55	84.69	24.76	134.65	54.91	8.82
2016	1.45	162.91	88.35	25.79	132.60	54.73	9.23
2021	1.48	159.39	89.64	26.85	133.30	55.18	8.77
Total Growth	**-6.66%**	**-0.92%**	**-4.87%**	**7.82%**	**-3.10%**	**-3.90%**	**-18.54%**

Table 2-5c (in physical units) **Low Economic case**

Year	Motor Gasoline $/gal	Distillate ¢/gal	Jet Fuels ¢/gal	Residual $/bbl	Propane ¢/gal	Petroleum Products $/bbl	Electricity ¢/kWh
2000	1.59	160.87	94.22	24.90	137.55	57.42	10.76
2006	1.41	144.86	74.46	23.26	128.14	51.78	7.66
2011	1.39	154.40	78.87	23.45	126.93	52.14	8.26
2016	1.37	149.32	79.84	23.78	124.08	51.24	8.59
2021	1.36	145.74	81.93	24.17	123.15	50.75	8.06
Total Growth	**-14.33%**	**-9.41%**	**-13.05%**	**-2.92%**	**-10.47%**	**-11.62%**	**-25.14%**

New York State
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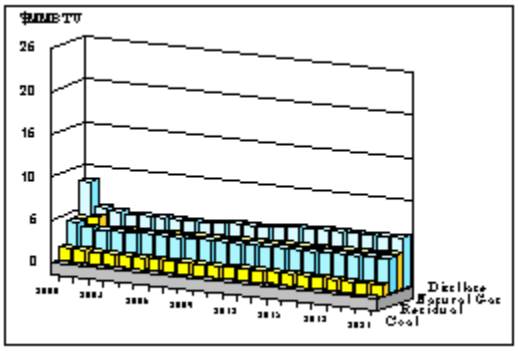

Table 2-6a (in physical units)($/2000)

Year	Coal $/ton	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Petroleum Products $/bbl
2000	39.11	4.39	118.20	27.19	23.91
2001	37.03	4.73	78.64	24.82	21.29
2002	36.13	3.58	75.02	23.15	19.90
2003	36.18	3.62	71.30	24.03	20.46
2004	36.40	3.66	71.90	24.18	20.59
2005	36.37	3.70	72.21	24.25	20.66
2006	36.33	3.74	72.15	24.28	20.68
2007	36.14	3.77	71.66	24.37	20.73
2008	35.93	3.81	71.77	24.47	20.81
2009	35.74	3.85	74.12	24.58	20.97
2010	35.63	3.89	75.55	24.69	21.09
2011	35.73	3.93	75.80	24.77	21.16
2012	35.48	3.97	76.27	24.90	21.27
2013	35.21	4.01	78.73	25.07	21.48
2014	35.08	4.05	81.84	25.21	21.68
2015	34.82	4.09	82.16	25.37	21.81
2016	34.67	4.13	82.43	25.50	21.92
2017	34.38	4.16	82.70	25.63	22.03
2018	34.07	4.20	82.98	25.82	22.18
2019	33.86	4.24	83.27	26.00	22.32
2020	33.66	4.28	83.55	26.14	22.44
2021	33.46	4.32	83.82	26.29	22.57
Total Growth	**-14.44%**	**-1.70%**	**-29.09%**	**-3.30%**	**-5.60%**

Table 2-6b (in physical units) **High Economic Case**

Year	Coal $/ton	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Petroleum Products $/bbl
2000	39.11	4.39	118.20	27.19	23.91
2006	36.65	3.93	73.04	24.65	20.89
2011	36.26	4.40	76.71	25.51	21.70
2016	35.39	4.50	84.95	26.62	22.39
2021	34.81	4.70	83.65	27.69	24.15
Total Growth	**-10.56%**	**6.92%**	**-29.28%**	**1.80%**	**1.02%**

Table 2-6c (in physical units) **Low Economic Case**

Year	Coal $/ton	Natural Gas $/dt	Distillate ¢/gal	Residual $/bbl	Petroleum Products $/bbl
2000	39.11	4.40	118.20	27.19	23.91
2006	36.13	3.60	70.73	23.89	20.45
2011	35.43	3.73	72.99	23.94	20.58
2016	34.27	3.84	75.40	24.31	21.06
2021	32.90	3.98	77.03	24.67	22.30
Total Growth	**-15.56%**	**-9.55%**	**-34.85%**	**-9.33%**	**-6.72%**