





Maryland Strategic Electricity Plan

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MARYLAND STRATEGIC ELECTRICITY PLAN

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1.0 Executive Summary

Over the last year, Maryland experienced dramatic hikes in electricity bills, warnings of summer time electricity shortages as early as 2011, and growing concern about the potential impact of climate change.

Under the direction of Governor O'Malley, the Maryland Energy Administration (MEA) has prepared this ***Strategic Electricity Plan*** to identify Maryland's options to take control of its energy future. In short, this Plan proposes options to help Maryland's consumers keep their bills down, their lights on, and achieve their climate and environmental goals.

There is no "silver bullet" that will enable Maryland to solve these problems overnight. This Plan should be viewed as "silver buckshot" - a series of measures that cumulatively will promote affordable, reliable and clean energy for Maryland.

The Plan involves four central elements. First, Maryland needs a Strategic Energy Investment Fund to finance energy efficiency, promote renewable energy and stimulate Maryland's emerging clean energy industry. The upcoming sale of carbon allowances to electricity generators under the Regional Greenhouse Gas Initiative (RGGI) offers an ideal mechanism to finance these investments without relying on the General Fund or a ratepayer surcharge.

Second, electric utilities need to do their part. Under the Plan, utilities would be required to reduce electricity consumption and peak demand by implementing energy efficiency programs, such as consumer rebates for ENERGY STAR appliances, incentives for home energy audits, and interruptible load devices on air conditioners. These programs, combined with savings from the Strategic Energy Investment Fund, will enable Maryland to achieve the ambitious EmPOWER Maryland goals and reduce its electricity bills.

To keep the lights on, Maryland needs to invest in new generation. Maryland should encourage new sources of renewable electricity by more than doubling the amount of clean, renewable electricity sold by Maryland's retail electricity suppliers by 2022. Maryland should also improve the residential solar and geothermal grant programs, encourage long term contracts for new generation, and evaluate the need to require utilities to construct or purchase new generating capacity to meet summer time peak demand.

Finally, Maryland needs to do a better job of planning for the future. MEA should be given adequate resources to produce biennial comprehensive state energy plans, promote regional transmission planning, and stimulate Maryland's emerging clean energy industry.

The following recommendations provide additional detail about how Maryland can keep consumer's electricity bills down and lights on, and achieve the State's environmental goals.

1.1 Recommendations

Establish a Strategic Energy Investment Fund

1. **Use RGGI Revenues to Create a "Strategic Energy Investment Fund" –** Maryland should create a Strategic Energy Investment Fund (Energy Fund) using the revenue generated through the sale of carbon allowances under the Regional Greenhouse Gas Initiative (RGGI). MEA is the only state agency authorized to run the energy efficiency and renewable energy programs envisioned under RGGI. MEA should provide support to MDE, DNR, PSC and other state agencies through the Energy Fund for climate change research and other programs directly related to reducing or mitigating the effects of climate change.

2. **Require that MEA Use the Energy Fund to Promote Energy Efficiency, Support Renewable Energy, and Stimulate Maryland's Emerging Clean Energy Industry -** MEA should be required to:

    a. Implement cost-effective energy efficiency programs to reduce statewide electricity consumption and peak demand, focusing on traditionally underserved market segments, such as low income communities, below market consumer and small business financing, public buildings, statewide coordination and education, and other investments with a longer payback period.

    b. Invest in renewable energy technologies. Despite tremendous advances in recent years, most forms of renewable electricity are not yet cost competitive. Therefore, a portion of the Energy Fund should be dedicated to expanding Maryland's currently limited subsidies for renewable energy.

    c. Develop, in conjunction with DLLR and DBED, a suite of financial tools to attract and cultivate clean energy businesses in Maryland. Maryland should identify this sector as an economic development priority and advance a coordinated package of incentives to increase the viability of the renewable energy and energy efficiency markets.

Reduce Maryland's Electricity Consumption

1. **Codify the EmPOWER Maryland Goals** – Legislatively codify the EmPOWER Maryland goal of reducing overall electricity consumption and peak demand by15% by 2015 based on 2007.

2. **Create Utility-Implemented Electricity Savings Targets –** Maryland should enact legislation requiring utilities to implement performance-based programs to reduce electricity consumption and peak demand. Examples of such programs include rebates for the purchase of ENERGY

STAR appliances; incentives for home energy improvements; and/or window air conditioner and refrigerator exchange programs. The utility programs would apply broadly to residential, commercial and industrial customers. MEA and the PSC should review utility plans to ensure adequacy to achieve electricity savings targets and cost effectiveness. The PSC should retain authority to allow cost recovery for utility energy efficiency investments. Utilities should be required to establish a transparent, competitive process to hire program implementation contractors.

3. **Adopt Measures Encouraging Energy Efficient Residential and Commercial Buildings –** To encourage energy efficient residential and commercial buildings, Maryland should:

    a. **Require Disclosure of Prior Year's Energy Consumption at Time of Sale** - Most buyers have little information available about a building's energy efficiency. To correct this market failure, legislation should require disclosure of a household's previous year's energy consumption at the time of listing. Maryland should also require similar disclosure of commercial energy information.

    b. **Devote Additional Resources to Better Building Code Enforcement -** Building code enforcement is the province of county governments, who should be encouraged to provide adequate resources for better energy code enforcement. To the extent possible, the General Assembly should help by devoting additional resources to counties and the Department of Housing and Community Development for this purpose.

    c. **Incentivize Energy Efficient Buildings** – Incentives should be created using the Energy Fund to encourage construction of energy efficient buildings. Residential builders could be offered rebates for construction of homes that meet the ENERGY STAR Home Certification or that install ENERGY STAR appliances. Similarly, high performing commercial and industrial buildings can be encouraged by subsidizing high-efficiency equipment and offering low-interest financing to small businesses.

    d. **Promote Green State Buildings –** The Maryland Green Buildings Council is expected to submit a report to the Governor in early 2008 on the need for state action on green buildings. MEA expects the report to identify the potential savings to Maryland from green state building design and construction as well as the options available to finance the greening of state government in Maryland.

4. **Evaluate Smart Meters and Smart Grid Technology -** Legislation should require the PSC to evaluate whether "smart meters" and "smart grid" technology, including time-of-use and critical peak pricing are cost effective in reducing consumption and peak demand, and issue a report to the General Assembly by December 1, 2008.

5. **Develop Best Practice Electricity Savings Programs –** To accelerate implementation of programs to promote energy efficiency, MEA and the PSC should establish a portfolio of cost-effective electricity savings programs available for quick implementation. The objective is to develop a list of at least ten pre-approved energy efficiency and demand reduction programs, such as those that promote home energy audits; energy efficient lighting; ENERGY STAR

appliances; heating and cooling system efficiency, and commercial/industrial building energy upgrades.

6. **Decouple Utility Profits from Sales Volume** – The PSC should implement decoupling for all Maryland's utilities by the end of 2008 as practicable. Decoupling will allow energy efficiency programs to compete fairly with other utility operations. Utilities would be paid a rate of return for serving demand, regardless of kilowatt hour volume sold.

Increase Maryland's Electricity Supplies

1. **Strengthen Maryland's Renewable Portfolio Standard (RPS) -** Maryland's RPS is generally considered ineffective due to its broad geographic scope, relatively modest targets, and low penalty provisions. To enhance the effectiveness of Maryland's RPS, MEA recommends (1) limiting the geographic eligibility to generation resources located within the PJM grid; (2) increasing the Tier 1 requirement in 2022 to 20 percent, while keeping the solar requirement at its current level, and (3) increasing the Alternative Compliance Payment to $40 per megawatt hour.

2. **Enhance the Solar and Geothermal Grant Program** – To offset the up-front costs of installing residential solar and geothermal systems, MEA recommends increasing the existing grant percentage and caps (1) for photovoltaic solar to $2,500 per kilowatt installed with a cap of $10,000, (2) for solar water heating to 30% of system cost with a cap of $3,000, and (3) for geothermal systems to up to $1,000 per ton, with a cap at $3,000 for residential, and $10,000 for non-residential systems. These recommendations would enable Maryland to significantly expand the number of homeowners installing solar and geothermal systems in Maryland each year. To further incentivize these systems, MEA recommends exempting both solar and geothermal systems from the state sales tax and local property taxes.

3. **Encourage Long-Term Contracts for New Generation –** To improve consumer price stability and relieve price pressures, the PSC should be encouraged to require that utilities enter into long-term contracts for new generation for a certain percentage of their load. To ensure that such a requirement is consistent with Maryland's climate and environmental goals, a preference should be given to renewable energy.

4. **Evaluate Creating a Maryland Power Authority and Other Options To Satisfy Peak Load –** The PSC issued a draft report on Maryland's options for electricity re-regulation to the General Assembly on December 4, 2007. While not included in the draft, MEA anticipates that the final report, among other things, will evaluate the merits of creating a Maryland Power Authority and whether the PSC needs to exercise its authority to require utilities to construct or purchase generating capacity to satisfy peak load.

5. **Increase the State of Maryland's Green Power Purchases** - The State of Maryland should meet the existing green power purchasing goal and gradually increase its purchase to mirror the Renewable Portfolio Standard requirements.

Enhance Maryland's State Energy Planning

1. **Require Preparation of Biennial State Energy Plans–** Maryland has not updated its state energy plan since 1993. MEA should be provided adequate resources to develop biennial comprehensive energy plans that will allow Maryland to better anticipate and prepare for upcoming energy challenges.

2. **Promote Regional Transmission and Electricity Planning** – To jumpstart a long-overdue regional dialogue, Governor O'Malley should meet with regional leaders to discuss our common energy challenges and the many opportunities for greater regional coordination on transmission and energy planning. If there is a common will to work together, the Governors could direct staff to meet regularly to consider a range of issues including planning, siting, and/or regulatory practices. Staff could be directed to develop action oriented policies to address common regional concerns.

3. **Establish a Maryland Energy Information Service –** Accurate, up-to-date information is the key to informed policy making. To enable effective energy planning, Maryland needs a central repository that can (1) gather data on energy use, consumption and production, (2) analyze the electricity, natural gas and petroleum markets, and (3) publicly disseminate the information to interested parties throughout the state, region and nation. MEA should be provided adequate resources to perform this function.

4. **Require Integrated Resource Planning –** The PSC should be encouraged to resume Integrated Resource Planning to explore solutions for meeting electrical demand using a least cost and/or risk approach.

Stimulate Maryland's Emerging Clean Energy Industry

1. **Create "Green Workforce Development Task Force" -** To promote Maryland's transition from a carbon based economy to a more sustainable, renewable economy, Governor O'Malley should create an inter-agency "Green Workforce Development Task Force" charged with developing policies to drive green energy job creation in the state. The Task Force should be asked to produce a plan of action for the Governor within 6 months.

2. **Establish a Maryland Clean Energy Center**- The General Assembly should enact legislation creating the Maryland Clean Energy Center (MCEC) as a state chartered organization. The mission of the MCEC would be to advance clean and renewable energy industry in Maryland. Specifically, the MCEC would serve as a clean energy industry incubator, collect and analyze industry data, and provide outreach and technical support to further Maryland's clean energy industry. As a state chartered organization, the MCEC would be eligible to receive private donations and would not rely on General Funds.

Acknowledgment

The Maryland Energy Administration would like to thank the many Maryland businesses, utilities, energy companies, environmental groups, associations, technical consultants, state agencies, and political leaders for their input at the Governor's Energy Summit, stakeholder outreach meetings, and technical workshops. Stakeholders have provided a broad view of the energy issues in Maryland and have helped MEA refine a series of strategies that are presented in this document. Thank you to all that participated in the development of this document and we look forward to your further participation as we move through the legislative and implementation phases of the Strategic Electricity Plan.

2.0 Maryland's Electricity Challenges

Maryland, like many other states, is facing significant electricity challenges that have real world impacts on its economy, environmental quality, and overall standard of living.

Over the past few years, Maryland experienced dramatic hikes in electricity rates, coupled with a warning that electricity shortages could cause rolling blackouts as early as 2011, absent appropriate action. At the same time, global warming and other environmental challenges are driving a transition from fossil fuels to more sustainable, clean energy.

Governor O'Malley and the Maryland Energy Administration (MEA) recognized the need to bring policy makers and stakeholders together to develop innovative solutions to lower energy bills while providing clean and reliable electricity to all Marylanders. The resulting strategic electricity plan is designed to answer three basic questions:

1. **How do we keep bills down?**
2. **How do we keep the lights on?**
3. **How do we meet our climate and environmental goals?**

This strategic plan provides a brief analysis of Maryland's electricity picture, as well as its challenges and opportunities to provide affordable, reliable, and clean energy. The plan builds on the discussions at the July 2007 Governor's Energy Summit, two full day stakeholder outreach meetings in September (in which Governor O'Malley participated), and numerous individual meetings with hundreds of Maryland stakeholders.

The document is organized into five sections. The first section discusses the opportunities presented by the upcoming sale of carbon allowances to electricity generators under the Regional Greenhouse Gas Initiative. The resulting "Strategic Energy Investment Fund" offers an ideal mechanism to invest in energy efficiency, renewable energy and Maryland's emerging clean energy industry without relying on General Funds or a surcharge on ratepayers.

The second section focuses on additional options to reduce electricity consumption. The objective is to achieve Governor O'Malley's "EmPOWER Maryland" goal of reducing Maryland's electricity consumption 15% by 2015, one of the nation's most ambitious energy efficiency targets. Among the key options include: requiring utilities to achieve specified electricity savings goals, encouraging energy efficient residential and commercial buildings, and evaluating the potential of "smart meters" to dramatically reduce peak demand.

Energy efficiency alone cannot solve Maryland's electricity challenges. The need to build new transmission and/or generation is the third section of the report. Among the options evaluated are: strengthening Maryland's Renewable Portfolio Standard, enhancing the solar and geothermal grant program, entering into long term power purchase agreements, and increasing the State of Maryland's green power purchases.

The fourth section focuses on building the State's capacity for energy planning, including the development of a comprehensive energy plan, integrated resource planning, and a Maryland Energy Information Center. Finally, the report addresses opportunities to stimulate Maryland's emerging clean energy industry, such as workforce development and the creation of a Maryland Clean Energy Center.

Together, these recommendations will allow Maryland to take control of its energy future and ensure its citizens access to affordable, reliable, and clean energy.

2.1 How do we keep bills down?

Energy Prices

Maryland experienced dramatic increases in the cost of electricity in 2007, affecting residential, commercial, and industrial consumers. In fact, most customers' electricity rates have roughly doubled in the last three years. Statewide, according to the U.S Energy Information Agency (EIA), the average retail price of electricity for residential customers increased from $0.1143 per kWh in July 2006 to $0.1338 in July 2007. This price only reflects the actual cost of energy and does not reflect the additional cost for transmission and distribution. This price change, however, represents a more than 17 % increase, which is the largest increase within the South Atlantic region. Maryland continues to have the second most expensive residential electricity prices in the region.

South Atlantic Region Electricity Prices
Cents per kilowatt-hour

State	July '06	July '07	Approximate % Change
Delaware	13.45	13.64	1.4
Maryland	11.43	13.38	17.1
District of Columbia	11.30	12.72	12.6
Florida	11.32	11.18	-1.3
South Atlantic Region Average	10.11	10.41	3.0
Georgia	9.75	9.85	1.0
North Carolina	9.12	9.56	4.8
South Carolina	9.07	9.34	3.0
Virginia	8.96	9.26	3.3
West Virginia	6.30	6.81	8.1

Source: U.S. Energy Information Agency

The prices of other energy sources are also rising around the country. In Maryland these prices are significantly higher than in other states. In June 2007, the average price of natural gas for residential consumers in Maryland was 21% higher than the national mean price.

2.2 How do we keep the lights on?

Supply and Demand

Maryland faces the threat of rolling blackouts as early as

Electricity Generation in Maryland

Electricity Generation Type in Maryland	Thousand MWh Generated in July '07	Approximate Percentage of Maryland Generation
Petroleum-Fired	49	1.0
Natural Gas-Fired	270	5.9
Coal-Fired	2779	61.5
Nuclear	1267	28.0
Hydroelectric	34	0.7
Other Renewables	59	1.3

Source: U.S. Energy Information Agency

2011 based on growing demand, limited supply and a highly congested transmission capacity. Electricity consumption increased 15.7% from 1999 to 2005 in the State, while generation increased by only 1.9%. However, installed capacity increased between 6 and 7 percent in the same time frame. For 2006, the EIA reports that electricity sales in Maryland totaled 63 million MWh, while net generation was only 49 million MWh. Due to this imbalance, nearly 30% of electricity was imported from out of state.

It should also be noted that the state lacks diversity in its electricity generation. Of the electricity generated in July 2007, 89.5% was derived from two sources: coal-fired and nuclear powered generation facilities.

Reliability

Maryland is part of the Pennsylvania-New Jersey-Maryland (PJM) Interconnection, or power grid, which currently encompasses 13 states and the District of Columbia. PJM has an installed capacity of 163,000 MW, serving more than 50 million people. PJM serves as the area's regional transmission organization, and is responsible for ensuring the reliability of the electric power supply system for all electricity consumers. PJM operates the wholesale electricity market, and manages a long-term regional electric transmission planning process to maintain the reliability of the power supply system.

Maryland's dependency on electricity imports has led to a strained transmission system. The Delmarva Peninsula and the Baltimore/Washington metropolitan areas have been identified by the U.S. Department of Energy (DOE) as among those areas where higher prices and lower reliability can be traced to transmission congestion. DOE explains that this congestion is leading to "transmission bottlenecks" that hold up the flow of electricity from the generation source to points of use and threatens reliability. PJM has stated that without transmission upgrades, Maryland may experience rolling blackouts as early as 2011.

The transmission and energy reliability situation might continue to deteriorate as Maryland's consumption increases while electricity-generating capacity continues to stagnate. Moreover, Maryland's generating fleet is relatively old. On average, Maryland power plants are 30 years old. In the past 15 years, 9 new power plants have come on line in Maryland, one coal fired power plant (AES Warrior Run 180 MW); two gas fired facilities (Panda Brandywine 289MW and Rock Springs 680 MW); three cogeneration facilities (Millennium Chemical 11 MW, Sweetheart Cup 12 MW, University of Maryland 60 MW); and three landfill gas facilities (Browns Station, Newland Park, and Eastern Landfill). Neither wind power, nor nuclear or hydroelectric facilities have been built in nearly 30 years in Maryland.

2.3 How do we meet our climate and environmental goals?

Climate Change

Maryland is particularly vulnerable to climate change, with more coastline than California. According to a recent study, Maryland is the third most exposed state to sea level rise, behind Florida and Louisiana. Experts predict that Maryland may experience an additional two to three foot sea level rise along its coast by 2099, some of which has already been detected by historic gauge records that show that sea level in the state's waters has risen one foot during the last century.

Climate change may also expose Maryland to increased storm intensity, extreme droughts and heat waves, and increased wind and rainfall events.

Maryland's energy industry has been responsible for about 38 million metric tons of CO2 while transportation activity totaled about 32 million metric tons. The state energy planning cannot ignore the potential impact of climate change on its citizens, businesses, and industry.

To begin to address climate change, Maryland has joined the Regional Greenhouse Gas Initiative (RGGI), a first-of-its-kind initiative of 10 northeastern and Mid-Atlantic States to reduce greenhouse gas emissions from power plants. RGGI creates a market-based, regional cap-and-trade system that requires states to auction off at least a portion of the state's carbon allocation. The proceeds of the auction are used to:

- promote energy efficiency
- directly mitigate electricity ratepayer impacts
- promote renewable or non-carbon-emitting energy technologies
- stimulate or reward investment in the development of innovative carbon emissions abatement technologies with significant carbon reduction potential, and/or
- fund administration of the program

The first RGGI auction of carbon credits is currently scheduled for the summer of 2008.

On April 20, 2007, Governor O'Malley signed Executive Order 01.01.2007.07, establishing the Maryland Commission on Climate Change. The Commission is charged with developing a "Plan of Action" to address the causes of climate change, to prepare for its likely impacts in Maryland, and to establish goals and timetables for implementation. The Plan is to be submitted to the Governor and General Assembly by April 20, 2008.

Air Quality Challenges

While Maryland's air quality has greatly improved over the course of the last decade, approximately 90% of Maryland's population still lives in areas of the state that are not currently meeting federal air quality standards. The two pollutants that Maryland continues to battle are ozone and fine particulate matter. These pollutants can cause significant health impacts including respiratory and cardiovascular damage.

Maryland is working very hard to meet the federal air quality standards and progress to date has been significant. Maryland has some of the toughest air pollution laws in the country and Maryland continues to be viewed as a leader in progressive air pollution control. The Maryland *Healthy Air Act* which targets coal burning power plants, and the *Maryland Clean Cars Act* which will require cleaner cars be sold in Maryland starting in 2011 are two of the most aggressive air pollution laws in the county. When fully implemented the *Clean Cars Act* will also significantly reduce CO2 emissions from the mobile sector by as much as 30%.

3.0 Use RGGI Revenues to Create a Maryland Strategic Energy Investment Fund

Maryland has a unique opportunity to chart a path towards more affordable, reliable and clean energy by wisely investing a soon-to-be launched Maryland Strategic Energy Investment Fund (Energy Fund). The Energy Fund, created from the upcoming sale of carbon allowances to electricity generators under the Regional Greenhouse Gas Initiative (RGGI), offers a mechanism for the State to invest in energy efficiency, renewable energy and Maryland's emerging clean energy industry without relying on General Funds or a surcharge on ratepayers.

3.1 What is the Maryland Strategic Energy Investment Fund?

The Maryland Strategic Energy Investment Fund is a key part of the Regional Greenhouse Gas Initiative (RGGI), which Maryland joined in April 2006, to address the growing threat of climate change. Under the inter-state agreement between 10 northeastern and Mid-Atlantic states, electricity generators are required to obtain carbon allowances equal to the amount of their annual emissions. At least 25% of each state's allowances must be sold at auction. The proceeds from the auction are to be placed into the Energy Fund.

Under RGGI, the Energy Fund is dedicated exclusively to three functions: (1) promoting energy efficiency measures; (2) promoting renewable or non-carbon emitting energy technologies; and/or (3) directly mitigating the impact on ratepayers attributable to the carbon trading program.[1]

Maryland's Department of the Environment (MDE) is charged with conducting a public rulemaking to establish a CO2 Budget Trading Program. The regulations cover how Maryland will distribute 37.5 million CO2 allowances allocated to the state under the RGGI program and what requirements affected sources need to follow. MDE will promulgate a second rulemaking describing the RGGI auction parameters and directing the proceeds of the auction into the designated fund. These regulations will be completed in early 2008.

3.2 What Should be the Mission of Maryland's Strategic Energy Investment Fund?

There is broad agreement among Maryland state agencies (including MEA, MDE, DNR and the PSC) that the State should use the Energy Fund for five general purposes:

(1) Promote energy efficiency and conservation measures,
(2) Support renewable energy technologies,
(3) Stimulate Maryland's emerging clean energy industry,
(4) Sponsor climate change research and other state programs directly related to reducing or mitigating the effect of climate change, and

[1] See RGGI Model Rule, http://www.rggi.org/docs/model_rule_corrected_1_5_07.pdf.

(5) Fund the administration of the program.

Each of these functions is discussed below.

3.2.1 How Would The Energy Fund Promote Energy Efficiency and Conservation?

The least expensive kilowatt is the one not needed. Energy efficiency technologies, such as compact florescent lights, ENERGY STAR appliances, and programmable thermostats, are readily available at local hardware stores. These technologies are an initial investment, but will save the consumer money in the long term. The challenge is to incentivize consumers and businesses to make the up front investment in energy efficiency to reduce electricity consumption and lower bills.

Energy efficiency programs are often estimated to have a life-cycle cost of 3 cents per kWh, versus roughly 11 cents per kWh for new generation. BGE recently filed a proposal with the PSC suggesting that its energy efficiency programs would, over their lifetimes, cost 2 cents per kWh.

States such as Connecticut, California and Washington each have saved over 7% of their energy expenditure through their highly successful and well-funded energy efficiency programs.

Due to the success of state energy efficiency programs, over 67,000 GWh of electricity were saved nationwide in 2003. This equated to about 1.9% of national energy sales. According to the U.S. Energy Information Administration (EIA), in 2003, national average residential electricity prices were 8.27 cents per kWh. Based on this figure, these programs saved consumers over $5.54 billion.

Utility Spending (Per Capita) on Electric Energy Efficiency

National Average	$4.65
Highest State	$28.26 - Vermont
Maryland	$.01 (Ranks 47th)

Source: American Council for an Energy-Efficient Economy (ACEEE), August 2006.

Examples of programs typically supported by energy efficiency funds include:

- Rebates for the purchase and replacement of ENERGY STAR appliances;
- Subsidies for residential and/or commercial energy audits if the customer agrees to implement certain recommendations from the audit;
- Low-interest financing for energy efficiency improvements in homes and businesses;
- Training for HVAC installers and incentives for residential and commercial consumers to have their HVAC systems inspected and properly sealed; and

- Education and outreach through training and marketing to all energy consumers about the effectiveness of energy efficiency in reducing energy costs and reducing environmental pollutants.

To avoid duplication with utility-implemented energy efficiency program, the Energy Fund should be used to target traditionally underserved market segments, and activities, such as low-income communities, below-market financing, public buildings, statewide coordination and educational efforts, and other investments with a longer payback period. Such programs should include, but not be limited to:

a. **Market Transformation Programs -** Implementing energy efficiency market transformation programs across the residential, commercial and industrial sectors. Market transformation programs generally work with businesses who act as agents to implement efficiency programs rather than working directly with consumers;
b. **Low-Income Programs -** Serving the low-income population through targeted programs, such as weatherization and window air conditioner exchange programs and below-market loan programs;
c. **Reduced Interest Loans** – partnering with financial institutions to provide below-market interest rates to finance energy efficiency investments;
d. **Public Buildings -** Financing energy efficiency and conservation in public buildings;
e. **Statewide Coordination and Education Programs -** Coordinating statewide educational and incentive campaigns;
f. **Green Building Strategies** – Implementing green building initiatives to encourage better energy performance; and
g. **Strengthened Building Code Enforcement** – Providing adequate training to code officials and resources to counties to enable them to comply with the most recent Maryland Building Performance Standards.

3.2.2 How Would The Energy Fund Promote Renewable Electricity?

Renewable energy technologies, such as solar, wind and geothermal, are clean sources of new electricity generation. Promoting renewable electricity helps augment Maryland's limited electricity supply. In addition, renewable electricity typically is distributed throughout the electric grid, which helps reduce dependence on central generating stations, improves grid reliability, avoids the need for transmission, and enhances homeland security.

Examples of programs that could be funded through a Strategic Energy Investment Fund include:

- Rebates, grants or tax credits for the purchase of renewable energy equipment;
- Low-interest financing for renewable energy improvements in homes, schools, non-profits, or businesses;
- Education and outreach through marketing and training to all energy consumers about the effectiveness of renewable energy in reducing energy costs and reducing environmental pollutants.

3.2.3 How Would The Energy Fund Promote Maryland's Clean Energy Industry?

States have a variety of financial tools to support the emerging clean energy industry, which includes businesses in both the renewable energy and the energy efficiency sectors. These tools include research, development and deployment of renewable energy; industry recruitment incentives, and production incentives. They are intended to advance the promotion of renewable energy sources and energy efficient technologies with the added benefit of easing energy demand on existing infrastructure and reducing greenhouse gas emissions.

Research, Development and Deployment of Renewable Energy

States offer grants to support research, development and deployment of renewable energy technologies. Grants are available to all sectors of the economy. Some grant programs focus on research and development, while others are designed to help a project achieve commercialization.

Industry Recruitment Incentives

Industry recruitment entails offering financial incentives to attract renewable energy equipment manufacturers or suppliers to a specific location, and developing the related workforce.

Production Incentives

Production incentives provide energy suppliers with cash payments for electricity produced from renewable fuels. The Renewable Energy Production Incentive, managed by the U.S. Department of Energy, is an example of a federal production incentive.

3.2.4 What is the Relative Effectiveness of Financial Incentive Programs?

Every state operates some type of financial incentive program in support of renewable energy and energy efficiency. The majority of these are in the form of rebates, grants and loans. A diverse mix of incentive programs has the furthest reach, allowing for participation from private citizens, small businesses, corporations and institutions. These strategies can include programs as small as rebates on energy efficient light bulbs to the building of large wind or photovoltaic installations.

State administrators need to balance the positives and negatives of each type of incentive. The U.S. Department of Energy states that rebates spur investment in renewable energy and energy efficient technologies, but that rebate programs are expensive and time-consuming to administer. While grant programs can support new technologies entering the market, there is also a risk that they will be used to support a technology that is ultimately not commercially viable. Loans cost less to administer (though there is a significant amount of documentation involved), and states ultimately recoup the amount of the loan. In the process, inefficient technologies are replaced by those that are more efficient, creating a public benefit. Most loans are focused on commercial and industrial entities, and some argue that utilities should be providing these programs rather than state governments.

A comparison of financial incentive programs is provided below. While New York clearly has the most robust and diverse group of incentives, Maryland is not far behind, with incentives in many categories, and offers the widest range of tax exemptions and credits for both residential and business consumers. Pennsylvania is the only state that has local grant and loan programs, but Maryland stands alone in offering a local rebate program. Many states offer state grant programs

that support renewable energy research, and institutional, corporate and residential efficiency, but Maryland does not currently have any grant programs in place. New York and New Jersey are the only two states that have production incentives and industry recruitment/support programs which are in place to strengthen the renewable energy industry.

Comparison of Financial Incentive Programs for Energy Efficiency and Renewable Energy

	Delaware	Pennsylvania	New Jersey	New York	Maryland
State Grant Program	• R&D and Demonstration Grants Delaware Energy An$wers: • Business • Home Appliances	• High Performance Green Schools Planning Grants • Pennsylvania Energy Development Authority • Pennsylvania Energy Harvest		NYSERDA: • Assisted Home Performance • Distributed Generation as Combined Heat and Power • EmPower New York • Renewables R&D	
State Loan Program		• Keystone Home Energy • Pennsylvania Energy Development Authority • Small Business Pollution Prevention Assistance	• Home Performance with Energy Star • Sustainable Development Loan Fund	NYSERDA: • Energy $mart Loan Fund • Home Performance with Energy Star	• Community Energy Loan • State Agency Loan
State Rebate Program	• Green Energy Program Incentives		• COOLAdvantage • ENERGY STAR Homes Program • New Jersey Clean Energy Rebate • New Jersey Smart Start • WARMAdvantage	NYSERDA: • Energy $mart Multifamily • Performance Energy $mart New Construction • Enhanced Commercial/ Industrial Performance • On-Site Small Wind • Peak Load Reduction • PV Incentive • Small Commercial Lighting	• Geothermal Heat Pump • Solar Energy
Utility Loan Program		• Adams Electric Cooperative - Energy Resource Conservation and Supplemental Loan	• South Jersey Gas- Residential Loan Program		• SMECO - Energy Star Home Program
Utility Rebate Program			• South Jersey Gas- Residential Energy Efficiency Rebate Program	• Freeport Electric - Commercial Energy Efficiency Partnership • KeySpan Energy Delivery - Solar Thermal LIPA: • Solar Pioneer Program • Energy Efficient Commercial Construction • Residential Energy Efficiency	

	Delaware	Pennsylvania	New Jersey	New York	Maryland
Property Tax Exemption				• Energy Conservation Improvements Property Exemption • Solar, Wind and Biomass Energy Systems Exemption	• Property Tax Exemption for Residential Solar Energy Systems • Special Property Assessment for Solar Heating and Cooling Local Option: • Corporate Property Tax Credit • Property Tax Exemption for High Performance Buildings
Sales Tax Exemption			• Solar and Wind Energy Exemption	• Solar Sales Tax Exemption	• Wood Heating Fuel Exemption
Personal Tax Credit				• Green Building Tax Credit Program (Personal) • Solar and Fuel Cell Tax Credit	• Clean Energy Production Tax Credit • Income Tax Credit for Green Buildings
Corporate Tax Credit				• Green Building Tax Credit Program (Corporate)	• Clean Energy Production Tax Credit • Income Tax Credit for Green Buildings
Production Incentive			• NJ Board of Public Utilities - Solar Renewable Energy Certificates	NYSERDA: • Anaerobic Digester Gas-to-Electricity Program	
Industry Recruitment/Support			• Renewable Energy Business Venture Assistance Program	NYSERDA: • Clean Energy Business Growth and Development • Energy Star Home Builders • Renewable, Clean Energy and Energy Efficient Product Manufacturing and Incentive	

Source: Database of State Incentives for Renewables and Efficiency (DSIRE)

One lesson from other states is that financial incentive programs are much more effective when implemented in concert with other programs, such as education, outreach, and effective public policy. These incentives are not quick fixes, but are part of an overall strategy to address energy issues. Funding should be consistent from year to year to build on progress, but state-funded programs do not always have the luxury of consistent financial support. One final challenge of incentive programs is that their results are difficult to measure, and available data are not sufficient to establish quantifiable results.

3.3 State Experiences with Energy Funds

3.3.1 Maryland

Maryland offered Demand-Side Management (DSM) programs during the 1990's with fees collected from each investor-owned utility serving Maryland customers. Expenditures for these programs totaled more than $850 million from 1991 through 1998. These programs were associated with a 3.5% reduction in electricity sales in Maryland for 1998. Around the time of de-regulation, however, the programs were eliminated.

Although Maryland currently does not have a dedicated Energy Fund, the General Assembly has appropriated money in recent years for a Solar Energy Grant Program administered by the MEA. The program, in effect since January 1, 2005, provides funding for a small portion of the costs to install certain qualifying solar energy systems. Maryland also has several revolving loan programs, most notably the State Agency Loan Program and the Community Energy Loan Program, which help state and local agencies and non-profits finance energy efficiency investments.

3.3.2 Vermont

In 2005, the Vermont General Assembly established the Vermont Clean Energy Development (VCED) Fund. VCED is primarily funded through fees received by the state under the terms of two memoranda of understanding between the Vermont Department of Public Service (DPS) as well as Entergy Nuclear VT and Entergy Nuclear Operations, Inc. According to the DPS, the purpose of the fund is to promote the development and deployment of cost-effective and environmentally sustainable electric power resources. VCED expects to receive annual payments of $6 - 7.2 million from Entergy, which owns the Vermont Yankee nuclear power plant. Grants are available for solar photovoltaics and hot water, as well as wind systems.

The state also created "Efficiency Vermont" in 2000. Efficiency Vermont provides technical assistance and financial incentives to Vermont households and businesses, to help them reduce their energy costs with energy-efficient equipment and lighting, and with energy-efficient approaches to construction and renovation. It is funded by an energy efficiency charge on an electric bill. Since 2000, Efficiency Vermont has helped Vermonters reduce annual energy costs in their businesses and homes by a total of more than $31 million. In 2006 alone, Efficiency Vermont helped 38,655 Vermonters (more than 10 percent of the state's electric ratepayers) complete efficiency investments. This resulted in $5.7 million in annual electric, fuel and water savings, as well as 56,000 MWh of annual electric savings.

3.3.3 New York

New York's system benefits charge (SBC), established in 1996 by the New York Public Service Commission, supports energy efficiency, education and outreach, research and development, and low-income energy assistance. Incentives also are available for, among other things, residential and commercial wind and solar systems. According to the Database of State Incentives for Renewables & Efficiency (DSIRE), the state's SBC programs are supported by six investor-owned electric utilities. These utilities collect funds from customers through a surcharge on customers' bills. Each year from 2006-2011, all of these utilities must collect and remit to the New York State Energy Research and Development Authority (NYSERDA) a sum equal to 1.42% of their 2004 revenues

(this percentage may be adjusted slightly each year based on updated utility revenue). According to a 2007 evaluation, the NYSERDA SBC-funded Energy Smart program reduced annual electricity use in New York by about 2,360 GWh (as of the end of 2006) with annual total bill savings for participating customers estimated at $340 million.

3.3.4 California

In 1996, California enacted restructuring legislation directed at the state's three major investor-owned utilities, Southern California Edison, Pacific Gas and Electric Company, and San Diego Gas & Electric. The legislation required that the California PUC collect a Public Goods Surcharge (PGS) on ratepayer electricity use. The PGS created public benefits funds from 1998 through 2001 for renewable energy ($540 million), energy efficiency ($872 million), and research, development & demonstration (RD&D) ($62.5 million). Legislation in 2000 extended the programs for ten years beginning in 2002, with annual funding of $135 million for renewable energy programs (projected to be $150 million annually for 2007-2011), $228 million for energy efficiency programs, and $62.5 million for RD&D. In 2004, energy efficiency measures in California saved approximately 1,900 GWh. Solar photovoltaic grants are available for residential and commercial systems for $2.50/watt for systems up to 1 MW.

3.4 Should the State or Another Party Administer the Energy Fund?

There are three basic approaches for administering and implementing Energy Funds:

- Administration by the state,
- Utility administration, and
- Non-profit, third party administration.

Each of these approaches has been implemented successfully and no one approach has emerged as more cost-effective than the others.[2]

The traditional approach is for Maryland's Energy Fund to be administered by a state entity. State agencies have a proven track record of implementing cost-effective programs across the energy efficiency, renewables and economic development sectors. State administration helps ensure that underserved populations, such as low- and middle income communities, benefit from programs specifically targeted to address their needs. It also facilitates state-wide educational efforts and programs that cross utility service territories. Finally, state administration provides greater legislative and executive control over programs financed by the Energy Fund. Under this approach, an advisory board should be created, consisting of all agencies having a vested interest in the dispensation of the Energy Fund, such as MDE, DNR and the PSC.

[2] According to a December 2006 survey by ACEEE, of the thirty states with utility sector energy efficiency programs, twenty states use a utility administrator, seven states use a state administrator and three states use a non-profit, third party administrator. In terms of financing, sixteen states employ a general state systems benefit charge, ten states include additional fees in utility base rates, and four states employ a separate tariff rider to recover program costs.

Many state energy funds have been "raided" by legislators for non-energy related purposes. It is critical, therefore, that an energy fund be shielded to the maximum extent possible from the inevitable pressures on general funds. The success of the RGGI program or other climate change programs depends on the auction proceeds that support energy efficiency programs. Since there are no control technologies for CO2 reduction all reductions in CO2 will come from energy efficiency gains and energy supply from non-carbon based energy generation. Heavy investment in these programs produces the needed reductions and the savings in energy costs predicted by various technical analyses of the viability and costs of the program.

Another approach is the electric utility model, which would utilize Maryland's electric utilities as the prime program implementers. Utilities have existing relationships with customers and, due to existing energy efficiency programs, arguably can "hit the ground" running. Concerns have been raised, however, about giving utilities a monopoly on the multi-million dollar energy efficiency business. And utilities traditionally have not been active in promoting renewable energy or clean energy economic development programs.

Finally, several states recently have experimented with a new model, using a non-profit, third party administrator. The program has been very successful in Vermont, where it was needed to coordinate several dozen separate utility companies and local cooperatives. Maryland faces different challenges. Since Maryland does not have an existing organization that would lend itself to such a role, the start-up times may be significant. Finally, some level of oversight or regulation (even for a designated non-profit entity) may still be necessary, which has associated costs.

3.5 Recommendations

1. **Use RGGI Revenues to Create a Strategic Energy Investment Fund.** Maryland should create a Strategic Energy Investment Fund (Energy Fund) using the revenue generated through the sale of carbon allowances under the Regional Greenhouse Gas Initiative (RGGI). MEA is the only state agency authorized to run the energy efficiency and renewable energy programs envisioned under RGGI. MEA should provide support to MDE, DNR, PSC and other state agencies through the Energy Fund for climate change research and other programs directly related to reducing or mitigating the effects of climate change.

2. **Require MEA Use the Energy Fund to Promote Energy Efficiency, Support Renewable Energy, and Stimulate Maryland's Emerging Clean Energy Industry -** MEA should be required to:

    (1) Implement cost-effective energy efficiency programs to reduce statewide electricity consumption and peak demand. MEA should be directed to focus on traditionally underserved market segments, and activities, such as low-income communities, below-market consumer and small business financing, public buildings, statewide coordination and educational efforts, and other investments with a longer payback period. Programs implemented by MEA should be managed in close coordination with the PSC to ensure no duplication of utility program efforts to meet the overall EmPOWER Maryland goals.

(2) Invest in renewable energy technologies. Despite tremendous advances in recent years, most forms of renewable electricity are not yet cost competitive. Therefore, a portion of the Energy Fund should be dedicated to expanding Maryland's currently limited subsidies for renewable energy.

(3) Develop, in conjunction with the Department of Labor, Licensing and Regulation and the Department of Business and Economic Development, a suite of financial tools to attract and cultivate clean energy businesses in Maryland. Maryland should identify this sector as an economic development priority and advance a coordinated package of incentives to increase the viability of the renewable energy and energy efficiency markets. These incentives should include grants for research, development and deployment of renewable energy, industry recruitment incentives, and production incentives.

4.0 Options to Decrease Demand

Governor O'Malley's EmPOWER Maryland goal of reducing Maryland's electricity consumption and peak demand by 15 percent by 2015 is one of the nation's most ambitious energy efficiency targets. The premise is simple - the least expensive kilowatt is the one not needed. Energy efficiency is widely considered to be the least expensive way to meet electricity demand, with the lifetime costs of energy efficiency estimated at 3 cents per kWh, compared to 11 cents per kWh for new generation.

Cost-effective energy efficiency technology is as close as our local hardware store. The U.S. Environmental Protection Agency (EPA) states that using readily available technologies such as programmable thermostats and ENERGY STAR appliances can save 10 – 30% of many consumers' energy bills. This can translate to hundreds of billions of dollars saved throughout the country just by installing up to date technology. And emerging new devices, such as "smart meters," promise even greater potential savings.

The challenge is getting these products and technologies into Maryland homes and businesses. One option is to simply require utilities to implement energy efficiency incentive programs that achieve specified electricity savings goals. Such an approach could supplement the targeted, publicly administered programs implemented under the "Strategic Energy Investment Fund." Other important steps worth evaluating include: codifying the EmPOWER Maryland energy efficiency goals, encouraging energy efficient residential and commercial buildings, evaluating the potential of "smart meters" to reduce peak demand, promoting "green" state buildings, and "decoupling" utility profits from kilowatts sold.

4.1 Codify the EmPOWER Maryland Energy Efficiency Goal

4.1.1 What is the EmPOWER Maryland Goal?

Governor O'Malley launched the EmPOWER Maryland program in July 2007 to address the urgent need to mitigate the almost doubling of electricity prices over the last two years in most areas of the state. The primary goal of EmPOWER Maryland is to provide affordable, reliable, and clean energy for consumers in Maryland.

The goal is a 15% reduction in per capita electricity consumption based on 2007 levels by 2015 and a 15% reduction in projected peak demand by 2015. This aggressive but achievable target doesn't just reduce the growth in electricity use; it actually sets a target to cut the overall consumption of electricity, while accounting for continued population growth and economic expansion.

> "The cheapest kilowatt of electricity is the one not needed."
>
> - Governor O'Malley, announcing the EmPOWER Maryland Initiative, July 2, 2007.

In addition to establishing one of the most ambitious goals in the nation, the EmPOWER Maryland initiative consists of a series of actions by State government as well as by the residential, commercial and industrial sectors to employ energy efficiency and peak demand reduction strategies to reduce the overall consumption of electricity in Maryland. The state will lead by example through significantly expanding the use of energy performance contracts to make state buildings more efficient, expanding energy loan programs, improving state building operations, constructing new energy efficient buildings, and purchasing energy efficient products. The state will also implement a series of residential energy efficiency programs aimed at improving the efficiency of existing homes as well as working with the affordable housing community to renovate homes to higher level of efficiency. The state will work with the Public Service Commission to implement residential and commercial energy efficiency and peak demand reduction programs through utilities and third party contractors.

Many of these commitments are based on the recognition that energy efficiency is a resource that can reduce energy bills and wholesale prices, defer costly power plant investments and cut carbon dioxide emissions.

4.1.2 What are the Anticipated Benefits and Costs of Achieving the EmPOWER Maryland Goal?

If successfully implemented, meeting the EmPOWER Maryland Goal of a 15 percent reduction in per capita electricity consumption and a 15 percent reduction in projected peak demand by 2015 will:

- Save consumers $1.9 billion by 2015 and $4.1 billion by 2020 in avoided electricity costs[3];
- Save consumers an additional $346 to $725 million in avoided peak demand costs[4];
- Avoid 25 billion kWh of electricity consumption, which is enough to power three-fourths of Maryland homes in 2015[5], and avoid construction of two large fossil fuel power plants; and
- Eliminate 35 billion pounds of CO_2[6], which is the equivalent to taking three million cars off the road[7].

[3] Calculated based on 2007 projected consumption; cumulative savings by 2015 and 2020; assuming a $0.1038 average rate of electricity between residential, commercial, and industrial sectors; a 5% real, societal discount rate; and an average 10 year lifespan of the energy efficiency measures.

[4] Estimate based on data from the 2009/2010 RPM auction. The actual price will vary depending on the extent of Maryland's future transmission congestion. The lower end estimate is calculated based on unconstrained price of $102 per MW-day in 2009/2010 RPM auction. The higher end estimate is calculated based on constrained RPM prices of $218 per MW-day in the SWMAAC region and $189 per MW-day in the MAAC+APS region in the 2009/2010 RPM auction.

[5] Calculated using EPA and US Census data, based on total savings of 25 billion kWh divided by assumed number of homes in 2015 of 2.3 million and each home consuming 14,000 kWh.

[6] Calculated using EPA assumptions that every Megawatt produces 1,395 lbs of CO_2 .

[7] Calculated using EPA assumption that an average car produces 11,450 lbs of CO_2 in an average year.

Implementation costs required to meet the EmPOWER Maryland electricity reduction goal are estimated to average $238 million each year over the eight year period between 2008 and 2015. The cost estimates are based on an average of 3 cents per kilowatt-hour (over the lifetime of the energy efficiency measures) as documented in the National Action Plan for Energy Efficiency. This average was developed from a review of dozens of utility and state energy programs implemented over the last ten years.

To more fully refine the benefits and costs of energy efficiency programs to meet the EmPOWER Maryland goal, the American Council for an Energy-Efficient Economy, in partnership with the Maryland Energy Administration and a number of foundations, is developing a study of Maryland's electricity use patterns and the potential opportunities for electricity savings. This analysis will be documented on a sector-by-sector (residential, commercial, industrial, etc.) basis. The study will also propose specific energy savings programs along with their costs and benefits. The study is expected to be available in Spring 2008.

4.1.3 What Goals Have Other States Established?

Eighteen other states have established energy efficiency targets or goals to drive down growth or absolute amount of energy used within a state. These states face many of the same issues in trying to control the increasing costs of energy while maintaining a healthy environment for its citizens. Political leaders throughout the country are establishing specific goals to help drive legislative, policy, and regulatory initiatives to achieve measurable energy savings. For example:

- Delaware's goal is to reduce its electricity consumption overall 10% by 2015.
- New York has set a goal to reduce electricity consumption 15% below projected 2015 sales by 2015.
- New Jersey has established an energy efficiency portfolio standard designed to achieve savings of 20% of electric and natural gas sales in 2020.
- Virginia has established an energy efficiency goal of 10% by 2022.

National studies of the potential electricity savings in eleven states show a median achievable potential of 24 percent reduction of electricity sales. On an annual basis, this 24% translates into approximately a 1.2 percent reduction of electricity sales. Recently, a number of states, including New York, have begun to establish more aggressive energy efficiency targets approaching 2% reduction in electricity sales per year to more quickly realize the strong cost advantage of energy efficiency efforts over construction of new power plants and/or transmission lines. The target in Maryland is in the aggressive range of approximately 2% reduction of electricity sales per year.

4.1.4 Pros and Cons of Setting Reduction Goals

Pros:

Legislatively codifying energy efficiency goals provides clarity of effort for ensuing policy, administrative actions and regulations.

Cons:

Not all involved will agree with the level of the goal or its interpretation.

If conditions change, adjusting the goal through a legislative process may take an extended period of time.

4.1.5 Recommendation

Codify the EmPOWER Maryland goal of a 15% reduction in per capita electricity use and 15% reduction in projected peak demand by 2015.

4.2 Require Utilities to Achieve Specified Energy Savings

4.2.1 What is an Energy Efficiency Performance Standard?

One straight-forward way to reduce electricity consumption is to require that utilities run energy efficiency and conservation programs designed to achieve measurable results for its customers. In short, utilities can be required to meet quantitative electricity savings targets. An Energy Efficiency Performance Standard (EEPS) sets energy efficiency targets for utilities in an aggregate sense, usually as a percentage of electricity sales over a multi-year period. Targets typically range from 1% to 2% of a utility's total annual sales, with savings reaching as high as 25% over a decade. An EEPS can also be expressed as a percentage of forecasted electricity growth or overall per capita electricity consumption. To achieve the energy savings required, the utility typically implements energy efficiency programs for its customers and recovers its investment through rate adjustment

4.2.2 What Was Maryland's Experience with Energy Efficiency Programs in the 1990s, and What Is the Current Status Today?

Utilities in Maryland have experience with the implementation and management of energy efficiency programs. In the early- and mid-1990s, Maryland's utilities collected and spent over $850 million through energy conservation programs. According to ACEEE, the documented savings achieved as a result of these programs was 3.5% of electricity sales in 1998. In addition, growth in demand was kept to less than 1% per year during the period of 1991-1998. However, when these energy conservation programs ended in 1998, Maryland's electricity usage increased quickly, growing at three times the 1992-1998 rate increases. From 1998-2004, residential electricity usage grew 15%.

According to ACEEE, Maryland utilities spent over $850 million on efficiency during the 1990s, keeping electricity demand growth at less than 1% per year. After efficiency programs ended in 1998, demand growth tripled to 2.4% per year.

Deregulation of Maryland utilities occurred in 1999 and electric rates, particularly for residential customers, were fixed for an extended period of time. In this environment of fixed residential electric rates virtually no investment in energy efficiency occurred.

Over the last 10 years, energy efficiency program managers across the country have learned from experience. According to the Alliance to Save Energy, today's programs are different than those of the 1990s in that they: 1) cost less to operate, relying less on customer rebates and more on education and efficiency marketing; 2) utilize established national programs such as ENERGY STAR which sets performance criteria and provides marketing support for high-efficiency products and appliances; and 3) use better design approaches that not only offer rebates at the retail level, but gain maximum leverage from each of the market players by engaging manufacturers, distributors, retailers, and contractors in marketing efforts.

More recently, the Maryland Public Service Commission (PSC) in Order No. 81637 (Case No. 9111) stated that a substantial portion of the EmPOWER Maryland goal will need to be obtained from energy efficiency, conservation, and demand reduction programs developed by utilities. The Order assigns a specific share of the electric usage savings to each Maryland electric utility.

In response to that Order on October 26, 2007, Baltimore Gas and Electric Co. (BGE), Delmarva Power and Light Co. (Delmarva), Potomac Edison Co., and Potomac Electric Power Co. (Pepco) filed their initial energy efficiency, conservation, and demand reduction plans. Delmarva program savings targets, if realized, will fully meet EmPOWER Maryland goals for their service territory. Pepco programs would allow the utility to reach 79% of the EmPOWER Maryland goal for their service territory. Potomac Edison/Allegheny and BGE have proposed programs that meet approximately 25% of their EmPOWER Maryland goals. The programs recommended by BGE provide life cycle energy savings at a cost level of 2 cents per avoided kWh, well below its cost for new generation of about 11 cents per kWh[8].

4.2.3 What Have Other States Experienced with Electricity Savings Targets?

As of September 2007, 18 states have implemented (or are in the process of implementing) electricity savings targets for their utilities.

An increasing number of states are requiring their utilities to meet electricity savings targets. As of September 2007, eighteen states are implementing such standards. Of these eighteen states, Texas is the only one that has had enough time to report reliable electricity savings data. In 1999, Texas pioneered this approach with a standard requiring 10% of forecasted growth in electricity demand be offset through end-use energy efficiency savings. Results thus far indicate that the standard is resulting in significant energy savings. Texas utilities have exceeded the savings targets in each of the past four years.

According to the Texas Public Utility Commission, Texas utilities spent $79 million in 2005, which over the next decade, is projected to save customers $290 million in avoided electricity bills. As a result, in 2007, the Texas legislature doubled the EEPS to 20% of load growth. Higher targets of 30% by 2010 and 50% by 2015 are now being studied as potential options for the future.

4.2.4 How Do Utilities Recover The Costs Of Their Energy Efficient Investments?

As businesses, electric utilities cannot make significant energy efficiency investments without the ability to recoup their costs and make a reasonable rate of return. To maximize utility investments in energy efficiency, the earnings potential for energy efficiency investments need to be at least similar to that of new generation and other rate-based assets.

There are many ways in which cost recovery and the utilities' rate of return can be structured. Traditionally, the PSC simply exercises its authority to determine a prudent rate of return. Decoupling utility electricity sales from revenues is a tool that many public service commissions use to create a level playing field for a utilities investment in energy efficiency. Decoupling is further described later is this chapter.

Some commissions are starting to put in place specific incentives for superior performance as well as penalties for sub-standard performance. Some states, most recently California, has adopted a "shared savings" approach where utilities and consumers share in the energy savings generated by

[8] According to PSC comments on the filings, the cost information provided by the other utilities does not suggest that their costs would be markedly different from BGE's estimate; however, not enough information was provided to deem an estimate for those utilities at this time.

energy efficiency efforts. Due to the complexities inherent in each approach, many states give their PSCs discretion to maximize utilities' energy efficiency investments and consumer benefits.

4.2.5 How Do Utility Commissions Speed the Implementation of Efficiency Programs to Meet Performance Goals?

Aggressive energy efficiency performance targets like the EmPOWER Maryland goal requires an equally aggressive implementation strategy in order to meet the goal. The Texas Public Utility Commission established a series of "templates" or "Best Practice" programs in the residential and commercial sectors. Programs on the list ranged from ENERGY STAR New Homes to commercial energy efficiency motor programs and could be adopted for implementation by Texas utilities without going through a lengthy Commission approval process.

4.2.6 What are the Pros and Cons of Electricity Savings Targets?

Electricity savings targets have a proven track record, with experience showing that such goals can often be exceeded in a cost-effective manner. From a political perspective, it also may be is easier to mandate an electricity savings target than to require spending on energy efficiency investments with uncertain benefits. Rather than require that utilities spend a certain amount of money, an electricity savings target guarantees that specific levels of savings will be achieved.

Even under decoupling, utilities will need to rate recover for their energy efficiency investments. By decreasing consumption, however, consumer's bills should be significantly reduced.

4.2.7 Recommendations

Create Utility-Implemented Electricity Savings Targets – Require that Maryland utilities implement performance-based programs that reduce per capita electricity consumption and peak demand. Examples of such programs include rebates for the purchase of ENERGY STAR appliances; incentives for home energy improvements; and/or window air conditioner and refrigerator exchange programs. This approach would include the following components:

1. **Energy Efficiency Goals** - Utilities would be required to establish programs to meet the majority of the overall EmPOWER Maryland goal of reducing per capita electricity consumption of 15% by 2015. Annual targets would be set for each utility.
2. **Peak Demand Reduction Goals** -Utilities would be required to establish programs to meet the majority of the peak demand reduction goal of a 15% reduction in peak demand by 2015. Annual targets would be set for each utility.
3. **Program Scope -** Such programs, subject to PSC and MEA oversight, would include energy efficiency and peak demand reduction programs for residential, commercial and industrial customers.
4. **Implementation** - Utilities would be required to establish a transparent, competitive process to hire program implementation contractors.

4.3 Encourage Energy Efficient Residential and Commercial Buildings

4.3.1 What are Energy-Efficient Buildings?

Residential and commercial buildings make up 40% of total U.S. energy consumption. Space heating (38%), water heating (13%), lighting (11%), and cooling (8%) make up the majority of end-uses for which energy is consumed in buildings[9]. Therefore, buildings provide a huge opportunity to reduce electricity consumption to meet the goal established in Governor O'Malley's EmPOWER Maryland Initiative.

Energy-efficient buildings are high performing and less expensive to operate. Compared to code, residential energy-efficient homes typically have much lower air infiltration, higher insulation levels, smaller and more efficient heating and cooling systems, and energy-efficient appliances, lighting, and windows. In the commercial sector, energy-efficient buildings often have more efficient lighting and HVAC systems and automated control systems that turn off lighting and appliances when they are not in use.

4.3.2 What are Maryland's Options to Promote Energy-Efficient Residential and Commercial Buildings?

During the stakeholder process, four policy options emerged to encourage the construction and retrofit of energy-efficient buildings. These options are:

1. Require disclosure of residential energy information at the time of listing a home for sale
2. Require disclosure of commercial energy information at the time of listing a building for sale or lease
3. Improve building codes and their enforcement
4. Expand incentives for high performance buildings

Each of these options is discussed below.

Is Greater Disclosure of Residential Energy Information Warranted?

Home buyers rarely consider energy efficiency, in part because information is not readily available. One option to encourage more energy efficient homes is to require the disclosure of energy information at the time a home is listed for sale (or lease). Making this information available would allow a prospective buyer to better predict the home's future operating costs. Supporters of this approach suggest that, all other things being equal, buyers will seek to purchase homes that are more efficient. Energy efficiency information could take the form of a formal energy rating or, more simply, annual consumption of electricity, natural gas, oil and propane from the previous year.

Home Energy Rating System (HERS) Ratings. An energy rating in the residential sector could be determined by a HERS rating. A HERS rater will perform various technical diagnostics of a home and then model the results to establish a rating for the home based on the current code. For example, a house built to the current code would achieve a rating of 100, while a more energy-

[9] *Buildings Energy Data Book*, U.S. DOE, September 2007.

efficient house would earn a score that is lower than 100. Alternatively, an existing home that was built to a previous code could earn a score higher than 100.

The HERS ratings system provides a detailed evaluation of each individual home and is therefore the most accurate way to compare the energy efficiency of various homes. However, the cost for a rating in Maryland currently ranges from $300 to $700. As such, requiring a HERS rating at the time of listing would impose an additional expense on home sales.

Annual Household Consumption. To avoid the costs of a HERS rating, one could simply require disclosure of the previous year's energy consumption on the Multiple Listing Service (MLS). For example, a Baltimore resident would contact BGE and request his annual electricity and natural gas consumption data at no charge, and then include the data on the MLS listing. If propane or oil is used for home heating, then the MLS listing would provide how many gallons of fuel is consumed in one year.

Household consumption provides only a rough measure of how energy efficient a house is. A household with young children who are often home will likely have greater electricity consumption than a home that is typically vacant during daytime business hours. Nevertheless, disclosure of annual household consumption has the advantages of being administratively easy and inexpensive and would, for the first time, provide a systematic way for information about energy efficiency to be incorporated into the marketplace.

LEED or ENERGY STAR Ratings. Another option is to require that the MLS provide an easy way to recognize homes that have been certified as "Green" or "Energy Efficient." An example of a green standard would be the United State Green Building Council's (USGBC) Leadership in Energy and Environmental Design for Homes (LEED-H). Likewise, the federal government has created the "ENERGY STAR Qualified New Homes" designation, which applies to homes that achieve at least an 85 HERS rating and meet other energy efficiency criteria.

State Experiences with Residential Energy Disclosure

Kansas recently updated its law to require a builder of a new home to disclose specific energy information about the home at time of closing. The specific information includes insulation values for the attic, walls, foundation, and windows; heating and cooling systems efficiency; and water heating efficiency.

Alaska, Colorado, Rhode Island, and Florida allow voluntary disclosure of a HERS rating on the MLS. Florida has created a database of all rated homes in the state so people can search for the rating of specific addresses.

Pros and Cons of Requiring Residential Energy Disclosure

The advantages of requiring energy information to be added to the MLS system at time of listing include:

- Solves market failure by providing – for the first time –information about energy efficiency to be easily incorporated into a home buyer's decision making;

- Provides incentives to sellers to make energy efficiency investments to boost a homes' marketability, and
- Strengthens market for, and increases value of, energy-efficient homes.

There are drawbacks to mandating that all homes obtain a HERS rating prior to listing. First, from a practical perspective, more HERS raters would have to be trained and certified, and consequently, any requirement would need to be phased in (e.g., could start with homes over a certain square footage and phase in other homes) to build the needed HERS infrastructure. In addition, HERS ratings can be expensive. This concern might be minimized if the State subsidized a portion of the rating and/or if the seller and buyer can split the cost at closing. As currently envisioned, however, this approach is likely to be controversial.

These drawbacks do not apply to a requirement to disclose the prior year's energy consumption at the time of listing. As noted above, however, household consumption is only a rough indicator for the energy efficiency of a home.

Recommendations

Forty percent of energy consumption occurs in buildings, but most buyers have little information about a building's energy efficiency. To begin to correct this market failure, the General Assembly should enact legislation requiring disclosure of a household's previous year's energy consumption at the time of listing. Homeowners and builders should also be able to indicate on the MLS a home's HERS rating and if the home earned an ENERGY STAR Homes or LEED Homes certification.

Is Greater Disclosure of Commercial Energy Information Warranted?

Energy information disclosure is equally important in the commercial sector because businesses' profit depends directly on their operating costs. The high and potentially volatile price of energy is a major factor in businesses' operating costs.

California's Experience with Commercial Energy Disclosure

California recently passed a law that would require electric and gas utilities to maintain records of the energy consumption data of all nonresidential buildings to which they provide service. Starting in January 2009, the information is required to be uploaded into the U.S. Environmental Protection Agency's ENERGY STAR Portfolio Manager, for at least the most recent 12 months. As of January 2010, a nonresidential building owner or operator will be required to disclose ENERGY STAR Portfolio Manager benchmarking data and ratings, for the most recent 12-month period, to a prospective buyer, lessee, or lender.

Pros and Cons of Requiring Commercial Energy Disclosure

Requiring disclosure of energy information for non-residential buildings would address a market failure by making it easy for energy efficiency to be incorporated into market decisions. Such a disclosure requirement would create an incentive for sellers to make energy efficiency investments and help buyers consider long-term operating costs. Information regarding the prior year's energy consumption is readily available to the seller so this requirement would not impose a significant administrative or financial burden.

Recommendations

Maryland should follow California's lead and adopt legislation requiring similar disclosure of commercial building energy information.

Can Maryland Enhance Energy Efficiency Through Better Building Codes or Code Enforcement?

Maryland's Building Performance Standards were recently updated to include the 2006 International Building Code and 2006 International Residential Code. However, buildings typically perform only as well as the minimum building codes are enforced. Ensuring adequate enforcement of the code is proving to be a challenge because:

- Counties can only add amendments that are more restrictive than the International Energy Conservation Code.
- Code officials often have overwhelming workloads and are not able to evaluate each building as thoroughly is desirable.
- Code officials do not have the time, and counties do not have the resources, to send the officials to obtain adequate field training on a regular basis.
- The State lacks a process to ensure that the counties are enforcing current building codes.

Proper enforcement of building codes helps ensure public health and safety, and reduces subsequent electricity bills. Advocates note that stronger enforcement saves the builders money by reducing the number of callbacks for inadequate construction. Of course, better code enforcement requires more staffing, training, and resources.

One method that other states and municipalities have adopted, including some in Maryland, is to allow HERS ratings to take the place of an energy inspection by a code official. HERS raters are specifically trained to understand building science and to know current code in their jurisdictions. By allowing a HERS rating to substitute for an energy code inspection, it relieves some stress on county resources and ensures that the energy code is being enforced to the fullest extent. By working with a HERS rater, builders and contractors will be effectively trained on best practice construction techniques, and if they choose, can start incorporating ENERGY STAR Homes characteristics into their construction practices thereby making the homes they build and retrofit higher performing and more energy-efficient.

In the commercial sector, code enforcement tends to be even more difficult because buildings are extremely diverse in their characteristics. One way to ensure that commercial buildings are meeting code and are performing as they were intended is to have them commissioned. Building commissioning is the systematic process of ensuring that a building's complex array of systems is designed, installed, and tested to perform according to the design intent and the building owner's operational needs.

Recommendations:

Since building code enforcement is the province of county government in Maryland, counties should ensure adequate resources for better energy code enforcement. Additional resources should be

made available to counties and the Department of Housing and Community Development for this purpose.

MEA should work with the counties and DHCD to determine best practices for building code enforcement and encourage the adoption of HERS ratings as a substitute for an energy inspection by code officials.

MEA should work with counties and DHCD to assess the possibility of requiring commercial building commissioning so that the completed building fully complies with the current code.

MEA should also work with the Residential Energy Services Network (RESNET) to strengthen the HERS rater infrastructure in Maryland.

Can Maryland Establish Cost-Effective Incentives for Energy Efficient Buildings?

A number of States and utilities have found it cost-effective to provide incentives for high performing, energy-efficient buildings. By providing incentives for energy efficiency, these programs are able to overcome market barriers, such as high first-costs for energy-efficient products. According to (ACEEE) some of the most effective incentive programs are:

Small Business Services Program – National Grid is offering to pay up to 80 percent of energy efficiency improvements in small businesses whose demand is less than 200 kW. In addition, National Grid offers low-interest financing for the difference of the cost. In 2002, 14,000 MWh were saved with a total budget of almost $5 million. National Grid recoups its costs for this program via a monthly charge on participants' electric bills.

New Jersey Cool Advantage HVAC Program – Since 1999, the Cool Advantage program has been offering incentives for the sale or purchase and installation of high-efficiency equipment. In addition, the program includes aggressive consumer marketing, direct training of HVAC distributors and contractors, and promotion of HVAC technician certification. In 2002, the savings were equivalent to 14,000 MWh (or $1.3 million in avoided costs for consumers in that single year) and 12.5 MW of demand, while the program budget was $17 million.

Texas ENERGY STAR Homes Programs – Texas has achieved outstanding success with its ENERGY STAR Homes programs by offering relatively modest incentives (average of $250) to homebuilders and providing massive cooperative marketing funds. Through these incentives, Texas built 10,000 ENERGY STAR Homes in 2002 alone, saving 38,000 MWh on a budget of $5.5 million.

Massachusetts TumbleWash/ENERGY STAR Appliance program – Since 1998, utilities in Massachusetts have provided rebates for more than 52,500 ENERGY STAR clothes washers, which yield an estimated annual savings of 9 million kWh and 370 million gallons of water, and customer savings of $1 million (based on $.12 per kWh).

Recommendations

Develop cost-effective incentives for energy efficiency improvements to build and/or retrofit buildings for higher performance using the Strategic Energy Fund. To ensure cost-effectiveness and transparency, MEA should be required to track the details of program implementation and cost, as well as energy savings, and make this information publicly available.

4.3.3 Should Maryland Mandate that All New Homes Contain ENERGY STAR Appliances and/or Achieve the ENERGY STAR Home Certification?

Home owners who roll the cost of energy-efficient products into their mortgages at the time of purchase usually save money from the very first day. Simply put, their energy savings typically more than offset the additional amount in their monthly mortgage payment due to the added costs of the energy efficiency measures.

Some suggest, therefore, that Maryland should simply mandate that all new homes contain ENERGY STAR appliances. ENERGY STAR appliances typically consume 10-50 percent less energy and water than a standard appliance. Homeowners who use ENERGY STAR appliances save more than $80 annually in reduced energy costs.[10] This does not count water savings from ENERGY STAR clothes washers and dishwashers. On the other hand, builders argue that market demand for ENERGY STAR appliances is limited and that such a mandate would be inconsistent with consumer preferences

An alternative approach would be to require that all new homes and businesses be built to ENERGY STAR standards. By definition, ENERGY STAR Homes consume at least 15 percent less energy than a home built to current code. Commercial buildings become eligible for an ENERGY STAR certification by showing that they are among the top 25 percent of facilities in the country for energy performance. Commercial buildings that have earned the ENERGY STAR use on average 35 percent less energy than typical similar buildings and generate one-third less carbon dioxide.[11]

Maryland could mandate that new homes must either have ENERGY STAR appliances installed in the home or achieve the ENERGY STAR Homes certification. For the reasons discussed above, such an approach should save homeowners with mortgages money on the very first day since their energy costs would be less than the additional amount in the mortgage payment. It would also provide builders with great flexibility. In some homes, they may choose to incorporate ENERGY STAR appliances. In other homes, they may go the extra step to meet the ENERGY STAR Homes qualifications. This flexibility also allows builders to accommodate consumer preferences.

A third option is to mandate ENERGY STAR heating and cooling equipment be installed in new homes. Heating and cooling consumes 46 percent of the energy buildings use. ENERGY STAR heating and cooling equipment can save up to 20 percent of these expenses.

However, the recent weakness in the housing market makes this a particularly difficult time to consider imposing new costs on builders. As such, each of these recommendations would be controversial.

[10] Marylanders will likely save even more because the $80 savings figure is based on a national average of energy prices. Maryland's energy prices are higher than the national average.
[11] *ENERGY STAR* website, November 2007.

Recommendation

Incentives should be created to encourage builders of new construction to either meet the ENERGY STAR Home Certification or install ENERGY STAR appliances. Financial incentives have proven effective in other states. Such incentives could be administered either by the utilities or by MEA using the Strategic Energy Investment Fund.

4.4 Promote Green State Buildings

4.4.1 What is a Green Building?

"Green" or "sustainable" buildings consume resources such as energy, water, materials, and land more efficiently than buildings only built to code. Additionally, green buildings provide more natural light, better air quality and typically contribute to improved occupant health, comfort, and productivity. To accomplish this, green buildings have different construction and operation standards compared to buildings built to conventional code.

The United States Green Building Council (USGBC), a national non-profit membership organization, developed the Leadership in Energy and Environmental Design (LEED) System to provide a guideline and rating system for green buildings. There are four different levels of LEED certification: certified, silver, gold, and platinum. The levels are based on a set of required prerequisites in six major categories including: water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation process.

As of December 2006, USGBC listed 10 LEED certified buildings in Maryland and 58 projects that were registered or pending certification. Another function of USGBC is the accreditation of architects, engineers and green building consultants. Currently, there are over 700 LEED accredited professionals in Maryland.

4.4.2 What is Maryland Doing to Promote Green State Buildings?

In 2007, Governor O'Malley re-established the Maryland Green Building Council with purpose of developing recommendations for the renovation and construction of energy efficient and resource friendly Maryland public buildings. The Council held its first meeting on October 26, 2007 and is expected to release a report in early 2008.

In addition, the Legislature passed a bill establishing the Task Force on Green Building in 2006. The actual Task Force convened this fall and is working on preparing recommendations due in early 2008. This Task Force was charged with developing recommendations for green building strategies in the private sector.

4.4.3 What Options are Available to Promote Green State Buildings?

According to the U.S. Department of Energy's Office of Renewable Energy and Energy Efficiency, a range of policy options is available to states that can help them green their buildings and increase energy efficiency, including:

Energy Performance Contracting

Energy performance contracts (EPCs) may be used to pay for energy efficiency investments. EPCs are typically offered by Energy Service Companies (ESCOs). ESCOs can provide up-front capital for investments in energy efficiency and renewable energy. The ESCOs recover the cost of installing and maintaining the equipment from the resulting energy cost savings.

Maryland was one of the pioneers in the use of EPCs. To date, Maryland has performed EPCs at over 400 buildings, resulting in a cost savings of over $130 million. As part of Governor O'Malley's "EmPOWER Maryland" program, the Governor challenged the state to evaluate 3,000 state buildings over the next two years for their potential to benefit from an energy performance contract.

Revolving Loan Program With Low Interest Rates

States can design loan programs that offer below-market interest rates to fund energy efficiency projects. As initial loans are paid off, the fund is replenished for future projects.

Maryland currently has two primary loan programs: the State Agency Loan Program (SALP), and the Community Energy Loan Program (CELP). The State Agency Loan Program provides low interest loans to other state agency for energy efficiency and renewable energy projects on state buildings. The SALP loans are often combined with an energy performance contract to expand the scope and future impacts of the project. Since 1991, 60 projects have been completed resulting in annual energy cost savings of $2.4 million. The Community Energy Loan Program provides low cost loans to local governments and nonprofit agencies. Since 1989, MEA has made 56 loans to local governments and nonprofit agencies resulting in savings of almost $4 million annually as a result of their investment in energy-efficient equipment and building structures.

Energy Efficient Design Standards

Rigorous energy efficiency standards for state buildings ensure that new construction projects and/or major renovation projects incorporate energy saving measures on the front end, rather than having to be addressed after construction is already begun, or many years after high operating costs have become a hardship for the state's taxpayers.

Life-Cycle Cost Procedures

Life-cycle costing is an accounting tool that can be utilized when considering the feasibility of new construction projects. This analysis considers all costs, including building materials, construction procedures, projected utilities costs, etc., associated with a building over its projected life.

According to a 2003 report for the California Sustainable Building Task Force[12], an initial investment of up to $100,000 to incorporate green building features into a $5 million project would result in savings of at least $1 million over the life of the building, assumed conservatively to be 20 years.

State Government Bonds for Non-Profit Corporation

States can establish a nonprofit corporation to help government agencies implement cost-effective energy improvements in their buildings and facilities. This enables a state to use its bonding authority to reap the financial rewards of energy efficiency investments. The corporation can finance energy projects as "off balance sheet" projects, without adding to their state-required responsibilities or spending their limited capital funds.

[12] "The Costs and Benefits of Green Buildings," 2005, at http://www.usgbc.org/Docs/News/News477.pdf

4.4.4 State Experiences with Green Building Programs

Oregon

In Oregon, state schools and state and local governments spend more than $78 million per year on energy. Public agencies that take advantage of energy-saving opportunities can cut energy costs by 10 to 20 percent, saving roughly $16 million per year. The Conservation Division within Oregon's Department of Energy (ODOE) is responsible for implementing energy efficiency and conservation programs in the state.

Another effective tool for Oregon's Department of Energy is its energy loan program (ELP). Beginning in 1981, the ELP began making loans to individuals, businesses, schools, cities and counties, state and federal agencies, cooperatives, tribes, and non-profits to improve energy efficiency in buildings. Public entities enjoy a 4.90%-5.30% interest rate for 10-15 years, depending on availability of funds. Residential and commercial customers receive a slightly higher interest rate.

Arizona

Arizona requires the Department of Commerce to create and adopt energy conservation standards for new public construction, including schools and universities. The state is requiring that certain state agencies reduce energy use in their building systems by 10% in 2008 and by 15% in 2011 (using 2002 as the baseline year). The Arizona Energy Office provides technical assistance and insures that the mandate is implemented.

According to a 2007 report from the Arizona Department of Commerce[13], for FY 2003-2004, agencies implemented a reduction in energy use in the first year on the order of 2.5 to 3.0%. By FY 2007, the Arizona Department of Emergency and Military Affairs had achieved the 10% reduction and now stands at 22% below its FY 2001-02 level.

California

In December 2004, California, under an executive order by Governor Schwarzenegger, established green building as a priority for the state. The Green Building Executive Order (GBEO) requires state-owned facilities to be designed, constructed, operated, and renovated as at least "LEED Silver" certified buildings. The GBEO created a cabinet-level Green Action Team, led by the State and Consumer Services Agency to monitor progress. According to California, it has the most registered LEED projects in the country.

[13] "State Energy Annual Usgae Report," 2007, at http://www.commerce.state.az.us/doclib/energy/2007_state_agency_annual_energy_usage_progress_report.pdf

The California Integrated Waste Management Board (CIWMB) also provides funding in the form of competitive grants and contracts, to local government and state agencies, to promote a comprehensive building approach and assist in the advancement of green building design and construction practices and techniques.

4.4.5 What are the Benefits of Green Buildings?

By building green, governments can lead by example and help promote the use of green building techniques in the private sector.

Because green buildings increase comfort and improve lighting, productivity of employees is likely to increase, and absenteeism may be reduced. A recent report[14] indicates that LEED certified buildings increase worker productivity, which translates into significant savings. Table 1 outlines some of these benefits.

Increasing energy efficiency protects against higher energy prices and helps reduce overall energy demand and consumption.

Making construction and rehabilitation decisions based on the full life of buildings and equipment maximizes the use of taxpayer dollars over the long term.

Green buildings can help Maryland meet its climate and environmental goals.

Financial Benefits of Green Buildings Summary of Findings (per sq. ft)

Category of Benefit/Cost?	20-year Net Present Value
Energy Savings	$5.80
Emissions Savings	$1.20
Water Savings	$.050
Operations and Maintenance Savings	$8.50
Productivity and Health Benefits	$36.90 to $55.30
Subtotal	**$52.90 to $71.30**
Average Extra Cost of Building Green	(3.00 to -$5.00)
Total 20-year Net Benefit	**$50 to $65**

Source: Capital E Analysis

4.4.6 Drawbacks to Green Buildings

Green building demands more up-front capital.

Contracts for installing energy efficiency and green energy measures often take additional time to prepare compared to buildings that simply comply with state and local building codes.

With additional green building innovations on the horizon, it is challenging to continuously keep buildings up to date.

The typical payback period for green building and rehabilitation often exceeds ten years..

4.4.7 Recommendations

Since buildings are where consumers use an estimated 40% of their electricity, Maryland's Strategic Electricity Plan should not ignore opportunities to improve the energy efficiency of state buildings. The Maryland Green Buildings Council is expected to submit a report to the Governor in

[14] "Green Building Costs and Financial Benefits," 2003, at http://www.cap-e.com/ewebeditpro/items/O59F3481.pdf

early 2008 on the need for state action on green buildings. MEA expects the report to identify the potential savings for Maryland from green state building design and construction as well as the options available to finance the greening of state government in Maryland.

4.5 Evaluate Smart Meter and Smart Grid Technology

4.5.1 What are Smart Meters and Advanced Metering Infrastructure?

Advanced Metering Infrastructure (AMI), also known as Smart Meter technology, is the next generation of utility meter. Based on digital technology, the advanced meter is a two-way communication tool, allowing for exchange of data between utilities and their customers. As such, advanced meters support energy efficiency and peak demand response by making it easier for customers to participate in programs that reduce consumption.

On the customer side, advanced meters may be combined with critical peak pricing[15] to allow price signals to be received in real time or in short intervals by consumers. Consumers are alerted to critical peak prices through email alerts and/or home-based systems that provide them with the opportunity to curtail their electricity usage. Consumers shift their load usage when they know the current price of electricity per kilowatt-hour. Automatic meters also address load shifting remotely so that even if consumers are not aware of the price of electricity, electrical devices (such as central air conditioners) are cycled off during peak periods.

For example, air conditioning systems in homes or businesses could be connected to advanced meters. During times of high demand (when electricity prices are high) the advanced meters can automatically reduce the load on these systems by either cycling the air conditioning on or off or changing the temperature settings on the thermostat via a signal from the utility. This will save the home or business money. In short, advanced meters can control "time of use" in the interest of supporting energy conservation and demand response.

From the utility perspective, advanced meters reduce the time and cost needed for manual meter reading, outage detection, and restoration. When implemented widely, advanced meters offer the promise of reducing peak demand, which reduces stress on the grid and helps customers avoid high peak power charges.

4.5.2 How is AMI Applicable to the Smart Grid?

If the Smart Grid is the "whole," then AMI is one of the key "parts" that will enable it to function.

The Smart Grid refers to a sophisticated communications network among the entities that generate, deliver, and consume electricity. As such, the Smart Grid relies on real-time, accurate information in the interest of generating, transmitting, and using energy more efficiently and reliably. PJM defines the Smart Grid as "digital automation of the entire power supply system – from generator to consumer – to improve reliability and efficiency." While the Smart Grid is not yet in place, advanced metering infrastructure is already seen as a key component for enabling the Smart Grid, especially with regard to customer end use.

[15] Critical Peak Pricing refers to the ability of the utility to dynamically and remotely put in place a special peak price to reflect periods of particularly high electricity demand on the system.

The Smart Grid would reach from the generator to the plug to regulate customer-side equipment and appliances. It would rely on advanced meters to manage many appliances and adjust thermostats for residential customers by shutting appliances down or reducing load for minutes at a time, or longer. The Smart Grid might also act as a self-monitoring system that can regulate power flows in the interest of increasing energy reliability and promoting energy efficiency.

4.5.3 What Have Other States Experienced with AMI?

Several AMI initiatives around the country are resulting in sizeable AMI implementation. California is seeing the most activity. After a statewide pricing pilot (2003-2004), significant load reductions were accomplished through demand response pricing programs. Since the pilot, each investor owned utility in California has filed a business case docket with the state public service commission examining the cost-effectiveness of AMI. Several of them have been approved. Typically, the initial cost of AMI deployment is recovered through a monthly charge on customers' bills, with benefits estimated to occur over a 15-20 year period.

Examples associated with these initiatives follows:

- Baltimore Gas and Electric's AMI pilot phase was approved by the Maryland Public Service Commission in April 2007. Full deployment of advanced meters in BGE's service territory will be decided on by the PSC after BGE submits its report on the pilot in the fall of 2008.
- Southern California Edison has forecasted customer bill savings for its AMI program. The utility estimates that, in a "time of use" rate scenario and assuming a ten percent load shift response, 7 percent of residential customers will experience an annual bill decrease of at least eight percent. Additionally, 55 percent of all residential customers would potentially benefit from time of use rates by receiving lower bills.
- The California statewide pricing pilot indicated that, in the San Diego Gas and Electric service territory, advanced meters resulted in savings to the customer in the range of 40% during critical peak periods.
- In the California statewide pricing pilot, the annual decrease in energy bills was 4% for "low use" customers and 1.7% for "high use" customers (arithmetic mean based on percentage bill change under critical peak pricing as compared to previous, standard rates).
- Gulf Power (Florida) indicates that customers can save up to 15% annually as a result of advanced meters and critical peak pricing.
- In its 2005 application to the California Public Utilities Commission for an AMI initiative (which was approved), Pacific Gas & Electric estimated a cost of $2.22 billion, but a total return on investment of $2.49 billion (total benefit is the sum of operational benefits and demand response benefits, based on a 20-year present value revenue requirement); (Freeman, Sullivan & Co., August 2007).
- PPL Electric Utilities (Pennsylvania) began a rollout of 1.3 million advanced meters in 2002, which was complete by 2004. Based on a 15-year present value analysis, the utility has forecasted operational benefits alone to outweigh costs by $7 million. (Freeman, Sullivan & Co., August 2007).

- Southern California Edison filed a business case with the California Public Utilities Commission in July 2007 associated with its AMI program. By deploying 5.3 million smart meters to all customers with less than 200 kW of demand (at any given time), the utility indicates that the reduction in demand would be as much as 1,000 MW and would result in savings that are greater than the total capital cost of approximately $1.3 billion.
- Florida Power and Light's demand response programs (including AMI) provide benefits on the order of 3,300 MW, over 20% of peak load (eMeter Corporation).
- The government of the province of Ontario, Canada backs advanced metering and is committed to installing 800,000 meters by the end of 2007. In the advanced metering pilot conducted by Hydro One in 2004, customers reduced electricity usage by an average of 6.5 percent.

4.5.4 What are the Potential Benefits of AMI?

When coupled with price-based demand response programs, it reduces the need for power during peak hours. This results in savings to the customer and the utility and also decreases the utility's reliance on peaking facilities;

AMI enables the customer to remotely access and control a home's energy consumption via the web;

AMI allows for broadband over power lines (BPL), another means of communication in which data may be transmitted via electric lines in a fashion similar to DSL and cable broadband services and may allow some of the costs of AMI to be borne by selling broadband capacity.

AMI also improves grid infrastructure, through:

- Remote, automated meter reading and service connection/disconnection
- Outage detection and service restoration support
- Wireless connectivity similar to cell phone technology which allows wire-free transmission of data
- Load forecasting support and power quality monitoring (advanced meters may be used to provide data to the utility for predicting future load patterns or to monitor the quality of power)

4.5.5 What are the Potential Barriers and Disadvantages of AMI?

AMI is an extremely expensive investment. At a cost of around $250 per AMI meter, with over two million meters, the investment exceeds $500 million without adding in the costs for the communication network and the data system to collect and process all the information.

Uncertainty exists over whether vendor products will meet the long term needs of utilities and regulators (with regard to rate design, for example).

The AMI market is relatively immature; too many vendors exist with different platforms.

Lack of standards may hinder communication among different AMI systems, especially in a Smart Grid scenario.

To be fully operational in terms of AMI benefits to the residential customer, HVAC systems need to have control devices installed to allow their control via the AMI system.

4.5.6 Recommendations

Legislation should require the PSC to evaluate whether "smart meters" and "smart grid" technology, including time-of-use and critical peak pricing are cost effective in reducing consumption and peak demand, and issue a report to the General Assembly by December 1, 2008.

4.6 Decouple Utility Profits from Kilowatts Sold

Decoupling a utility's revenues from its volumetric sales is increasingly viewed as a necessary first step to removing the disincentive to make greater energy efficiency investments.

4.6.1 What is Decoupling?

Electric distribution utilities have historically collected revenues (i.e., recovered costs) based on the volume of electricity sales. The more electricity sold, the greater the revenues to the utility. Under this traditional model, a utility that implements an energy efficiency program will reduce its revenue because the program will reduce the amount of electricity sales. For a utility to effectively implement energy efficiency programs without reducing the amount of revenue it collects, the link between revenues and electricity sales must be disconnected, or *decoupled.*

In short, "decoupling" provides utilities the same amount of revenue per customer even if each customer uses less electricity. To be more technical, decoupling refers to a rate adjustment mechanism that separates a utility company's agreed-upon fixed costs (including allowed earnings) from the actual volume of unit sales that occur. There are a number of variations in how the computations can be done (e.g. normalizing for weather, adjusting for the number of customers, etc.) but the basic principle is that a "true-up" mechanism is applied once actual sales levels are known. If sales were lower than forecasted (for whatever reason, including energy efficiency) then an upward adjustment (usually less than 3 percent) in rates is applied to compensate the utility. Conversely, if sales were higher than forecasted, a slight rate decrease is implemented to compensate consumers. In other words, utilities are guaranteed the same amount of revenue per customer (on average) even if each customer uses less electricity.

4.6.2 What is Maryland's Experiences with Decoupling?

Maryland has had a decoupling mechanism in place for gas service with BGE since 1998 and more recently enacted the same mechanism for Washington Gas. The mechanism consists of three parts. Base revenues are set based on weather-normalized patterns of consumption. Monthly revenue adjustments are accrued based on actual revenues. Monthly adjustments to rates are made based on the accrued adjustments. The intent of this mechanism is to decouple weather and energy efficiency impacts from the revenue ultimately recovered by gas companies. Another main objective is to provide revenue stability to the companies.

Decoupling gas utilities did have a positive effective in stabilizing revenues in a weather dependent business. Significant energy efficiency improvements in the gas sector did not occur primarily due to the fact that no other incentives were in place.

The Maryland Public Service Commission (PSC) recently issued an order allowing Pepco and Delmarva to implement a decoupling mechanism (called a Bill Stabilization Adjustment or BSA) for their residential ratepayers taking Standard Offer Service electric service. As proposed by PEPCO and Delmarva, the BSA was intended to account for unanticipated changes in usage due to severe weather, customer response to supply price increases or energy-efficiency programs. With the BSA, the utilities' revenue risk is decreased and, therefore, they benefit from a reasonably steady revenue stream in line with the level of revenues approved in this proceeding. Although not intended solely

as a mechanism to decouple sales from revenue for purposes of energy efficiency programs, that is one of the potential benefits.

4.6.3 What are Other State's Experiences with Decoupling?

California was the first state to experiment with decoupling, beginning in 1982. At that time, the California Public Utilities Commission (CPUC) adopted an electric rate adjustment mechanism (ERAM) for the three major California utilities beginning with Pacific Gas & Electric. Southern California Edison and San Diego Gas & Electric followed in 1983 and 1984, respectively. The mechanism applied to all electricity and gas sales for residential and small commercial customers. Not surprisingly, California utilities led the nation in their commitment to energy conservation in the early 1980's.

In 1990, the CPUC supplemented decoupling with a system of performance-based financial incentives for utilities to promote even more cost-effective energy savings. The ERAM was eliminated in the mid 1990s because the CPUC thought it was inappropriate in conjunction with restructuring its electric utility industry. However, after the electricity crisis in 2001, the California legislature enacted legislation partially re-regulating the electric utilities and at the same time added language re-establishing the decoupling mechanism.

4.6.4 Pros & Cons of Decoupling in Maryland

Advantages of decoupling include:

- Revenue decoupling significantly reduces the link between sales and margin recovery of a utility, thereby increasing the interest of a utility in promoting energy efficiency.
- Through decoupling, the utility's revenues are stabilized and shielded from fluctuations in sales. Some have argued that this, in turn, might lower its cost of capital. The degree of stabilization is a function of adjustments made for weather, economic growth and other factors (some mechanisms do not adjust revenues for weather or economic growth-induced changes in sales).
- Decoupling does not require an energy efficiency program measurement and evaluation process to determine the level of under-recovery of fixed costs.
- Only those programs with actual savings trigger adjustments through the mechanism.
- Administrative costs are low, relative to specific lost revenue recovery mechanisms.

Disadvantages of decoupling include:

- By itself, decoupling does not incentivize utilities to encourage energy efficiency nor encourage consumer actions for energy efficiency.
- Rates can be more volatile between rate cases, although annual caps can be instituted.
- The need for frequent balancing or true-up can increase regulatory costs.

4.6.5 Recommendations

The PSC should implement decoupling for all Maryland utilities by the end of 2008, as practicable. Decoupling will allow energy efficiency programs to compete fairly with other utility operations. Utilities would be paid a rate of return for serving demand, regardless of kilowatt hour volume sold.

5.0 Options to Increase Generation of Clean Electricity

According to the PJM Interconnection, Maryland is facing the threat of periodic blackouts as early as 2011 because of growing demand, limited supply and a highly congested transmission capacity. Energy efficiency alone cannot solve Maryland's electricity challenges. There is little doubt that Maryland will need either new generating capacity or new transmission lines soon. We cannot afford a wait and see approach to keeping the lights on. Since it takes years to site and construct transmission lines, the time to act is now. Furthermore, any new generation needs to meet our climate and environmental goals.

Maryland was one of the first states to adopt a Renewable Portfolio Standard (RPS). As other states subsequently adopted more stringent RPS requirements on their utilities, Maryland's RPS is becoming insufficient to stimulate significant development of new renewable capacity. Maryland's RPS currently requires 9.5% of the power to be generated from renewable resources by 2022, compared to Delaware who recently updated their RPS to 20% by 2019. Maryland's RPS also allows the renewable electricity to be generated in an extremely broad geographic region and has relatively low penalties for non-compliance. To increase much needed generation while meeting our climate and environmental goals, this plan evaluates strengthening Maryland's RPS. Other options evaluated include entering into long term power purchase agreements, evaluating creation of a Maryland Power Authority and other options to satisfy peak load, and increasing the State of Maryland's Green Power Purchases.

5.1 Strengthen Maryland's Renewable Portfolio Standard

5.1.1 What is the Maryland Renewable Portfolio Standard?

A Renewable Portfolio Standard (RPS) requires electricity suppliers to provide a certain percentage of electricity from renewable resources, such as solar, wind and biomass. RPS policies have proven to be an effective market-based tool to jump-start generation of renewable electricity.

The Maryland RPS, which was enacted in 2005, took effect at the beginning of 2006, and was amended in 2007 to incorporate separate provisions for solar power. The Maryland RPS calls for 9.5% of Tier 1 renewables (such as solar, wind, biomass, landfill gas and small hydroelectric power) by 2022. Under the 2007 amendments, 2% of Tier 1 specifically is set aside for solar.[16] The Maryland RPS also requires 2.5% to come from Tier 2 renewables (such as municipal solid waste and poultry litter) until 2019, after which Tier 2 is eliminated.[17] Electric suppliers not in compliance with Tier 1 of the Maryland RPS pay a $20 per MWh non-compliance payment and $15 per MWh for Tier 2 shortfalls.

The Maryland RPS is the most geographically expansive state RPS in the country, after the District of Columbia RPS, which employs much the same geographic eligibility as Maryland. It allows

[16] Tier 1 renewables include: wind, solar, advanced biomass, small hydro under 30 MW in operation as of 2004, landfill methane, ocean, geothermal, and fuel cells powered by biomass.
[17] Tier 2 renewables include: municipal solid waste (MSW), large hydro, and poultry litter.

electricity suppliers to purchase renewable power from roughly 16 states, specifically those states located within the PJM regional transmission area, and states adjacent to PJM.

5.1.2 What are State Experiences with Renewable Portfolio Standards?

Although the Maryland RPS has only been in effect for 18 months, it is apparent that it will not stimulate much development of new renewable capacity. A primary reason is its broad geographic scope. First-year compliance reports for Maryland show that electric suppliers purchased renewable energy certificates (RECs) from as far away as Michigan, Ohio and New York. External estimates suggest Maryland REC prices currently average between $1 and $2 for Tier 1 and less than $1 for Tier 2. These low prices confirm that there are ample Tier 1 and Tier 2 renewable resources available within and outside of PJM to meet the Maryland RPS.[18] **Strengthening the RPS would stimulate new renewable energy projects. This would increase the price of a renewable energy credit (REC) which would establish a more meaningful incentive.**

Other states, however, have found RPS standards to be far more effective. For example, building on its previous voluntary renewable portfolio goal of 8% by 2013, Illinois recently enacted a new law that creates the Illinois Power Agency (IPA) and charges it with developing electricity procurement plans for state utilities serving over 100,000 customers and then competitively procuring energy according to those plans. The IPA's procurement activities must also meet an expanded and now-mandatory RPS of 25% by 2025, beginning in 2008 with a 2% requirement. A minimum of 75% of the renewable energy must be produced from wind. The new law also requires that utilities establish annual energy savings goals in order to meet a percentage of their energy delivery requirements through efficiency efforts. In a move reminiscent of California's creation of a state power purchaser in 2001, a new state agency, the Illinois Power Agency, will oversee power procurement by utilities, and may even build generators and sell their output to municipal utilities and cooperatives.

In another expansion of an existing RPS, Delaware has increased its requirement, previously at 10% by 2019, to 20%, 2 % of which must be obtained from solar photovoltaics. The expanded RPS applies to investor owned utilities, municipal utilities and rural electric cooperatives, though the municipals and rural coops were permitted to opt out of the RPS requirements upon establishment of a voluntary green power program and creation of a green energy fund.

In March 2007, New Mexico passed SB 418, which directs investor-owned utilities to generate 20% of total retail sales to New Mexico customers from renewable energy resources by 2020, with interim standards of 10% by 2011 and 15% by 2015. In August 2007, the PRC issued an order and rules requiring that investor owned utilities meet the 20% by 2020 target through a "fully diversified renewable energy portfolio" which is defined as a minimum of 20% solar power, 20% wind power, and 10% from either biomass or geothermal energy starting in 2011. Additionally 1.5% must come from distributed renewables by 2011, rising to 3% in 2015. Distributed resources counted toward the other portfolio requirements cannot also be counted for the distributed requirement. Utilities will be excused from the diversification targets should costs of achieving them raise the cost of

[18] Princeton Energy Resources International and Exeter Associates, Inc. *Inventory of Renewable Resources Eligible for the Maryland Renewable Energy Portfolio Standard*. Maryland Department of Natural Resources, Power Plant Research Program, June 2006. http://esm.versar.com/pprp/bibliography/PPES_06_01/PPES_06_01.pdf

electricity by more than 2 % or if the targets cannot be accomplished without impairing system reliability.
Overall, 21 states and the District of Columbia have enacted an RPS in some form, with 4 others having voluntary policies. This area covers 40% of the national electricity load. None of them have been repealed. Their requirements range from 2% to 30% of total retail sales. Most have helped to significantly increase the number of new renewable projects throughout the country.

5.1.3 What are Maryland's Options to Improve the Renewable Portfolio Standard?

The following options have been identified to strengthen the Maryland RPS to facilitate renewable project development in Maryland and nearby states.

Option 1: Reducing the Geographic Footprint of the RPS

The geographic eligibility for renewables in the Maryland RPS could be tightened by limiting eligibility to those resources within a certain area. Narrowing the geographic footprint of the RPS would create greater incentives to build renewable generation within the eligible area. The primary options are to limit the RPS to sources located within (1) the PJM regional transmission grid area, (2) "classic PJM" (PA, NJ, MD, DE and DC), or (3) most restrictive, exclusively Maryland.

Since Maryland is part of the larger PJM regional transmission grid, one option is to allow renewables to qualify for the state RPS if they are generated within PJM grid or the electricity is physically transmitted onto the grid. This is the case with RPS policies in Delaware and New Jersey and is roughly equivalent to that in Pennsylvania.[19] An advantage to Maryland of taking this approach is that the Maryland RPS would be more consistent with other state RPS policies in the Mid-Atlantic and allow for a more robust trading market. Since PJM itself is broad, covering all or parts of 13 states and the District of Columbia, another advantage is that is provides electricity suppliers with the flexibility to purchase relatively inexpensive renewable power. On the other hand, such flexibility means that this approach alone may not be sufficient to create a meaningful incentive for new renewable generation in the region.

A second, more restrictive alternative is to limit eligibility for the Maryland RPS to renewable energy projects located within "classic PJM," i.e., Delaware, Pennsylvania, District of Columbia, New Jersey and Maryland. Limiting geographic eligibility in this fashion would likely stimulate new renewable development in the region. However, of the 18,000 MW of renewable energy projects currently proposed for PJM, 15,000 MW are located outside the "classic PJM" states. Currently there are insufficient renewable resources within "classic PJM" to meet the combined state RPS policies of Maryland, the District of Columbia, Pennsylvania, New Jersey and Delaware, even before Delaware doubled the level of its RPS and Illinois enacted its 25 % RPS, both in 2007. The limited supply of renewable energy in "classic PJM" therefore would significantly drive up the cost of compliance. This would create a significant incentive for new generation, but would strain the region's renewable energy resources.

[19] Although most of Pennsylvania is within PJM, small parts of Pennsylvania are within the Midwest Independent System Operator (MISO) and the New York ISO. Pennsylvania limits eligible renewables to within an RTO, i.e., electric suppliers within MISO must use renewables from within MISO.

The final alternative is to require all renewable generation to be located in Maryland. As discussed above, Maryland may not have sufficient renewable resources to satisfy such a requirement. In any event, the cost would likely be prohibitive.

Option 2: Increasing the RPS percentage Requirements

Many states have recently increased their RPS requirement. Since 2003, 14 states have amended their RPS, generally to strengthen the RPS levels, with eight states changing its RPS policy more than once. Delaware, for instance, increased its RPS in 2007 from 10% by 2019 to 20%, of which 2% must be from solar. Increasing the Maryland RPS from 9.5% to 20% by 2022 would increase the demand for renewable energy from about 1,260 MW to nearly 3,200 MW.

The costs of strengthening Maryland's RPS are difficult to calculate because there are a multitude of variables. Assuming that 20 percent of the projects currently proposed to PJM get built (which is an estimate), demand would exceed supply as early as 2010 if Maryland were to increase it's requirement to 20 percent in 2022. However, in a dynamic market, new projects are expected to be stimulated by Maryland's increasing its RPS requirement. In addition, significant investment by the mid-Atlantic states is expected in renewable energy, particularly in light of RGGI. In a worst case scenario, inadequate supply of renewables would trigger the alternative compliance payment safety valve, which translates into a maximum (though unlikely) potential cost to customers of roughly $2 per month (if Maryland increases in alternative compliance payment to $40). However, we believe that RPS requirements by the states will drive increased development of renewable generation resources and result in significantly less consumer costs.

Option 3: Increasing the Alternative Compliance Payment (ACP) Amount

Another reason that Maryland's current RPS is not expected to incentivize significant new renewable generation is the relatively low Alternative Compliance Payment. Electricity suppliers who do not generate or purchase sufficient Renewable Energy Credits (RECs) to comply with the RPS requirements can choose to pay the ACP, set at $20 per MWh for Tier 1 non-compliance. Maryland's ACP is relatively low compared to other Mid-Atlantic RPS policies. See chart below.

RPS Alternative Compliance Payments in Nearby States

Maryland	$20
New Jersey	$50
Delaware	$50
District of Columbia	$25
Pennsylvania	$45

Like all laws, Maryland's RPS cannot be effective if the penalties for non-compliance are too low. Should the supply of renewable energy become tight relative to demand and REC prices escalate, suppliers could opt to meet the RPS requirements in states with higher ACP levels first (i.e., New Jersey and Pennsylvania) and simply pay the ACP in those states with smaller penalties (i.e., the

District of Columbia and Maryland). Increasing the ACP would be particularly important if the demand for RECs were to increase significantly.

Changing the Maryland ACP level, however, will not be sufficient by itself to encourage new renewables. Absent making the geographic eligibility requirements more stringent or increasing the Tier 1 requirement of the Maryland RPS, it is unlikely that REC prices in Maryland will rise above, or even approach, the Maryland ACP, simply because there is a greater supply of RECs that are eligible to meet the Maryland RPS than there is demand for Maryland-eligible RECs.

Option 4: Limiting the RPS Tier 1 to New Resources

Except for small hydro (Tier 1), the Maryland RPS does not limit eligibility to *new* resources, as defined by on-line dates. Other states do.[20] Limiting eligibility for the Maryland RPS to renewables installed after a certain date would lessen the supply of renewables to meet the Maryland RPS targets and perhaps stimulate the development of new renewables, though it would likely increase the cost of compliance. The effectiveness of limiting eligibility to renewable energy installed after a certain date may not be meaningful absent parallel changes to Maryland's geographic eligibility requirements.

Option 5: Changing the RPS Tier 2 Requirements

The Tier 2 category for the Maryland RPS includes resources that have not seen much new development in recent years—waste-to-energy (WTE), large hydro, and poultry litter. One option is to limit Tier 2 eligible resources to only new facilities. This would generate incentives for construction of these energy generation resources. Such a change would likely raise Tier 2 REC prices close to the Tier 2 ACP level of $15 per MWh.

Another option is to include move poultry litter from Tier II to Tier I. This approach would encourage the development of a poultry litter to energy plant on the Eastern Shore. Such a plant could significantly boost the region's efforts to clean the Chesapeake by preventing some nutrients from the poultry litter from running off into the Bay. Such a facility may drive up the cost of poultry litter that many farmers use for fertilizer.

Another option is to make Tier 2 permanent, which would help incentivize new Tier 2 facilities by creating additional demand for Tier 2 generation. It should be noted that not all stakeholders believe that poultry litter and waste to energy facilities should be included in the RPS.

Option 6: Accelerating the Solar RPS Requirement

Solar industry representatives advocate accelerating implementation of Maryland's new law requiring that two percent of electricity come from solar placed in service by 2022. They suggest that Maryland could achieve this two percent target by 2015.

This increased use of distributed generation would offset conventional generation thereby lessening the grid congestion and reducing Maryland's carbon footprint.

[20] Arizona limits eligibility to renewables that came on-line after January 1, 1997. Massachusetts will not allow renewables installed before 1998 to qualify for its RPS. Connecticut requires combined heat and power (CHP) facilities to be in place after January 1, 2006, to qualify for the Tier 3 of the Connecticut RPS.

The costs of accelerating implementation of the solar requirements are unclear. Initial estimates indicate that retail rate increases would be in the range of between 1 and 2 percent annually. These costs would be borne by the electricity suppliers and they would seek to recover these costs, to the extent possible, in their bids to serve residential load and in their industrial and commercial rates.

5.1.4 Recommendations

To enhance the effectiveness of Maryland's RPS, MEA recommends:

- Limit the geographic eligibility to generation resources located within PJM;
- Increase the Tier 1 requirement in 2022 to 20 %, while keeping the solar requirement at its current level, and
- Increase the Alternative Compliance Payment to $40 per megawatt hour.

5.2 Enhance the Solar and Geothermal Grant Programs

5.2.1 What are the Solar Energy and Geothermal Grant Programs?

Launched in FY 2005, the Solar Energy Grant Program provides funding for a portion of the costs to install certain qualifying solar energy systems. The Geothermal Grant Program provides small grants to individuals that install high efficiency geothermal, or ground-source, heat pumps. Specifically, the current Solar Energy and Geothermal Grant Program incentives are as follows:

- Solar water heating property: 20% of system costs up to a maximum grant amount of $2,000;
- Residential photovoltaic property: 20% of system costs up to a maximum grant amount of $3,000;
- Non residential photovoltaic property: 20% of system costs up to a maximum grant amount of $5,000; and
- Geothermal grants are for $1,000 for both residential and non-residential customers.

Due to the relatively low caps, both programs focus on the residential sector. There is currently no specific program for apartment buildings or commercial/industrial entities. Larger systems may be able to benefit, however, from the "solar renewable energy credits" created under Maryland's revised Renewable Portfolio Standard (RPS) when the PSC begins implementation of this solar-specific program in 2008. As discussed in chapter 3, additional commercial and industrial incentives can be provided if MEA receives authorization to use the Strategic Energy Investment Fund for this purpose.

The combined budget for the Solar Energy and Geothermal Grant Program for FY 2008 is $675,000. This includes solar grants, geothermal grants and a small amount of marketing.

5.2.2 What is Maryland's Experience with this Program Thus Far?

In the FY 2007 budget, MEA requested an increase in the amount of each individual solar grant provided through the Solar Energy Grant Program and an increase in the program's overall budget. Although the budget was increased, the grant amounts were not. Therefore despite a record number of grants offered and paid, the program did not fully allocate all of the budgeted dollars. In FY 2007 there were 151 solar grant offers worth $312,500. There were 80 geothermal grants for $80,000. Marketing was approximately $50,000, most of which came from a separate federal funding source.

MEA believes that the incentive for photovoltaic solar energy is too low to induce significant participation both in terms of percentage and in terms of the grant cap. For example, the typical Maryland resident installing photovoltaic solar on their roof installs a two kilowatt system. This system costs roughly $20,000 installed. With a $3,000 state grant and a $2,000 federal tax credit, the homeowner's out of pocket expenses are roughly $15,000. Such a system would offset monthly electric bills and provide enhanced reliability, but assuming current electricity rates, the financial break-even point on the investment is 43 years. Similarly, the incentives for non-residential solar and geothermal projects are not sufficient to stimulate significant demand.

Solar Renewable Energy Credits

Due to the most recent changes to the Maryland RPS, Solar Renewable Energy Credits (SRECs) are expected to be bought and sold in Maryland perhaps as early as 2008. It is still unclear what the value of the SRECs will be. It is also unclear how active the market will be in the early years of the RPS compliance since the generators may be able to meet their requirements relying on larger commercial or industrial generators, without actively pursuing the SRECs from the many small systems in Maryland.

Federal Incentives

The federal incentives for solar have helped to stimulate investments in solar for both the residential and the commercial sectors. The 30% income tax credit is limited to a cap of $2,000 for residential installations and has no cap for commercial installations. The federal incentive is due to expire at the end of calendar year 2008. Although there is a bill pending in the House of Representatives to continue the commercial tax credits, it does not contain language to continue the residential tax credits. There is also a $300 federal tax credit for geothermal systems.

5.2.3 What are the Most Effective States Doing?

Delaware

The investor-owned utility program was established as part of The Electric Utility Restructuring Act of 1999, and is supported under Delaware's public benefits program, the Green Energy Fund. Under the program, incentives are available for the installation of qualifying photovoltaic, solar water heating, wind turbine, fuel cell, and geothermal heat pump systems. The Fund may also be used to support energy efficiency education programs.[21]

For customers of Delmarva Power, the maximum individual grant amount is 50% of installation costs for photovoltaic, solar water heating, fuel cells, and wind turbine systems, with the following caps:

PV – Residential, $31,500; non-residential, $250,000

Solar Water Heating – Residential, $3,000; non-residential, $250,000

Solar Water Heating integrated into a radiant heating application – Residential, $5,000; non-residential, $250,000

Small Wind Turbines – Residential, $22,500; non-residential, $100,000

Fuel Cells – Residential, $22,500; non-residential, $250,000

[21] Under the investor-owned program, 40% of rebate funding is available for residential customers and 60% of funding is available for nonresidential customers, including energy efficiency education programs. The total of all grants shall not exceed 65% of the total annual revenue collected for the Green Energy Fund.

Grants are also available for geothermal heat pumps at a maximum of $600/ton, capped at $3,000 for residential systems and $25,000 for non-residential systems.

Colorado

Xcel Energy's Solar Rewards Program provides up to a $4.50-per-watt (DC) incentive for Xcel Energy customers who install grid-connected photovoltaic (PV) systems ranging from 0.5 kilowatts (kW) to 10 kW-DC in capacity. The incentive is structured as a $2.00-per-watt rebate and up to $2.50-per-watt Renewable Energy Credit (REC) payment. The REC payment may be adjusted, either up or down, based on the calculation of expected kWh of electric output as compared with an optimally oriented, fixed (i.e., non-tracking) system at the customer's location.

New Jersey

Through 1999 legislation and 2001 Board of Public Utilities funding approvals, New Jersey opened an aggressive solar rebate program. At the beginning of the program, NJ provided the highest rebates of any state in the nation: 70% of system cost, gradually reduced over time, for residential and commercial/industrial solar arrays. The most recent incentives were as high as $4.40 per watt for small systems with a step-down of incentive amounts for larger system capacities.

Despite a $273 million budget (2005-2008)), the NJ solar rebate program recently ran out of funds. Factors for this include: pent-up demand; increased solar industry capacity; and several large commercial scale installations. Potential revisions to the program include relying on the SREC market as the incentive for large projects and to re-open the rebate program for small systems (possibly up to 10 kilowatts). MEA will continue to monitor the more mature solar incentive markets such as NJ and California to ensure that we learn from their experiences and make appropriate adjustments to Maryland's incentives.

5.2.4 Recommendations

To increase affordability and demand for solar and geothermal energy systems, MEA recommends:

- Increasing the grant percentage and caps for photovoltaic solar to $2,500 per kilowatt installed with a cap of $10,000.
- Increasing the grant percentage and caps for solar water heating to 30% of system cost with a cap of $3,000.
- Increasing the geothermal grants to up to $1,000 per ton, and grant limits of up to $3,000 for residential, and up to $10,000 for non-residential systems.
- Exempting both solar and geothermal systems from the state sales tax.
- Giving MEA discretion to reduce the grant amounts through regulation to reflect market conditions and prevailing prices.

Increasing the grant amounts will enable a greater number of individuals to afford solar and geothermal energy systems. MEA anticipates that grants of this size, combined with effective marketing, will result in significantly more demand for solar and geothermal systems. While these grants will not pay for an entire system, it will help homeowners afford these renewable energy investments.

As discussed in Chapter 3, this program would not require General Funds if MEA receives authorization to use the Strategic Energy Investment Fund for this purpose.

5.3 Require Utilities to Enter Into Long Term Power Purchase Contracts

5.3.1 What is a Long-Term Power Purchase Agreement?

Most prospective power plant developers in Maryland, regardless of fuel type, are requesting that the State help them secure a long-term contract for the purchase of the electricity from the facility, often for 15 years or longer. Long term power purchase agreements (PPA's) generally have a pre-determined price for electricity for the length of the contract. Entities often enter into long-term PPA's as they provide a physical guarantee of electricity and forward price stability.

5.3.2 What are the Advantages and Disadvantages of Long-Term Power Purchase Agreements?

PPA's provide a measure of cost stability (i.e., fewer dramatic price swings) for consumers. Like diversity in a stock portfolio, PPA's have a moderating effect on future electricity prices.

PPA's are also a powerful financial policy tool to encourage the construction of new capacity. A power plant developer will be able to either obtain capital or reduce its cost of capital by showing Wall Street that it has a long-term purchaser of the plant's output. By helping to finance the construction of new electricity generation, PPA's can increase the supply of electricity, which in turn may help reduce prices.

PPA's will not likely reduce current electricity prices, however. Depending on price changes in the wholesale market, a fixed-price PPA may be less expensive or more expensive than the prevailing market price over the full term of the contract.

In Vermont, Vermont Yankee has a long-term power purchase agreement to sell electricity for 3.9-4.5 cents per kilowatt hour, which is below today's market price. While the mechanism by which the Vermont Public Service Board negotiated that price is not likely to be available to Maryland, it illustrates the potential of a PPA.

It is also important to note that wholesale electricity costs are only one portion of overall retail electricity bills. Today retail electricity bills are composed of the following cost components:

Utility Bill Cost Component	**% of total monthly bill**[22]
Wholesale purchase of electricity:	65
Transmission & Distribution:	25
Billing/Administration:	5
State/Federal Taxes	5

Under these conditions, if PPA's could reduce the cost of wholesale electricity relative to the current market price by 15% (perhaps an overly optimistic goal), a consumer's total utility bill might fall by 9%.

[22] Based upon the cost breakdown of a PEPCO residential bill for August, 2007.

5.3.3 Are There Any Lessons-Learned in Designing Effective PPA's for New Generation?

Negotiating an effective PPA is an inherently project-specific exercise. Key factors include the appropriate contract duration, collateral requirements on the project developer and price for delivery (generally per kW-year or MW-hour). In general, longer contract terms (ten years or greater), with moderate collateral requirements and high default penalties tend to bring the greatest percentage of proposed projects to completion.

5.3.4 Recommendations

Some sort of long-term revenue guaranty is likely to be necessary to finance new power plant construction in Maryland. A PPA will also help promote cost stability in residential retail prices if incorporated into the electricity supplier's Standard Offer Service (SOS). As such, MEA recommends that the PSC be encouraged to require that SOS electricity suppliers enter into long-term contracts for new or existing generation for a certain percentage of their load. To ensure that such a requirement is consistent with Maryland's climate and environmental goals, a preference should be given to renewable energy.

5.4 Evaluate Creation of a Maryland Power Authority and Other Options To Satisfy Peak Load

5.4.1 What is a State Power Authority?

A state power authority is a state-owned and operated organization vested with the authority to: (1) own or lease power generation and transmission facilities within the State, (2) sell power at wholesale and/or retail to certain types of customers, and (3) enter into long-term contracts for the purchase of power and transmission capacity.

Creation of a Maryland Power Authority (MPA) would require the enactment of establishing legislation to create a State government entity with authority to issue bonds, purchase/construct generation resources and transmission, operate generation resources, and identify the types of organizations to which the MPA would be permitted to sell power.

The PSC issued a draft report on Maryland's options for electricity re-regulation to the General Assembly on December 4, 2007. While not included in the draft, MEA anticipates that the final report, among other things, will evaluate the merits of creating a Maryland Power Authority. The report is also likely to address whether the PSC should exercise its existing authority to require utilities to construct or purchase generating capacity to satisfy peak load.

5.4.2 What are State Experiences with State Power Authorities?

Currently, New York[23] and Illinois have the only state-owned power authorities (Illinois only this year created theirs). Connecticut is actively considering forming a state-owned and operated power authority in response to the recent increases in electricity prices experienced in New England. The California Power Authority was "de-funded" in 2004 and while still in existence, does not function. The Federal Government also operates several power marketing agencies that sell power at wholesale and retail to particular classes of customers. Examples include the Bonneville Power Administration (BPA), the Western Area Power Administration (WAPA), the Southwest Power Administration (SWAPA), and the Southeast Power Administration (SEPA).[24]

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[23] The New York Power Authority (NYPA), organized in 1931, owns and operates 18 power generation facilities (hydro and fossil fuel) and approximately 1,400 circuit-miles of high-voltage transmission lines[23]. NYPA sells power at retail and wholesale (at rates below market) to government agencies, municipal utilities, electric cooperatives, private companies (as a method of promoting job creation), utilities (for resale without profit to end-use customers), and to entities in neighboring states in compliance with federal regulations. In addition to owning and operating power plants and transmission lines and selling power, NYPA also is engaged in promoting energy efficiency and clean energy technologies. All project construction is financed through revenue bonds sold to private investors. NYPA does not use State tax revenues or State credit in its operations. As such, NYPA is fully self-financing.

[24] The federal government also operates several power marketing agencies (PMAs) that sell power at wholesale and retail to particular classes of customers. In general, the customers to which power is sold include federal and state government installations, municipal utilities, electric cooperatives, Native American tribes, and irrigation districts. The PMAs

The existing New York and federal government power authorities generate power from older plants (typically hydropower projects) from which power can be generated at costs well below market prices. In contrast, the Maryland Power Authority would be a new entity without existing generation assets and would need to either construct new power plants or purchase existing generation resources at market value. Consequently, many of the advantages associated with the existing power authorities would not be available to a newly created power authority.

5.4.3 What are the Advantages and Disadvantages of Establishing a Maryland Power Authority?

The advantages associated with creation of a Maryland Power Authority (MPA) include:

(1) the State would have the ability to construct generation on a schedule to match consumer demands for electricity;
(2) the prices charged for power generated from MPA facilities would reflect the costs to generate the power, which could be significantly less than the prevailing market price.
(3) the cost to finance generating facilities through the MPA would be lower than private sector financing costs.

The disadvantages with creating a Maryland Power Authority include:

(1) the State would assume the significant risks associated with financing, constructing and operating a power plant.
(2) it is unclear whether the State could perform these functions any better than the market.
(3) large scale investment by the State in power generation facilities may require the suspension of customer choice for at least some portion of the customer base. Otherwise, the State would be exposed to a risk of not being able to cover costs from power generation activities relying on revenue from operations alone.

5.4.4 As An Alternative, Can Maryland Mandate That the Utilities Build New Generating Capacity?

Maryland, either through the legislature or the PSC, could simply require the existing electric service providers to construct or purchase generating assets to satisfy peak and/or base load. Under this approach, construction of new generating facilities to meet load requirements would be largely in control of the State (through the PSC) and charges to customers would be reflective of the cost of service. It would also enable the State to order new generation on a schedule to match consumer demands for electric energy. Such an approach would therefore enable Maryland to get most of the advantages of an MPA without assuming all of the risks associated with electric power construction, ownership and operation.

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operated by the federal government are the Bonneville Power Administration, the Western Area Power Administration, the Southwest Power Administration, and the Southeast Power Administration.

The bulk of PMAs power is generated from hydroelectric facilities owned by the Bureau of Reclamation. The four federal government PMAs have approximately 40,000 MW of generation capacity, the vast bulk of which is hydroelectric. The PMAs were established in the early to mid-1900s and each operates as a self-contained entity within the U.S. Department of Energy. The rates charged by the PMAs are cost-based and are generally significantly below market rates.

On the other hand, utility ownership of generating facilities would likely be more costly than MPA ownership due to differences in the cost of financing. Such an approach would also involve partial suspension of customer choice for at least some portion of the customer base to ensure that the utilities are able to cover their costs.

5.4.5 What about Authorizing Municipalities to Build Peaking Plants or On-Site Generation?

An alternative option to facilitate the construction of peaking capacity in Maryland would be for municipalities to construct their own peaking plants. While peaking plants have low capital costs relative to base load generating capacity, construction of commonly sized peaking plant (say, 300 megawatts) would entail capital costs in excess of $100 million, which could place a serious strain on the financial capabilities of a municipality. In addition, and perhaps more important, most municipalities currently do not have the expertise to efficiently operate such plants and we would expect that municipal authorities would not be able to operate peaking plants more efficiently than the private sector. Finally, construction of peaking plants, while improving reliability, would not have substantial impacts on power supply prices since these plants are expensive to operate and typically do not run more than a few hundred hours per year, when demand is at its highest levels.

One alternative is for municipalities to invest in small, on-site generation such as renewable energy or diesel generators. To defray the costs of the generation, municipal facilities can use the on-site generation in several ways, including operating the generators when the running cost of the generation is below the cost of power purchased from the grid, participating in PJM Demand Response programs, and offering the capacity into the PJM Reliability Pricing Model's Capacity Auction. However, revenues from participation in PJM markets and savings from running the units at times of high prices are not likely to offset the cost to the municipalities of installing, owning, and operating the generators.

Easton Utilities (Easton) is one of just a handful of municipalities that operate electricity generation units. Easton operates 16 diesel generators and 2 combustion turbines which also run on diesel. Each individual unit is permitted to run up to 1,500 hour per year, with a combined total capacity of about 70 megawatts. In an interview, an official with Easton Utilities commented that there are special circumstances that make generation viable for them, but that it was not necessarily a business that he would recommend to other municipalities due to the complexity and cost of the operation.

5.4.6 Recommendation

The PSC is currently reviewing the economics of creating a state power authority. MEA anticipates that the report, among other things, will evaluate the merits of creating a Maryland Power Authority and whether the PSC should exercise its authority to require utilities to construct or purchase generating capacity to satisfy peak load. In advance of those findings, MEA recommends authorizing the Maryland Environmental Service to construct and operate energy facilities. This gives the State the flexibility to move quickly should the need and opportunity arise to build new generation.

Significantly, the PSC currently has authority to require utilities to construct or purchase generating capacity to satisfy peak load if they determine that there is a significant risk of market disruption due to insufficient peak load capacity.

5.5 Require Greater State Purchases of Green Power

5.5.1 What is a Green Power Purchase Agreement?

Electricity produced from a renewable energy source such as wind, solar, biomass, or geothermal, is often referred to as "green power." Green power can be generated on-site at a customer's facility (also known as distributed generation). Green power also can be produced remotely and then delivered over the transmission grid. Green power is typically more expensive than power produced from traditional sources. Green power products include:

Renewable electricity that is delivered to the consumer via the grid (i.e., through retail electric choice in competitive markets or through utility green pricing programs in regulated markets); and

Renewable Energy Certificates (RECs) that represent the positive attributes (environmental, solar, or other) of power generated by renewable resources. RECs are sold separately from electricity, and thus can be purchased in any market and in any location, even if a local utility or power marketer does not offer a green power product.

5.5.2 Is the State of Maryland Achieving Its Target for Purchasing Green Power?

The State of Maryland announced a commitment to purchase green power for its executive departments and state agencies in 2001. Executive Order 01.01.2001.02 (issued on March 13, 2001) called for at least 6 % of the electricity consumed by state-owned facilities to be generated from renewable sources, such as wind, solar, landfill gas, and other types of biomass. The order specified that no more than 50% of the power procured to meet this requirement was to be produced from municipal solid waste.

In November of 2006, the last State electricity procurement administered by the Department of General Services and the University System of Maryland, the State agreed to the purchase of 1,479,405,395 kilowatt hours. Of that amount, 3,906,879 kWh came from Tier 1 renewable resources which represent 0.264 % of the total – far short of the 6 % goal.

5.5.3 What Are Other State Experiences with Green Power Purchase Agreements for State Agencies?

Overall demand for green power has increased dramatically in recent years. While consumers purchased just 400,000 MWh of green power in 2001, the National Renewable Energy Laboratory estimates that U.S. green power sales has risen from 8.5 million MWh in 2005 to approximately 12 million MWh in 2006. In addition to Maryland, the states of Arizona, Connecticut, Illinois, Iowa, New Jersey, New York, Pennsylvania, Rhode Island, Tennessee, and Wisconsin have committed to purchasing green power for their state agencies, and in many cases have already implemented power purchase agreements that include green power. Like Maryland, Pennsylvania and New Jersey have been at the forefront of state agency purchasing of green power.

Pennsylvania

Twenty-eight percent of the energy used by Pennsylvania state government agencies is produced from wind and hydroelectric power. Pennsylvania currently leads all states in green power purchasing. Under a nine month contract with Community Energy announced in October 2007, Pennsylvania will purchase 277,399 MWh of green power annually at a rate of $0.0034 (0.34 cents) per kWh. This power consists of 57% generated by wind and 43% generated by hydropower. Pennsylvania is currently the only state on the U.S. Environmental Protection Agency's Top 25 Green Power Partnership list, ranking 13th with 157,200 MWh of qualifying green power purchased (only Pennsylvania's wind power purchases qualify for the EPA list).

New Jersey

In 1999, New Jersey established a 10% green power procurement goal for state agencies. Through April 2006, New Jersey state agencies had obtained 54 million kWh annually–or 10% of annual load–from green power through a contract with Pepco Energy, which supplied wind power. The aggregated green power supplied 180 state accounts, including departments and agencies within state government, state universities, and sports and transit authorities.

5.5.4 What are the Pros and Cons of Green Power Purchase Agreements for State Agencies?

State green power purchases showcase strong environmental leadership and can help accelerate development of new renewable energy capacity by making more capital available for investment. Green power purchases can also support the state's economy and create local environmental benefits if the purchases are made from in-state renewable generation.

One of the challenges to state agency purchases of green power is the fact that green power usually costs more than conventional electricity. The price paid for green power can vary widely by resource type available, location of resource, and duration of contract.

5.5.5 Recommendations

The State of Maryland should meet the existing green power purchasing goal and gradually increase its purchase to mirror the Renewable Portfolio Standard requirements. The State should also consider better leveraging the many positive attributes of its green power purchases by becoming a U.S. Environmental Protection Agency Green Power Partner.

6.0 Options to Enhance State Energy Planning

Maryland has not prepared a state energy plan since 1993. Since then, Maryland has deregulated its electric utilities, oil and electricity prices have risen to an all time high, and new technologies ranging from smart meters to cellulosic ethanol and plug in electric cars promise to transform how Americans get their energy. Regular comprehensive planning is needed so Maryland can prosper in an ever-changing global energy marketplace. This chapter will discuss the development of a comprehensive energy plan, integrated resource planning, and regional transmission and energy planning.

6.1 Develop Comprehensive State Energy Plans

6.1.1 What is a state energy plan?

A secure and diversified energy portfolio is a key element of strong economic development, environmental quality, and the health and welfare of the nation's citizens. In states across the nation, governors, energy and environmental regulators, elected and appointed officials, non-governmental organizations, citizens, and businesses are working together to create state energy plans so that future energy needs are met in a responsible, cost-effective, and environmentally sound way.

A successful state energy plan includes all sectors of energy use. Broadly defined, these include electricity, natural gas, home heating fuel, and transportation fuels. State energy plans consider energy use in the residential, commercial, industrial and agricultural sectors and typically include:

- Assessments of current energy supply and demand
- Forecasts and models of projected supply and demand
- Broad targets to deploy and use energy efficiency and renewable-energy programs and tools
- Policies and programs to address grid congestion, transmission, and distribution issues
- New energy supplies for transportation
- Energy resource development options
- Deployment of new technologies

Many state energy plans also include goals for improving state government energy operations and recommended legislative, regulatory, and administrative actions for improving energy conditions in the state. In recent years, energy security has also been incorporated into state energy plans.

Although each state energy plan is unique, all plans have a common theme to improve price stability, reliability, safety and security, and environmental stewardship. State energy plans are the mechanism by which policy makers and stakeholders come together to recommend innovative solutions to lower energy bills while providing clean and reliable energy through responsible policies and programs. A state energy plan will also summarize progress to date and serves to inform policy- and law-makers on the effectiveness of existing policies and programs.

A successful state energy plan should outline a strategy for ***affordable, reliable and clean energy.*** The plan should be developed with the state's citizens in mind, but also be one that the business community and major energy suppliers can support as well.

It should incorporate involvement from a broad cross-section of the public and key stakeholders. The plan should be periodically updated to reflect current situations and include verifiable monitoring and measurement procedures so that progress can be tracked.

6.1.2 State experiences with comprehensive energy planning

California

California created its first state energy plan in 1997 and requires an Integrated Energy Policy Report every two years. The plan focuses on safe, reliable, clean energy, based on the results of more than 60 hearings statewide and input from 140 organizations. The original plan gave recommendations in seven key policy areas and outlines detailed strategies for achieving them. California spent approximately $2 million in consulting fees to create its state energy plan.

Georgia

Georgia created its first state energy plan in 2006. The state focused on energy reliability and affordability, creating a website for public comments along with several public stakeholder meetings to gather input from all sectors. Updates and evaluations in the plan are highly encouraged, but not yet required by legislation. Georgia had five full time employees working solely on the state energy plan in addition to nearly $100,000 spent on outside consulting.

Idaho

Idaho created its state energy plan in 2007. The plan focused on the current energy picture in Idaho, high electricity rates and future supply options. Legislative subcommittees were formed to work on the plan in addition to an extensive public input process. Biennial reports to the legislature and yearly energy forecasts were an important aspect of the plan. Idaho spent approximately $300,000 on outside consulting fees to create the state energy plan.

6.1.3 Benefits of comprehensive state energy plans

There are many benefits to composing and updating a comprehensive state energy plan. A comprehensive planning process would allow Maryland to:

Develop a comprehensive analysis of supply and demand for electricity and natural gas, home heating oil, and transportation fuels.

Evaluate all economic sectors in the analysis, including residential, small and large commercial, governmental and institutional, industrial, and transportation.

Identify potential threats to Maryland's energy security and best practices to minimize Maryland's exposure to both natural and man-made disruptions to our energy supply.

Analyze the impact energy policies have on low-income constituents and recommend actions and programs to be implemented that assist this population.

Develop modeling and forecasting that is specific, measurable, and verifiable, using common assumptions and data about planned or new facilities, demand and economic growth, etc.

Articulate clear requirements for monitoring and implementation of the programs driven by economic analysis, including prioritized recommendations that are both measurable and verifiable.

Construct a comprehensive plan based on robust and transparent public involvement, including input throughout the planning process from all affected stakeholders in Maryland.

6.1.4 Recommendations

Maryland has not prepared a state energy plan since 1993. There have been drastic changes in the energy landscape since then, such as utility deregulation and oil and electricity prices reaching an all time high. These factors have repeatedly demonstrated the need for updated comprehensive energy planning as Maryland is not prepared to handle many of the challenges that arise. MEA is not currently equipped with the staff or the funds necessary to prepare a comprehensive plan. We recommend that MEA be given adequate resources to effectively fulfill the mission of composing biennial comprehensive energy plans that will allow Maryland to take control of its energy future.

6.2 Promote Regional Transmission and Energy Planning

6.2.1 Is There a Need for Regional Transmission and Energy Planning?

Maryland is not an island. In fact, the State currently imports approximately 30 % of its electricity from out of state. Regional coordination is critically important to devising policies and programs that will maximize the region's ability to provide affordable, reliable and clean energy to all consumers.

The Mid-Atlantic States face a number of common energy challenges. To varying degrees, all of the States have de-regulated their retail electricity markets, although each state retains regulatory authority on distribution service and the siting of generation and transmission facilities. Each State is facing rising electricity prices, aging power plants, significant cost instability, more stringent air quality rules and the prospect of carbon regulation to address climate change.

The need for regional coordination may be most pronounced with respect to transmission issues, where the interests of the Mid-Atlantic States sometimes differ. Some States in the PJM region have excess electricity capacity, whereas others, including Maryland, have insufficient capacity. As a result, transmission lines that bring electricity from the surplus states to the deficit states are viewed very differently.

6.2.2 What Regional Transmission and Energy Planning Currently Occurs?

Despite the obvious need for coordination, there is surprisingly little between the various political jurisdictions. Each State largely addresses utility matters independent of their neighboring states, particularly in discussing future needs.

Nevertheless, there are examples of limited regional coordination focused on particular aspects of the electricity market. Most notably, the PJM Interconnection is a regional transmission organization that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.

PJM manages a sophisticated regional planning process for generation and transmission expansion to ensure the continued reliability of the electric system. Using information technology, PJM provides real-time information to market participants to support their daily transactions and business decision-making.

PJM serves about 51 million people. The company dispatches 164,905 megawatts (MW) of generating capacity over 56,250 miles of transmission lines. PJM has administered about $71 billion in energy and energy-service trades since the regional markets opened in 1997.

6.2.3 What is the Experience In Other Areas in the Nation with Regional Transmission and Energy Planning?

The Western Governors Association has dedicated significant time and resources to regional coordination, with considerable results. Regional coordination in the West occurs both at the

Governors and staff level. The regional staff level discussions receive direction from the high level regional policy goals that the Western governors have agreed to through their association.

Closer to home, the New England Governors Conference has provided a forum for coordination for decades, with its focus on the electric system varying from time to time.

Maryland is part of the Southern States Energy Board. There are some new regional coordination efforts taking place within the Southwest Power Pool and the States of North and South Carolina. But the Southwest Power Pool, in particular, is very focused on cost allocation related to construction of new transmission.

6.2.4 What are the Opportunities for Greater Regional Transmission and Energy Planning in the Mid-Atlantic States?

There are multiple areas where Maryland would benefit from greater regional energy planning among the Mid-Atlantic States. One example of potential coordination involves development of a transmission siting protocol – a commitment among the states to promote cooperation in addressing projects of regional value. States could also maximize their efforts to achieve common ground in advocacy with the Federal Energy Regulatory Commission.

Another area for coordination involves building a strategic, regional strategy to promote new generation of clean electricity. Many of the states already encourage renewables through state law and policies. A coordinated strategy might enable the Mid-Atlantic States to emerge as a model for sustainable development.

A third area involves energy efficiency and demand side investments. Each State in the Mid-Atlantic is exploring opportunities to offset new generation and transmission investments by reducing electricity demand. Greater coordination could help each State maximize its energy efficiency and demand side investments.

6.2.5 Recommendations

The Mid-Atlantic region faces a series of challenges to serve the electricity needs of millions of consumers. Electricity knows no state boundaries, with large interstate flows of electricity already occurring in the region. The regional nature of the electric grid is unmistakable, yet traditional regulation drives attention to purely state or federal actions.

Regional coordination can work with some sustained effort. MEA recommends that Governor O'Malley meet with his fellow Mid-Atlantic Governors to discuss the region's energy challenges and the many opportunities for greater regional coordination on transmission and energy planning. If there is a common will to work together, the Governors could direct staff to meet regularly to consider issues like planning, siting, and/or regulatory practices. Staff could be directed to develop an action oriented policies to address common regional concerns.

6.3 Establish a Maryland Energy Information Service

6.3.1 What Is An Energy Information Service?

State energy information services act as a clearinghouse for information on energy issues, policies and programs. Such services work in close coordination and cooperation with state energy offices, environmental divisions, and other state and local organizations that have a stake in energy information. By consolidating various technical, program, and outreach efforts (such as financial issues and policies and programs), states can provide coordinated information. Energy information services can be housed within existing state agencies, established at universities or non-profit organizations, or set up as independent non-profits.

The U.S. Department of Energy currently has an Energy Information Agency (EIA). Maryland lacks an agency that performs a similar function. A Maryland Energy Information Service would focus strictly on Maryland consumers and businesses, providing much needed Maryland specific data and analysis.

6.3.2 What specific functions would a Maryland Energy Information Service perform?

The purpose of an energy information service (EIS) is to help stakeholders gain access to accurate, up-to-date energy information. An EIS can also allow those stakeholders to make effective use of the energy information collected. Energy information services generally perform four basic functions:

- Collect all applicable data on energy usage consumption, production, energy reserves, distribution, prices, technology and related financial matters.
- Analyze the data and organize according to electricity, natural gas and petroleum markets and create long and short term energy forecasts from the available data.
- Disseminate up-to-date energy information to all interested stakeholders in an easily understood format by building and maintaining a publicly available, web-based information service.
- Provide a centralized, coordinated place for expert analysis, shared technical research, and education and outreach activities for energy management.

These four functions would help the State of Maryland provide and distribute accurate information on how to use and save energy wisely. It also would allow all stakeholders to have public access to expert, practical information that would empower them to cut energy bills, make their homes and work places more comfortable and reduce emissions that have great potential to harm the environment and public health. And provide up-to-date information to policy- and law-makers evaluating energy issues.

6.3.3 What are the Benefits of a Maryland Energy Information Service?

All sectors of the economy, from public agencies to private corporations to residences can benefit from a Maryland Energy Information Service. An MEIS is needed to benchmark usage and identify priority targets for energy efficiency investments. An MEIS will also play an instrumental role in:

- Developing baseline usage data to measure results of energy efficiency measures;
- Helping monitor and verify energy usage, and identify areas where a prompt response could lower electricity bills;
- Tracking utility expenses for both businesses and residences;
- Developing emissions inventory and track and report emission reductions to help Maryland meet its climate and environmental goals;
- Disseminating energy information easily through the web (electronic download of information);
- Delivering information to the consumer in a format users need and can use; and
- Providing automated reports for easy sharing of the information.

6.3.4 Recommendations

Accurate, up-to-date information and planning is the key to an informed public and informed policy making. To enable effective energy planning, Maryland needs a central repository that can (1) gather data on energy use, consumption and production, (2) analyze the electricity, natural gas and petroleum markets, and (3) publicly disseminate the information to interested parties through out the state, region and nation. MEA should be provided adequate resources to perform this function.

6.4 Require Integrated Resource Planning

6.4.1 What is Integrated Resource Planning?

Integrated resource planning is the process by which issues and alternative solutions for meeting electrical demand are identified and evaluated to determine a least cost and/or least risk approach. The goal is to evaluate the costs, benefits, and risk of feasible options for meeting or modifying demand on a consistent basis. Plans are periodically reviewed to reevaluate the changing economies of various technologies and risks brought about by changed circumstances.

6.4.2 Why was Integrated Resource Planning Discontinued by the PSC?

The Public Service Commission implemented integrated resource planning in the 1990s in response to the inflationary pressures of new power construction in the 1980s. Maryland's utilities were required to file long range integrated resource plans for Commission review. Within the review process, the Commission evaluated whether the utilities' existing plans effectively minimized the total cost to society of providing reliable electric service. The Commission indicates in its 1990 Ten Year Plan Report that its immediate concern was to influence the planning process at each stage to encourage the use of demand side management to delay construction of new generating stations when appropriate from a cost and reliability standpoint. The Commission developed a set of incentives and a monitoring program to achieve its goals.

The passage of the *Electric Customer Choice and Competition Act of 1999* restructured the electric industry. Investor-owned utilities were required to divest themselves of generation and the pricing of electricity was deregulated. It was anticipated that electric customers would buy their power from competitive electric suppliers. Integrated resource planning, along with the conservation and demand side programs of the electric utilities, were discontinued at the same time.

6.4.3 Why is Integrated Resource Planning Needed Today?

Maryland's residents, businesses, and industries have seen sharp increases in their electricity rates in the past few years. While some have utilized the retail market in an effort to alleviate these increases, future electricity price increases appear likely as our electricity infrastructure ages and generation capacity and transmission capabilities are not keeping up with demand. As indicated above, Maryland may well be on the verge of experiencing serious reliability problems that will not only raise electricity prices for all consumers even further – a situation which will not only hurt our businesses and industries but may prove a significant barrier to those that might otherwise locate here in the future.

An integrated resource planning process is needed today to balance the sometimes competing goals of reasonable prices, price stability, reliability, safety and security, and environmental stewardship in the electric power industry. A competitive market did not develop in Maryland for residential and small commercial customers. The legislature has returned the primary responsibility for the provision of electric service back to electric companies. New standards for price stability have been imposed on that service. An integrated resource planning process provides the framework for analyzing all competing goals and resource options using common assumptions and data inputs. The PSC is charged with seeking the balance between these competing interests. No other entity performs this function.

6.4.4 What are the Benefits of Integrated Resource Planning?

With sufficient resources, the PSC can perform integrated resource planning to:

- Develop a consistent set of data and assumptions for evaluating resource options.
- Provide an open forum for comment and analysis from all stakeholders.
- Establish plans which balance the goals of price, reliability and environmental stewardship and provide a mechanism for the comparison of the cost of implementing various policy strategies such as greenhouse gas reduction strategies to other, more conventional strategies.
- Provide a structure for performance incentives and penalties to accomplish goals.
- Ensure continuous monitoring and review of plans to adjust for changing circumstances.
- Provide authority to authorize charges to pay for programs.
- Help state-wide[25] or even a regional planning process.

Despite the advantages, it should be recognized that integrated resource planning can be time consuming and is inherently dependent on assumptions which may prove incorrect. In addition, the IRP process may make it difficult for utilities to react to rapidly changing market conditions, because of months-long administrative processes that were undertaken to "approve" IRPs. It also can be hard to integrate renewable generation (which generally cannot follow load) into the resource plan and the utility's operating requirements.

6.4.5 Recommendations

Integrated resource planning is a valuable tool to better enable the PSC to balance the goals of affordability, reliability and clean electricity. The PSC should be encouraged to resume Integrated Resource Planning to explore solutions for meeting electrical demand using a least cost and/or least risk approach.

[25] Among other things, Chapter 549, Laws of 2007 requires the Maryland Public Service Commission to "also consider the availability of adequate transmission and generation facilities to serve the electrical load demands of all customers in the State, pricing and physical constraints on the electrical transmission and distribution grids in the State, and options and policy recommendations to provide an adequate, safe, and reliable supply of electricity at reasonable cost to all customers in the State".

7.0 Options to Stimulate Maryland's Clean Energy Industry

Investment in energy efficiency and renewable energy industries is soaring around the globe. According to a trend analysis from the UN Environment Programme, global investment capital flowing into this sector climbed from $80 billion in 2005 to a record $100 billion in 2006.[26]

Maryland lags behind other states, however, in exploiting opportunities in this emerging sector. By identifying clean energy as a priority, Maryland has a unique opportunity to attract and cultivate highly sought after clean energy investment and jobs. This section focuses on Maryland's options which include workforce development and creating a Maryland Clean Energy Center to serve as a business incubator and provide technical support. In addition, as discussed in Chapter 3.0 the Maryland Strategic Energy Investment Fund can also be used to create targeted programs to stimulate Maryland's emerging clean energy industry.

7.1 Provide Clean Energy Workforce Training

7.1.1 What is Clean Energy Workforce Development?

Clean energy workforce development refers to the development of skilled workers and career opportunities that can be applied to the entire range of "green energy" careers. In a society that is increasingly demanding clean energy solutions to solve a variety of problems (pollution, global warming, high energy costs, dependency on foreign petroleum, etc.), a new career path is emerging to serve this growing industry. Federal, state, and local governments, as well as the private sector, are all part of the drive toward clean energy. Yet, despite increasing support and even mandates, a mature clean energy industry will not be achieved unless a qualified workforce is available to implement clean energy technologies, techniques, supply chains, and infrastructure. A sample of careers that are necessary to serve the clean energy industry is provided below:

- Green Building Construction and Supply
- Solar (PV) Installation and Component Manufacturing
- Carbon Trading / Emissions Brokerage
- Energy Auditors
- Energy Efficiency and Green Building Architects and Engineers (including LEED Consultants)
- Distributed Generation (Solar, Wind and Biomass) Specialists
- Urban Planning and Landscaping

A key finding of the Clean Energy Workforce Summit (Boston, October 2007) is that ***generating demand*** for clean energy and energy efficiency is needed in addition to job training itself. Further,

[26] United Nations Environment Programme, Press Release "Investors Flock to Renewable Energy and Efficiency Technologies: Climate Change Worries, High Oil Prices and Government Help Top Factors Fueling Hot Renewable Energy Investment Climate," 20 June 2007, available at http://www.unep.org.

the summit identified the industry of energy efficiency and retrofitting as having the greatest job potential.

7.1.2 What are State Experiences with Clean Energy Workforce Training?

Clean energy workforce development is too new an idea to have substantial evidence of the benefits. However, 33 states currently offer clean-energy or related courses and professional training programs through their state university systems. While clean-energy courses are being offered through the university system, few state-sponsored workforce development initiatives are in place. In most cases, job creation follows demand created by market growth, policy decisions and public interest, but not necessarily targeted workforce development efforts. NY, CA, and PA do have organized initiatives, with a few other states (NJ, MA, CO, MN, and WA) showing increasing activity. Prominent examples are given below:

- Coordinated by the New York State Energy Research and Development Authority (NYSERDA), the New York Energy $mart Program (funded by a System Benefits Charge) stimulates the demand for energy-efficient products and services as well as renewable resource technologies, in addition to supporting renewable energy training programs. NYSERDA claims that the program has retained or created over 4,000 jobs per year. The program's 8-year budget is approximately $961.8 million (average of $120.2 million per year). Of this, 13.4% is dedicated to low-income program initiatives.
- In California, Assembly Bill 32 (Global Warming Solutions Act; signed into law on September 27, 2006) is predicted to create jobs through mandatory reductions in greenhouse gases. Some estimates put job creation as high as 83,000.
- "Green Enterprise Zones" are springing up in larger cities and are geared towards economically underprivileged populations. In Oakland, there is local support to develop so-called "Green Collar" jobs, such as solar installers and green building tradesmen. $250,000 has been pledged by the city government to develop the workforce (primarily from low-income areas) in the interest of keeping green energy jobs local and giving workers a new set of skills for expanding green energy industries. The organization has identified Baltimore as a city that would also be appropriate for similar initiatives.
- The Mayor of the District of Columbia announced a Green Collar Jobs Initiative in September, 2007. The first step in this program is the creation of a Green Collar Jobs Advisory Council, comprised of local officials, non-governmental organizations, as well as contractors and developers.

7.1.3 What are the Benefits of Clean Energy Workforce Development?

- Supports clean energy and energy efficiency by giving the workforce the skills and knowledge necessary to fill jobs created by policy initiatives and market growth.
- Creates new opportunities for workers with training in traditional fields: communications, community outreach, sales/marketing, construction, business administration and support, engineering, etc.
- Involves economically disadvantaged individuals.

- Strengthens communities, especially when clean energy jobs and industries are kept within the communities where workers reside.
- Supports the concept that environmental protection is compatible with economic growth.

7.1.4 What Steps Could Maryland Take to Promote Clean Energy Workforce Development?

Currently only one course offered by the Interstate Renewable Energy Council is listed for Maryland; it is dedicated to connecting PV systems to the grid. Clearly, a need exists for a greater number of educational opportunities for bringing clean energy jobs to the state, as well as for policies to provide drive clean energy generation in the state.

To accomplish this, Maryland could:

- Conduct a labor assessment for clean energy in Maryland. Review the existing workforce development landscape to determine how best to direct efforts to growing industries.
- Set up a system for getting reliable data on demand and actual hirings from clean energy industries (perhaps through a Maryland Clean Energy Center, see section 7.2).
- Through partnerships and alliances, encourage the development of new university and community college programs dedicated to clean energy careers.
- Create a Strategic Energy Investment Fund to invest in renewable energy / energy efficiency projects that create clean energy jobs.
- Consider launching a venture fund to assist clean energy start-ups in Maryland.
- Consider legislation that provides tax breaks to companies involved in clean energy that are based in Maryland. Consider offering bigger tax breaks to companies that operate in economically disadvantaged areas.
- Consider the development of a "Green-Collar" program to foster development of a clean energy workforce in Maryland's urban areas and stimulate local economic development.
- Focus initial workforce development efforts on urban areas (Baltimore and metro D.C.).
- Consider starting a state or regional organization dedicated to clean energy workforce development.
- Stay informed on existing or pending Federal programs that provide funding for the development of green collar jobs. For example, the *Energy Policy Act of 2005* (EPAct 05) authorizes appropriation of $20,000,000 for programs that include traineeship grants for technical personnel.

7.1.5 Recommendations

To promote the transition from a carbon based economy to a more sustainable, renewable economy, the Governor should create an inter-agency "Clean Workforce Development Task Force," charged with developing policies to drive clean energy job creation in the state. The workforce should be jointly led by the Department of Labor, Licensing, and Regulation, and the Maryland Energy Administration and include members of Maryland's Department of Environment, Department of

Business and Economic Development, Department of Natural Resources, Department of Planning, Department of General Services, the Governor's Workforce Investment Board, and representatives from the Maryland Higher Education Commission as well as the state's universities and colleges. Other potential Task Force participants include representatives of business organizations such as a Chamber of Commerce, a labor union, a major employer in Maryland, a construction firm, and local departments of economic development. The Task Force should be asked to produce a plan of action for the Governor within 6 months.

7.2 Create a Maryland Center for Clean Energy

7.2.1 What is a Clean Energy Center?

State clean energy centers act as clearinghouses for information on clean energy issues, policies and programs. Such centers work in close coordination and cooperation with state energy offices, environmental divisions, and other state and local organizations that have a stake in clean energy development. By consolidating various technical, program, and outreach efforts (such as clean energy financial issues and renewable policies and programs), states can provide coordinated support for clean energy through a clean energy center. Clean energy centers can be housed within existing state agencies or established at universities, non-profit organizations, or set up as independent non-profits.

Maryland is beginning to transition from a carbon-based economy to a more sustainable, renewable economy. The General Assembly has enacted a number of clean energy policies and incentives, including the Clean Energy Production Tax Credit, Income Tax Credit for Green Buildings, Local Option Corporate Property Tax Credit, Solar Energy Grant Program, and the Community Energy Loan Program. A Maryland Clean Energy Center (MCEC) could help coordinate and centralize the efforts of these existing clean energy policies and programs, as well as potential new activities.

A MCEC could also foster investment, innovation, and growth in clean energy supply and infrastructure. Clean energy development offers a number of public benefits, such as job creation, energy efficiency, and a cleaner environment. Capturing and assessing these benefits requires financial and program support, which also can be centralized at an MCEC.

Maryland's clean energy industry is still growing. A recent report by the University of Baltimore finds that the state supports approximately 2.3% of the total number of clean energy businesses found in the United States, and approximately 1.9% of all clean energy sector jobs. An MCEC could play a pivotal role in further developing the clean energy industry in Maryland.

Clean Energy Business Profile

State	# of Businesses	# of Employees
United States	21,692	230,426
Middle Atlantic	2,053	20,679
Delaware	70	771
Maryland	503	4,456
Pennsylvania	826	7945
Virginia	587	7,064
West Virginia	67	443

Source: D&B iMarket

7.2.2 What specific functions could a Maryland Clean Energy Center perform?

The mission of a MCEC would be to advance clean and renewable energy in Maryland. To further this mission, a MCEC could perform a variety of functions, including:

Clean Energy Incubator

Clean energy business incubator acts as an agent to attract, recruit, support and retain companies and firms engaged in clean energy businesses to Maryland.

Data Collection, Assessment and Analyses

Reliable, timely and helpful information is essential for the growth of any industry. Public and private sector organizations use this information to develop appropriate public policies and business plans. A MCEC could be charged with obtaining, analyzing and disseminating clean energy-related information.

Outreach and Technical Support

The clean energy industry requires a credible champion and promoter to support development and deployment. A MCEC could lead this effort by providing a centralized, coordinated place for expert analysis, shared technical research, and education and outreach activities for clean energy growth.

7.2.3 What are State Experiences with Clean Energy Centers?

Iowa

In 1990, the State of Iowa created a state energy center to promote clean and renewable energy in the state. The energy center's objectives are to:

- Strive to increase energy efficiency in all areas of Iowa's energy use
- Assist Iowans in assessing technology related to energy efficiency and alternative energy production systems
- Support educational and demonstration programs that encourage implementation of energy efficiency and alternative energy production systems.

To accomplish these goals, the center awards grants to Iowa-based, nonprofit groups to conduct energy-related research, demonstration and education activities. Additionally, the energy center implements the Alternate Energy Revolving Loan Program (AERLP). AERLP offers loans for clean energy development projects, based on both technical merit and financial qualifications of the applicant. The energy center provides up to 50% of the total financed cost of a project (up to $250,000) at zero interest. Besides offering financial assistance and providing public relations support, the energy center compiles and analyzes data about renewable energy for the state. This information is used by utilities, farmers, manufacturers, municipalities, school districts, and local and state governments.

The energy center receives its primary funding from an assessment on the intrastate revenues of Iowa's gas and electric utilities. For FY 2005, the center received nearly $3.1 million from this utility assessment. Over 50% of the center's funding is dedicated to the AERLP loan program.

New York

New York's clean-energy technology sector grew by 134% in 2000, and is projected to grow from $7 billion to about $82 billion per year by 2010. In 2001, to help foster and promote this growth, the New York State Energy Research and Development Authority (NYSERDA) established the Saratoga Technology and Energy Park (STEP).

According to NYSERDA, STEP is a special destination for clean energy and environmental technology companies in the state. STEP serves as a fully-integrated "knowledge community" that offers educational programs, technical services and partnership opportunities to support the success of clean energy companies and their employees. Currently, over a dozen companies are housed at STEP. Firms such as Global Resource Options, Inc., a leading national distributor and installer of solar energy systems, benefit from STEP's package of state tax incentives.

7.2.4 What are the Benefits of a Clean Energy Center?

According to the International Center for Sustainable Development (ICSD), energy efficiency and renewable energy can be very valuable investments for Maryland. An investment of $1 million per year by the state in an MCEC over the next 20 years would return between $973 million and $2.2 billion in state and local tax revenues and would create between 144,000 and 327,000 new jobs.

Economic Benefits of a Larger Clean Energy Industry

Scenario	Employment	Wages & Salaries	State and Local Tax Revenues
20 % energy-efficiency improvements, 10% renewable-energy increase, and 10% ethanol production increase	143,719	$5,729.7 (million)	$973.3 (million)
40 % energy-efficiency improvements, 30% renewable-energy increase, and 30% ethanol production increase	326,514	$12,944.8 (million)	$2,166 (million)

Source: International Center for Sustainable Development , "Economic Development Potential of Clean Energy Technologies in Maryland and Feasibility Study for a Maryland Clean Energy Center," 2006

ICSD reports that the U.S. clean energy industry is worth over $50 billion a year, growing at a rate of about 30% per year. By supporting research, deployment, and education activities at a clean energy center, the state could further reap the benefits of this growing industry. According to the ISSD, Maryland has substantial untapped renewable energy resources that could produce between 30% and 137% of all the state's electricity from solar PV and on-shore and off-shore wind power, at costs often competitive with conventional sources, potentially making Maryland a net energy exporter. By consolidating research and deployment efforts of an energy center into the state's overall energy program, these clean energy resources could be more effectively deployed.

7.2.5 Recommendations

The General Assembly should enact legislation creating the Maryland Clean Energy Center (MCEC) as a state chartered organization. The mission of the MCEC would be to advance the clean and renewable energy industry in Maryland. Specifically, the MCEC would serve as a clean energy industry incubator, collect and analyze industry data, and provide outreach and technical support to further Maryland's clean energy industry. As a state chartered organization, the MCEC would be eligible to receive private donations and would not rely on General Funds.

8.0 Conclusion

Maryland is facing significant energy challenges and is not equipped to properly address them. The state is facing record high electricity prices and the possibility of rolling blackouts as soon as 2011. Maryland needs a long-term vision and plan to provide its citizens with affordable, reliable, clean energy.

The recommendations in this *Strategic Electricity Plan* will allow Maryland to keep its bills down and its lights on, while achieving its climate and environmental goals. The plan proposes four critical actions to achieve these goals:

1. Create a Strategic Energy Investment Fund, using revenues generated by the sale of carbon allowances under the Regional Greenhouse Gas Initiative, to invest in energy efficiency, renewable energy and Maryland's clean energy industry.
2. Require utilities to implement cost-effective energy efficiency programs.
3. Increase generation by strengthening the state's Renewable Portfolio Standard and other tools such as the solar and geothermal grant programs.
4. Plan for the future by improving Maryland's energy plans and stimulating its emerging clean energy industry.

While there is simply no "silver bullet" that will solve all of Maryland's electricity challenges, a "silver buckshot" approach will allow Maryland to take control of its energy future.