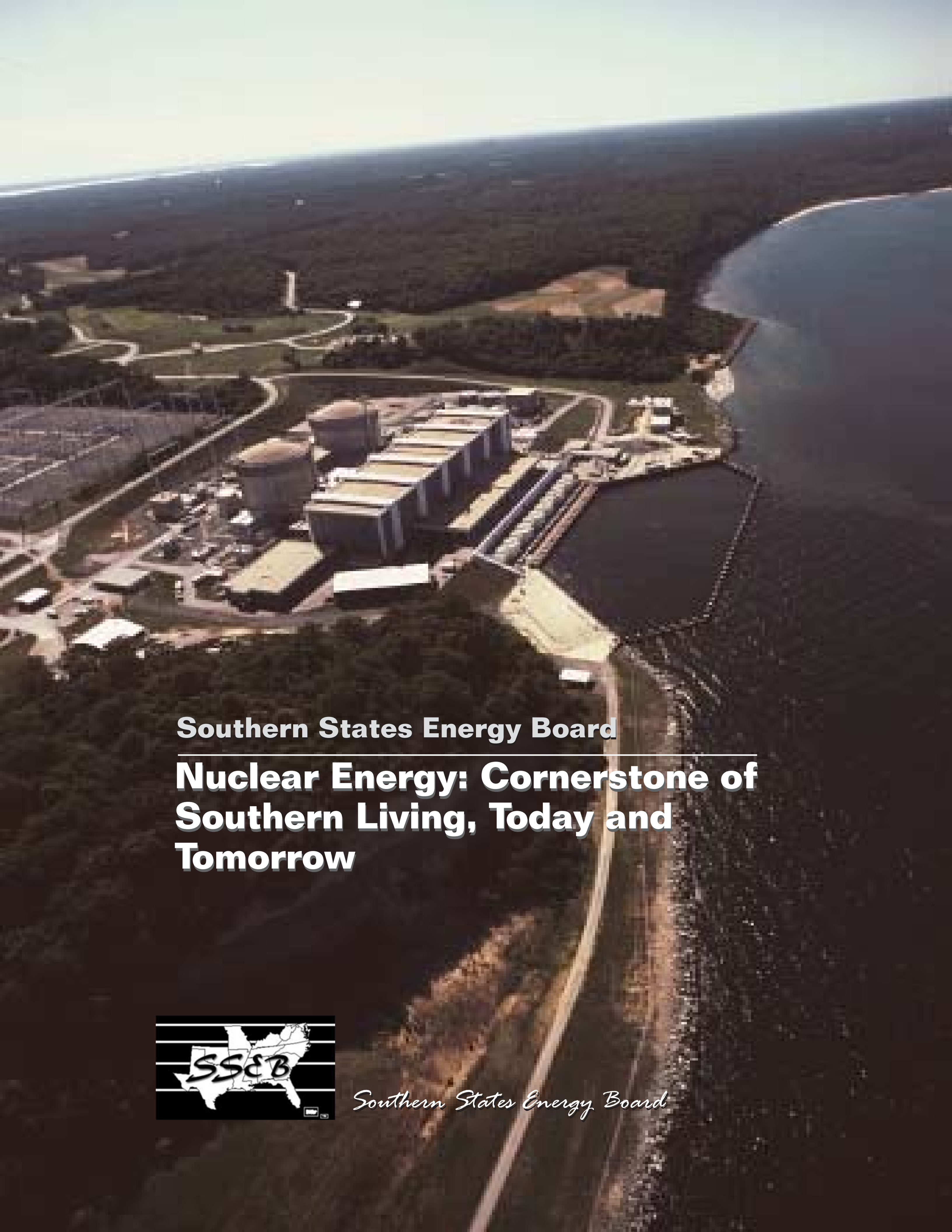

Southern States Energy Board

Nuclear Energy: Cornerstone of Southern Living, Today and Tomorrow

Southern States Energy Board

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Executive Summary

The United States and the South must have a diversified energy policy that fuels economic growth, environmental preservation and reduces our dependence on foreign sources of energy. Over the past 30 years, the U.S. economy has grown three times faster than our energy consumption. During that same period of time, more than 55 million jobs have been created while air pollution has been reduced by about 50 percent. Historically, the United States has put policies in place that encourage economic growth, make the nation more dependent on domestic energy sources and protect the environment. It is imperative that states enact policies to further address these urgent issues over the next two decades. Electricity demand is projected to increase by nearly 50 percent by 2030, according to the U.S. Energy Information Administration. In the Southeast and across America, policymakers must consider implementing a strategy to meet that demand from a diverse portfolio of electric generation sources while maximizing other energy resources such as renewable power, along with conservation and efficiency measures.

Nuclear power plays a vital role in this diverse energy portfolio. Uranium fuel is abundant and affordable, and nuclear power plants already generate 20 percent of U.S. electricity safely without emitting any greenhouse gases or controlled air pollutants.

More than 100 nuclear power plants operate in 31 states, including 44 reactors in SSEB member states. They are the nation's second-leading source of electricity, after coal, with average production costs that are cheaper than coal or natural gas for electricity production. Nuclear power also helps states meet Clean Air Act goals as well as reduce carbon. Without nuclear energy, carbon dioxide emissions would have been 28 percent greater in the electricity industry in 2004, and an additional 700 million tons of carbon dioxide would have been emitted each year—about the same as the annual emissions from 136 million passenger cars.

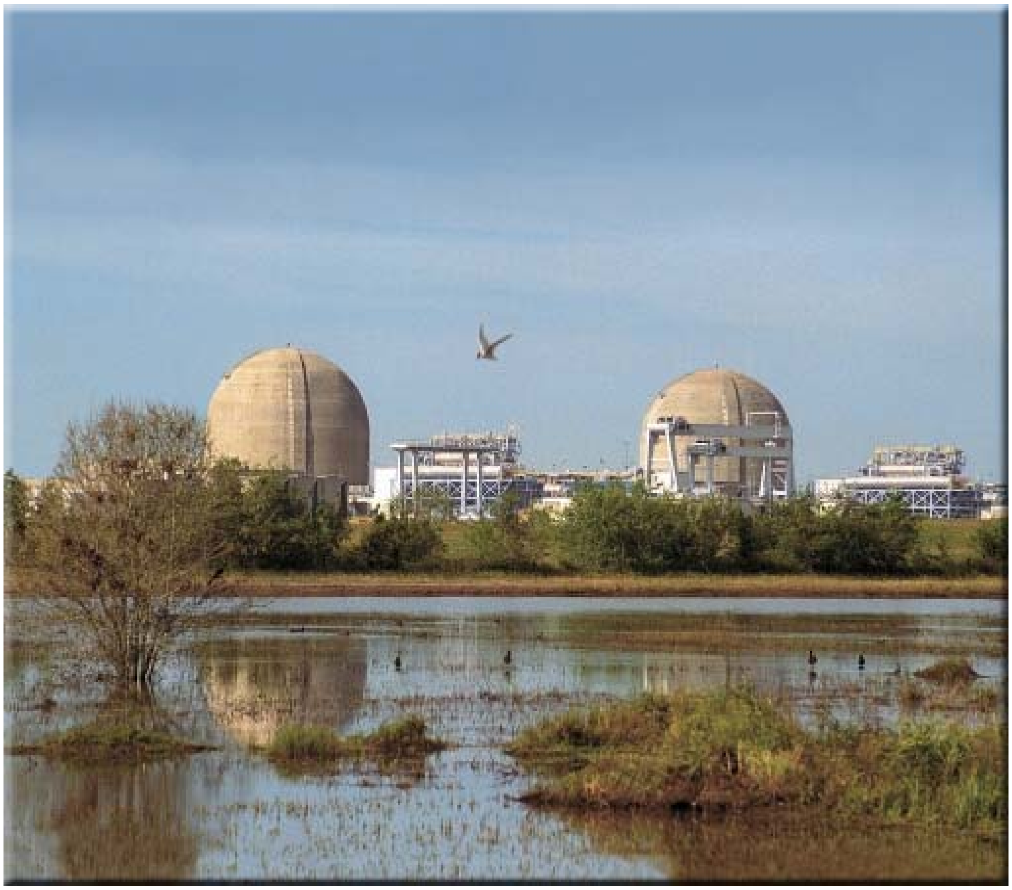
In order to fuel regional economic growth and enhance national security, our region must consider construction of advanced-design nuclear power plants. Electric companies from Louisiana to Virginia have announced their intention to develop license applications for as many as 20 new reactors by 2020. These new reactors are needed to meet rising electricity demand in fast-growing SSEB member states, and they are economic drivers for communities and states where they are located.

Provisions in the Energy Policy Act of 2005 are jumpstarting interest in new reactors. The legislation includes limited investment incentives, such as loan guarantees for carbon-free energy sources, production tax credits for new nuclear power plants and federal insurance to protect companies against avoidable delay in the government's reactor licensing process. Moreover, the Nuclear Power 2010 Initiative is a $1.1 billion partnership between the federal government and the industry to facilitate construction of advanced reactor designs. Some state legislatures have followed the federal model and are considering energy policy legislation to remove impediments to building energy infrastructure, including nuclear power plants.

Public support for nuclear energy also is growing, including many environmentalists and opinion leaders across the political spectrum. Public support for nuclear energy in the United States has grown steadily as a result of excellent plant safety and performance, as well as growing awareness of nuclear energy's benefits. A March 2006 survey revealed that 86 percent of the general public agrees that nuclear energy will play an important role in meeting our nation's electricity needs in the years ahead. In addition, 73 percent found it acceptable to add a new reactor at the nearest existing nuclear plant site. Overall, 68 percent of Americans surveyed support nuclear energy, while 29 percent oppose it (Bisconti Research 2006).

While acknowledging the benefits of conservation, efficiency and renewable sources of energy, opinion leaders are echoing political blogger Matt Yglesias, who wrote that “it's simply not feasible to meet current electricity demand through these routes, much less meet current demand plus the additional demand imposed by economic growth plus the additional demand imposed by the need to move away from gasoline. That means looking at nuclear power”(neinuclearnotes.blogspot).

Progress on the issue of nuclear waste disposal must move in tandem with new plant construction. The White House and Congress in 2002 approved a repository site at Yucca Mountain, Nevada, to serve as the nation’s used nuclear fuel disposal center. The Department of Energy must make progress toward licensing and building that facility and meeting its legal commitment to move used fuel rods from nuclear plant sites across the country.



Introduction: A Bright Outlook for the South

The key to the economic prosperity we are witnessing in the South is a stable, reliable and relatively inexpensive supply of electricity. The role of nuclear power has become more significant because of improved efficiency and life extension at existing reactors and because of the prospect of electricity production at new reactors that could begin to operate within the next decade.

As we have seen, the latest era of base-load natural gas plants presents challenges with fuel supply, and as the environmental consequences of some aging fossil-fired power plants continue, nuclear power is on the brink of a remarkable return to prominence. Existing nuclear plants in the United States and in the South are operating at record-high capacity factors, ushering in the time to consider seriously additional reactors in the South. With booming population growth and economic prosperity, the outlook for increased demand for electricity is evident. While some electricity production will come from renewable power supply, such as biomass and wind sources, and new natural gas- fired combined cycle plants, the South's thirst for electricity will require unprecedented growth in bulk power supply from nuclear and coal.

The outlook for nuclear power has grown recently due to several other factors, including the growing apprehension about global warming, fluctuating fuel prices for other electric generating sources, and renewed emphasis on new-generation nuclear technology. Rising world temperatures, blamed partly on greater use of fossil fuels for power generation, makes atomic power more attractive. A power supply option that does not generate greenhouse gases, such as carbon dioxide (CO_2), or controlled pollutants such as sulfur dioxide (SO_2) and nitrogen oxides (NOx), is attractive from an environmental perspective. While the capital costs of nuclear power plants are not expected to be considerably greater than other emerging new baseload technologies, the fuel costs of nuclear are low and the next generation of nuclear power plants will be safer, notwithstanding the high levels of safety at today's reactors (Francis 2005).

The Bush Administration and Congress have signaled their continued support of nuclear power to help reduce our dependence on foreign sources of energy and contribute to environmentally attractive solutions to electricity generation. President George W. Bush stated, when signing the Energy Policy Act of 2005, that "nuclear power is another of America's most important sources of electricity. Of all our nation's energy sources, only nuclear power can generate massive amounts of electricity without emitting an ounce of air pollution or greenhouse gases, and because of advances in science and technology, nuclear plants are far safer than ever before" (NEI 2005).

Challenges remain on key issues such as waste storage and disposal; nuclear non-proliferation; and overall safety perceptions in some circles. Nonetheless, nuclear power seems poised to enter a second phase of prominence in the U. S. and globally as part of a diverse electricity supply mix.

The Scope of Nuclear Power in the South

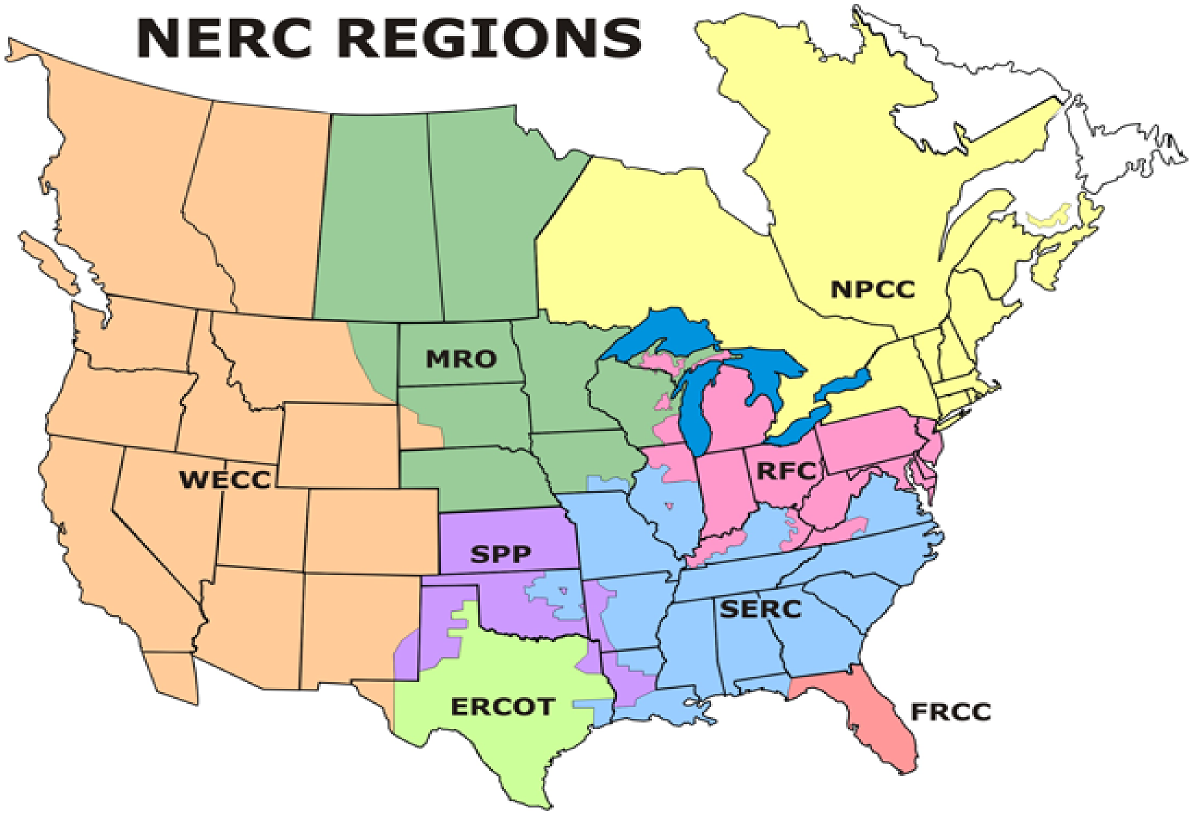
Nuclear Power Fulfills a Need for Electricity

Many states in the South are confronted with increasing electricity demand and the resulting need for new baseload electricity generation. In Texas, high temperatures in April 2006 created rolling blackouts, and future electricity demand has state planners concerned. Electric utilities typically undertake routine power plant maintenance in the 'off-peak' months during the spring and fall, but this extreme weather event created a real capacity shortage and rolling blackouts throughout the Electric Reliability

Council of Texas (ERCOT), affecting over 600,000 residences and businesses in the north Texas area (Piller 2006). The state's surplus of electricity—about 20% in 2000—is expected to be no more than 11% by 2010 because of population growth, retirements of older power plants and a slowdown in the construction of new electric generation.

While the Texas incident was partially blamed on abnormal temperature patterns for the spring, the need for additional electrical generating capacity in the South is clear. According to the North American Electric Reliability Council (NERC), electricity growth for the summer peak demand for the past 10 years nationwide has been around 2.4% per year, while the forecast for the next 10 years is slightly lower at 2% per year. In the South, peak demand is expected to grow at a slightly faster pace – 2.1% per year for the Southeast Electric Reliability Council (SERC) states; 2.7% per year for Florida; 1.8% per year for ERCOT; and 1.3% to 1.5% per year for the Southwest Power Pool (SPP). Energy use is

Figure 1: NERC Regional Reliability Councils



NOTE: The Southern States Energy Board consists of member states represented, in the most part, by the following reliability organizations of the North American Electric Reliability Council (NERC): SERC (Southeast Electric Reliability Council)- most of the SSEB states; ERCOT (Electric Reliability Council of Texas) – majority of Texas; SPP (Southwest Power Pool) – Oklahoma, Missouri, portions of TX, LA, AR; FRCC (Flordia Regional Coordinating Council) – Florida.

projected to follow a similar pattern with nationwide growth expected to be around 1.8 % per year while SERC forecasts energy to grow at 1.7% per year. (Figure 1 shows the regional reliability organizations that comprise NERC).

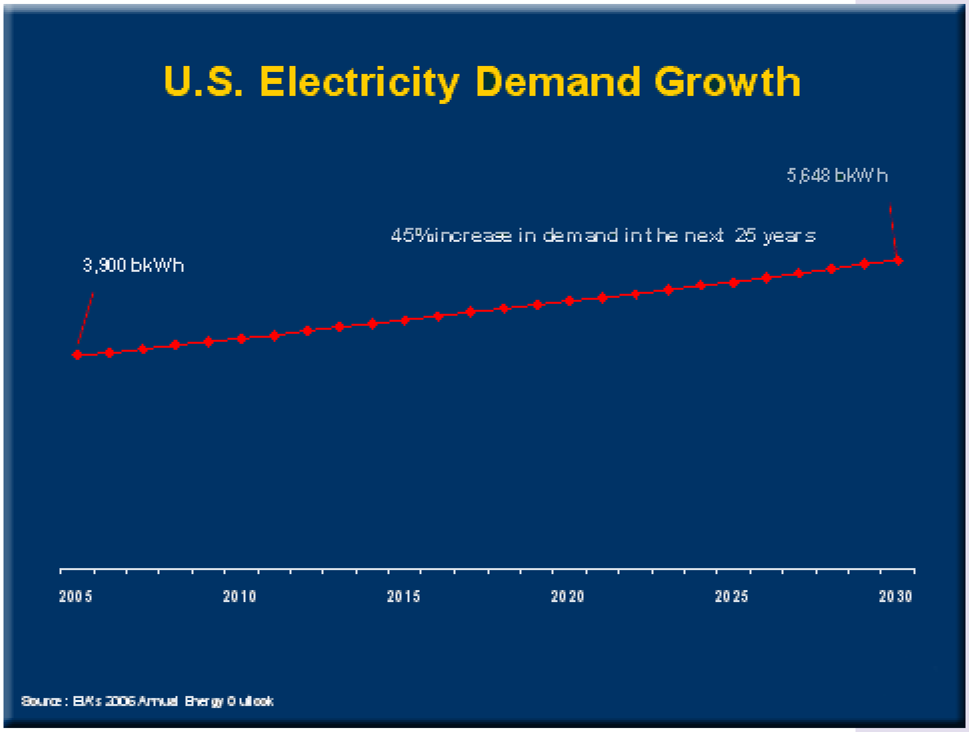
Part of the increased use of electricity is due to the increased population in the region. Between 1990 and 2000, the region's population grew by 17%, and eight of the states in the region grew by a greater percentage than the national average of 13.1%. Between 2000 and 2004, the nation grew some 4.3% while the South grew by 5.6%. This trend is expected to continue in the future. With the population of the South representing some 38% of the total U.S. population in 2004, the expected higher growth in the South will be significant.

In the NERC regions that serve the SSEB states, the following peak loads are expected:

NERC Region	Peak Electric Demand 2006 (Gigawatts)	Peak Electric Demand 2010 (Gigawatts)
Southeast Electric Reliability Council	163.0	178.8
Electric Reliability Council of Texas	61.0	65.0
Florida Regional Coordinating Council	41.9	46.8
Southwest Power Pool	41.2	44.3

Most regions maintain a capacity reserve margin – a measure of installed capacity and peak load – of 11% to 15%. As electric demand grows, supply must grow in order to maintain adequate reserves and to reliably supply energy requirements. Nationally by 2010, the peak electric load is expected to reach 807.4 GW in 2010 up from an expected peak of 743.9 GW in 2006. Figure 2 shows the expected growth in electrical energy requirements, in billions of Kwh, over the next 25 years.

Figure 2: Electricity Demand Forecast Through 2030



Over the past dozen years, the majority of the capacity additions to meet additional load growth have been natural gas-fired combined cycle capacity (for intermediate load service) or combustion turbines for peaking needs. From 1998-2004, 132.4 GW of combined cycle capacity was added to the generation mix and 73.5 GW of combustion turbines of the total 216.1 GW added. The forecast for the next

10 years is for 48.1 GW of combined cycle additions; 6.5 GW of combustion turbines; 19.4 GW of coal; 12 GW of wind turbines; and 2.9 GW of nuclear uprates and the refurbishment of Tennessee Valley Authority's Browns Ferry 1 nuclear plant.

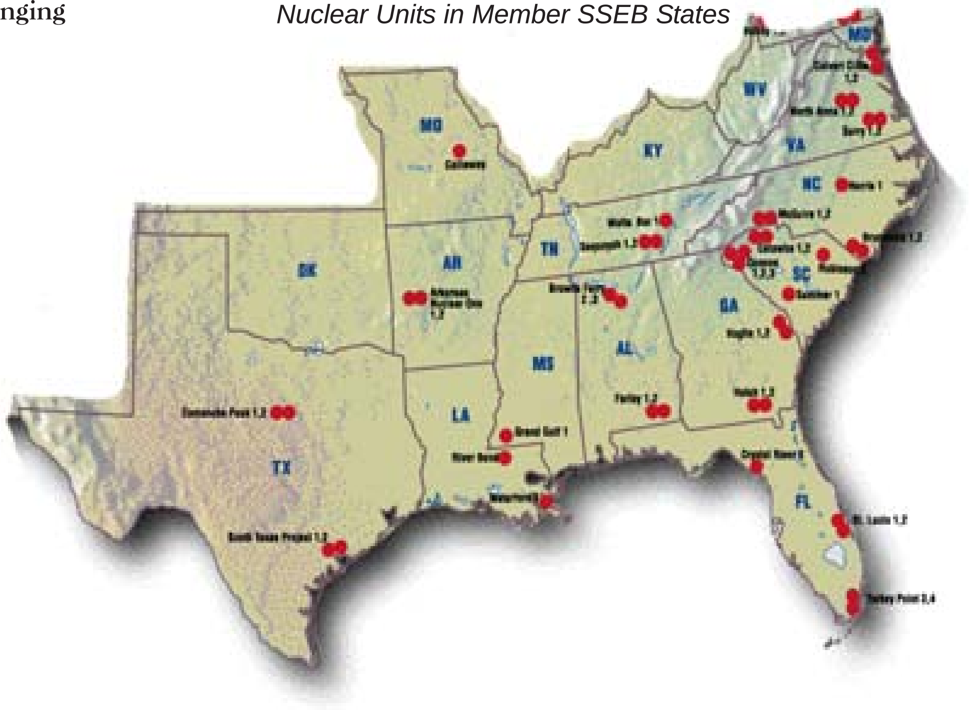
According to the U.S. Energy Information Administration, all regions will need additional generating capacity by 2025 with the greatest need in the Southeast and the West. In 2025, the Southeast will account for around 30 percent of projected total demand due to the size of the electricity market and the slightly higher growth in the region, as described earlier. The EIA report expects coal-fired generating units and renewable capacity to be among the capacity additions in the Southeast (EIA Annual Energy Outlook 2005). Electricity demand over the next 25 years will be 45% greater than it is today. To maintain the current electric fuel supply mix would require building the equivalent of 50 nuclear reactors of 1,000 MW each, 261 coal plants at 600 MW each, 279 natural gas plants at 400 MW each, and 93 renewable power supply sources at 100 MW each (a total of some 328 thousand MW).

Increasing investment by the public and private sectors for the construction of new nuclear plants has generated significant interest on Wall Street. Fitch Ratings is one of the Wall Street firms bullish on the prospect of new nuclear plants in the near term:

> *It is no longer a matter of debate whether there will be new nuclear plants in the industry's future. Now, the discussion has shifted to predictions of how many, where and when. New nuclear plants and baseload power plants using new coal technologies are least likely to appear in the populous and energy-hungry Northeast or in California, regions that already have significantly higher energy prices than the Southeast and Midwest. For political or geological reasons, these regions are likely to rely either on gas-fired power facilities or costly investments for other resources, such as wind or solar. These differences will tend to favor lower energy prices in the Southeast and Midwest to the disadvantage of the Northeast and California (Fitch Ratings 2006).*

While some of this new electrical load of the next 20 years will be met by wind power and other renewable energy options, including small-hydro, the bulk of the requirements will have to fall to a large, central station power supply option. Limitations to the amount of energy that can be generated by wind power, for example, include the fact that there are certain periods of the day when the wind does not provide adequate or sustained speed to ensure reliable power supply. Typically wind generators operate at capacity factors ranging from 25 to 40 percent. Wind facilities also require large amounts of land, typically located considerable distances from the users, resulting in significant transmission line losses. Solar facilities, meanwhile, are still economically unattractive and also need the capability to store energy for nighttime supply. Coal-fired power plant technology, with emerging emissions-reduction technology, is expected to be available within the next decade. Nuclear power, with its abundant fuel supply and recent high safety and efficiency ratings, will be a viable, economical option to fill those energy and capacity needs.

Figure 3: Map Showing Current Nuclear Units in Member SSEB States



Nuclear Power Plants Operating in the South

Since they first started to come on line in the early 1970s, the 44 nuclear generating units in the SSEB region have been a reliable, efficient source of electricity for a growing economy and for consumers. Nuclear plants in the South have a combined electrical generating capacity of approximately 44 Gigawatts (GW). In 2005, these reactors contributed about 341 billion Kwh of electricity, following 350 billion Kwh of total generation in 2004. The operating capacity factor of those units over the past three years is 90.3% (excluding Browns Ferry 1, which is not currently operating). One of the newest nuclear plants is also located in the South at the Tennessee Valley Authority's Watts Bar site, a 1,121-MW reactor that began commercial operation in 1996. Figure 3 is a map of the nuclear generating units in the South while Table 1 lists the nuclear generating units in the SSEB member states along with their capacities and license expiration dates. Table 2 shows recent state-by-state generation from nuclear capacity along with the percentage of generation in each state that comes from nuclear power.

Table 1 - Nuclear Generating Units in the Southern States

State	Unit Name	Capacity (MW)	License Expiration	State	Unit Name	Capacity (MW)	License Expiration
AL	Browns Ferry 1 *	1065	2013	MO	Callaway 1	1137	2024
	Browns Ferry 2	1118	2014		Total	1,137	
	Browns Ferry 3	1114	2016	NC	Brunswick 1	938	2016
	Farley 1	851	2017		Brunswick 2	900	2014
	Farley 2	860	2021		McGuire 1	1100	2021
	Total	5,008			McGuire 2	1100	2023
AR	Arkansas Nuclear 1	841	2014		Shearon-Harris	900	2026
	Arkansas Nuclear 2	996	2018		Total	4,938	
	Total	1,837		SC	Catawba 1	1129	2024
FL	Crystal River 3	838	2016		Catawba 2	1129	2026
	St Lucie 1	839	2016		Oconee 1	846	2033
	St Lucie 2	839	2023		Oconee 2	846	2033
	Turkey Point 3	693	2012		Oconee 3	846	2034
	Turkey Point 4	693	2013		Robinson 2	710	2010
	Total	3,902			Summer	966	2022
GA	Hatch 1	869	2034		Total	6,472	
	Hatch 2	883	2038	TN	Sequoyah 1	1150	2020
	Vogtle 1	1152	2027		Sequoyah 2	1127	2021
	Vogtle 2	1149	2029		Watts Bar 1	1121	2035
	Total	4,053			Total	3,398	
LA	River Bend	968	2025	TX	Comanche Peak 1	1150	2030
	Waterford 3	1087	2024		Comanche Peak 2	1150	2033
	Total	2,055			South Texas 1	1280	2027
MD	Calvert Cliffs 1	873	2034		South Texas 2	1280	2027
	Calvert Cliffs 2	862	2036		Total	4,860	
	Total	1,735		VA	North Anna 1	925	2018
MS	Grand Gulf 1	1270	2024		North Anna 2	917	2020
	Total	1,270			Surry 1	799	2012
					Surry 2	799	2013
					Total	3,440	

Table 2: Nuclear Generation by State and Percentage of State Generation - 2005

State	Nuclear Capacity (MW)	Nuclear Generation (Billions of Kwh)	Percentage of Generation from Nuclear Energy	Three Year Nuclear Capacity Factor (%)
Alabama	5,008	31.7	23	73.5
Arkansas	1,837	13.7	29	90.4
Florida	3,902	28.8	13	88.5
Georgia	4,053	31.5	24	92.5
Louisiana	2,055	15.7	17	90.2
Maryland	1,735	14.7	28	94.8
Mississippi	1,270	10.1	22	93.6
Missouri	1,137	8.0	9	85.5
North Carolina	4,938	40.0	31	94.2
South Carolina	6,472	53.1	52	90.8
Tennessee	3,398	27.8	29	90.2
Texas	4,860	38.2	10	88.5
Virginia	3,440	27.9	35	89.4
Total	44,105	340.4		88.1 (90.3 without Browns Ferry 1)

Nuclear Energy is a Stable, Reliable Power Supply in the South

Nuclear power plants supply electricity around the clock and help ensure the stability of the nationwide electrical supply. Since the fuel costs and other operational costs of nuclear plants are relatively low compared to other options (except hydro and other renewables), nuclear generating capacity typically operates as 'base load' generation operating at full output every hour of the day.

In addition, nuclear plants typically operate for long periods of time between either scheduled refueling outages or occasional outages due to unplanned maintenance. Originally the operation of nuclear plants was scheduled so that refueling outages were planned for every 12 months, but the industry standard has changed over time to 18 months to 24 months. As a point of reference, the longest continuous run by a U.S. light water reactor is LaSalle 1, which completed a 739 day run in February 2006 (NEI 2006).

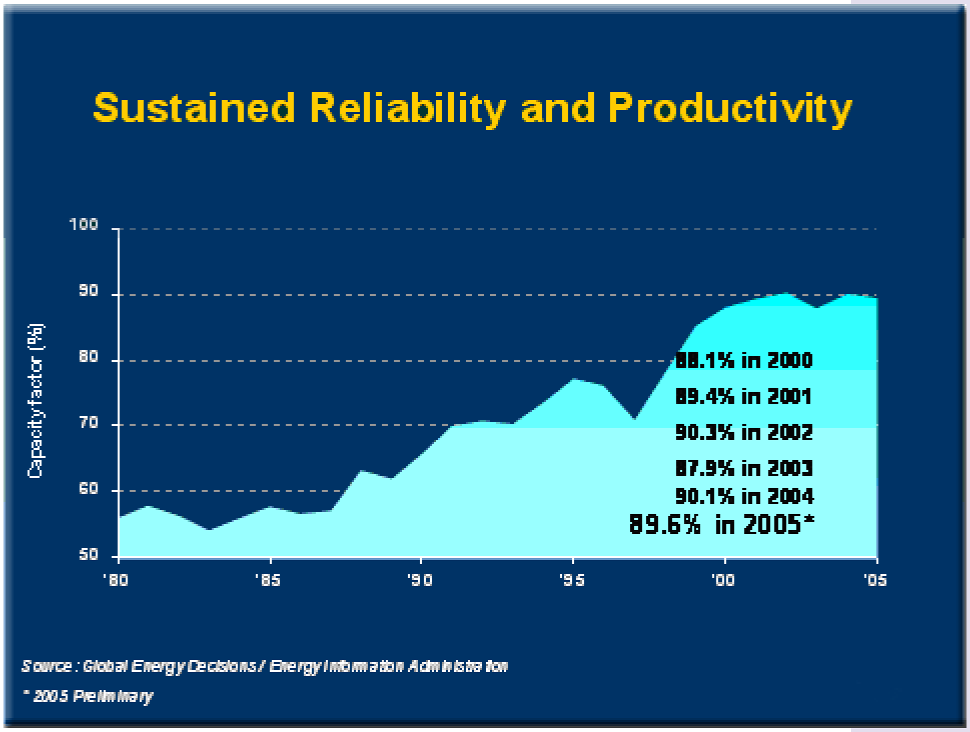
Electric companies have been steadily reducing the period of time it takes to refuel reactors, thereby increasing the time that they are producing electricity. In 2005, the average refueling outage was 38 days—compared to 104 days in 1990. The shortest refueling outage by a U.S. nuclear power plant is less than 15 days, attained by TVA's Browns Ferry Unit 3 in 2002 (NEI 2006). Industry-wide improvement in refueling outage duration is due to "significant improvements to processes; planning; training; earlier inspections of equipment; simultaneous performance of more work; and the use of new equipment to perform routine tests more efficiently" (Power 2005).

An important measure of overall reactor performance is capacity factor. In the past three years, the average capacity factor – the amount of energy actually produced divided by the maximum energy potential over that time – was 89.2% for U.S. nuclear plants. This includes plant down time due to scheduled refueling and unplanned maintenance shutdowns.

As shown in figure 4, nuclear plant capacity factors have grown steadily over time from the first six years, when capacity factors ranged between 54% and 58% to the most recent five years (2001-2005), when capacity factors were at an all-time high of 87%to 90.3%. During that time, the median capacity factor for five year increments has steadily climbed from 56.6% in 1980-1985 to 70.9% (1991-1995) and

89.6% percent from 2001 -2005 By comparison, the average capacity factor for coal-fired plants is 72.6%; natural-gas plants, 37.7%; hydropower, 29.3%; wind, 26.8%; and solar, 18.8%.

Figure 4: Nuclear Unit Capacity Factors Improve Over Time



Price Stability Relative to Other Fuel Types

Nuclear energy is characterized by low production costs, high capital costs, stable fuel prices, long operational life and significant regulatory costs. Existing nuclear power plants are generally competitive even in deregulated markets and particularly when initial investment costs have been amortized (NEA 2003, 59).

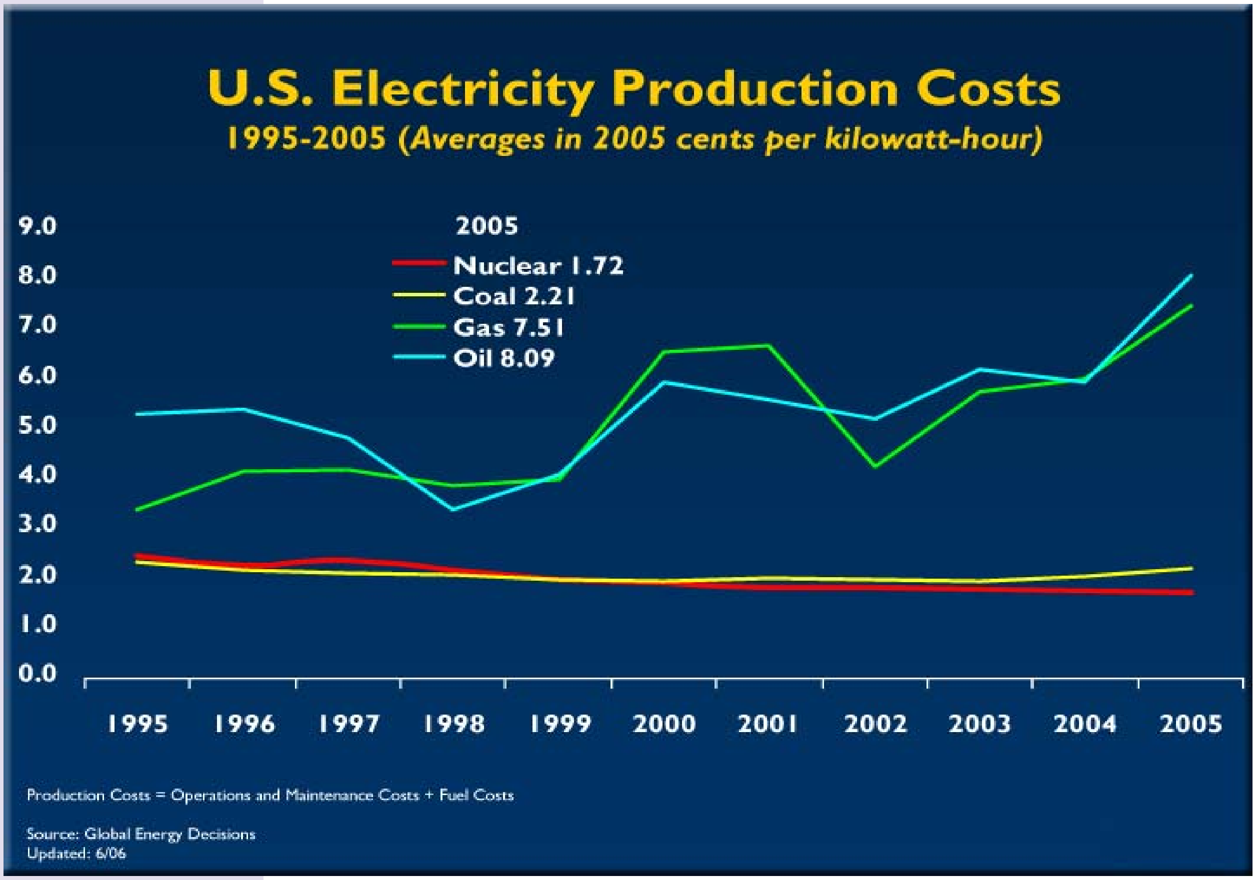
The total cost of producing electricity from nuclear power consists of three major categories: investment in capital costs; operation and maintenance; and fuel. Although capital costs are high, the overall production cost of electricity from nuclear generation is relatively stable over time due to the low fuel costs and continued reductions in operating and maintenance costs.

Nuclear fuel has been a relatively abundant resource for which there is little concern over long-term availability or price stability. Fuel costs include purchasing uranium, and conversion, enrichment, and fabrication services. For a typical 1,100-MW reactor, the approximate cost of fuel for one reload (replacing one third of the core) is about $40 million, based on an 18-month refueling cycle. The average fuel cost at a nuclear power plant in 2004 was 0.42 cents/Kwh, cheaper than most other fuel sources for electric generation (NEI 2006).

Operating and maintenance costs include expenses apart from fuel cost, including the cost of operating and support staff, training, security, health and safety, and management and disposal of operational waste. In addition, the costs of ongoing maintenance and inspection are also included.
Total production costs of electricity from a nuclear generating unit consist of approximately 25% fuel

and 75% operating and maintenance (O&M) cost. For a coal unit, some 76% of the production cost of the plants is in fuel while 24% is O&M. For gas-fired generation, approximately 91% of the total production cost is its fuel cost. Figure 5 shows production costs for various generating sources. Since 1981, production costs of nuclear energy increased from 2.54 cents/Kwh to a high of 3.63 cents/

Figure 5: Production Costs of Various Generating Options



Kwh in 1987 before declining steadily to an average in 2004 of 1.68 cents/Kwh (2004 dollars). Although this was higher than the production costs of coal-fired electricity during the 1990s, the production cost of nuclear and coal were essentially the same at the turn of this century. In 2004, production costs for nuclear plants were slightly lower than the cost of coal-fired generation (1.68 cents/Kwh for nuclear versus 1.92 cents for coal).

By comparison, the production costs for gas-fired generation was 5.87 cents/Kwh in 2004, several times that of the cost of nuclear energy. Because nuclear plants refuel every 18-24 months, fuel costs are not subject to fuel price volatility like natural gas and, more recently, coal-fired power plants. Steve Specker, president of the Palo Alto, CA-based Electric Power Research Institute (EPRI), said during a recent panel on future generating costs that as the electric industry begins to recognize and assign a cost associated with CO_2 emissions, the total operating cost of the coal-fired generation will increase relative to nuclear generation (2006).

Economic Impact of Nuclear Power Plants

The average U.S. nuclear plant employs approximately 500 employees in the local community. These jobs typically pay salaries that are 40 percent higher than the average salaries in the local area. Economic activity by the plant also generates 500 additional jobs in the local area, according to studies of several nuclear power plants by the Nuclear Energy Institute.

A nuclear plant generates approximately $350 million in total output for the local community, and roughly $60 million in total labor income. These figures include both direct and secondary effects. The direct effects reflect expenditures for goods, services, and labor made directly by the plant. The secondary effects include subsequent spending effects and reflect how plant expenditures "trickle down" through the local economy.

Another way of measuring the secondary effects of a plant is by using multipliers, which show the ratio of the plant's "total economic impact" to its "direct economic impact" and can be measured for each geographic region. Multipliers essentially measure how many dollars are created in the economy for every dollar spent by the plant. The local output multiplier for the average nuclear plant is approximately 1.13. That means that every dollar spent by a nuclear plant results in the creation of $1.13 in the local community.

Nuclear plants also account for a significant amount of tax revenue to their state and local communities. The tax impacts from a nuclear plant extend beyond the tax revenue generated directly by the plant. Spending from the plants has direct impacts on income and value creation, which, in turn, affects taxes paid on that income and value. Similarly, the secondary effects of plant purchases on other products and services, in addition to the increased economic activity itself, lead to additional income and value creation, as well as additional tax revenues. The average nuclear plant results in total state and local tax revenue of over $20 million. These tax dollars benefit schools, roads and other state and local infrastructure needs.

A specific example of the benefits of nuclear plants is found in a 2004 report on the economic impacts to local communities and the states of Duke Power's nuclear power plants. In this report, NEI estimated that the economic impact on the counties surrounding the nuclear plants at McGuire and Catawba are more than $1.5 billion, and those surrounding Oconee plant at $791 million.

In a 2004 economic impact study of Progress Energy's Brunswick Nuclear Power Station, University of North Carolina-Wilmington economists Claude

Farrell and William Hall Jr. found that the Brunswick facility has significant positive impacts on the four Southeastern counties of North Carolina. The facility has impacts on gross output or income, employment, payrolls, self-employment income, property income, indirect business taxes, and local property taxes. The facility's impact on gross output or income in the four counties was almost $901 million in 2003, 14 percent of the value of total regional output in the four-county area.

The Brunswick facility supported 2,030 jobs (1.3 percent of total employment) and $88.4 million in payrolls in the region in 2003, with an annual average salary per job of $43,500. "Prior to this report, little, if any was known about the facility's economic impact inside or outside of Brunswick County. It has been an unknown and, perhaps, at times, misunderstood and unappreciated, major asset to the four-county regional economy," the analysis found. "Also, not to be overlooked are Progress Energy's significant public service contributions associated with the nuclear facility."

New Nuclear Plants - An Energy Imperative?

Improved Financial Climate for Nuclear Power

Independent analyses by the University of Chicago and the Massachusetts Institute of Technology in 2003 and 2004, respectively, found that the first few new nuclear power plants would face unique economic and financing hurdles. The Energy Policy Act of 2005 addressed these hurdles with several financial incentives for the construction of a limited number of new nuclear plants in the United States. A production tax credit, similar to the credit for wind and solar generation, and a loan guarantee program, available to all low- or zero-emission generation, were designed to improve the economics of and to facilitate financing for the first few new nuclear power plants. The legislation also provided standby support, a form of insurance, to help protect private companies against delays caused by licensing or litigation owing to factors beyond their control.

The electric utility industry has a much shorter focus than in the past. Avoiding near-term economic risk will sometimes outweigh long-term needs resulting in the increased reliance on one fuel source, such as the over-reliance on natural gas in the electricity sector over the past dozen years. One key issue that will impact the future of nuclear energy is the ability to finance new nuclear power plants. In that regard, recent key financial institutions have bolstered the outlook for new nuclear power plant construction.

Merrill Lynch, discussing the need for environmental controls on coal plants, sees large nuclear utilities as “beneficiaries of the rising cost profile of coal generation and since the costs of nuclear power are relatively stable, these higher prices lead to higher margins for the nuclear plants. In addition, nuclear utilities represent a free option on potential future carbon-reduction legislation, and this should be an added margin for a nuclear plant” (December 2005). Moody’s says “the favorable trend of [nuclear] plant performance is partly due to the sector’s proactive response to meeting much stricter inspection requirements imposed by the NRC” (February 2004).

Finally, Prudential Equity sees a convergence of “powerful economic and political forces that should lead to a renaissance of nuclear power,” with momentum for new nuclear construction being sustained by industry and federal officials who see nuclear as emission-free, secure source of electricity (Prudential Equity Group, January 2005).

Of course, the first investors to gain access to funds for a new nuclear plant will be charting a new course—or at least one that has not been navigated with the current market, policy and technology variables. Uncertainty will continue to create some investment angst until the new era of nuclear power expansion is well underway. The Energy Policy Act of 2005 will also play a role in invigorating investor confidence and enabling new nuclear power plants to come on line.

Implications on Nuclear Power of Energy Policy Acts of 1992 and 2005

Energy Policy Act of 1992

Although this law had energy-efficiency and conservation as its key features, several sections of the act deal specifically with nuclear power and the role it plays in the electricity mix of the United States. The act codified the framework for the licensing process for new nuclear plants, given protracted delays and ensuing financial difficulties posed by the former process. The revised licensing process allows for public input early, so that energy companies can resolve issues before they make a large financial commitment to build a new reactor.

As many as 10 energy companies are now pursuing license applications for new reactors using approaches developed under the framework provided by the 1992 law. These include the early site permit process, which allows a company to gain pre-approval of a site for a new reactor in advance of a decision to build, and combined operating process, which allows a company to pursue a construction permit and an operating license for a new reactor simultaneously. The law established the United States Enrichment Corporation (USEC) for the purpose of managing uranium and uranium enrichment services both domestically and to foreign entities. USEC today is a $1.6 billion corporation that operates the only uranium enrichment facility in the United States, a gaseous-diffusion plant, at Paducah, Kentucky.

The act also dealt with uranium supply and processing, including the establishment of the National Strategic Uranium Reserve; and health, safety and environmental issues associated with uranium enrichment activities. In addition there was a focus on the commercialization of advanced nuclear reactor technology, in particular the advanced light-water technology and the modular high temperature gas-cooled reactor technology, along with the liquid metal reactor technology. The act set in place the framework allowing a company to gain certification for a new plant design, paving the way for standardized reactors – an approach not applied on a large scale with the construction of today's operating reactors.

Energy Policy Act of 2005

Signed into law in August 2005, this law includes a range of measures supporting both currently operating plants and the construction of new nuclear plants. The act provides limited incentives for building new reactors, including loan guarantees, production tax credits, and investment protection for delays beyond the builder's control; extends the Price-Anderson Act framework for industry-funded indemnification insurance; and provides added nuclear energy research and development funding.

The production tax credit provides a credit of 1.8 cents/Kwh for the first 6,000 Mwh of generation from a new nuclear unit for its first eight years of operation for units in service before 2021. The loan guarantee component of the act provides loan guarantees up to 80 percent of the zero-emission or low-emission project costs, while the standby insurance provision protects for financial impacts of delays beyond the industry control for the first six reactors. These delays could be due to delays in NRC inspections or litigation.

Senate Energy and Natural Resources Chair Pete Domenici of New Mexico, in hearings in May 2006, said this insurance on delays is an essential part of the act and believes new nuclear generation of up to 25,000 MW could be in place between 2015 and 2020. "It's important that this risk insurance be done right. We haven't seen a new nuclear power plant ordered in three decades. I consider an effective insurance program to help utilities cover the cost of delays caused by law suits or regulatory problems essential to making those proposed plans a reality" (Energy Senate Press Release 2006).

New Nuclear Plant Licensing – Plant Design Certification, Early Site Permits, and Combined Operating License

Interest in one-step nuclear power plant licensing was accentuated following lengthy licensing procedures for the Shoreham Nuclear Plant in New York and the Seabrook plant in Massachusetts in the 1980s. According to the NRC, it was "apparent that the complicated licensing process was a major deterrent to utilities who might consider building nuclear plants." The NRC proposed to facilitate the licensing procedures by replacing the traditional two-step process with a one-step system. In this system, the NRC established a graded approach that applied to the systems, structures, and components and their relationship to plant safety, thus ensuring safety while providing flexibility for development of new designs (NRC 2003).

NRC Chairman Nils Diaz suggested the use of a revamped 10 CFR Part 52 for licensing new nuclear plants depends on numerous factors, including the quality of the application submitted by the electric company. "The primary purpose for establishing the new Part 52 process for licensing nuclear power facilities was to encourage early resolution of issues to increase regulatory predictability in advance of major financial commitments while maintaining the requisite safety reviews."

Recognizing the number of potential applications for new plants that are expected to use the AP1000, the economic simplified boiling water reactor (ESBWR) and the economic pressurized reactor (EPR), "there is much appeal in an approach that resolves specific design details for all important areas early in the process – early resolution of environmental issues and emergency preparedness, prior to submittal of the combined construction and operating license (COL) application, could be beneficial to the timely completion of the COL reviews." Standardization in both industry planning and COL application review is the key to making this approach work for potentially scores of license applications for the three reactor designs (Diaz February 13, 2006).

The certification of new standard reactor designs resolves all safety issues with the design before it is ordered for a particular site. The design certification process is a lengthy process but has been successfully completed for four advanced reactor designs: the Westinghouse AP-600 (Pressurized Water Reactor or PWR); the Westinghouse AP-1000; Combustion Engineering System 80+ (PWR); and the GE Advanced Boiling Water Reactor (BWR). The GE ESBWR is currently under review and AREVA intends to pursue certification of its EPR design.

Early Site Permits (ESP)

The early site permit (ESP) process allows an applicant to address site-related issues, such as environmental impacts, for possible future construction and operation of a nuclear power plant at a site. The NRC's review process requires both a technical review of safety issues and an environmental review for each application. If approved, an ESP gives the applicant up to 20 years to decide whether to build one or more nuclear plants on the site and to file an application with the NRC for approval to begin construction.

To date, three ESP applications have been submitted, all at sites where nuclear power plants are currently operating. Dominion, Entergy and Exelon have submitted applications, and discussions have taken place within Duke Energy to consider application for ESP for a new reactor site (Travieso-Diaz 2004, 83). The NRC issued a final environmental impact statement on the proposed ESP for the Grand Gulf nuclear plant site near Vicksburg, Mississippi. The Grand Gulf ESP application was filed in 2003 by System Energy Resources, a subsidiary of Entergy Nuclear.

Another three companies, including Southern Company, are either preparing or considering filing ESP applications. The NRC has recently held public meetings in Georgia, for example, to discuss review of possible early site permit application for the Southern Nuclear Operating Company's Vogtle site, which already has two reactors generating electricity (NRC April 25, 2006).

Combined Construction and Operating Licenses (COL)

Consolidation of steps required to obtain an operating license is another important licensing change intended to make the entire process more efficient and manageable. Instead of filing separate applications for a construction permit and then an operating license, a prospective nuclear plant operator applies for one combined construction and operating license (COL), during which time contentious licensing issues and public participation in the project are vetted prior to construction. "The intent is that the only remaining issues that may be raised after the plant is built are those relating to adherence by the as-built facility to the design specifications and any new safety issues that may have emerged since the COL was issued" (Travieso-Diaz 2004, 84).

Most of the new nuclear plant activity is focused in the Mid-Atlantic and Southern states. Three consortia have applied to the U.S. Department of Energy for matching grants to pursue COLs including NuStart Energy, a TVA-led group, and a Dominion Energy-led group. NuStart, which consists of Constellation Energy, Duke Energy, EDF International North America, Entergy, Exelon, Florida Power & Light, Progress Energy, Southern Company, TVA, General Electric and Westinghouse, has identified two sites for which it plans to file an application for COL. At TVA's Bellefonte site, a Westinghouse AP 1000 reactor plan will be submitted; and at Entergy's Grand Gulf site, a GE ESBWR plant will be submitted. NuStart Energy's mission is to keep the nuclear option open by demonstrating the NRC application and approval process for COL.

Progress Energy is preparing to file COL applications for possible new nuclear plants, one in the Carolinas and one in Florida, with an application date for both COLs to the NRC by 2008. If plans continue on track, construction of these units could begin as early as 2010 with power generation by 2015. According to company officials, variables that will impact decisions regarding which future generating options to pursue include the power market conditions; projections of other proposed plants in the area; fuel prices; regulatory environment; and the ability to obtain financing. "Nuclear power may prove to be our best option to provide reliably affordable and emissions-free energy and it will provide an opportunity to maintain a diverse fuel mix in meeting future demand" (Progress Energy 2005).

In addition, Duke Power plans to submit a COL within 24-30 months for the Westinghouse AP-1000. Southern Nuclear Operating Co. plans to submit a COL for a new reactor at its Vogtle plant while Entergy likewise has submitted plans for its River Bend plant.

History of Nuclear Energy

The Early Days of Nuclear Power in the United States

After World War II, the U.S. government encouraged the development of nuclear energy for peaceful civilian purposes. Congress created the Atomic Energy Commission (AEC) in 1946. The AEC authorized the construction of Experimental Breeder Reactor I in Idaho, where electricity was first generated from nuclear energy on Dec. 20, 1951 (DOE 1994).

> *To stimulate the private development of nuclear power, the Atomic Energy Commission provided myriad supports to U.S. firms engaged in building and operating nuclear power stations, including underwriting reactor construction costs, providing free fuel for reactors, funding nuclear research & development activities, and committing the federal government to the development of nuclear waste disposal facilities (Rodobnik 2006, 105).*

In 1953, President Dwight Eisenhower delivered his "Atoms for Peace" speech at the United Nations, declaring that the United States was intent on fostering international cooperation of an energy technology "to solve humanity's energy difficulties by the end of the century." The Eisenhower Administration also supported congressional enactment of the Price-Anderson Act of 1957, which limited the liability of utilities operating nuclear reactors to a maximum of $560 million in the event of any accident (Rodobnik 2006, 105). Today, the U.S. nuclear power industry has an umbrella of more than $10 billion in liability insurance protection to be used in the event of a reactor incident. Utilities, not the public or the federal government, pay for this insurance.

A major goal of nuclear research in the mid-1950s was to show that nuclear energy could produce electricity for commercial use. The first commercial nuclear plant powered by nuclear energy was located in Shippingport, Pennsylvania. It began commercial operation in 1957. Light-water reactors like Shippingport use ordinary water to cool the reactor core during the chain reaction. Private industry became more and more involved in developing light-water reactors after Shippingport became operational and federal nuclear energy programs shifted their focus to developing advanced reactor technologies (DOE 1994).

The U.S. nuclear power industry grew rapidly in the 1960s. Electric utility companies saw this new form of electricity production as economical, environmentally clean, and safe. In 1963, Jersey Central Power and Light announced a commitment to the Oyster Creek nuclear plant, the first time a nuclear plant had been ordered as an economical alternative to fossil fuels (Nuclear Technology Milestones). In 1973, U.S. utilities ordered 41 reactors, and in 1974, the first reactor of 1,000-MW size came online with Commonwealth Edison's Zion 1 unit in Illinois (DOE 1994).

Nuclear Power Grows in the South

The first nuclear plants in the South in the early 1970s were Carolina Power & Light's H. B. Robinson 2, Surry 1 in Virginia, Turkey Point 3 in Florida, Duke's Oconee 1 and 2, TVA's Browns Ferry 1 and Arkansas Nuclear 1. From an electricity dream in the sixties to large-scale power generation of the 1970s, the large boost of nuclear energy was beginning to make a major mark in the electricity supply and the economy in the South.

A task force for nuclear power policy created by the Southern Governors' Conference in 1969 investigated the public issues, opportunities, and environmental effects related to the increased use of nuclear power and assisted in the development of state and regional nuclear power policies for the public interest. The task force (1) identified and evaluated relevant information on the role of nuclear power in satisfying state and regional electric energy requirements; (2) studied public issues and problems related to nuclear power operations, plant safety, radiation control, waste disposal, cooling water discharge, and other environmental considerations; and (3) prepared recommendations for state or regional nuclear power policies for consideration by governors and other state officials (Southern Governors' Conference 1970).

Recommendations of the report included a statement of support for the development of nuclear power; public education program; regulatory responsibility review and sharing with the federal government; analysis and studies of numerous aspects of nuclear power; and cooperation and coordination among organizations and agencies, among others. The Southern States Energy Board, originally formed in the early 1960s as the Southern Interstate Nuclear Board, has continued to be involved with nuclear issues since this time.

Electricity growth averaged about 7 percent per year for a number of years, doubling every 12 years, in the 1960s and early 1970s when nuclear power plants were being planned. In addition, projections of capital and operating costs were relatively optimistic so that new nuclear units were being ordered throughout the country at a rapid pace. In the late 1970s and 1980s, however, growth slowed. Demand forecasts for electricity decreased and concern grew over nuclear issues, such as reactor safety, waste disposal, and other environmental considerations (DOE 1994). The oil embargo of the early 1970s stalled economic growth, while delays and cost increases were occurring at nuclear power plant projects. Together, these factors resulted in a number of utilities canceling baseload power projects, both coal and nuclear, that were either under consideration or already under construction.

Yet, throughout these past 30 years, nuclear power in the South has been a key factor leading to stable electric rates and an adequate, reliable supply of power. With generation topping 341 billion Kwh in 2005 in the 16 SSEB states, nuclear energy provides approximately one-fifth of the electricity needs of those states. Note that South Carolina receives 52% of its electricity from nuclear power, while Virginia receives 35% and North Carolina 31%. All but three SSEB states host nuclear power plants.

Nationally, nuclear power generation has tripled in the past 25 years—from 251 billion Kwh in 1980 to nearly 782 billion Kwh in 2005. The South's annual generation from nuclear power over select years is shown in Table 2 and has averaged 342 billion Kwh in the past four years. As a point of reference, the South uses approximately 44% of the nation's total electricity. Note that in 2005, the environmental benefits of nuclear energy resulted in the prevention of 305 million tons of carbon dioxide (CO_2) emissions; a 1.5-million ton reduction in sulfur dioxide (SO_2) emissions; and a 500,000-ton reduction in nitrogen oxide (NOx) emissions.

Table 3: Total Nuclear Generation from SSEB Member States - Selected Years

	Billions of Kwh													
	AL	**AR**	**FL**	**GA**	**LA**	**MD**	**MS**	**MO**	**NC**	**SC**	**TN**	**TX**	**VA**	**Total**
1986	11.6	8.9	22.0	7.2	10.6	12.8	4.1	7.2	20.3	35.6	0	0	21.2	162
1996	29.7	13.4	25.5	29.9	15.7	12.1	9.2	8.9	33.7	43.6	22.9	35.7	26.3	307
2002	31.8	14.6	33.7	31.1	17.3	12.1	10.1	8.4	39.6	53.3	27.6	35.6	27.3	343
2003	31.7	14.7	31.0	33.3	16.1	13.7	10.9	9.7	40.9	50.4	24.1	33.4	24.8	335
2004	31.6	15.5	31.2	33.7	17.1	14.5	10.2	7.8	40.1	51.2	28.6	40.5	28.3	350
2005	31.7	13.7	28.8	31.5	15.7	14.7	10.1	8.0	40.0	53.1	27.8	38.2	27.9	341

Continued Improvements in Nuclear Plant Operations

Safety Emphasis in the Aftermath of Three Mile Island

The 1979 accident at the Three Mile Island Unit 2 (TMI-2) nuclear power plant near Middletown, Pennsylvania was the most serious in U.S. commercial nuclear power plant operating history, even though it led to no deaths or injuries to plant workers or members of the nearby community. However, this event brought about sweeping changes involving emergency response planning, reactor operator training, human factors engineering, radiation protection, and many other areas of nuclear power plant operations. It also caused the U.S. Nuclear Regulatory Commission to heighten its regulatory oversight. Resultant changes in the nuclear power industry and at the NRC had the effect of enhancing plant safety and performance.

The sequence of certain events -- equipment malfunctions, design related problems and worker errors -- led to a partial meltdown of the TMI-2 reactor core but only controlled, small off-site releases of radioactivity.

Major industry changes have occurred since the TMI accident:

- Upgrading and strengthening plant design and equipment requirements. This includes fire protection, piping systems, auxiliary cooling water systems, containment building isolation, component reliability, and automatic plant shutdown systems;

- Identifying human performance as a critical part of plant safety, revamping operator training and staffing requirements, improving instrumentation and controls for operating the plant, and establishing fitness-for-duty programs for plant workers;

- Improving reactor operating instruction to avoid the confusing signals that plagued operations during the accident;

- Enhancing emergency preparedness to include immediate NRC notification requirements for plant events and an NRC operations center which is staffed 24 hours a day;

- Establishing a program to integrate NRC observations, findings, and conclusions about licensee performance and management effectiveness into a periodic, public report;

- Expanding NRC's resident inspector program, first authorized in 1977, whereby at least two inspectors live nearby and work exclusively at each plant in the U.S to provide daily surveillance of licensee adherence to NRC regulations;

- Establishing the Atlanta-based Institute of Nuclear Power Operations (INPO), the industry's own "policing" group, and formation of what is now the Nuclear Energy Institute to provide a unified industry approach to generic nuclear policy and regulatory issues.

The NRC in 2000 moved toward a new reactor oversight process for the nation's nuclear plants, a process based on quantitative performance indicators and safety significance. Today's reactor oversight process is designed to focus industry and NRC resources on equipment, components and operational issues that have the greatest importance to, and impact on, safety. The agency and the industry have six years of experience with this revised reactor oversight process and the approach is successful in improving the transparency, objectivity and efficiency of regulatory oversight.

The reactor oversight process combines the results of performance indicators in 18 key areas and findings from about 2,500 hours of NRC inspections per reactor to determine the appropriate allocation of inspection resources across all operating plants. The most recent results, after the fourth quarter of 2005, are as follows:

- 85 reactors had all green (best level) performance indicators and inspection findings and will receive the baseline level of NRC inspection (approximately 2,500 hours per year);
- 11 reactors had a single white (second-best level) performance indicator or inspection finding and will receive supplemental inspection beyond the baseline effort ;
- 7 reactors had more than one single white indicator or finding in a performance area or had white indicators or findings in different performance areas and will receive more in-depth inspection.

Nuclear Plant Challenges of the Mid-1980s to Mid-1990s

Utilities nationwide embarked on ambitious nuclear programs during a period of high load growth and high expectations of the 1960s and early 1970s, but that growth pattern evaporated following the Arab Oil Embargo. Instead, the nuclear industry experienced skyrocketing construction costs, partly due to new requirements that grew out of the lessons learned from the accident at Three Mile Island. Many utilities saw rates rise dramatically as new, large generating units came into service in the mid-1980s, partly because of excess capacity as a result of units prudently started but not currently needed to meet a lesser rate of growth in demand for electricity (Baliles 1987, III-3).

According to one source, "there is little doubt that one major factor in halting nuclear power expansion was a sharp drop in demand growth, beginning in 1973." Demand growth averaged 7.1 percent a year during 1960–1972, then dropped to 2.6 percent a year during 1973–1982. During 1982–1988, load growth averaged 3.3 percent a year. Several other factors in addition to this sharp decline in demand slowed nuclear power's expansion. Chief among these are: (1) loss of confidence by the financial community in the ability of utility management; (2) increasingly complex and burdensome regulation at the federal and state level; and (3) erosion of the historic cost advantage that nuclear power enjoyed over coal as the major option for large-scale electricity generation in the United States. Nuclear power expansion may also have been affected by a sharp increase during the mid-1970s in the public's belief that energy conservation was preferable to the construction of more power plants. In addition, problems with radioactive waste disposal played a role in the decline of nuclear power (Nealy 1990, 3).

In its 2004 report "Ending the Energy Stalemate: A Bipartisan Strategy to Meet America's Energy Challenges," the National Commission on Energy Policy said that "government policies to improve

the prospects for expansion of nuclear energy are warranted by the interests of society as a whole—going beyond the private interests that are reflected in the marketplace—in abating climate change risks by expanding the share of no-carbon and low-carbon energy options in the electric generating mix. The policies that the commission judges to be warranted at this time are similar in many respects to those of the recent MIT study of the future of nuclear energy: they relate to (a) cost and safety/security, considered together; (b) radioactive waste management; and (c) proliferation risks (Energy Commission 2004).

Critics of nuclear power, such as the Natural Resources Defense Council (NRDC), suggest that there are still perceived risks of the accidental release of radioactivity and that there are occupational and public health risks with uranium mining and milling. An NRDC position paper in 2005 stated, "Unfortunately, in terms of helping solve the problems of global warming, the nuclear power industry in its present state suffers from too many security, safety and environmental exposure problems and excessive costs to qualify as a leading means to combat global warming pollution" (Cochran et al 2005, 2). However, other organizations, such as the Pew Center for Global Climate Change, the Progressive Policy Institute, the Earth Institute at Columbia University and Princeton University believe that nuclear energy is one way to meet the dual challenge of meeting our growing electricity demand and reducing carbon emissions.

A May 13, 2006 editorial in The New York Times reiterated the challenges and benefits of nuclear power, including the abundant and inexpensive fuel supply diversity offered by nuclear power; the ability of nuclear energy to reduce carbon dioxide emissions that contribute to global warming; and the fuel diversity that gives growing economies in China and India alternatives to heavy dependence on burning large quantities of coal and oil. However, making any real dent in carbon emissions "could require building many hundreds or even thousands of new nuclear plants around the world in coming decades" which, most importantly, begs the question of the long-term solution for waste disposal (2006).

Maximizing Existing Assets: License Renewal, Unit Capacity Uprates and Capacity Factor Increases

There are several methods available to increase the value of today's nuclear generating assets, including extension of the license of the nuclear reactor; increasing the operation of the reactor; and changes to the unit that increase the power rating, which results in increased capacity and energy output.

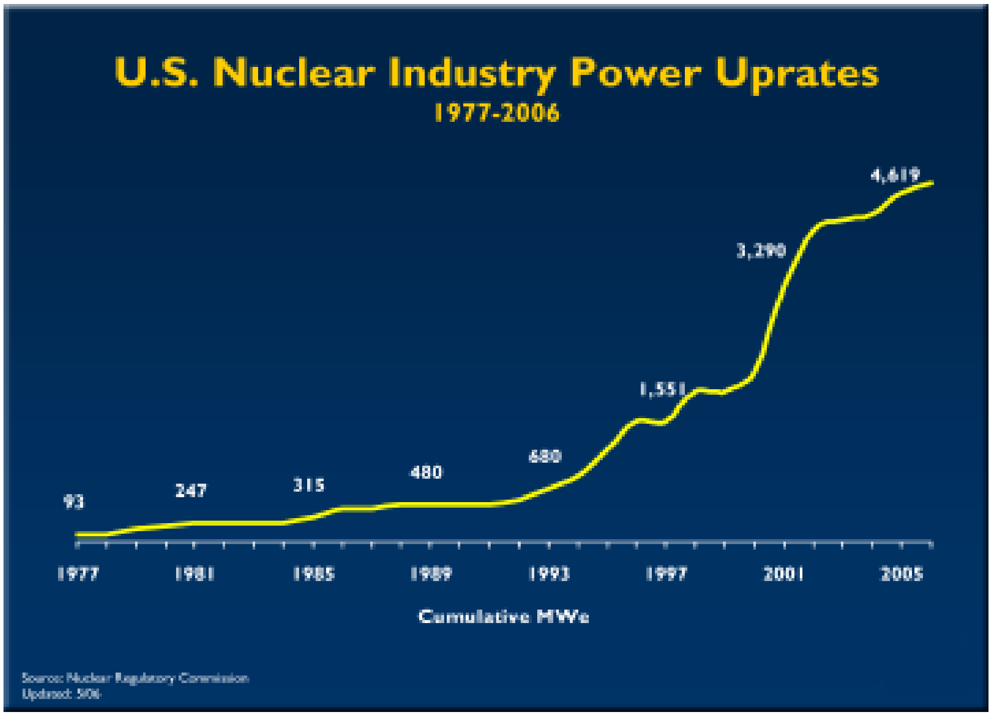
License Renewal

While some utilities were closing reactors before their 40-year operating licenses expired, others were weighing the potential of extending the lives of plants beyond 40 years. Following a detailed analysis of license renewal in 1985 and further study, the NRC determined that plants would be able to apply for a maximum of a 20-year extension to their licenses. Baltimore Gas and Electric received the first license extension at its Calvert Cliffs plants in 1998 with Duke Energy obtaining extensions for its Oconee nuclear units in South Carolina. Forty two reactors have had their licenses extended for 20 years while nine others have applied for license renewal.

Unit Capacity Uprates

Recognizing the low fuel and operating cost of nuclear facilities, nuclear operating companies have not only begun to seek license renewal but have also continued to upgrade the operation of the units as well as adding electrical generating capacity to the units already in service. Since the 1970s, utilities have been using power uprates as a way to increase the power output of their nuclear facilities. The NRC categorizes power uprates as follows: (1) measurement uncertainty recapture power uprates; (2) stretch power uprates; and (3) extended power uprates.

Figure 6: Additional Capacity from Nuclear Unit Uprates



Measurement uncertainty recapture power uprates are power increases of less than two percent and are achieved using enhanced techniques for calculating reactor power. Stretch power uprates, typically up to seven percent, usually involve changes to instrumentation settings. These uprates do not generally involve major plant modifications, especially for BWRs. Extended power uprates are greater than stretch power uprates and have been approved for increases up to 20 percent. Extended power uprates usually require significant improvements to major pieces of plant equipment such as the high pressure turbines, condensate pumps and motors, main generators, and transformers. From the first uprate in 1977 at Calvert Cliffs, which increased capacity some 5.5 percent, there have been over 4,200 MW of nuclear uprates. The largest uprates in the South have occurred at Southern Nuclear Operating Companies Plant Hatch in 1998 (8 percent) and at Progress Energy's Brunswick plant with a 15 percent uprate in 2002.

Approximately 1,000 MW of nuclear plant uprates are under consideration by the NRC to be in place in the next several years. Figure 6 shows the megawatts of nuclear generating capacity added through various uprates over the period 1977 to 2006.

Increased Capacity Factors and other Operating Parameters

Operation of nuclear plants has increased substantially with operating capacity factors now hovering around 90% over 3 year cycles. In addition, the frequency of unplanned reactor shutdowns has plummeted from more than 7 per 7,000 critical operating hours 20 years ago to less than 1 per 7,000 hours today. That improvement can be attributed to the maturation of operating practices. The constant improvement in nuclear plant operating and maintenance (O&M) practices is reflected by the continuous operating runs that continue to break records. In September 2005, Exelon Nuclear's Peach Bottom 3 set a world record for the longest continuous run by a BWR by operating for 707 days since its last refueling outage in 2003 (Pettier 2005).

Nuclear Energy on the World Stage

Worldwide, 443 nuclear power reactors have an electrical generating capacity of 369,000 MW. In 2005, these reactors produced over 2,628 billion Kwh of electricity. There are 103 reactors in the United States, 59 in France, 56 in Japan, 31 in the Russian Federation, 23 in the United Kingdom, 20 in South Korea, 18 in Canada, 17 in Germany 17 and 15 each in India and the Ukraine (Nuclear Energy Institute 2006). The U.S. produced 782 billion Kwh of power in 2005, about 20% of its electrical generation, from nuclear power. France has the second largest integrated system of nuclear power plants, producing 431 billion Kwh in 2005, accounting for 79% of its electricity generation (IEA 2004 Review).

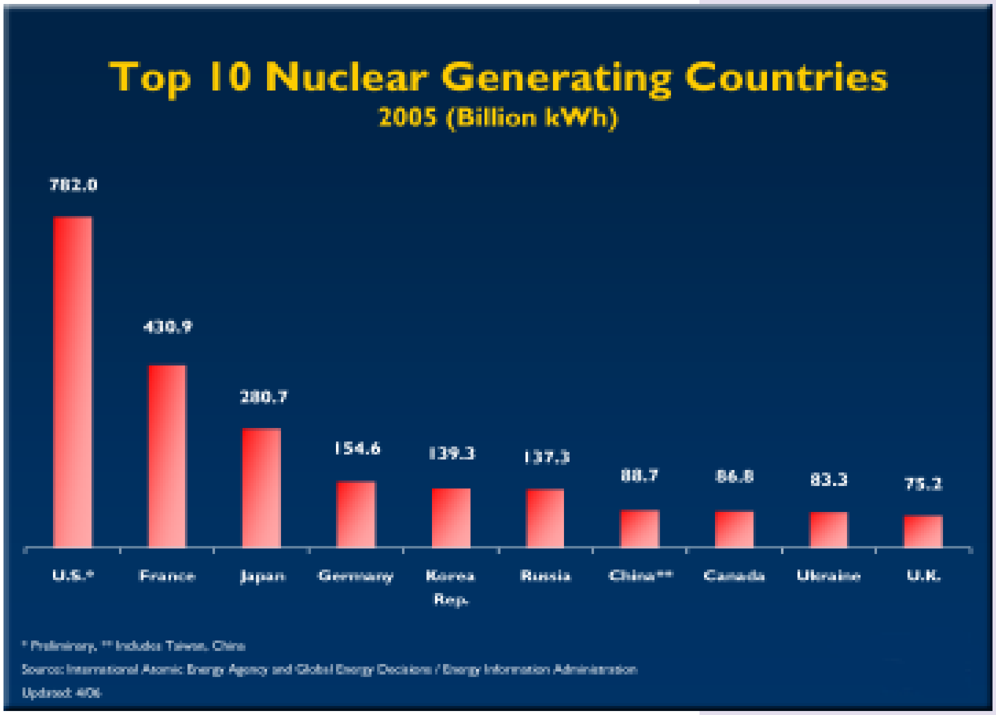
Twenty seven reactors are under construction worldwide as of June 2006, including in Eastern Europe and in the fast-growing Asia market (South Korea, China and Japan.) In South Korea, two new plants are under construction, and contracts for two more are being negotiated. China is considering 25 to 30 new nuclear plants, some 36,000 MW of nuclear generation, by 2020 to power its booming economy in a manner that doesn't contribute to an already dire environmental situation (Francis 2005). The installed electric generation capacity in 2004 in China is 440,700 MW, annually generating 2,187 billion Kwh, second highest worldwide. However, less than one-half of a percent of China's electrical generation comes from nuclear power plants. Electricity consumption continues to grow at a significant rate in China with growth of 15.3% in 2003 from the previous year.

India, with an estimated electrical growth rate of 6.75% per year, also is planning an ambitious buildup of nuclear power plants. It has an installed electric generation capacity of 115,500 MW, currently with only 2,700 MW of nuclear power. India has over 67,000 MW of coal fired generating capacity and 30,000 MW of hydro. About 4,500 MW of nuclear capacity is expected to be added in the future.

Finland, which gets one-third of its electricity from nuclear power plants, recently granted a license to build the country's fifth nuclear plant, an advanced design 1,600-MW reactor at the Olkiluoto site. The construction permit was the final hurdle in the approval process for the $3.9 billion reactor, which is the first to be built in the European Union since France completed its most recent plant in 1991 (Power 2005). A recent announcement of a short delay indicates the plant should be operational by 2010 (Energy and the Environment Daily 2006).

In European nations, the government's position on nuclear power varies widely. Germany shut down a 37-year-old plant in 2005. The current government has a policy of phasing out the remaining 17 plants over an average of 32 years, but that policy is in question as Germany

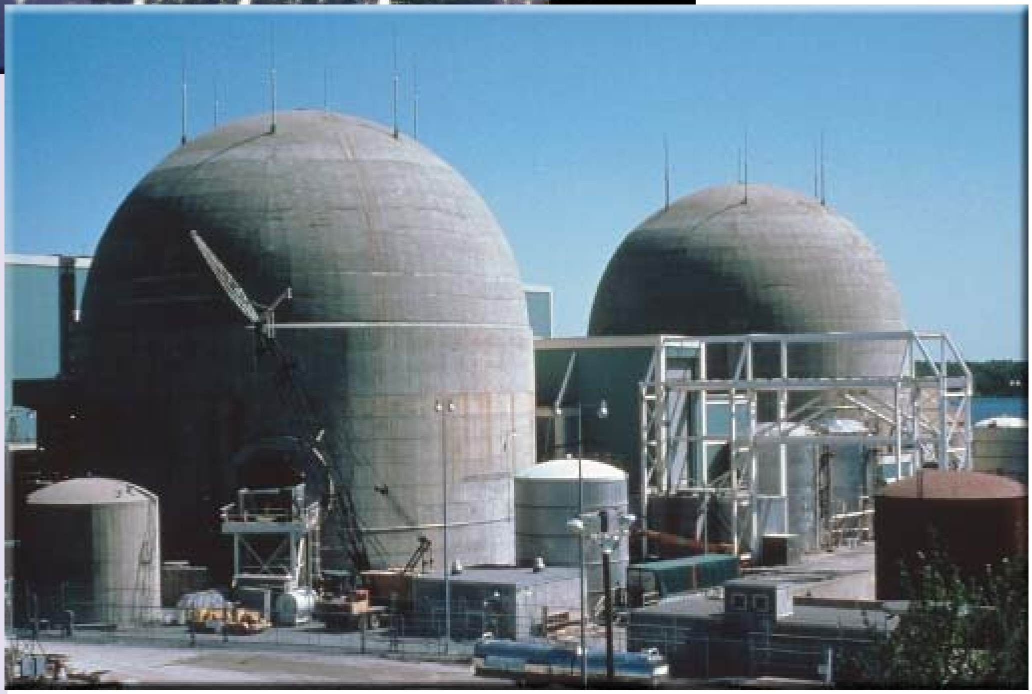
Figure 7: Top 10 Nuclear Generation Countries in the World



attempts to comply with its commitments under the Kyoto Protocol. Sweden voted in 1982 to phase out atomic power. One of its 12 plants was recently closed, but now Swedish public opinion strongly favors nuclear power.

France's pro-nuclear policy will continue as it replaces some of its aging nuclear plants with new reactor technology. In Britain, there is speculation the Labour government may switch to a pro-nuclear policy. In mid-2006, the United Kingdom was reviewing its energy policy, including the role of nuclear power. Prime Minister Tony Blair has said the country should build more nuclear plants.

Despite varied political outlooks toward nuclear energy, it provides 16 percent of the world's electricity—almost the same as it did in 1986 despite two decades of continued electrification around the world. Since 1970, nuclear power output has grown on average 9.2 percent a year (FRANCIS 2005). Figure 7 shows the energy production from the nuclear units in those countries with the largest amount of nuclear generation.



Policy Issues

Non-Proliferation Issues

The need to prevent the spread of nuclear weapons was evident from the first days of the nuclear era. By the mid sixties, there were five declared nuclear weapon states -- the United States, the Soviet Union, the United Kingdom, France and China. Many predicted that the nuclear club could grow to 20-30 countries within two decades. It rapidly became clear that if the many peaceful uses of nuclear technology were to be developed, states needed credible assurances that nuclear programs would not be diverted to military applications. Along these lines the United States has redefined its non-proliferation policy on nuclear energy through various aspects of its Global Nuclear Energy Partnership:

- Upgrading and strengthening plant design and equipment requirements. This includes fire protection, piping systems, auxiliary cooling water systems, containment building isolation, component reliability, and automatic plant shutdown systems;

- Recycling nuclear fuel using new proliferation-resistant technologies to recover more energy and reduce waste will dramatically reduce the amount of waste requiring permanent disposal. The U.S. and its international partners will work together to develop commercial recycling technologies that do not produce separated plutonium, thereby reducing proliferation concerns.

- Utilize the latest technologies to reduce the risk of nuclear proliferation worldwide.

- By developing new proliferation-resistant recycling technologies and increasing the safety and security of nuclear energy worldwide by providing fuel services to developing nations, GNEP will limit proliferation risks and keep nuclear technology and materials out of the hands of rogue states and terrorists.

- A Fuel Services program will enable nations to acquire nuclear energy economically while limiting proliferation risks. Under GNEP, a consortium of nations with advanced nuclear technologies would ensure that countries who agree to forgo their own investments in enrichment and reprocessing technologies will have reliable access to nuclear fuel. Once the advanced recycling technologies are demonstrated, the spent fuel would be returned to fuel supplier countries for recycling and possibly ultimate disposition. This concept builds on the moratorium on the sale of enrichment and reprocessing technologies that has been in place over the past two years among G-8 nations.

- Improve nuclear safeguards to enhance the proliferation-resistance and safety of expanded nuclear power. Under GNEP, an international safeguards program is an integral part of the global expansion of nuclear energy and the development of future proliferation-resistant fuel cycle technologies. A basic goal of GNEP is to make it nearly impossible to divert nuclear materials or modify systems without immediate detection. In order for the IAEA to effectively and efficiently monitor and verify nuclear materials, GNEP will design advanced safeguards approaches directly into the planning and building of the expanding base of nuclear energy systems and fuel cycle facilities. The U.S. will continue to work closely with the IAEA and our international partners to ensure that civilian nuclear facilities are used only for peaceful purposes (Global Nuclear Energy Partnership 2006).

Energy Diversity and Energy Security

When President Bush signed the Energy Policy Act of 2005, he specifically mentioned the benefits of nuclear energy regarding its security as a domestic fuel supply. In his 2006 State of the Union address, he also decried America's addiction to oil and proposed increasing domestic energy sources, including nuclear power, to reduce U.S. reliance on imported oil. In addition, as described earlier, the United

States will need significant additional sources of electricity production in the next two decades as demand continues to grow and as significant amounts of aging power plants are retired.

A May 2006 report entitled Securing America's Energy Future from the U.S. House of Representatives said that "no other issue is as central to the continued well-being of the United States as is energy security." The Government Reform Subcommittee on Energy and Resources summarized nine oversight hearings on energy-related issues in 2005 with recommendations that will assure continued economic growth and insulate U.S. foreign policy from coercion by producers of oil and natural gas. Among the eight specific recommendations, the committee said that "the solution is not an 'either or' choice between promoting production and promoting conservation. The U.S. must pursue both options." The committee recommended that to enhance competitiveness and protect American jobs, natural gas should not be used for baseload electricity generation or new generating capacity. Instead, natural gas should be reserved for industries that use it as a feedstock or for primary energy which cannot be substituted for by fuel-switching. "Nuclear energy must become the primary generator of baseload electricity, thereby relieving the pressure on natural gas prices and dramatically improving atmospheric emissions" (2006).

Increased use of natural gas in the electricity sector has resulted in supply and price volatility as well. Restrictions on pollutants such as SO2, NOx, mercury and CO2 also could limit coal use. While nuclear power currently accounts for about 20% of the electricity generated in the United States and in the South, these percentages will decline over time without additional nuclear reactors as electricity demands grow and existing nuclear plants are decommissioned. The regional economy could be severely affected by a scenario in which there is inadequate power supply to fuel the region's economic growth or by a scenario where higher than necessary cost of new generations are incurred.

Clean Air/Climate Change/Environmental Footprint

In a February 2006 report entitled Agenda for Climate Action, the Pew Center on Global Climate Change concluded the "continued use of nuclear power generation, pending resolution of issues such as safety and waste storage" as one of a number of key actions the U.S. should take to address emissions of greenhouse gases. Specifically, it recommends actions to drive the energy system toward greater efficiency, lower-carbon energy sources. "Because nuclear power is one of the few options for no-carbon electricity production, efforts should be made to preserve this option, which depends on the ability of the nuclear industry to start expanding nuclear generating capacity in the next 10-15 years, as well as on the resolution of cost, safety and waste storage issues".

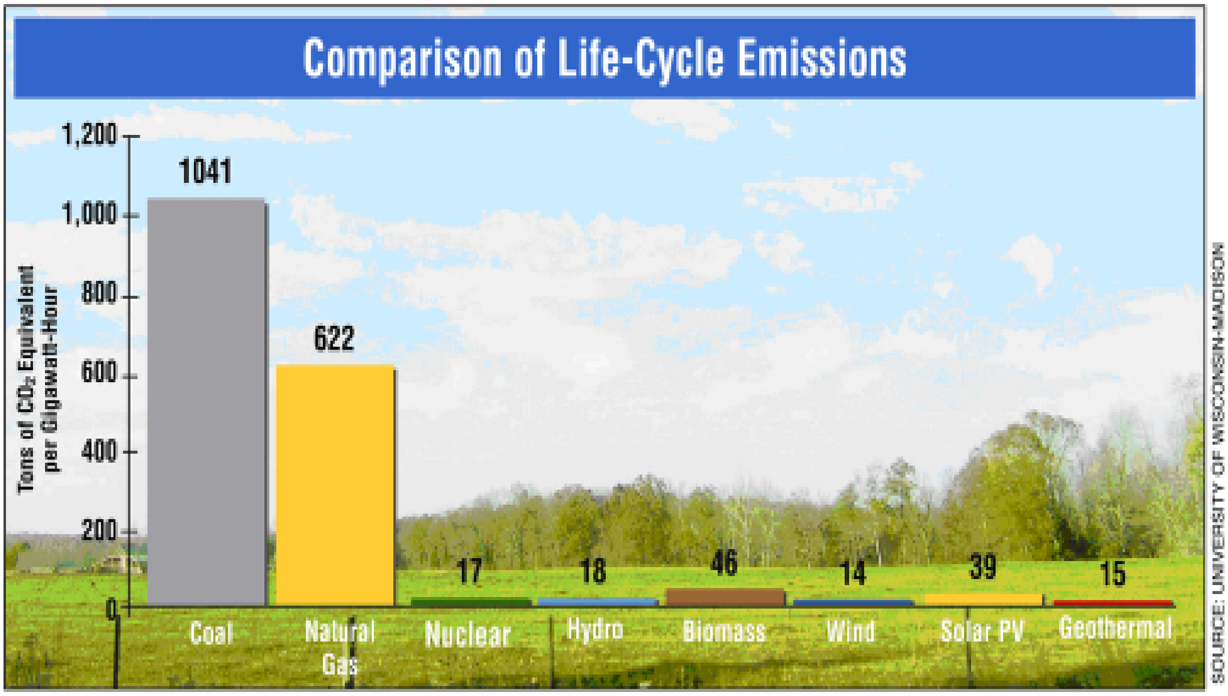
The report goes on to suggest that:

> Congress should enact legislation to encourage new first-mover nuclear plants using advanced technologies, contingent on the resolution of these issues. Finance incentives, such as a production tax credit, an investment tax credit, loan guarantees, and other mechanisms including those in the Energy Policy Act of 2005 will increase opportunities for these new plants. Congress should restructure DOE's nuclear R&D funding to focus on the once-through fuel cycle (Pew Center 2006, 9).

The ability of the electric utilities to develop and promote the use of resources that do not create harmful emissions will be critical in the decades ahead as countries struggle to meet growing electricity demand while creating more environmentally sustainable energy solutions. Nuclear wastes continue to concern many, yet there is considerable effort being expended to develop solutions to those issues. The Nuclear Energy Research Initiative (NERI), a program sponsored by the Department of Energy, is working toward solutions to help reduce and ameliorate civilian reactor waste.

Figure 8 shows a relative picture of the lifecycle emissions of CO2 from various sources of electrical generating capacity. Nuclear power's lifecycle emissions are significantly lower than other baseload generating options. In fact, nuclear power emissions are even lower than the majority of renewable sources of energy.

Figure 8: Carbon Dioxide Emissions from Various Generating Sources



Nuclear energy's life-cycle emissions of carbon dioxide are among the lowest of any electricity source.

Used Fuel Management

Scientific Consensus on Deep Geologic Disposal

It has been the scientific and technical consensus of the National Academy of Science (NAS) and most nuclear fuel management specialists for several decades that geological disposal, using a system of engineered and natural barriers, is the preferred means of disposal for high-level radioactive waste. This strategy would securely isolate the byproducts from the biosphere for extremely long periods of time, and ensure that residual radioactive substances reaching the biosphere after many thousands of years would be at concentrations insignificant compared to natural background levels of radioactivity. Such a final disposal solution would be permanent, but would be monitored for ongoing scientific research and confirmation that it is performing as modeled, and the used fuel containers could be retrieved if needed.

Prior to the decision to dispose of nuclear waste in a geologic repository, other options were considered. These options included dropping the waste into the Arctic shelf; blasting it into space; sending it to a remote Pacific island already contaminated by nuclear weapons tests; and burying it in seabed sediments (SSEB Spent Fuel Handbook 1995).

Scientific Justification of Yucca Mountain Site

The screening process that led to the selection of Yucca Mountain for characterization started in 1977 when the U.S. government decided to investigate the Nevada Test Site (NTS). Yucca Mountain is a federally owned desert ridge in the Nevada desert some 90 miles northwest of Las Vegas. The NTS was selected for investigation because it was used for nuclear weapons testing; its land was withdrawn from public use; and it was subject to long-term institutional control. Furthermore there were many favorable geologic reasons:

- In southern Nevada, groundwater does not discharge into rivers that flow to major bodies of surface water;
- Many of the rocks have geochemical characteristics that would retard the migration of radionuclides if there were a leak in the specially designed containers;
- The paths of groundwater flow between potential sites for a repository and the points of ground-water discharge are long;
- The arid climate reduces the rate at which groundwater is recharged and therefore the amount of moving groundwater is very low, especially in the unsaturated rocks.

Site screening was eventually limited to three locations on the southwestern part of the NTS, of which Yucca Mountain was eventually selected as the site (Yucca Mountain Site Overview 1988).

In January 2002, the Secretary of Energy made the formal decision to recommend to the President that the Yucca Mountain site be developed as the nation's repository for commercial reactor fuel and high-level radioactive waste from the nation's defense programs. His decision started the final site approval process. The law that created the Yucca Mountain program is very specific about the process required for final site approval. Once DOE has determined that the site is suitable, it notifies the Nevada governor and state legislature, then 30 days later DOE notifies the President. The Secretary of Energy submitted his recommendation to the President on Feb. 14 2002. On July 23, 2002, President Bush signed House Joint Resolution 87, allowing the DOE to take the next step in establishing a safe repository at which to store our nation's nuclear waste. Nevada vetoed the President's approval, but a bipartisan majority of Congress overrode the state's veto as allowed by the Nuclear Waste Policy Act. DOE is in the process of preparing an application to obtain the Nuclear Regulatory Commission license to proceed with construction and operation of the repository.

If DOE receives a license from the NRC to build and operate a repository at Yucca Mountain, Nevada, it will begin shipping nuclear waste from commercial and government-owned sites to the repository after 2015.

The federal government must transport used nuclear fuel according to strict federal regulations. The fuel will be transported in heavily shielded casks certified by the NRC along approved transportation routes. Additionally, the department will provide technical assistance and funding to states and Native American tribes for training emergency response personnel. Over the last 40 years, the nuclear energy industry has safely transported 3,000 shipments of spent nuclear fuel over 1.7 million miles of U.S. highways and railroads. Fuel containers were involved in just eight accidents, only four with fuel loaded in the container. No radiation was released in any of the accidents.

DOE is examining implementation of a multipurpose container to shield spent fuel during transport, storage and disposal. This container system will address transportation, at-reactor storage, and repository storage and disposal of commercial spent nuclear fuel, and will be consistent with DOE's current container designs.

Policy Statements in Support of Yucca Mountain

An international committee of the National Academy of Sciences' National Research Council issued a 2001 report supporting centralized disposal of used nuclear fuel, preferably in an underground repository. "After four decades of study, the geological repository option remains the only scientifically credible, long-term solution for safely isolating waste without having to rely on active management," NAS said. "Although there are still some significant technical challenges, the broad consensus within the scientific and technical communities is that enough is known for countries to move forward with geological disposal." This approach is sound, the committee said, as long as it involved a step-by-step, reversible decision-making process that takes advantage of technological advances and public participation. "For example, geological repositories, such as Yucca Mountain in Nevada, are intended to be controlled and monitored for many decades throughout and some time beyond their operational phase, during which retrieval of waste would be possible if required."

The leadership of the National Association of Regulatory Utility Commissioners expressed their support to Secretary of Energy Samuel Bodman for the civilian radioactive waste management program. The commissioners also expressed their concern about the need to reform the Nuclear Waste Fund and bring financial stability to the program, the need for comprehensive and realistic program schedules, and the importance that a solution to the waste disposal problem will have in sustaining or expanding nuclear generation.

The Southern Governors Association, in its 2005 policy priorities for energy, urged that full funding be made available for all past and present commitments to cleanup operations at nuclear energy facilities.

Nuclear Waste Fund (NWF) Payments/ Interim Storage Inventory

Funding for the federal government's nuclear waste management program, including the Yucca Mountain project, comes from collecting a one-tenth of a cent per Kwh fee from consumers who use electricity generated at nuclear power plants. This fee is collected into a special trust fund called the Nuclear Waste Fund, which has collected approximately $27.9 billion since 1983. Six southern states have paid more than $500 million into the fund since 1983, including more than $1billion from South Carolina alone. Through 2005, DOE spent approximately $9.1 billion on repository site characterization research. Even though the fee is collected specifically for this program, Congress still must appropriate money each year for DOE's work.

The nuclear industry believes Congress has consistently failed to provide the program with adequate funding which is one reason the program is behind schedule. In 2006, DOE proposed legislation that will allow funding for the project directly from the Nuclear Waste Fund rather than competing with other programs to remain within congressional budget caps. Clearly, DOE must develop a method to ensure that it has appropriate funding as the project moves to the construction phase.

The Southern Legislative Council, in 2005, urged federal policymakers to support regulatory, legislative and fiscal policies that would "reform the Nuclear Waste Fund by restoring the fund to its original budgetary status; thus ensuring that fees paid by electricity consumers are used solely to pay for the used fuel management program." The SLC also endorsed investment stimulus for new nuclear plant construction and mitigation of regulatory risks associated with new plants.

Table 4 shows the contributions each state's consumers have made to the Nuclear Waste Fund through the first quarter of 2006.

Table 4: Contributions by SSEB Member States to Nuclear Waste Fund

State Nuclear Fuel Contribution to Waste Fund

State	Nuclear Waste Fund Contributions ($ Millions)
Alabama	647.7
Arkansas	253.9
Florida	679.5
Georgia	586.8
Kentucky	0
Louisiana	274.7
Maryland	313.3
Mississippi	172.5
Missouri	166.4
North Carolina	716.9
Oklahoma	0
South Carolina	1086.7
Tennessee	383.1
Texas	492.0
Virginia	612.9
West Virginia	0
TOTAL	6386.4

Fuel share is percent electricity generated within the borders of each state

* Preliminary

Fuel Share Source: Global Energy Decisions / Energy Information Administration
Nuclear Waste Fund Contributions as of March 31, 2006 from Department of Energy

Spent nuclear fuel is stored at 83 locations throughout the United States, including reactor storage pools, independent spent fuel storage facilities, national laboratories, university research and training reactors and defense weapons sites. The 103 commercial nuclear generating units licensed to operate in 31 states discharge more than 2,000 metric tons of spent fuel annually, a relatively small amount given the 782 billion kilowatt-hours of electricity generated at the plants. The total inventory was approximately 54,000 metric tons at the end of 2004 (Energy Information Administration 2004). Table 5 shows where nuclear fuel assemblies are stored in the U.S.

Table 5: Fuel Storage Sites in the United States

Facility	St		Assemblies	Metric Tons	Facility	St		Assemblies	Metric Tons
Arkansas Nuclear One	AR	P	1517	666.7	W.B.McGuire Nuclear Station	NC	I	160	68.6
		I	552	241.4	Shearon Harris Nuclear Power Plant	NC	P	3814	964.5
Browns Ferry Nuclear Plan	AL	P	6696	1230.2	Catawba Nuclear Station	SC	P	1780	782.4
J. M. Farley Nuclear Plant	AL	P	2011	903.8	H.B.Robinson Steam Electric Plant	SC	P	344	147.9
Crystal River Nuclear Power Plant	FL	P	824	382.3			I	56	24.1
St. Lucie Nuclear Power Plant	FL	P	2278	870.7	Oconee Nuclear Station	SC	P	1419	665.8
Turkey Point Station	FL	P	1862	851.7			I	1726	800.4
A. W. Vogtle Electric Generating Plant	GA	P	1639	720.8	Savannah River Defense Site	SC	F	9657	28.9
E. L. Hatch Nuclear Plant	GA	P	5019	909.3	V. C. Summer Nuclear Station	SC	P	812	353.9
		I	816	151.2	Sequoyah Nuclear Power Plant	TN	P	1699	742.6
River Bend Station	LA	P	2148	383.9	Watts Bar Nuclear Power Plant	TN	P	297	136.6
Waterford Generating Station	LA	P	960	396.4	Comanche Peak Steam Electric Station	TX	P	1273	540.7
Calvert Cliffs Nuclear Power Plant	MD	P	1348	518.0	South Texas Project	TX	P	1254	677.8
		I	960	368.1	North Anna Power Station	VA	P	1410	652.7
Callaway Nuclear Plant	MO	P	1118	479.0			I	480	220.8
Grand Gulf Nuclear Station	MS	P	3160	560.2	Suny Power Station	VA	P	794	365.4
Brunswick Steam Electric Plant	NC	P	2227	477.4			I	1150	524.2
W. B. McGuire Nuclear Station	NC	P	2232	1001.1	**TOTALS in SSEB Member States**			**65,492**	**18,809.5**

Reactors of the Future

Advanced Reactor Technology for the Next Wave of Nuclear Plants

Westinghouse has earned NRC approval for its 1,000-megawatt Advanced Pressurized-1000, a pressurized water reactor that has one-third fewer pumps, half as many valves, and more than 80 percent fewer pipes than current reactors. It can be built using modular units manufactured in a factory and transported to the nuclear plant site, cutting construction time to three years. The design relies on a largely passive safety system in which cooling water is above the reactor core and uses gravity and natural circulation for emergency cooling. In today's reactor designs, cooling water must be pumped into the reactor core. Duke Power, Progress Energy and Southern Company have chosen the AP1000 in applying for COL applications. Duke Power plans to prepare applications to the NRC for combined COLs for two of these designs to be submitted within the next 24 to 30 months. Progress Energy selected the Harris Nuclear Plant site in North Carolina and an unnamed site in Florida to evaluate for possible nuclear expansion. Meanwhile, Southern Nuclear announced plans to file an application for an early site permit in 2006, along with a combined COL in 2008 for Plant Vogtle in Georgia using the AP1000.

In 2005, GE formally submitted a design certification application to the NRC for its new reactor design – the economic simplified boiling water reactor (ESBWR) – which is a "Generation III Plus" design for a 1,500 megawatt reactor. According to GE, it has a simple design and passive safety features, depending on fewer active mechanical systems, with associated pumps and valves, relying instead on more reliable passive systems that utilize natural forces such as natural circulation and gravity. It also occupies a smaller footprint which will result in reduced construction cost and schedule. The ESBWR evolved from GE's Advanced Boiling Water Reactor design that the NRC certified in 1997. That design has more than 18 reactor years of operating experience from power plants in Japan. Plans are underway to prepare license applications for the ESBWR at Grand Gulf (Mississippi) and River Bend (Louisiana) (Petrochemical News 2005).

Three manufacturers are currently involved in the "Generation III Plus" reactor marketplace. AREVA is developing information to submit a design certification license to the NRC for a U.S. version of its newest reactor, one of which is already being built in Finland. The 1,500 megawatt Economic Pressurized Reactor (EPR) is an evolutionary design based on the French and German reactors designed by Framatome and Siemens. It is a simplified design using existing technologies, but with fewer parts. While maintaining an active rather than passive safety system, the EPR has several design improvements, including a double-wall concrete containment dome for greater protection against terrorist attacks using an aircraft. The design also extends the dome over the spent fuel pool and two of the four safety buildings. In case of a severe accident and meltdown, the reactor vessel is designed to capture the fuel in a cavity below the containment building.

Generation IV Technology

"Generation IV" reactors are intended to be safer, more efficient, and proliferation-resistant. These reactors reflect a revolutionary step from the Generation III reactors and earlier light-water reactors, but development of these designs is not expected before 2030. The goal of the Generation IV program is to draw the international community together to develop long-term technological solutions to energy needs. Generation IV systems are projected as prototypes in the next decade, with commercial operation before 2030 (NEI). One unique characteristic of Generation IV reactors is that they are designed to produce more heat and less spent fuel, with a different cooling mechanism than with light-water reactors. These reactors could produce hydrogen as a replacement for fossil fuels to power a wide range of activities from automobiles to electric lamps. International efforts are underway examining various technologies that would use gases, such as H20, or liquid metal or molten salt for cooling the reactor core.

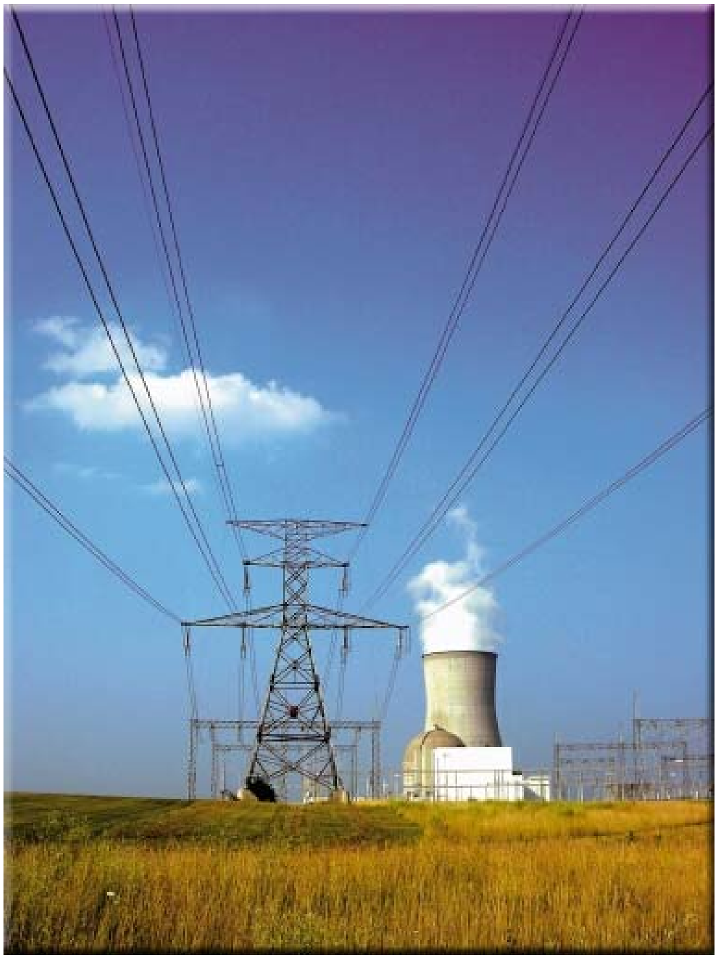
A helium-cooled reactor known as the "pebble bed modular reactor" is being developed in South Africa. The Energy Department is planning on a $1.25 billion program for a gas-cooled Generation IV experimental reactor in Idaho that would also produce hydrogen (AP 2005).

In its long-term plan, the administration envisions a hydrogen-based economy to reduce U.S. dependence on foreign sources of energy and to provide a clean, abundant source of energy. This initiative is focused on developing six of the most promising new reactor technologies, including the gas-cooled fast reactor; lead-cooled fast reactor; molten salt reactor; sodium-cooled fast reactor; supercritical water-cooled reactor; and the very high temperature reactor.

Other Potential Benefits of Nuclear Energy

Spurring the Transition to a Hydrogen Economy

Using Generation IV reactors, DOE's hydrogen initiative will demonstrate that commercial quantities of hydrogen can be manufactured economically without greenhouse gas emissions. Hydrogen is already an important industrial commodity, with an annual world consumption of some 45 million tons, used primarily in the production of chemicals, fertilizer, and in oil refining. Demand for hydrogen is expected to increase significantly as high quality oil stocks diminish and cleaner fuels are mandated. There is also research into replacing carbon fuels with hydrogen in automobiles. However, this will require more economical methods for producing hydrogen directly from water without using carbon fuels. Nuclear energy could become an important source of sustainable hydrogen either through the production of the necessary high-temperature heat or through electricity (NEA 2003, 82).



Seawater Desalinization

Increasing demands for fresh water in many parts of the world, particularly in Africa, Asia and the Middle East, are becoming more difficult to meet. These demands are from agriculture, industry, urban development and growing populations. Purification of seawater is one answer to this water shortage. In this desalinization process, considerable heat is necessary. Nuclear-powered desalinization plants already are operating in Japan and India. While these plants currently provide pure water for onsite uses rather than large-scale consumption, they are successfully demonstrating that nuclear energy is a viable alternative to fossil fuels as the heat source for the process (NEA 2003, 83).

Summary

The history of nuclear power in the South has been one of reliable, relatively inexpensive, clean electrical energy. As the South continues to grow, outpacing growth in the remainder of the nation, the electrical energy needed to fuel a strong and healthy economy in the South must grow as well. The region requires a diversity of new supplies and nuclear power is a leading contender for new power supply, along with renewables, new clean-coal technology, and natural gas.

While there are challenges for the nuclear industry, particularly as new nuclear units are designed, constructed and licensed for the first time in over 30 years, there are major efforts underway to resolve issues such as waste disposal. Features of the Energy Policy Act of 2005 should be utilized by utilities in the South so that these utilities can take advantage of early nuclear commitments through loan guarantees, production tax credits, stand-by support insurance and the re-authorization of the Price-Anderson Act - all benefits provided to those who lead the way to a new era of nuclear power in the United States.

With early site permitting, COL and new nuclear designs being reviewed and ready for the new wave of construction, states have a legitimate role in ensuring unnecessary barriers to new construction are removed.

Through the Southern Governors' Association Policy Priorities in Energy issues, the governors in 2005 issued a statement "recognizing the re-emerging interest in nuclear energy and urging full funding of various activities such as those regarding environmental sampling and analysis at nuclear energy complexes".

Some specific steps that can be taken by various participants in the new nuclear vision include:

- Utilities should study and consider capacity uprates as appropriate for existing nuclear power plants;
- Utilities should study and consider life extensions as appropriate;
- Utilities and state energy offices, as well as state public service commissions, should cooperate in public outreach efforts to increase the public's awareness and understanding of energy issues and the role of nuclear power in those concerns;
- State officials should continue to coordinate waste transport efforts, emergency planning and other inter-state activities that are critical to the ongoing safety concerns of nuclear electrical generation;
- Utilities can take advantage of provisions of the Energy Policy Act of 2005, which provides opportunities for the resurgence of nuclear energy;
- State energy plans should consider methods to facilitate and ease the process for new nuclear facilities to be built within their states;
- States should review their permitting, siting and other regulatory processes to ensure the state is not a barrier to full process efficiency when studying nuclear applications;
- The nuclear industry should continue to prioritize its endorsement of safety through the NRC, INPO, Nuclear Energy Institute and other means of promotion of the safe and efficient use of nuclear power.

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