DRAFT NEW JERSEY ENERGY MASTER PLAN

APRIL 2008

State of New Jersey
OFFICE OF THE GOVERNOR
THE STATE HOUSE
PO BOX 001
TRENTON, NEW JERSEY 08625

JON S. CORZINE
GOVERNOR

April 17, 2008

Dear Citizens of New Jersey,

New Jersey's economy depends on a reliable supply of energy at a reasonable price. Surveys of the business community in our state repeatedly show that high energy costs weigh against decisions to locate, retain or expand businesses here.

The production, distribution and use of energy also affect the quality of our environment. Air pollution from burning fossil fuels to generate electricity, to heat our homes, and to support our businesses and industries, and run our transportation systems jeopardizes the health of our residents and contributes to global warming.

Energy's critical role in our economy and our environment is nothing new. Since the oil shocks of the 1970s, energy challenges have repeatedly awakened us to our growing demand for energy and regional and global competition for supply, resulting in vulnerability to high prices, supply shortages, and environmental damage.

Today we face a different energy crisis. This crisis is not as sudden or as visible as the gas lines of the 1970s. Instead, we face a steadily growing threat to our economy, our household budgets, our environment, and our quality of life. It is unfortunately tempting to become accustomed to, and accept, electricity bills that continually increase, home heating bills that periodically spike, and droughts, floods, and heat waves that gradually become more frequent over time.

Since the 1970s, the State has periodically published Energy Master Plans. However, this Plan must be different. It must set the course for correctly identifying the energy problems that we face, for developing the right solutions, and for taking the actions that make those solutions a reality. This Energy Master Plan, once implemented, must enable New Jersey to overcome the many energy and environmental challenges that have emerged and to regain firm control of our energy destiny over the next decade.

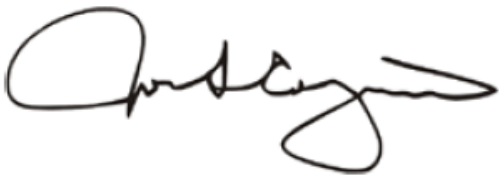
That has become apparent since October 2006, as residents, the business community, environmental advocates, consumer advocates, local governments, and other stakeholders invested their time and effort to help to lay the foundation and identify the challenges for this draft Energy Master Plan.

We cannot afford to ignore these challenges. We cannot afford to wait and hope that somebody else will address them for us. We cannot pretend that the major steps we have already taken to reduce our energy use and to expand renewable energy sources will be sufficient. A "business as usual" energy policy risks enormous economic and environmental consequences. In contrast, an energy policy that focuses on producing and using energy as wisely as possible greatly reduces these consequences and positions us to be a strong competitor in the global economy.

However, the electricity and heating fuel challenges are different from the transportation challenges that we face. Therefore, to focus the public debate, this draft of the Energy Master Plan includes only the electricity and heating fuels challenges that we face, and the transportation section of this Plan will be released separately.

With that challenge in mind, I am proud to release this Energy Master Plan as a draft that can focus the public debate on the electricity and heating fuel challenges, and proposed solutions to the many energy related issues we face here in New Jersey.

Sincerely,



Jon S. Corzine

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EXECUTIVE SUMMARY

Energy plays a vital role in the health of New Jersey's economy and environment. Families who are barely getting by paycheck to paycheck cannot bear ever-increasing energy bills; businesses need affordable and reliable supplies of energy to remain competitive. The production, distribution and use of energy, unless wisely managed, can threaten the economy of this State, the quality of our air and water and the health of our residents.

This draft Energy Master Plan (EMP or Plan) proposes a road map to guide us toward a future with adequate, reliable energy supplies that are both environmentally responsible and competitively priced. Planning for that future must begin with understanding our current energy picture, and understanding what the future will look like if we continue on our current course.

However, this energy picture is very different for the electricity and heating fuels section, compared to the transportation section. The challenges and potential solutions for each of these energy sectors are very different, and warrant separate discussions. Therefore, this draft focuses on the challenges and potential solutions to the electricity and heating fuels sectors, and the transportation section will be released separately.

To develop the energy picture of the future, the State worked with the Center for Energy, Economic, and Environmental Policy (CEEEP) and the Rutgers Economic Advisory Service of the Center for Urban Policy Research (R/ECON™) in the Bloustein School at Rutgers University, to model what our energy circumstances would look like in 2020 (see www.nj.gov/emp). The modeling included a "business as usual" scenario that assumed no major changes in state policies and actions, as well as an "alternative scenario" reflecting changes outlined in this draft Plan. The modeling outlines how "business as usual" and the "alternative scenario" could affect energy use, economic growth, air quality, and greenhouse gas emissions.

"BUSINESS AS USUAL" SCENARIO

The "business as usual" model includes no action by the State other than the policies already in place to address the following energy challenges:

CHALLENGE 1: Growth in the supply of electricity has not been keeping up with the growth in demand.

Our ability to maintain reliable, competitively priced supply is threatened by the fact that we have, over the past decade, consistently and dramatically increased our electricity demands at a time when the resources needed to supply this demand have consistently been reduced. A reliable supply of electricity requires power plants with enough capacity to meet the peak demand for electricity, transmission lines with enough capacity to carry

that electricity from power plants to areas where customers are concentrated, and distribution systems with enough capacity to take the electricity from the transmission system and deliver it to customers. However, demand rises to peak levels for only a small number of hours each year – generally fewer than 50 hours out of 8,760. Building power plants and transmission lines to serve growing peak demand is far more costly than reducing demand during those few hours.

Larger homes, more computers, plasma televisions, and other devices have grown our demand significantly and are likely to continue to fuel higher demand that are not matched by growth in the capacity to satisfy that demand. Between 2002 and 2007, electric generation capacity in New Jersey increased annually at an average rate of 0.71%. Peak demand is expected to keep growing faster than supply has grown. PJM Interconnection, which operates the regional transmission system and administers regional wholesale electricity markets for a 13-state area stretching from New Jersey to Illinois and North Carolina, projected in January 2008 that peak demand in New Jersey will continue to grow from 2008 through 2018 at an annual rate of about 1.75%. This projected growth in peak demand is about 2-1/2 times as fast as supply has grown in recent years.

In addition, regional pressures on our energy supplies exacerbate the gap between supply growth and demand growth. Because of the deregulation of the wholesale markets and creation of a class of merchant generators, competitive pressures entice generation companies to sell their power into the most lucrative markets. For power plants located in New Jersey, the Metropolitan New York markets are attractive because of the higher prices for power that may be obtained there. Therefore, a trend appears to have begun in which new transmission lines are constructed to export needed power from New Jersey into New York. One such project currently exports about 660 megawatts (MW) of electricity from Sayreville to Long Island – equivalent to about 4% of our generation capacity. Additional planned "extension cords" to New York have been proposed which, if constructed, could withdraw more than 2000 MW of additional capacity from New Jersey over the next several years.

Retirements of aging power plants put us even further behind. Less than 40 percent of New Jersey's generation capacity is 20 years old or less, while nearly half is 30 years old or older. Much of that older capacity is expected to retire during the period covered by this draft plan, especially the plants that are less reliable, less efficient, more expensive to run, and with greater greenhouse gas emission rates than newer capacity.

CHALLENGE 2: The price of energy has increased substantially over the past few years, and this trend is expected to continue.

Between 2002 and 2007, the price of natural gas nearly doubled, driving corresponding increases in the price of electricity and heating fuels in New Jersey. That increase is reflected in the price of electricity in the auctions held by New Jersey electric utilities since 2002, to procure a supply of electricity for virtually all of the residential and virtually all but the largest commercial and industrial customers. Between 2002 and

2007, the price resulting from that auction nearly doubled, from 5.06 cents per kilowatt hour in 2002 to 9.94 cents in 2007, and increased further to 11.33 cents in 2008.

For several reasons, New Jersey electricity prices are expected to continue increasing. Most importantly, New Jersey's electric generation fleet has changed over time, to become more reliant on power plants fueled by natural gas, which are more expensive to operate than plants using cheaper fuels. In 1990, power plants fueled by natural gas accounted for about 33% of New Jersey's electric generation capacity; by 2006, that share had grown to about 55%. In contrast, nuclear plants, which generate electricity at a much lower cost for each megawatt-hour, provided 26.6% of capacity in 1990 but only 21% in 2006. In addition, these increases in electricity prices have been compounded more recently by increases in the price of coal.

In addition to the increased reliance on natural gas-based electricity, a recent change in the wholesale electricity markets is fueling further price increases. Electricity suppliers serving retail customers must purchase the right to call on enough generation to meet their customers' peak demand, plus a reserve. The customers bear the cost of purchasing these capacity rights. Now that PJM has implemented a new capacity market structure known as the Reliability Pricing Model (RPM), developed by PJM and approved by the Federal Energy Regulatory Commission (FERC), capacity costs are at least 30 times higher than they were previously. The first four years of RPM will add nearly $6 billion to New Jersey electric bills, or about 15-20% of each customer's bill. The purpose of this capacity market is to increase generation capacity in regions with increased electricity demand. Most of the RPM revenue has gone to existing power plants, which has resulted in the re-powering of some plants and the reactivation and postponement of retirement for other plants. It has also resulted in new plans for generation investment in New Jersey. However, this has severely diluted any incentive that new plants could receive which would result in significant capacity increases.

Fossil fuels are used not just to generate electricity, but also to heat homes and businesses and to supply manufacturing processes. Our vulnerability to problems in the supply and price of these fuels has been demonstrated again and again. Over the past few years, natural gas prices spiked dramatically after Hurricanes Katrina and Rita disrupted supplies in 2005. Recently, there has been an increase in the use of natural gas for electric generation, which further increases our demand and our vulnerability to price instability.

The price of oil has also been rising, as some of the world's leading oil-producing regions finds them in turmoil. This dependence on these nations to supply our growing energy demands, has added increased concerns about supply, and resulted in enormous increases in the costs for oil and natural gas. The price of oil, which was about $55 per barrel at the beginning of 2007 and below $20 per barrel as recently as 2002, exceeded $110 per barrel this March.

CHALLENGE 3: Without action, our contribution to global warming and other pollutants will continue to increase.

A major part of New Jersey's efforts have focused on the power plants that supply New Jersey's electricity, from within and from outside the state. Those plants account for about a quarter of our greenhouse gas emissions.

Some efforts to preserve the reliability of our electricity supplies threaten to undermine the State's work on global warming. PJM has determined that the reliability of our supply of electricity will be jeopardized over the next several years, unless steps are taken to address the state's electricity demand and supply. Since PJM is responsible for planning and operating the transmission grid reliably, it is in the process of directing upgrades to the grid that will enable New Jersey to import more electricity. Much of these electricity imports would come from coal power production and would result in an increase in our contribution to global warming. In other words, our efforts to cut greenhouse gas emissions within New Jersey's borders will be undermined if the shortage of electricity supply is solved by simply importing more out of state based electricity.

The prospect of increased greenhouse gas emissions is only one reason to avoid increasing our reliance on imports of out of state dirty electricity. Just as importantly, hopes that these imports would bring us greater reliability and lower prices are likely to be dashed. The prospect of federal limits on power plant emissions of greenhouse gases is creating major uncertainty about what coal-based power will cost. In addition, demand for coal is increasing, as coal is becoming more difficult and expensive to mine and transport, and recent history has featured disruptions in coal supply and spikes in coal prices. All of these factors suggest that it would be irresponsible to stake our energy future on increased imports of out of state coal-based electricity.

CHALLENGE 4: The State has much less authority over the supply and price of electricity than it used to.

Until 1999, electric utilities planned, built, owned and operated most of the electric generation capacity in the State, under the oversight of the New Jersey Board of Public Utilities (BPU). State and federal laws changed that, with the goal of opening competitive markets in electricity. As part of this restructuring of the New Jersey electric industry, the electric utilities have divested their generation assets to third parties or to a utility affiliate and the BPU no longer regulates the generation of power.

As a result of these changes, no single entity is empowered to plan the generation, transmission, sale, and use of electricity. PJM, the FERC, generation companies, electric utilities, the financial community, State and federal environmental regulators, and the BPU now share a complex web of often uncertain, conflicting and overlapping decision-making. Along with the diffusion of planning responsibilities and dependence on market forces, we have seen that new generation capacity is not getting built at nearly the pace needed to keep up with growing demand. A spurt of new power plants from the mid-1990s into the early part of this decade has been followed by an almost total absence of new plants, while demand has continued growing unabated. The transmission solutions

which PJM and FERC propose ignore the economic, reliability and environmental concerns which face New Jersey.

The term "Energy Master Plan" stems from State law enacted in the 1970s, when none of these changes were foreseen. The term now seems almost quaint, implying a much more direct ability to plan and implement our energy future than we actually have. This portion of the draft Plan realistically focuses on actions within the State's control to bring us a future of reliable and competitively priced supplies of electricity and heating fuel consistent with our environmental needs, and actions to influence other decision-makers to do their part in making that vision a reality.

CONSEQUENCES: If nothing is done to address these challenges, the "business as usual" scenario, the State will consume 100,000 GWh of electricity and 590 trillion Btus of natural gas or heating oil. This total energy consumption will cost customers more than $26 billion per year, which is 60% more than the total annual energy expenditures in 2005. Greenhouse gas emissions would be 14.5% higher than they were in 2005. The economic, reliability, and environmental consequences of the "business as usual" scenario are unacceptable. Actions must be implemented to ensure that New Jersey's future energy environment provides energy that is competitively priced, reliable and consistent with the 2020 and 2050 greenhouse gas targets.

ALTERNATIVE SCENARIO

Strong, thoughtful actions that help us to use energy more efficiently, to reduce the growth in our need for energy infrastructure, and to produce more clean energy locally can lead us to a better future than what "business as usual" offers, include the following:

GOAL 1: Maximize energy conservation and energy efficiency. Reducing energy consumption through conservation and energy efficiency is the most cost-effective way to help close the gap between supply and demand, lower energy costs, increase reliability, and lower the state's contributions to global warming and other air pollutants. Reducing energy consumption at least 20% by 2020, as Governor Corzine has directed, would yield annual electricity savings of 20,000 GWh per year and annual heating savings of 119 trillion BTUs. This reduction in energy consumption will result in significant cost savings, and thereby fuel economic growth in the state. Actions to achieve that reduction include the following:

- Redesign and enhance the State's current energy efficiency programs in all sectors of the economy to achieve the desired results while remaining cost-effective. This redesign will emphasize a whole building approach to energy efficiency.
- Increase energy efficiency in new buildings with a statewide building code that will make new construction at least 30% more energy efficient than buildings under current code by July 2009.

- Increase energy efficiency in existing buildings through enhanced energy efficiency standards for new appliances and other types of equipment currently not covered by existing standards by 2009.
- Increase awareness about the importance of energy conservation and energy efficiency upgrades by developing an education and outreach program for the public. This will result in a shift in the way the state's consumers think about, and use energy.

GOAL 2: Reduce peak electricity demand.

Supplying electricity during times of peak demand is much more expensive, due to the increased costs of generation and the infrastructure capacity necessary, than electricity supplied during times of non-peak demand. During these times, wholesale electricity prices may increase by anywhere from 100% to 1,000%. While energy efficiency and conservation may help, additional actions need to be taken to encourage people to use less electricity during times of peak demand. Therefore, the following action items are recommended, in addition to the energy efficiency and conservation measures listed above, that would decrease peak demand by 5,700 MW by 2020:

- Expand real-time pricing for commercial and industrial customers with a peak demand of at most 600 kW or greater by 2010 and at most 500 kW or greater by 2012.
- Expand incentives for participation in regional demand response programs.
- Evaluate a strong "inverted tariff" pricing system for residential customers.
- Move the State's electricity grid toward the development of a 'smart grid' infrastructure.
- Monitor the results of all demand response initiatives through 2011 and implement the most effective mix of action steps to achieve a total peak demand reduction of 5,700 MW by 2020.

GOAL 3: Meet 22.5% of the State's electricity needs from renewable sources.

Under regulations already in place, such as New Jersey's current Renewable Portfolio Standard, renewable energy sources would generate 16,000 GWh of our electricity by 2020, including nearly 1,500 GWh from solar. This electricity is projected to come from 900 MW of biomass capacity, at least 1000 MW of offshore wind capacity, 200 MW of onshore wind capacity, and 1,500 MW of solar capacity. Since most renewable generation is currently more expensive to build than conventional generation, some financial help is needed to get renewable generation built. The Renewable Portfolio Standard itself provides some help, by increasing the monetary value of renewable power. Other ways to spur renewables include:

- Complete the transition of New Jersey's solar program to a fiscally responsible market that will foster the continued growth of solar energy use.
- Develop New Jersey's wind energy resources, including up to 1000 MW of offshore wind and up to 200 MW of onshore wind by 2020.
- Increase the amount of biofuels and biomass in the State's energy portfolio.
- Increase the Renewable Portfolio Standard for the years 2021 to 2025.

GOAL 4: Develop new low carbon emitting, efficient power plants to help close the gap between the supply and demand of electricity.

We must recognize that we cannot meet our 2020 needs for electricity solely by maximizing renewable energy and energy efficiency. It is projected that by 2020, under business as usual, New Jersey's homes and businesses will use 100,000 GWh of electricity annually. Achieving Governor Corzine's goal for reducing electricity consumption 20% by 2020 would reduce our electricity demand to 80,000 GWh annually. Achieving the installation of 1500 MW of combined heat and power cogeneration facilities by 2020 will provide 10,000 GWh, leaving 70,000 GWh to be supplied. Obtaining 22.5% of our electricity supply from renewable sources, as required by the State's Renewable Portfolio Standard, leaves about 54,000 GWh of demand to be satisfied.

This demand must be satisfied from existing in state power plants, through the development of new in state power plants, the development of power plants outside New Jersey, or from a combination of these options. Whichever option or combinations of options are used to meet this electricity demand, they must be consistent with the State's 2020 and 2050 greenhouse gas targets. Our current fleet of power plants cannot be expected to supply all of this electricity, especially when much of the fleet is aging, expected to retire, or likely to be exporting its power.

Meeting our current and future energy demands will depend on an increase in electric generation capacity available to New Jersey. Importing additional conventional coal-based electricity, or developing more high-emitting power plants within New Jersey, will undermine our efforts to fight global warming. Therefore, New Jersey needs more electric generation capacity that overall is less carbon-intensive. We will:

- Use the State's current authorities to influence the development of that infrastructure, and work with the Legislature to obtain additional authorities that may be needed.
- Foster development of 1500 MW of new cogeneration capacity in New Jersey by 2020.
- Create new electricity generation to meet the State's generation demands that will delay or eliminate forecasted problems with the reliability of the electricity supply, serve the State's greenhouse gas targets, and provide electricity at a reasonable price.

GOAL 5: Invest in innovative clean energy technologies and businesses to stimulate the industry's growth in New Jersey.

The Governor's Economic Growth Strategy committed to aggressively encouraging the expansion and creation of clean energy solutions, and declared the clean energy technology sector as a cornerstone of the Edison Innovation Fund. The State must continue this investment, and expand its efforts to help attract and grow the clean energy technology sector in New Jersey. Therefore, the State will work to implement the following action items:

- Expand the Edison Innovation Fund to invest in innovative clean energy technologies including both energy efficiency and renewable energy manufacturing businesses to stimulate the industry's growth in New Jersey.
- Develop a "Green Collar" jobs program to ensure that sufficient numbers of New Jersey workers have the skills demanded by industry to fill the jobs that are created from the action items in this Energy Master Plan.

Since October 2006, stakeholders have made major efforts to provide the State with information essential to developing this draft Energy Master Plan. We continue to need the help of those stakeholders, and members of the Legislature, to engage in a serious debate about our energy future needed to put this Plan in final form and begin to turn the plans into action. We will hold public hearings, seek written comments, and bring together experts from inside and outside government to put us all in the best position to decide on the wisest course of action.

INTRODUCTION

The critical role of energy in our economy and our environment is nothing new. Over the past several decades, energy challenges have repeatedly awakened us to our growing demand for energy and regional and global competition for supply, and to our resulting vulnerability to high prices, supply shortages, and environmental impacts.

After the oil shocks of the early 1970s, New Jersey enacted a law requiring an Energy Master Plan for the production, distribution, consumption and conservation of energy in New Jersey. The law requires the Plan to include not only long-term objectives, but also interim measures consistent with achieving those objectives.

Our ultimate objective is to ensure that New Jersey has a reliable supply of energy, at a reasonable price, produced and used in a manner that meets the state's environmental needs. At first glance, these objectives seem to conflict. When the growth in energy supply does not keep up with growth in demand, prices tend to rise and the supply becomes less reliable. When growing energy demand is met by an increase in the use of fossil fuels, the resulting greenhouse gas emissions threaten to exacerbate the higher temperatures, higher sea levels, and more frequent and more severe floods and droughts that we have experienced in New Jersey. A second look, however, shows that we can make progress toward all of these objectives by using energy more efficiently, by using less of it at times when heavy demand strains our infrastructure, and by producing more clean energy locally.

With those challenges and opportunities in mind, we must plan for meeting these challenges; we must carry out those plans, and we must measure the results we achieve and adjust our tactics in response. For that reason, State law requires the Energy Master Plan to be revised and updated at least once every three years. The State has not done so since 1995. Much has changed since then and much now needs to be done to shape our energy future.

This draft focuses on the challenges in the electricity and heating fuels sectors, and the transportation section will be released separately. This will help to facilitate a responsible and productive public discussion on each of these important energy issues.

ENERGY BACKGROUND

Electric "deregulation." Up until the 1980s, electric generation was largely built, owned and operated by the electric utilities. Since then, the generation industry has grown more competitive as the federal and state governments reduced their regulation on the industry. In 1995, when the previous Energy Master Plan was updated, electric utilities generated most of the electricity in the State, under the regulation and oversight of the Board of Public Utilities (BPU). The utilities built, maintained, and operated

power plants, with the expectation that the BPU would allow them to recover their prudently incurred costs from electricity customers, plus an opportunity to earn a specified rate of return. In this arrangement, the utilities were insulated against the risk of loss that State-approved investments in electric generation might prove unwise; electricity customers bore that risk. In exchange, the utilities bore an obligation and a responsibility to generate, transmit, and deliver electricity to serve those customers.

Substantial power industry restructuring occurred in 1999, when former Governor Christine Todd Whitman signed the Electric Discount and Energy Competition Act (EDECA). Under EDECA, utilities were no longer responsible for generating electricity. Instead, EDECA deemed electric generation to be a "competitive service," not subject to State energy regulation.

These fundamental changes in the structure of the electric generation industry have therefore shifted and diffused much of the authority to make decisions about the reliability of our electricity supply and the price we pay for it. Much of that authority now rests with:

- *Power plant owners*. The owners of New Jersey power plants now have no legal expectation that they can recover all of their costs or a guaranteed return from retail customers. Hence, the plant owners (and their financiers) make their own decisions to invest in existing or new power plants, without BPU oversight. They also make their own decisions about the price, using market signals, at which they are willing to sell their electricity, without traditional BPU oversight.
- *PJM*. PJM Interconnection LLC ("PJM"), the regional transmission organization, plans and operates the electric transmission grid in a region that covers thirteen states and the District of Columbia, stretching from New Jersey as far west as Illinois and as far south as North Carolina. PJM also designs and administers wholesale electricity markets in that region.
- *FERC*. The Federal Energy Regulatory Commission ("FERC") regulates PJM. PJM must obtain the FERC's approval of a variety of decisions, such as changes to the wholesale electricity markets, and determinations of how much electricity customers pay for upgrades to the transmission system. The FERC also has the authority to override state decisions on the siting of transmission lines, or to take over the siting process if the state takes too long to complete it.
- *Electric Utilities*: The following four electric utilities in the State operate the electric distribution systems that deliver electricity to end users, and procure energy, capacity, and all other electricity requirements from the wholesale market to serve virtually all but the largest industrial and commercial electricity customers:
    1. Atlantic Electric (AE)
    2. Jersey Central Power and Light (JCP&L)
    3. Public Service Electric and Gas Company (PSE&G)
    4. Rockland Electric Company.
- *BPU*. The New Jersey Board of Public Utilities ("BPU") regulates electric utilities, in all of the functions described above. The NJBPU has no direct authority over the wholesale electricity markets or the electric transmission operated by PJM, but can advocate for New Jersey's interests before PJM and the FERC. The BPU oversees the

Basic Generation Service (BGS) auction through which the utilities obtain contracts for supplies to serve customers who do not shop for their own power supplies. The BPU also administers the Clean Energy Program, which supports the development of renewable energy and the enhancement of energy efficiency through regulatory programs and financial assistance.

- *DEP*. The New Jersey Department of Environmental Protection ("DEP") issues permits for air pollution control, water pollution control, land use, and the management of other environmental impacts. Power plants need some or all of these permits to be constructed, improved, or operated. The DEP also develops and implements programs that cap overall emissions of air pollutants, such as carbon dioxide and oxides of nitrogen, from power plants and other large facilities.

Energy and capacity. Heat energy, such as the energy generated from burning heating oil or natural gas, is measured in British thermal units (Btu). One Btu is the quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit.

In the electricity sector, planning for the supply and use of electricity involves an understanding of two products, known as "energy" and "capacity." Electric "energy" refers to the electricity that power plants actually generate and that end users actually use. "Capacity" refers to the ability of power plants to generate electricity. With few exceptions, electricity must be generated at the same time as it is being consumed. This means that sufficient capacity to generate and deliver electricity must be built and operated to meet consumers' highest projected demand, plus a reserve.

Electric "energy" is measured in watt-hours, kilowatt-hours, megawatt-hours, or gigawatt-hours.

- It takes 60 watt-hours of energy to power a 60-watt light bulb for one hour.
- A kilowatt-hour is 1,000 watt-hours. The average New Jersey home uses about 9,000 kilowatt-hours (kWh) of energy each year.
- A megawatt-hour is 1,000 kilowatt-hours. Wholesale electricity prices are generally expressed in dollars per megawatt-hour (MWh).
- A gigawatt-hour is 1,000 megawatt-hours. New Jersey's four nuclear power plants generated about 32,600 gigawatt-hours (GWh) of energy in 2006. Total retail energy sales in New Jersey totaled about 82,000 GWh in 2006.

"Capacity" is typically measured in megawatts (MW).

- A power plant with 600 MW of capacity can generate 600 MWh in one hour.
- New Jersey is home to about 17,000 MW of generation capacity currently in operation.[1]
- PJM projects summer 2008 peak demand to be 2,829 MW for Atlantic City Electric; 6,478 MW for Jersey Central Power & Light; 10,967 MW for Public

[1] Energy Information Administration, New Jersey Electricity Profile, November 2007, Table 1, http://www.eia.doe.gov/cneaf/electricity/st_profiles/new_jersey.html.

Service Electric & Gas; and 435 MW for Rockland Electric Co, for a total projected peak demand of 20,709 MW.[2]

Capacity, peak demand, and infrastructure. New Jersey needs sufficient capacity to meet daily energy requirements and projected peak demand on the highest usage hour of each year, plus a reserve. That capacity includes electric generation infrastructure, and transmission and distribution infrastructure to move the electricity from power plants to customers. The higher the peak demand rises, the more infrastructure is needed to provide the capacity to satisfy that peak, and the greater the cost to New Jersey electricity customers. Conversely, measures to reduce electricity consumption at times of peak demand, known as "demand response," can reduce the peak, reduce the infrastructure needed, and therefore reduce the cost to New Jersey electricity customers.

Rising oil and natural gas prices. The commodity markets are demonstrating that growth in the supply of energy is not keeping up with the growth in demand. The dependence for much of this supply from regions of the world that are experiencing tremendous turbulence and conflict with the United States, increases the risk of supply interruptions and consequently the price volatility of these fuel sources. From January 2007 through March 2008, crude oil prices more than doubled, from just over $45 per barrel to more than $110 per barrel[3] – an increase that can be blamed only in part on the declining value of the dollar. Natural gas, much of which is also supplied by troubled and volatile regions, has also experienced a dramatic increase in prices. After decades of relative stability, natural gas prices more than doubled between 2002 and 2007, even with prices having declined from their post-Katrina peaks.[4]

Since many New Jersey residents use natural gas and oil for heating, increases in the price of those commodities will increase the cost of heating, even if the amount of the fuel used were to remain unchanged. Rising natural gas prices also increases the price of electricity, much of which is generated from the combustion of natural gas.

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[2] PJM Load Forecast Report, January 2008.

[3] Energy Information Administration, U.S. Spot Price FOB Weighted by Estimated Import Volume, http://tonto.eia.doe.gov/dnav/pet/hist/wtotusaw.htm; Bloomberg, "Oil Rises to Record for Fifth Day in New York on Weak Dollar," March 11, 2008, accessed March 11, 2008 at http://www.bloomberg.com/apps/news?pid=20601081&sid=aLom4V1suPNI&refer=australia..

[4] See Energy Information Administration, U.S. Natural Gas Prices, http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_m.htm. Wintertime "City Gate" prices, determined at a point or measuring station at which a gas utility receives gas from a natural gas pipeline company or transmission system, generally remained under $4 per thousand cubic feet each January from 1984 through 2000, but ranged from $5.20 to $8 each January since 2004. Summertime prices stayed under $4.00 each August from 1984 through 1999, but ranged from about $6.50 to $8.20 each August from 2004 through 2007.

GLOBAL WARMING

Satisfying the world's appetite for energy contributes to the growing crisis of global climate change. New Jersey contributes to the crisis. Although our contribution is small when measured against the rest of the world, we can help lead the way in reducing the threat of climate change, and position ourselves to be as economically competitive as possible as the world mobilizes to address that threat.

Most power plants generate electricity by burning fossil fuels, such as coal, oil, or natural gas. The combustion process releases air pollutants including nitrogen oxides, sulfur dioxide, mercury, and fine particles – pollutants that cause acid rain, respiratory diseases, neurological damage, and premature death. To attain health standards for ozone and fine particles, the DEP has developed plans which affect electric generating units, as well as most other major air pollution source categories. The DEP's ozone State Implementation Plan, which was submitted to the EPA earlier this year, commits to a multi pollutant control program for New Jersey's existing seven coal fired power plants. That will require all units to install up to date air pollution control systems for nitrogen oxides, sulfur dioxide, and other particulates.

For oil and gas fired electricity generating units, which are mostly peaking units used on high energy demand days (HEDD), the new HEDD rules will require lower nitrogen oxides emissions in two phases. The second phase in 2015 is anticipated to result in electricity generators replacing many of their old peaking units with new lower emitting and higher efficiency units, reducing both ozone and greenhouse gas emissions. These performance standards for coal, oil, and gas fired generators complement and move beyond federal emission trading rules for nitrogen oxides and sulfur dioxide. As part of the federal Clean Air Interstate Rule (CAIR), DEP has already adopted a nitrogen oxides allocation provisions based on energy output, which rewards energy efficiency and encourages more efficient electric power generation, thereby reducing greenhouse gas emissions, as well as nitrogen oxides.

Burning fossil fuels also releases carbon dioxide, a greenhouse gas that is contributing to the accelerating warming of our planet and changing our climate. Fossil-fueled electric generation, and the extraction and transport of the fossil fuels it depends on, also cause the emission of other greenhouse gases such as methane and nitrous oxide. Although these gases are emitted in far smaller quantities than carbon dioxide, each ton of those gases contributes more to global warming than a ton of carbon dioxide.

Existing power plants can be fitted with air pollution controls that will dramatically reduce emissions of all of these pollutants except for carbon dioxide. At the present time, no such control technology is available for carbon dioxide. Significantly reducing carbon dioxide emissions from existing power plants therefore depends on a transition away from the most carbon-intensive power plant technologies, and toward technologies that generate electricity with less carbon dioxide emissions or none at all.

As part of its response to Executive Order 54 and the Global Warming Response Act, the DEP has prepared the table below (Table 1) that shows the greenhouse gas emissions by each sector, including the emissions from electricity generation. The emissions from electricity generation, from both in-state generation and emissions estimates of imported electricity, is approximately 35.1 million metric tons, which makes up approximately 25% of New Jersey's total greenhouse gas emissions. If no actions are taken, New Jersey's electricity contributions to greenhouse gas emissions will grow more than 20% from 2005 to 2020.

In addition to the Energy Master Plan process, several other initiatives are currently underway that will shape New Jersey's energy future. These initiatives include the Regional Greenhouse Gas Initiative (RGGI), Governor Corzine's Executive Order 54, and the Global Warming Response Act.

RGGI caps carbon dioxide emissions from power plants in ten Northeast and Mid-Atlantic states. RGGI requires electric generation facilities to purchase and use an emissions credit, called an "allowance," for each ton of carbon dioxide they emit. All of the money New Jersey collects when it sells these allowances will be invested in energy efficiency, renewable energy, cogeneration, and environmental enhancements that will reduce New Jersey's total carbon footprint.

The Governor's Executive Order Number 54 calls for the reduction of greenhouse gas emissions to 1990 levels by 2020, approximately 24% below "business as usual," followed by a reduction of emissions to 80% below 2006 levels by 2050. The DEP has been charged with developing a report to outline the State's strategies to achieve these targets, and will be issuing a report to satisfy the combined requirements of the Executive Order and the Global Warming Response Act in the Spring of 2008.

The Global Warming Response Act, signed into law in July 2007, builds upon the aggressive emission reduction targets of the Executive Order, and mandates that these reduction targets be achieved. In addition, the first update of the Energy Master Plan following the enactment of the Global Warming Response Act must include recommended policies and measures that will contribute to achieving the 2020 limit on greenhouse gas emissions, by reducing the emission of greenhouse gases from the production, processing, distribution, transmission, storage, or use of energy.

(Million Metric Tons CO_2e)	1990	2000	2005	2010	2020	Explanatory Notes for Projections
Energy	**111.5**	**118.0**	**132.7**	**138.9**	**148.1**	
Electricity, Production-Based	12.4	20.2	20.3	14.6	22.8	
Coal	6.93	10.67	9.59	7.42	8.85	See electric sector assumptions
Natural Gas	3.64	7.41	8.32	5.49	12.4	in Appendix A.
Oil	1.70	0.85	1.14	0.42	0.29	
Wood (CH_4 and N_2O)	0.01	0.03	0.00	0.00	0.00	
MSW/LFG	0.17	1.27	1.27	1.27	1.27	
Net Imported Electricity	14.1	7.33	14.8	24.5	20.3	
Electricity Consumption Based	**26.5**	**27.6**	**35.1**	**39.1**	**43.1**	
Residential/Commercial/Industrial (RCI)	**46.3**	**43.3**	**46.0**	**45.0**	**44.2**	
Coal	0.70	0.033	0.029	0.029	0.030	Based on USDOE regional projections
Natural Gas	20.5	25.6	26.4	26.5	27.4	Based on NJ BPU projections
Oil	25.0	17.7	19.6	18.5	16.7	Based on NJ BPU projections
Wood (CH_4 and N_2O)	0.13	0.08	0.07	0.06	0.06	Based on USDOE regional projections
Transportation	**36.6**	**45.2**	**49.5**	**52.7**	**58.6**	
On-road Gasoline	29.8	35.6	38.9	41.1	44.3	Based on USDOE regional projections
On-road Diesel	4.22	6.76	7.63	8.54	11.0	Based on USDOE regional projections
Marine Vessels	1.01	1.35	1.48	1.56	1.79	
Rail, Natural Gas, LPG, other	0.63	0.48	0.48	0.51	0.55	Based on USDOE regional projections
Jet Fuel and Aviation Gasoline	1.00	1.00	1.00	1.00	1.00	Estimated portion of emissions able to be controlled by NJ
Fossil Fuel Industry	**2.06**	**1.87**	**2.02**	**2.06**	**2.14**	
Natural Gas Industry	2.06	1.87	2.02	2.06	2.14	
Industrial Processes	**1.26**	**2.86**	**4.02**	**5.49**	**8.61**	
Nitric Acid Production (N_2O)	0.203	0.001	0.001	0.001	0.001	Based on State's modeling forecast of manufacturing employment for 2006-2020
Limestone and Dolomite Use (CO_2)	0.000	0.003	0.005	0.005	0.004	Based on State's modeling forecast of manufacturing employment for 2006-2020
Soda Ash (CO_2)	0.08	0.08	0.08	0.08	0.08	Based on 2004 and 2009 projections for U.S. production
ODS Substitutes (HFC, PFC)	0.010	2.41	3.59	5.16	8.37	EPA 2004 ODS cost study report
Electric Power T & D (SF_6)	0.63	0.31	0.30	0.21	0.12	Based on national projections (USEPA)
Semiconductor Manufacturing (HFC, PFC, SF_6)	0.01	0.03	0.03	0.02	0.01	Based on national projections (USEPA)
Laboratory Use of SF_6	0.33	0.02	0.02	0.02	0.02	Assumed no change from 2005 levels.
Waste Management	**13.4**	**6.67**	**6.76**	**6.46**	**6.01**	
Waste Combustion	0.00	0.00	0.00	0.00	0.00	Captured under electricity production sector
Landfills	12.9	6.15	6.23	5.89	5.37	Includes waste landfilled out of state
Wastewater Management	0.45	0.52	0.54	0.57	0.64	Projections based on historical 1990 to 2005 average annual growth rate.
Agriculture	**0.61**	**0.55**	**0.50**	**0.48**	**0.43**	
Enteric Fermentation	0.13	0.09	0.08	0.07	0.06	
Manure Management	0.04	0.03	0.03	0.03	0.02	
Agricultural Soils	0.45	0.43	0.39	0.39	0.35	
Forestry and Land Use (Land Clearing Releases)	**1.10**	**1.10**	**1.10**	**1.10**	**1.10**	Based on NJDEP methodology; See Appendix H
Total Gross Emissions	**127.8**	**129.1**	**145.1**	**152.5**	**164.3**	
increase relative to 1990		*1%*	*13%*	*198%*	*28%*	
Forestry and Land Use (Sequestration)	**-7.53**	**-6.99**	**-6.73**	**-6.46**	**-5.93**	Based on NJDEP methodology; See Appendix H
Net Emissions (incl. forestry*)	**120.3**	**122.1**	**138.3**	**146.0**	**158.3**	

Table 1: New Jersey Historical and Reference Case GHG Emissions, by Sector.[5]

This draft portion of the Energy Master Plan recommends a series of policies and measures to reduce greenhouse gas emissions associated with electricity and heating fuels. The DEP's Executive Order 54 report and Global Warming Response Act will be responsible for reducing greenhouse gas emissions across all sectors, including but not limited to the electricity, heating fuels and transportation sectors.

[5] *The Draft New Jersey Greenhouse Gas Inventory and Reference Case Projections 1990-2020.* http://www.nj.gov/globalwarming/

ROLE OF THE ENERGY MASTER PLAN

The Energy Master Plan must incorporate, as its fundamental priority, the assurance that New Jersey electricity and heating fuel customers will receive a reliable supply of electricity and heating fuels at a reasonable price, consistent with the State's environmental priorities. The planning effort must also recognize that the State cannot simply dictate this result, because fuel suppliers, power plant owners, PJM, the FERC, and other countries all may make decisions that can help or hinder our efforts.

For example, the price of electricity for New Jersey customers depends, more than anything else, on the structure of the wholesale markets as determined by PJM and the FERC, and the price at which power plant owners sell their power into these markets. That price, in turn, depends heavily upon decisions made by PJM and the FERC regarding upgrades to the regional transmission grid, and even more heavily upon the prices that national and international commodities markets establish for natural gas and other fuels used to generate electricity.

Similarly, the cost and reliability of New Jersey's supply of electricity depends heavily on decisions made by power plant developers to site plants in strategic locations, and on decisions made by PJM about upgrades to the transmission grid. Those same decisions shape the carbon footprint of our electricity supply.

For these reasons, this draft Energy Master Plan has been crafted with full recognition of what the State can do directly to affect the reliability and cost of energy; what the State is constrained to do indirectly to influence the decisions of PJM, the FERC, and power plant owners and developers; and what factors are outside the State's control. The draft Plan analyzes New Jersey's current energy challenges and projected future challenges. It proposes a series of actions to shape an energy future that addresses our economic and environmental needs - some that are already underway, some that are clearly constructive and necessary, and some that reflect hard choices deserving of thoughtful and thorough public debate.

"Business as Usual". Under a "business as usual" approach with no changes in State policies or actions, New Jersey's projected energy demand in 2020 will be about 100,000 GWh of electricity and over 590 trillion Btus of natural gas, heating oil and propane at a total annual cost to New Jersey consumers of $26.8 billion. The average household will spend approximately $1,700 on electricity, and nearly $1,800 on heating fuels (including natural gas, heating oil and propane). In addition, greenhouse gas emissions from the electricity and heating fuel sectors will increase to over 90 million metric tons of carbon dioxide.

However, the draft Energy Master Plan proposes an alternative scenario that includes a series of goals and action items that will effectively reduce energy consumption by 20 percent, to 80,000 GWh of electricity, and 474 trillion Btus of heating fuels. Less demand means a lower total cost to New Jersey electricity consumers. Less demand will

also mean less energy generation from the combustion of fossil fuels, resulting in fewer emissions of carbon dioxide and other pollutants.

The draft Energy Master Plan also continues ongoing requirements to have 20% of 2020 New Jersey electricity consumption supplied from Class I renewable sources, including solar technologies, photovoltaic technologies, wind energy, fuel cells, geothermal technologies, wave or tidal action, and methane gas from landfills or a biomass facility, provided that the biomass is cultivated and harvested in a sustainable manner. The draft Plan also continues requirements to have 2.5% of 2020 consumption met by Class II renewable sources, specifically by electricity produced at a resource recovery facility or hydropower facility. Obtaining more of our electricity from renewable sources means a reduced reliance on fossil fuel based electricity generation and therefore less emissions of carbon dioxide.

Stakeholder process and next steps. Beginning in October 2006, the State conducted a comprehensive stakeholder process to understand the current energy landscape, the diverse challenges facing the State, and the possible solutions to meet these challenges. Together, the BPU, the DEP, the Department of Transportation (DOT), the Office of Economic Growth (OEG) and the Governor's Office have engaged more than 500 stakeholders, from the public and private sectors, in an effort to develop the strategic energy initiatives that are outlined in this draft.

The State's plan to address the challenges in the transportation sector will be released separately to facilitate a responsible and productive public discussion on each of these important issues.

The Center for Energy, Economic and Environmental Policy (CEEEP) and the Rutgers Economic Advisory Service of the Center for Urban Policy Research (R/ECON™) at Rutgers University assisted the state in conducting extensive analysis to help understand and address New Jersey's current and future energy requirements. The CEEEP and R/ECON™ completed modeling that provided a framework to study the potential costs of continuing business as usual versus the costs of implementing a series of different strategies to meet the State's energy challenges. This analysis focused on how different energy strategies could affect energy use, economic growth, air quality, energy prices and greenhouse gas emissions. The inputs and results of the CEEEP and R/ECON™ modeling can be found at the Energy Master Plan website at www.nj.gov/emp.

Also, several workgroups were established to assist in the drafting of the Energy Master Plan. Their advice and expertise of the diverse stakeholders who participated in these groups were invaluable and these stakeholders will continue to be engaged in a dialogue after the release of this portion of the draft Plan.

After this portion of the draft Plan has been released for at least 60 days, there will be a public hearings process to obtain the comments of the public for consideration in preparing the final document. Once released, the transportation portion of the draft Plan will also follow similar process for obtaining public comments. After the public hearings

have been held the Energy Master Plan Committee, which is made up of 11 State agencies, in consultation with the Governor's Office will consider the comments submitted on this Draft Energy Master Plan and adopt a Final Energy Master Plan. It is anticipated that this will occur in the fall of 2008.

In addition to this document and the modeling report, this portion of the Energy Master Plan includes the Energy Master Plan Implementation Strategies. This document, which can be found at the Energy Master Plan website at www.nj.gov/emp, contains detailed information to the extent known on each strategy, including a brief description, the anticipated energy savings or energy production, a detailed program design, costs and savings to ratepayers, affected sectors, administrative costs, the entity responsible for moving the strategy forward, the timeline for action, the source of funding for the strategy and the performance metrics that will be used to determine if the strategy is producing the desired results.

There will be an annual assessment of the progress being made on the Energy Master Plan strategies. This assessment will compare the actions that were anticipated to be taken in the year to what was actually completed. Where there are divergences, the assessment will explain why the action was not completed and what is being done to correct the situation. This may include detailed analysis on why certain desired outcomes are not being achieved. For example, a number of actions need to be taken to reduce energy usage. The assessment will evaluate whether those actions are being implemented and whether they are producing their desired result. It is possible that the desired result may not be achieved even though the actions are being fully implemented. In this case the assessment will try to determine why that situation is occurring and what can be done about it.

The Plan will also be updated every three years, with emphasis on addressing new issues that develop during the planning interval and extending the time period to an additional point in the future. For instance, the first update of this Plan should occur in 2012 and address the energy picture out to 2025.

The Energy Master Plan not only outlines a path toward a future with a reliable, competitively priced supply of energy that is produced and used in a way that meets the State's environmental needs; developing the Plan also offers a valuable opportunity for New Jersey to determine how best to position itself for the energy challenges that are facing the region and the country. The challenge of global warming tells us that we cannot continue to produce and use energy the same way we did throughout much of the twentieth century and continue to do today. The future belongs to those who produce and use energy as wisely as possible, and to those who develop the technologies that make this possible. This Plan gives New Jersey businesses and citizens an opportunity to invest in our energy future. If we in New Jersey can put ourselves at the forefront of those efforts, we will be positioned to advance our economy as we protect our environment.

ELECTRICITY & HEATING FUELS – THE CHALLENGES

In August 2003 a blackout hit an area with a population of about 50 million, including northern New Jersey and much of the Midwest and Northeast, as well as parts of Canada. A joint U.S.-Canadian task force investigating the blackout summarized the importance of electricity to modern life:

> Modern society has come to depend on reliable electricity as an essential resource for national security; health and welfare; communications; finance; transportation; food and water supply; heating, cooling, and lighting; computers and electronics; commercial enterprise; and even entertainment and leisure—in short, nearly all aspects of modern life.[6]

We depend as well on heating fuels (natural gas, heating oil and propane) to keep our homes, schools, and businesses warm in the winter. This is not only a matter of comfort; in severe conditions, it can be a matter of life and death. These fuels are also used to produce hot water and steam, for cooking and in industrial applications.

To address the challenges we face with electricity and with heating fuels, we must first identify what those challenges are.

With respect to electricity:

- The reliability of our supply of electricity is at risk.
- The price of electricity is high, and rising.
- The generation of electricity is contributing to global climate change.
- Unless New Jersey takes action to solve these problems ourselves, other decision-makers will choose and implement costly actions that will not position us well to ensure either reliability or more reasonable prices, and that will increase our contribution to global warming.

With respect to heating fuels:

- The prices of natural gas and heating oil are high, and rising.
- The use of heating fuels is contributing to global climate change.
- New Jersey has little ability to influence these prices, which are largely set on national and international commodities markets.

Understanding the root causes of these challenges leads to a clear outline of the types of actions needed:

- Reduce peak demand for electricity;
- Reduce overall consumption of electricity and heating fuels; and
- Increase the amount of clean electric generation available locally.

[6] U.S.-Canada Power System Outage Task Force, "Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations," August 2004, p. 5.

ELECTRIC RELIABILITY

Although serious blackouts, brownouts, and other disruptions of the electricity supply may be infrequent, they can cause extraordinary harm. Total costs of the August 2003 blackout to the United States were estimated to range from $4 billion to $10 billion.[7] Similarly, power outages along the New Jersey shore over the 2003 July 4 weekend seriously harmed businesses that depend heavily on that weekend as part of their success each year.

A reliable supply of electricity depends on several factors. Power plants must have enough capacity to generate enough electricity to satisfy customers' peak demands. The transmission system must have enough capacity to handle the electricity that the power plants generate, and deliver it to the areas where demand is concentrated. The distribution system must take power from the transmission system and reliably deliver it to the customers who need it.

Responsibility for ensuring reliability rests in several hands. PJM, under the supervision of the FERC, is responsible for planning the electric transmission system to preserve the reliability of the electricity supply in its territory. Electric generation companies and their financiers make decisions about how much generating capacity will be built, what types of power plants will provide that new capacity, and where the new plants will be located; those companies also decide what plants will be kept in service and what plants will be retired. Those decisions are informed by economic signals from the wholesale electricity markets that PJM designs and administers, again under the supervision of the FERC. New Jersey's local electric utilities, under the supervision of the BPU, are responsible for preserving the reliability of their distribution systems.

PJM has identified a number of factors that are progressively reducing the reliability of the electric transmission system not only in New Jersey, but in southeastern Pennsylvania and the DelMarVa peninsula as well.[8] Those factors include:

- Growth in demand for electricity
- Sluggish development of new power plants
- Deactivations and retirements of local power plants
- Increasing exports of power to New York City and Long Island
- Reliance on transmission to import power into the region from Pennsylvania, West Virginia, and the Midwest.

Growth in demand. New technologies and a higher standard of living have produced changes in the way New Jerseyans consume electricity. As residents build

[7] U.S.-Canada Power System Outage Task Force, "Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations," August 2004, p. 1.
[8] PJM, 2007 Regional Transmission Expansion Plan, February 2008, p. 221.

larger homes, plug in computers, and install flat screen TVs, overall electricity demand increases. As a result the following increases in New Jersey's electricity consumption have been observed:

- From 1980 to 1990, electricity consumption increased by less than 1 percent, to almost 63,000 GWh.
- From 1990 to 2000, electricity consumption increased by 14 percent, to approximately 70,000 GWh.
- From 2000 to 2004, electricity consumption jumped 11 percent to just over 77,500 GWh.

The increase in demand is expected to continue at a rate of 1.52% per year through 2020. Figure 1 shows the projected electricity demand from 2005 through 2020.

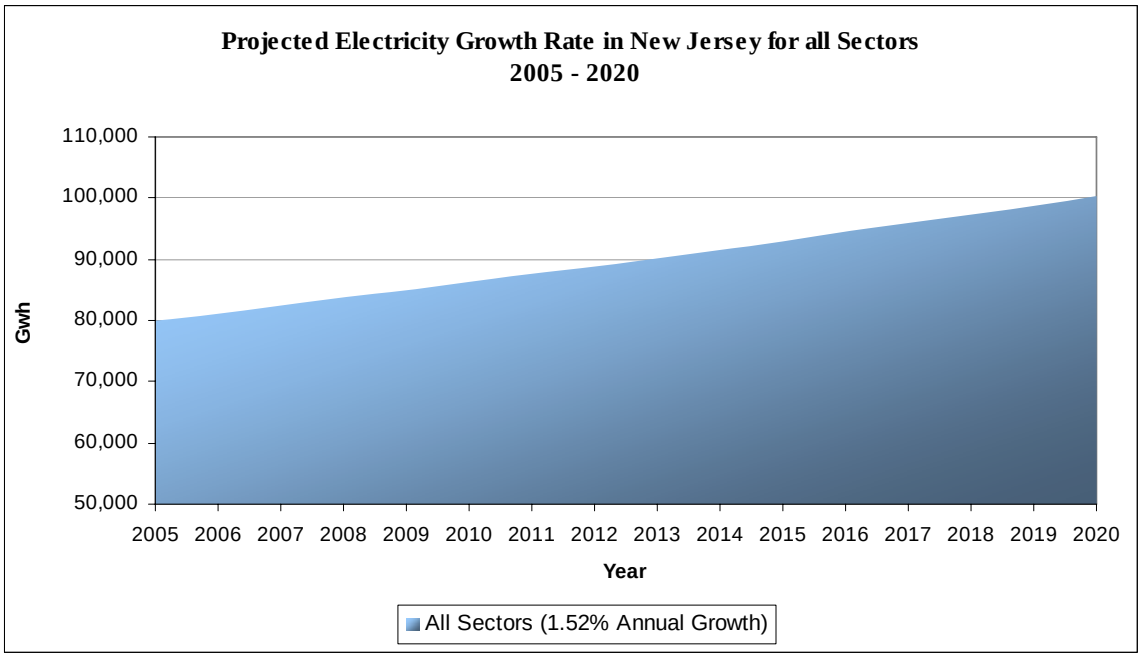

Figure 1: Projected Growth in Electricity Consumption. *If New Jersey does not act to change its energy use, demand is conservatively expected to grow 1.5% per year, leading to a 20,000 GWh increase in use between 2005 and 2020.*

As a result, peak demand is also steadily increasing. Peak demand typically occurs during the hottest summer days, when air conditioners throughout the state are running to provide relief from the heat and humidity. For example, Figure 2 shows the electricity demand curve for a two month period during the summer of 2006. This figure shows the hourly fluctuations in electricity consumption for each week, and also the weekly fluctuations in consumption due to temperature variations. This is an example of what a typical demand curve looks like, and highlights this peak demand.

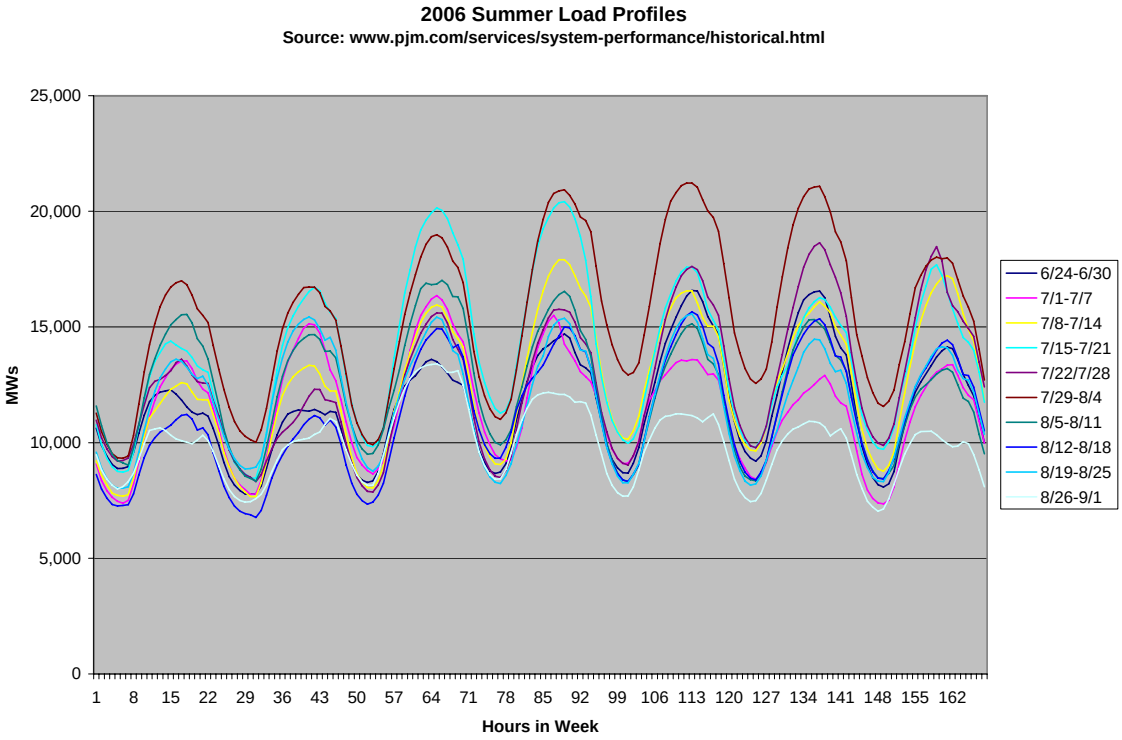

Figure 2: 2006 Summer Load Profiles*. A typical summer load profile has tremendous peak demand times that require sufficient electricity capacity to meet this demand.*

Planning of the electric system depends first and foremost on projections of what the highest peak demand will be each year. The electric system's reliability depends on having enough capacity, including a reserve margin, to generate electricity, to transmit it long distances, and to distribute it to customers at the time of the highest peak demand.

Long-term planning of the electricity system typically is based on projections that the highest peak demand will increase year by year. Plans are made and implemented to expand the system's capacity to transmit and distribute electricity to keep up with the expected increases in the highest peak demand.

PJM has forecasted the maximum peak electricity demand in New Jersey to be 20,709 megawatts for the summer of 2008. PJM projects that peak demand will grow at a statewide rate of 1.75% each year from 2008 to 2018.[9] If peak demand continues to grow at this rate through 2020, New Jersey peak demand in 2020 will be 25,557 MW.

The following table lists those peak demands for each electric utility's territory:[10]

[9] PJM, Load Forecast Report, January 2008, p. 35.
[10] PJM, Load Forecast Report, January 2008, p. 35.

Utility	*Summer 2008 Peak Demand Forecast (MW)*	*Projected Annual Growth Rate*	*Projected 2020 Peak Demand (MW)*
Atlantic City Electric	2,829	2.60%	3,866
Jersey Central Power & Light	6,478	2.00%	8,216
Public Service Electric & Gas	10,967	1.40%	12,978
Rockland Electric	435	1.10%	497
TOTAL	**20,709**	**1.75%**	**25,557**

Table 2: Peak Electricity Demand Forecasts, by Utility

Two general approaches are available to preserve reliability in the face of this growth in peak demand: increasing the system's capacity to generate, transmit, and distribute electricity to keep up with demand; and reducing peak demand.

Both types of approaches can be used simultaneously. However, reducing peak demand is dramatically more cost-effective and therefore must be the higher priority. Demand rises to peak levels for only a small number of hours each year – generally fewer than 50 hours out of 8,760. Figure 3 shows the number of hours during 2006 when demand was above a specified level. For example, although the highest demand during the year was more than 21,000 MW, demand rose above 15,000 MW for only a few hundred hours, and was below 10,000 MW the majority of the time.

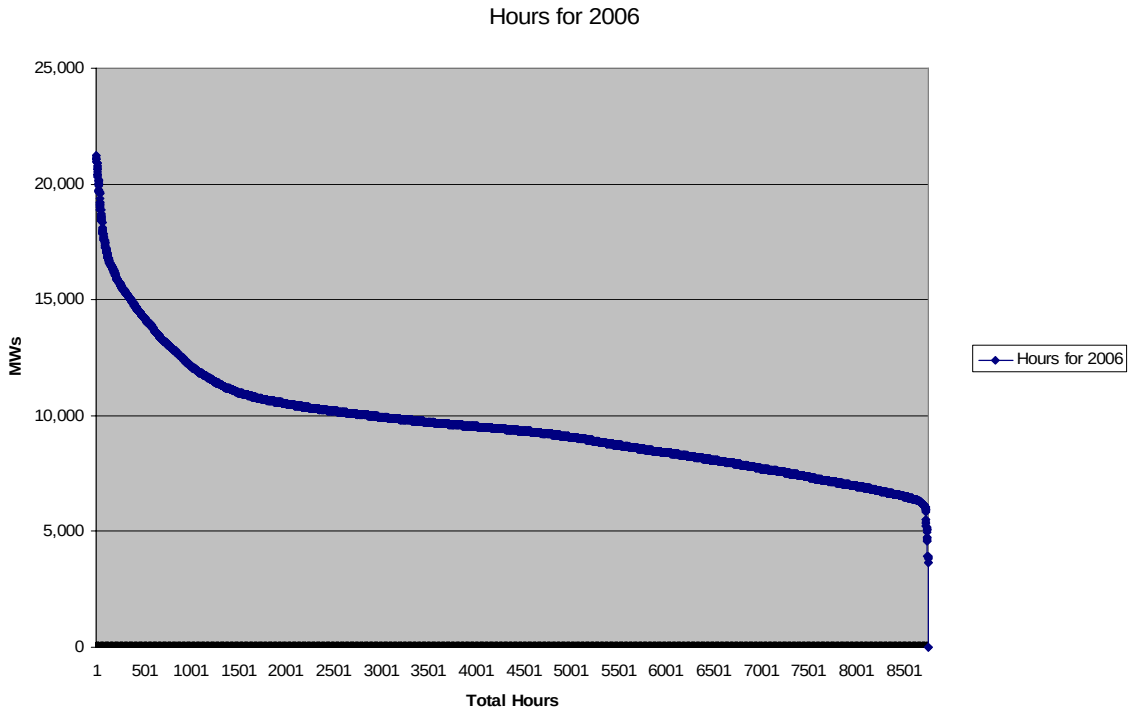

Figure 3: 2006 Load Duration Curve

The demand for this capacity triggers the activation of very high cost generation facilities, called "peaking plants." The demand for this capacity raises the prices that all power plants received, substantially increasing ratepayers' bills. Figure 4 shows the number of hours in 2007 that wholesale electricity prices were at or above a given level. During those few hours when demand is the highest, wholesale electricity prices increased nearly 300%; in other years, those prices have increased by 1,000% during the highest peak hours.

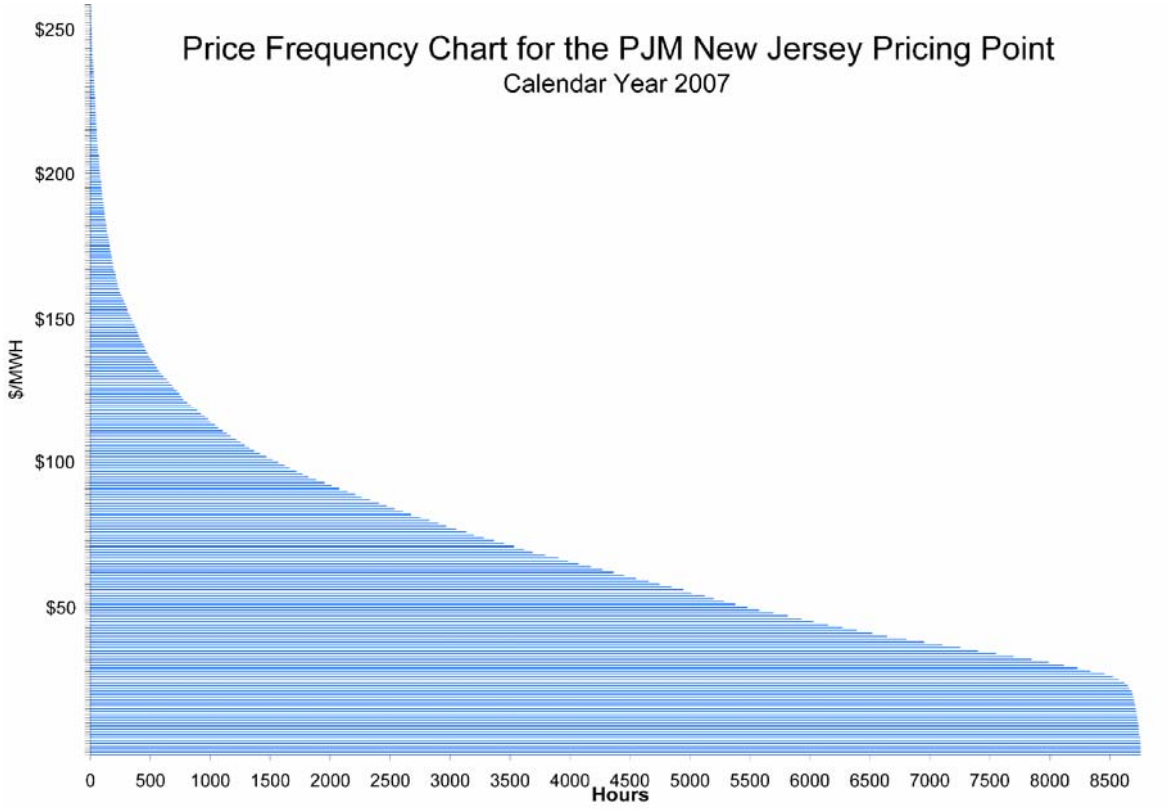

Figure 4: 2007 Price Frequency Chart for the PJM New Jersey Pricing Point.

Building power plants and transmission lines to serve growing peak demand is far more costly than reducing demand during those few hours. Reducing demand at peak times has also demonstrated the ability to generate enormous savings. On August 2, 2006, PJM set a new record of 144,644 MW across its entire territory. In response to this demand, PJM demand response measures were implemented across the region. These peak demand measures resulted in reductions that day reduced wholesale prices by about $300 per MWh, resulting in total cost savings of about $230 million on that single day. Over the weeklong heat wave that included the record peak, reductions in electricity use yielded savings of about $650 million for the week.[11]

[11] PJM, 2006 Annual Report, p. 19.

Sluggish development of new power plants. Focusing on reducing peak demand is especially important, because of the difficulty in expanding the capacity of our electricity infrastructure – especially the capacity to generate electricity. As noted above, PJM projects that New Jersey's peak demand will grow by 1.75% annually through 2018, about 2-1/2 times as fast as supply has grown in recent years. Electric generation capacity in New Jersey grew at an average annual rate of 0.71% between 2002 and 2007.

A variety of explanations have been offered for the slow growth in electric generation capacity in general and baseload capacity in particular. A few examples follow:

- Reluctance of the financial community to finance new plants, due to uncertainties about future regulation of power plant emissions of carbon dioxide and other pollutants, uncertainties about volatile fuel prices, uncertainties about construction costs at a time when those costs are rising rapidly, and uncertainties about longer-term energy and capacity revenues;
- High barriers to entry for new plants, such as high capital costs, high real estate prices, and local opposition to new power plants on sites that were not previously used for electric generation;
- Inadequate revenues from the capacity market. Until PJM began implementing the Reliability Pricing Model (RPM), prices for capacity were approaching zero. The very low capacity prices left new plants to rely almost entirely on energy revenues for their earnings. Since peaking plants run for only a small number of hours each year, their energy revenues are necessarily limited, and were likely to be insufficient to support financing. With RPM, PJM sought to encourage the development of new plants by increasing capacity prices dramatically, having the prices reflect local conditions, and making the prices more stable. While PJM has indicated that the RPM has brought new capacity into the region, it remains to be seen whether RPM will fully succeed in bringing new plants into service; what is already certain is that only a small fraction of the much higher capacity revenues are flowing new plants, while existing plants receive the lion's share.

Since deregulation of the electric generation industry in 1999, we have been relying on market forces alone to lead to the construction of new plants. Neither can we rely on the market to produce the lower-emitting, more efficient plants that we need most, because those plants tend to be more costly and more time-consuming to construct than the less efficient "peaking" generation. Since the peaking plants, despite being cheaper to build, produce electricity at a higher cost than more efficient plants, they are unlikely to provide much help in mitigating wholesale electric prices.

Several factors may be discouraging the construction of baseload nuclear and coal-fired plants. Those plants have substantially higher capital costs than gas-fired peaking plants; are more likely to be the subject of community opposition; take longer to develop and construct; face greater market uncertainties as a result of that longer lead time; and face great uncertainty about future national and global constraints on carbon dioxide emissions, which in turn is making it more challenging to obtain financing.

CEEEP prepared Table 3 which shows the capital costs to build several types of power plants (the installed overnight costs), to keep those plants available to supply electricity (fixed operation & maintenance costs) and to generate electricity (variable operation & maintenance costs). Although nuclear power plants are by far the most expensive to build and keep available, once in place they also generate electricity more cheaply than any other non-renewable technology. These plants operate nearly 24/7 and provide the cheapest source of energy production. However, due to their high fixed operation costs and the stress that is placed on these facilities to power up or power down, it is difficult for them to respond to peak demand, and therefore they run at or near capacity for extended periods of time and provide electricity to meet baseload demand.

NJ Generation Cost Assumptions ($2006)								
	Overnight Installed Cost ($/kW)		**Variable Operation & Maintenance Cost ($/MWh)**		**Fixed Operation & Maintenance Cost ($/kW-yr)**		**Capacity Factors**	
	Min	Max	Min	Max	Min	Max	Min	Max
Conventional Coal	$ 1,900	$ 2,400	$ 2.20	$ 2.70	$ 18.30	$ 22.40	Determined by model	
Integrated Gas Combined Cycle (IGCC)	$ 2,400	$ 3,200	$ 1.00	$ 1.25	$ 32.00	$ 40.00		
Advanced Combined Cycle	$ 700	$ 950	$ 2.00	$ 2.50	$ 11.40	$ 14.00		
Gas Turbine	$ 500	$ 750	$ 5.00	$ 6.20	$ 6.00	$ 7.30		
Nuclear	$ 1,700	$ 3,700	$ 0.50	$ 0.60	$ 70.00	$ 80.00	85%	92%
Combined Heat and Power (CHP) (3-25 MW)**								
w/out Chillers	$ 1,000	$ 1,500	$ 4.00	$ 6.50	$ 30.00	$ 45.00	80%	
w/ Chillers	approx. $2,000						80%	
Wind								
On-shore	$ 1,500	$ 2,200	$ 1.00	$ 2.00	$ 28.00	$ 32.00	25%	35%
Off-shore	$ 2,000	$ 2,800	$ 1.00	$ 2.00	$ 28.00	$ 32.00	25%	35%
Solar	$ 7,500	$ 8,000	$ -	$ 1.00	$ 11.00	$ 12.00	12%	15%
	Min	Max						
Levelized Real Fixed Capital Charge Rate (%)	12%	15%						
Note: Costs in NJ are assumed to be 10% higher than rest of PJM								
Improvements in technologies and cost reductions are modeled consistent with those in the Annual Energy Outlook and other References								
** - Other cost assumptions related to Energy Efficiency (EE), and the Regional Greenhouse Gas Initiative (RGGI) are being finalized along with fuel price assumptions*								
*** - Variable and Fixed O&M costs for CHP decrease with installation size; units of 20+ MW face the min. costs*								
Source: Cost Generation Taskforce 2007								

Table 3: NJ Generation Cost Assumptions: *These numbers are estimates and are in the process of being updated.*

The amount of time needed to plan and construct these various generation technologies also differs greatly. According to the 2006 EIA Annual Energy Outlook, the "lead time" to construct these plants is as follows:

- Conventional Coal: 4 years.
- IGCC: 4-6 years.

- Advanced Combined Cycle: 2-3 years.
- Gas Turbine: 1-2 years.
- Nuclear: 5-13 years.
- Wind: 2-3 years.
- Solar: 1-2 years.

The longer the lead time, the more regulatory risks are perceived for investment in these generation technologies. Therefore, due to its reduced capital costs, fixed operation and maintenance costs, and relatively short lead time, new gas turbines, that primarily serve peak demand have the greatest opportunity to be constructed. However, the cost to generate this electricity, their variable costs, is significantly higher, and results in higher electricity rates during the time they operate.

Deactivations and retirements of local power plants. According to the U.S. Energy Information Agency, New Jersey has about 17,000 MW of capacity currently operating in New Jersey. Figure 5 shows the age and MW capacity of New Jersey's electricity generating facilities in 2006.

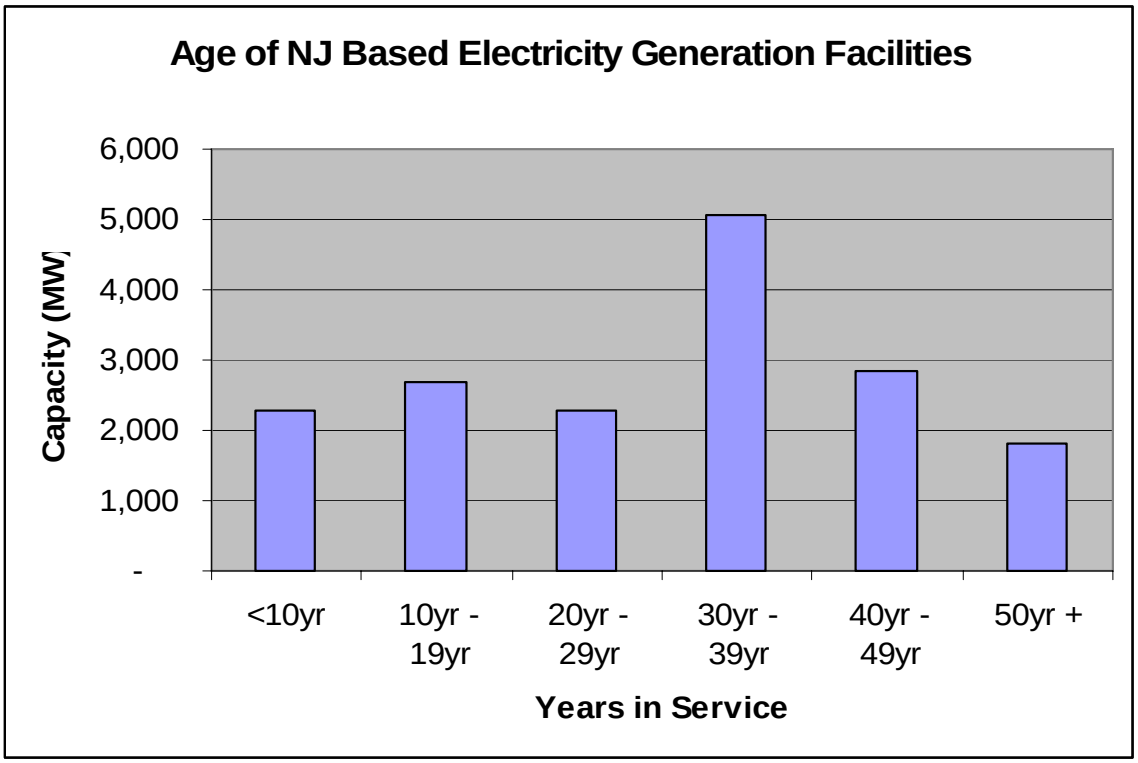

Figure 5: Age of NJ Based Electricity Generation Facilities. *Nearly half of New Jersey based electricity generating facilities are 30 years old or older.*[12]

Less than 40 percent of New Jersey's generation capacity is 20 years old or less, while nearly half is 30 years old or older. As existing power plants age, more are likely to retire, leading to an even greater challenge in providing enough capacity to satisfy peak

[12] Energy Information Administration, "Form EIA-860 Database, Annual Electric Generator Report," 2006, available at http://www.eia.doe.gov/cneaf/electricity/page/eia860.html (accessed April 10, 2008).

demand. More than 400 MW of capacity retired between 2005 and 2007. Retirements of more than 3,000 MW of additional capacity had been announced; although about 2,100 MW of those retirements have been reversed at least temporarily, those plants are less reliable, less efficient, more expensive to run, and have greater greenhouse gas emission rates than newer plants.[13] In other words, these are not the kind of plants that New Jersey can rely upon for its energy future. We must plan for the likelihood that these plants will be retired and will need to be replaced to ensure the reliability of New Jersey's electricity supply.

Increasing exports to New York City and Long Island. Like New Jersey, New York City and Long Island suffer from a shortage of local generation capacity and limits on their ability to import electricity. A substantial part of their strategy to address that problem is to enter into contracts that support the development of new transmission lines over which they can import more power. As New York City and Long Island import more electricity from and through New Jersey, our own shortfall of capacity to meet rising demand is exacerbated.

Before the "Neptune" transmission line from New Jersey to Long Island commenced operation, the United States Department of Energy said that the line "will move electricity from New Jersey to Long Island; the line will ease Long Island's supply needs, but it may exacerbate New Jersey's local reliability and supply problems."[14] When the Neptune line commenced operation in 2007, it immediately began withdrawing about 660 MW of capacity from New Jersey. This withdrawal was equivalent to an immediate retirement of about four percent of our current in-state generation, or about the capacity of the Oyster Creek nuclear plant. To look at it another way, activating the Neptune line had an instantaneous effect equivalent to two years' worth of increases in peak demand in New Jersey.

The Neptune line is not the end of the story. PJM states that with the Neptune line and other planned projects, the impact of growing peak demand is "compounded by the stresses on the transmission system of potentially having to accommodate more than 2,800 MW of planned exports of power from eastern PJM to New York City and Long Island. . ."[15]

In addition, the owner of one relatively new and efficient plant announced in January 2008 that it intended to "deactivate," making it unavailable to serve New Jersey customers. Instead, the owner hopes to export the plant's energy and capacity entirely to New York City, where electricity rates are higher, over a new transmission line.

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[13] Energy Information Administration, "Form EIA-860 Database, Annual Electric Generator Report," 2006, available at http://www.eia.doe.gov/cneaf/electricity/page/eia860.html (accessed April 10, 2008); PJM, "PJM Generator Deactivations," "Withdrawn Deactivation Requests," and "Pending Deactivation Requests," http://www.pjm.com/planning/project-queues/gen-retire.html (accessed April 10, 2008).
[14] U.S. Department of Energy, "National Electric Transmission Congestion Study," 2006, p. 42, http://nietc.anl.gov/documents/docs/Congestion_Study_2006-9MB.pdf (accessed April 10, 2008).
[15] PJM, "2007 Regional Transmission Expansion Plan," February 27, 2008, p. 223. p. 66

The loss of capacity from increased exports therefore creates another major challenge to retaining enough capacity to meet peak demand.

Reliance on imports. New Jersey's generating plants produce about 75 percent of the state's annual electric energy, thereby requiring the State to import the remaining 25 percent of its electricity. With exports rising, existing power plants retiring, and slow development of new plants locally, PJM has included in its transmission expansion plans several projects that will enable more imports of electricity from areas to the west and south. These long transmission lines are costly to build and more vulnerable to disruption than shorter lines linking local generation to local demand.

Attempts to solve New Jersey's reliability problems by importing more electricity are likely to increase greenhouse gas emissions and other air pollution challenges. Imported electricity is more heavily coal-based than electricity from New Jersey power plants, and therefore on the average has higher greenhouse gas emissions. Many of the out-of-state plants lack advanced technology to control air pollution, and the prevailing winds carry that pollution here to the detriment of our air quality and public health.

In addition, through its participation in RGGI, New Jersey based electrical generation facilities must purchase and use an allowance for each ton of carbon dioxide they emit. Although RGGI includes ten states, New Jersey, Maryland and Delaware are the only PJM states involved. Unlike generators in the RGGI region, the generation facilities in the other 10 PJM (including Pennsylvania, Ohio and West Virginia) states do not have to use allowances to cover their carbon dioxide emissions. The resulting cost advantage for generators outside the RGGI region may lead those generators to run more and emit more carbon dioxide, undermining RGGI's environmental benefits. This is commonly referred to as "leakage." Therefore, unless the State develops a strategy to mitigate leakage, the opportunity for a competitive advantage may lead generators to develop new plants in Pennsylvania, West Virginia, Ohio, and other states outside the RGGI region and export their power to New Jersey.

The prospect of increased greenhouse gas emissions is only one reason to avoid increasing our reliance on imports of out of state dirty electricity. Just as importantly, hopes that these imports would bring us greater reliability and lower prices are likely to be dashed. The prospect of federal limits on power plant emissions of greenhouse gases is creating major uncertainty about what coal-based power will cost. In addition, demand for coal is increasing, as coal is becoming more difficult and expensive to mine and transport, and recent history has featured disruptions in coal supply and spikes in coal prices. All of these factors suggest that it would be irresponsible to stake our energy future on increased imports of out-of-state coal-based electricity.

ELECTRICITY PRICES

New Jersey's electricity prices are among the highest in the country. Figure 6 compares New Jersey prices to the prices in several other states. While prices in New York and

Connecticut are higher, prices in other nearby states like Pennsylvania[16] and Delaware are considerably lower. In addition, industrial electricity prices are significantly lower in New York, Delaware, and Pennsylvania than in New Jersey. Since electricity prices can be a substantial share of the cost of industrial production, this disparity makes New Jersey appear less attractive to industries either seeking to locate or expand a facility or deciding where to close a facility.

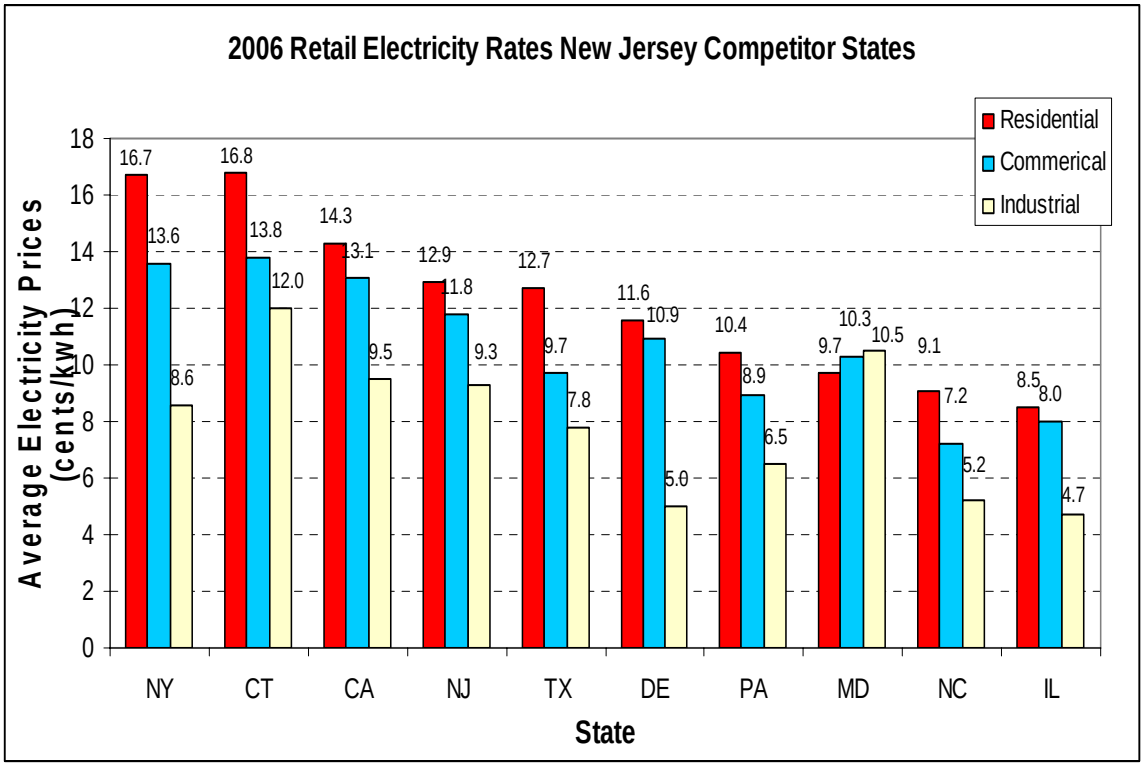

Figure 6: Comparison of Retail Electricity Rates. *In general, New Jersey's electricity rates are lower than those in the Northeast and California but higher than those of other Mid-Atlantic States.*

Although about a third of the retail rate pays for the cost of delivering the electricity and other utility-related charges, the bulk of the retail rate is simply a pass-through of costs of procurement on the wholesale electricity markets. For New Jersey customers, that pass-through has increased dramatically over the past several years, from 5.06 cents per kilowatt hour in 2002 to 11.33 cents in 2008.

Virtually all of this increase reflects increases in the prices of two products that power plants sell on the wholesale markets. The plants sell the electricity that they actually generate and supply to buyers, known as "energy"; and "capacity," which refers to the availability of plants to generate electricity during times of peak demand.

[16] For many electricity customers in Pennsylvania, electricity rates are capped. Rate caps have been common in states that transitioned to a competitive retail market for electricity; however, when the caps are eventually removed, drastic rate increases can result. For example, when rate caps ended in Maryland in 2006, Baltimore Gas & Electric rates for electricity increased by 72%.

The ultimate wholesale buyers of these products are the companies that supply power to retail customers. Those retailers must purchase energy to supply their customers with the electricity they need; that amount changes constantly with changes in the customers' demand, and the wholesale spot market price of energy changes constantly as well. PJM also requires that the retailers purchase enough capacity to meet their customers' highest projected peak demand, plus a reserve to protect against the possibility that some plants may be unavailable when the peak actually occurs.

Buyers and sellers are free to negotiate contracts directly with each other for the sale of either energy or capacity. Nonetheless, the prices set in the markets, and the expectations of trends in those markets, guide the prices that buyers and sellers will be willing to agree upon in their contracts.

Energy and capacity in "regulated" vs. "deregulated" states. In "regulated" states where electric utilities still own power plants that are regulated by a state utility commission, the utilities can supply their own needs for energy and capacity or strike a balance between self-supply and purchases on the wholesale markets. The utilities make those decisions under the oversight of the state utility commission. That commission also regulates the retail prices that utilities charge for electricity. Those retail prices reflect the utilities' actual cost of producing self-supplied energy. It also reflects the recovery of capital costs for the self-supplied capacity, plus a return, as well as the fixed operating and maintenance costs needed to keep that capacity available. In this scenario, consumers bear the financial risks of decisions that result in above market costs.

New Jersey regulated electric utilities in this manner before Governor Whitman signed the Electric Deregulation and EDECA into law in 1999. At that time, New Jersey's three largest electric utilities owned power plants, which were regulated by the BPU. After the law was enacted, all three utilities divested themselves of ownership of their power plants, removing them from the regulatory jurisdiction of the BPU. PSE&G conveyed its plants to an affiliate, known as PSEG Power LLC; the other utilities sold their plants to unrelated companies.

Under EDECA, retail customers can choose the supplier from whom they will purchase their electricity, or can do nothing and receive "default" service provided to customers who do not choose an alternative supplier. That service is known as the BGS auction. State utility regulators approve the retail price for BGS, while competitive retailers set their own retail prices. For both BGS and competitive retailers, fluctuations in the retail price of electricity largely follow fluctuations in the wholesale costs of energy and capacity. The wholesale markets that set these prices are regulated by the Federal Energy Regulatory Commission rather than by the State.

Wholesale energy and capacity markets. The wholesale spot market prices of energy and capacity, which are the largest influence on the retail price of electricity in New Jersey and other "deregulated" states, are not based on the actual cost of supplying

those products. Instead, the spot market sets a "clearing price" for energy, and one for capacity as well; all participating power plants get paid that clearing price, including plants with variable operating costs that are well below the clearing price.

In the spot market for energy, the clearing price is generally set by the most expensive power plant called upon to run at a given time. PJM calls upon plants to run ("dispatches" the plants), starting with the one that offers to supply energy most cheaply, and working up through plants with more expensive offers, until there is enough power being generated to satisfy demand at all locations of the PJM grid. All plants running at that time receive the price offered by that last, most expensive plant – even plants that offered to supply energy at a far lower price.

The cost of power from a particular plant depends primarily on how much its fuel costs, and how efficiently the fuel is used to generate electricity. Since nuclear plants generate each additional megawatt-hour of electricity at a very low cost (even though they are significantly more expensive to build and maintain than their fossil-fueled counterparts), they are generally the first plants dispatched. Coal plants are usually dispatched next. Combined-cycle plants fueled by natural gas (and sometimes with oil) generate additional electricity by reusing heat that would otherwise be wasted, and are therefore more efficient and dispatched ahead of simple-cycle combustion turbines that do not reuse their waste heat.[17]

Prices vary by location. New Jersey is part of a region within PJM (also including Delaware, Maryland, the District of Columbia, southeastern Pennsylvania, and northern Virginia) with limited ability to import power. This region therefore must rely at times on more expensive local plants to meet demand instead of less expensive plants to the west. Since it is the most expensive plant that sets the price for all plants running in the area, the limits on imports make energy more expensive here than in regions such as western Pennsylvania, Ohio, and West Virginia where less expensive coal-based power is more readily available.

On peak demand days, the need for more electricity triggers the activation of higher-cost generation facilities, called "peaking plants." Although these generating facilities are only needed a small number of hours per year, consumers pay year-round for the ability to call on these peaking plants. In addition, when these peaking plants are running, their higher costs set the price for all other plants running in the area at the same time – even plants that generate electricity much less expensively.

Electricity customers directly bear the cost of expanding the capacity of transmission and distribution infrastructure. Conversely, if actions are taken that convincingly reduce, eliminate, or reverse projected increases in the highest peak demand, customers will pay less for the expansion of infrastructure.

[17] Like nuclear plants, renewable facilities fueled by the wind or the sun are more costly to build but less expensive to run – since those renewable resources are essentially free. However, since they generate electricity intermittently based on how strongly the sun is shining or the wind is blowing, PJM cannot call upon them to supply a certain amount of electricity at a particular time.

Through the capacity market, customers also indirectly bear the cost of expanding generation infrastructure. Unlike the energy market, which has operated without dramatic changes in recent years, the capacity market in PJM underwent drastic changes in 2007, leading to capacity prices in New Jersey that were more than 30 times higher than they had been previously. The cost of capacity had not previously been a major factor in the price of electricity in New Jersey, but now is responsible for about 15 to 20 percent of the price. Strategies to reduce capacity costs therefore are now much more important in efforts to reduce electricity costs.

PJM developed the new capacity market construct, called the RPM, after determining that prices in the previous capacity market were too low to support the development of new power plants, to retain marginal power plants on the verge of retiring, or to provide a sufficient incentive for demand response. RPM was designed to ensure higher and more stable capacity prices, especially in areas such as New Jersey and the Baltimore-Washington corridor, where PJM believed that shortages of capacity resources were threatening the reliability of the supply of electricity. Capacity prices under RPM, like energy prices, are therefore supposed to vary by location.

Although the purpose of this new capacity market was to encourage the development of new generation, the revenues from the capacity auctions are spread thinly among a few new plants and virtually all existing plants. As a result, the major increase in the overall cost of capacity under RPM flows largely to existing plants in no danger of retirement. Thus far, since RPM has been in place, less than one percent of the capacity revenues are being paid to new generation.

Four RPM auctions have been held, establishing capacity prices for the one-year periods ending June 30 in 2008, 2009, 2010, and 2011. The total cost to New Jersey customers for capacity in those four years is estimated to be nearly $6 billion. PJM has asked the FERC to approve a change to RPM, which could increase capacity prices by about 50 percent. The State is opposing this change.

The next RPM auction will take place in May 2008, and will cover the periods June 1, 2011 through May 31, 2012. The results of this auction will provide the State with a clearer picture about the effects of RPM on increasing capacity in the region. Also, PJM has committed to perform a study of the effectiveness of RPM which will be complete in June, 2008 and include the May auction results. BPU, together with other utility commissions, consumer advocates, public power associations, and large energy users, has asked PJM to expand the scope of that study to include an evaluation of RPM's costs and cost-effectiveness. The same parties have also asked the FERC to hold a technical conference to evaluate RPM's performance and costs. The State and PJM will continue to work together, study and evaluate the impacts of the RPM on New Jersey's current and future energy infrastructure.

The four electric utilities in the State procure energy, capacity, and all other electricity requirements from the wholesale market to serve virtually all but the largest industrial

and commercial electricity customers. The utilities procure those products through an annual BGS auction, under rules and procedures approved by the BPU and under the oversight of the BPU. The utilities have conducted these auctions since 2002. Each year, the BPU has worked closely with stakeholders to identify and implement possible improvements to the auction.

In each annual BGS auction, the utilities procure three-year contracts for electricity supply, for one-third of supply needed. In that way, the BGS price each year reflects an average of procurements made over three years. The three-year average exposes New Jersey customers to less of the volatility in the wholesale electricity markets. However, the three-year average has steadily increased over the past several years.

Threat of continuing increases in wholesale energy and capacity prices. Several factors will combine to push wholesale energy and capacity costs higher unless policies are enacted to counteract them:

- Growth in the supply of electricity is not keeping up with growth in demand.
- More of the State's power plants are fueled by natural gas.
- Capacity prices now contribute substantially to increasing electricity bills.
- Substantial increases in fuel prices.

Growth in the supply of electricity is not keeping up with growth in peak demand. As discussed above with respect to threats to reliability, growth in capacity is not keeping up with growth in peak demand, while retirements of existing plants and increasing exports to New York City and Long Island make the shortage of capacity worse. When increasing peak demand meets an increasing shortage of the supply of capacity, higher capacity prices are likely to result.

More of our power plants are fueled by natural gas. New Jersey's electric generation fleet has changed over time, with plants fueled by natural gas generating a larger share of the State's electricity generation. Figure 7 illustrates the cost for each type of plant to generate one megawatt-hour of electricity, and how plants are called upon to provide electricity to the grid in order of their increasing costs as the demand for electricity increases.

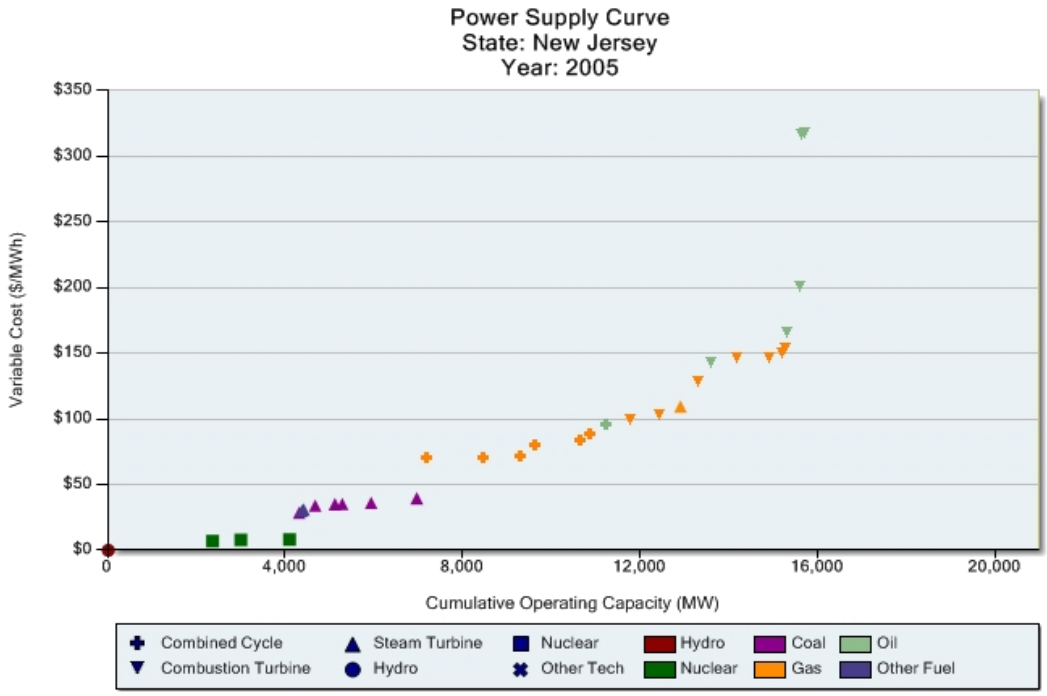

Figure 7: 2005 Power Supply for New Jersey. The plants with the highest operating costs (oil and natural gas) set the price of electricity that all plants receive.

Hydroelectric plants generate that megawatt-hour at the lowest cost, followed by nuclear and coal. Combined-cycle plants, which use a natural gas-fueled combustion turbine to generate electricity, and then recover heat from the turbine exhaust to generate steam that can be used to generate more electricity, are next in line. Peaking units, such as natural gas-fueled or oil-fueled older boilers and simple-cycle combustion turbines that do not recover waste heat, have the highest cost to generate a megawatt-hour of electricity.

The most expensive plant called upon to run at a given time sets the price for all plants running at that time. When plants fueled by more expensive fuels such as natural gas are called upon to meet New Jersey's demand for electricity more of the time, they set a higher price for all plants running at the time. Accordingly, heavier reliance on natural gas combined with increases in the price of natural gas contributes heavily to higher electricity prices.

The large majority of the 226,505 MW of new generation plants, that commenced operation nationwide since 1997, are fueled by natural gas. Figure 8 shows the amount of electric generation capacity that has been installed nationwide in the last 50 years.[18]

[18] Energy Information Administration, "Form EIA-860 Database, Annual Electric Generator Report," 2006, available at http://www.eia.doe.gov/cneaf/electricity/page/eia860.html (accessed April 10, 2008)

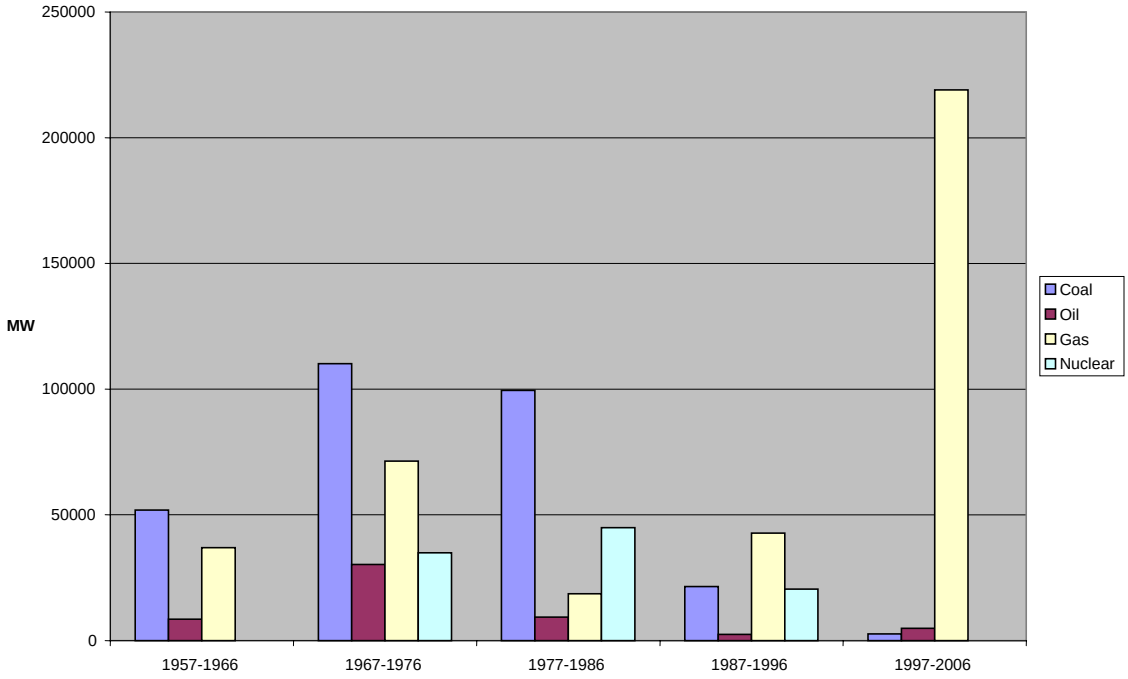

Figure 8: Electricity Generation Capacity Nationwide, by Fuel Type and In-Service Date.[19]

This trend is similar in New Jersey. Figure 9 shows the amount of electric generation capacity that has been installed in the State in the last 50 years.[20] In 1990, power plants fueled by natural gas accounted for about 33% of New Jersey's electric generation capacity; by 2006, that share had grown to about 55%.[21] Those plants not only account for a larger share of the generation capacity, but also generate a larger share of our electricity. Natural gas generation facilities accounted for 17.3% of the State's total electricity generation in 1990, and 25.8% in 2006.[22]

[19] Energy Information Administration, "Form EIA-860 Database, Annual Electric Generator Report," 2006, available at http://www.eia.doe.gov/cneaf/electricity/page/eia860.html (accessed April 10, 2008)
[20] *Id.*
[21] Energy Information Administration, New Jersey Electricity Profile, November 2007, Table 4, Electric Power Net Summer Capacity by Primary Energy Source and Industry Sector, 1990, 1995, and 2001 Through 2006, http://www.eia.doe.gov/cneaf/electricity/st_profiles/new_jersey.pdf (accessed April 15, 2008).
[22] Energy Information Administration, New Jersey Electricity Profile, November 2007, Table 5, Electric Power Net Generation by Primary Energy Source and Industry Sector, 1990, 1995, and 2001 Through 2006, http://www.eia.doe.gov/cneaf/electricity/st_profiles/new_jersey.pdf (accessed April 15, 2008).

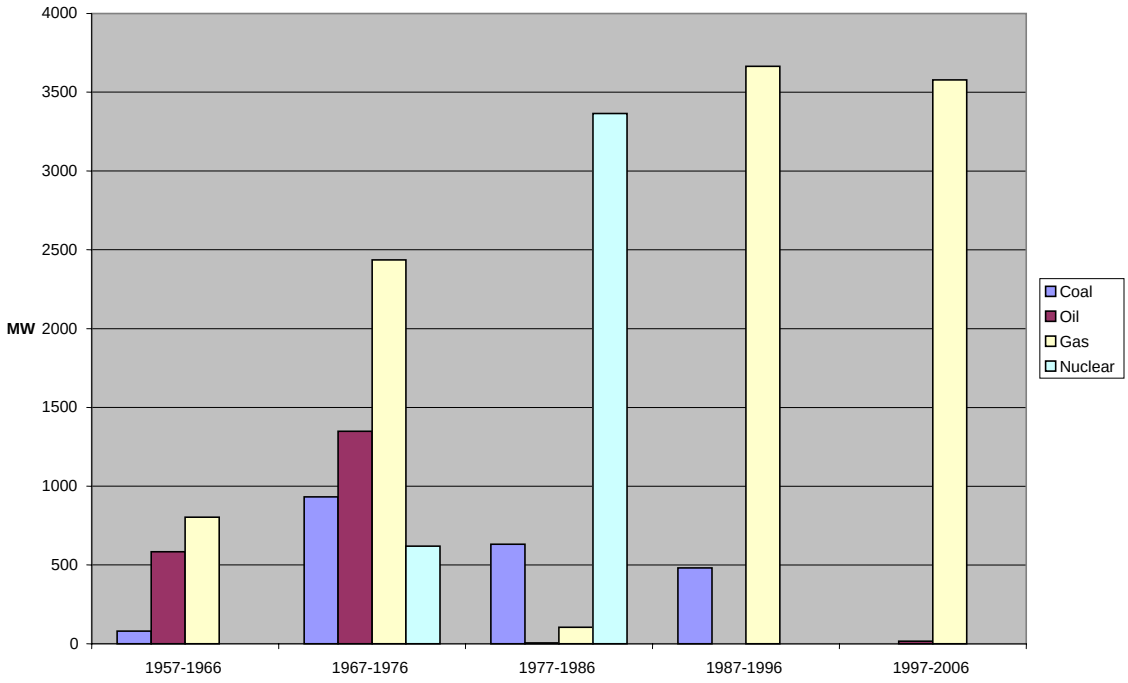

Figure 9: Electricity Generation Capacity in New Jersey, by Fuel Type and In-Service Date.[23]

In contrast, nuclear plants, which generate electricity at a much lower cost for each megawatt-hour, provided 26.6% of capacity in 1990 but only 21% in 2006. Despite accounting for only about one-fifth of the electric generation capacity in New Jersey, nuclear plants continue to produce over half of the electricity generated here. However, their share has dropped from about 60% in 1990 to about 54% in 2006.

Increases in natural gas prices over the past several years makes those plants substantially more expensive to operate than plants using cheaper fuels, contributing to higher energy prices. Figure 10 shows the increase and volatility of natural gas prices in New Jersey through October 2007; since then, the price has risen above $10.

[23] Energy Information Administration, "Form EIA-860 Database, Annual Electric Generator Report," 2006, available at http://www.eia.doe.gov/cneaf/electricity/page/eia860.html (accessed April 10, 2008)

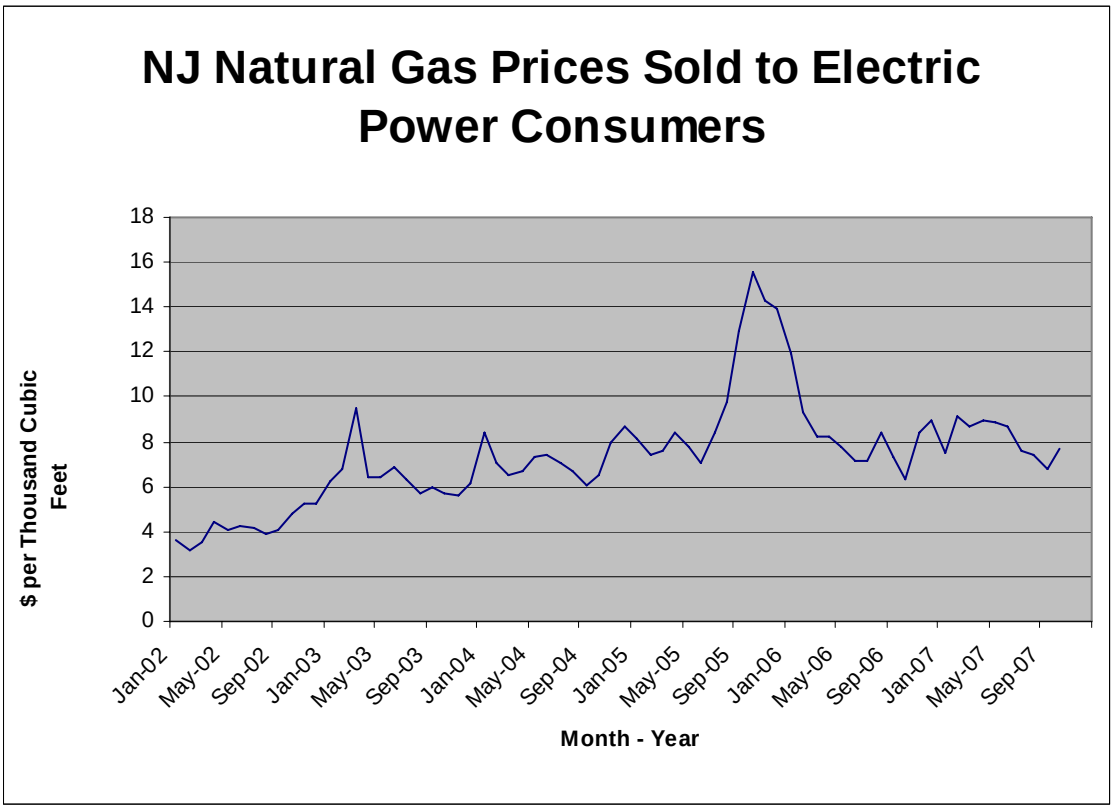

Figure 10: New Jersey Natural Gas Prices Sold to Electric Power Consumers. *The price of natural gas has increased nearly 100% since January 2002 with increased demand expected over the next decade.*[24]

In total, prices have nearly doubled since January 2002, with significant spikes in 2005 and 2006 due in part to heightened hurricane activity in the Gulf of Mexico.

A shift to coal-based generation offers little promise of lower prices. Although the urgent need to combat global warming precludes such a step, increasing our reliance on coal-based electricity offers no sustained promise of lower electricity prices.

East of the Mississippi, coal is becoming progressively more expensive to mine. The more easily mined coal, at shallower depths and in locations with a higher ratio of coal to "overburden" such as rock and soil, has already been extracted. Mining becomes more complex and more expensive when the seams of coal are located at greater depths, and

[24] Energy Information Administration, New Jersey Electricity Profile, Table 6, Electric Power Delivered Fuel Prices and Quality for Coal, Petroleum, Natural Gas, 1990 Through 2006, http://www.eia.doe.gov/cneaf/electricity/st_profiles/sept06nj.xls (accessed April 15, 2008); Energy Information Administration, Electric Power Monthly, Table 4.13.B, Average Cost of Natural Gas Delivered for Electricity Generation by State, Year-to-Date through December 2007 and 2006, http://www.eia.doe.gov/cneaf/electricity/epm/epmxlfile4_13_b.xls (accessed April 15, 2008).

where overlying or underlying seams have already been mined. Therefore, coal production east of the Mississippi has been declining (see figure 11).[25]

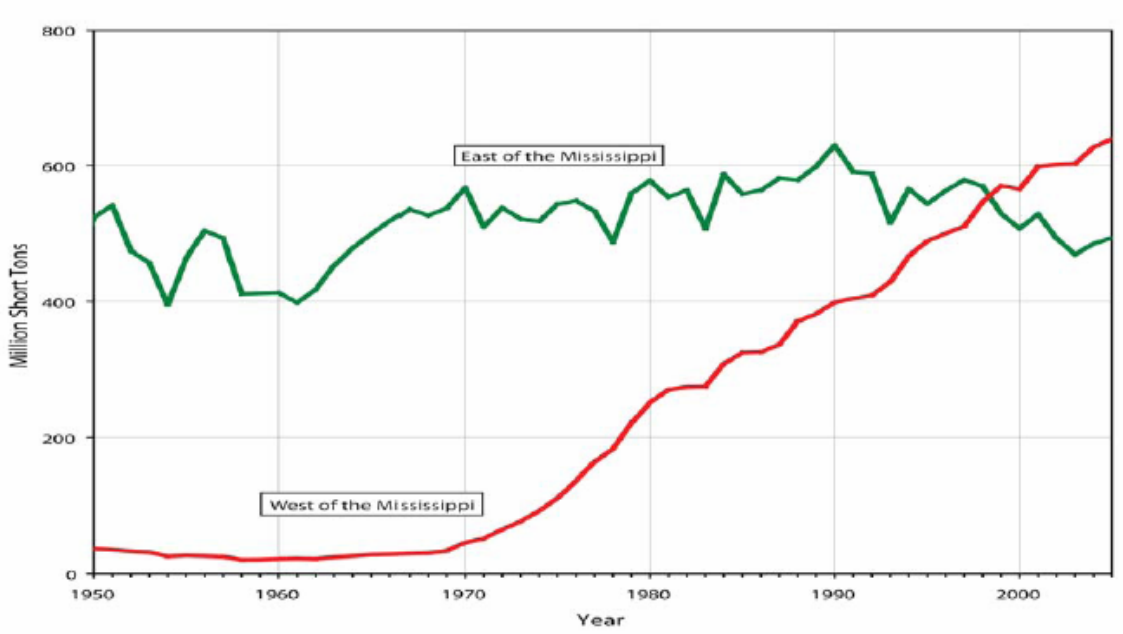

Figure 11: Domestic Coal Production Across the United States. *The amount of coal production west of the Mississippi has increased dramatically while the coal production east of the Mississippi has declined steadily since 1990.*

Figure 11 also illustrates the large and sustained growth of coal production west of the Mississippi. However, coal delivered over long distances from this region is vulnerable to disruptions in supply and spikes in price due to weather and other natural phenomena, such as earthquakes, fires, and floods. For example, when two coal trains derailed in May 2005, coal shipments were reduced for the rest of the year; the spot price of coal from the region more than doubled in just five months.[26]

With these problems in mind, it is unsurprising that coal prices, though currently much less expensive then natural gas, have increased 45% since January 2002 (see Figure 12). Growing worldwide demand for coal is likely to increase prices further; a doubling of world coal prices in 2008-2009 has been forecasted.[27]

Also, any meaningful future federal constraint on greenhouse gas emissions from power plants will significantly increase the cost of generating electricity from coal. The prospect of such a constraint is making it more challenging to obtain financing for new coal-based plants.

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[25] National Research Council of the National Academies, "Coal Research and Development to Support National Energy Policy," 2007, p. 66; Figure 13, p. 59.
[26] Id., p. 83.
[27] Forbes.com, "Coal Prices May Double In Coming Year," February 5, 2008, http://www.forbes.com/2008/02/05/coal-supply-pressures-markets-comm-cx_vk_0205markets01.html (accessed April 10, 2008).

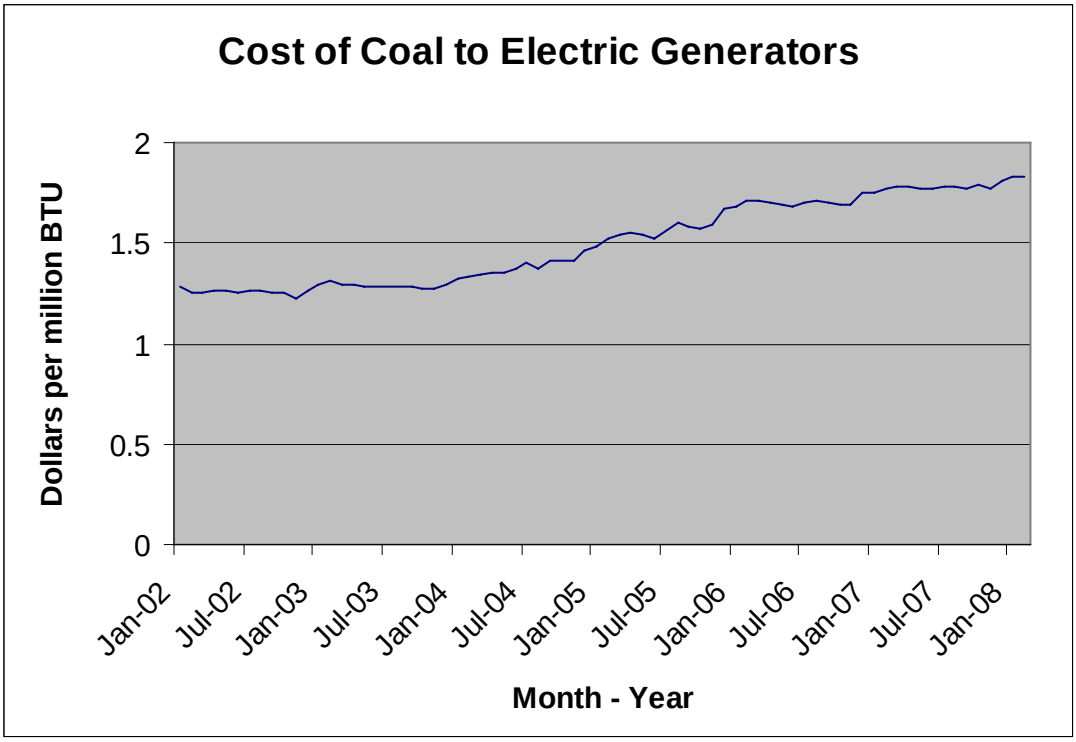

Figure 12. Cost of Coal to Electric Generators. *Since January 2002, the cost of coal to electricity generators has increased nearly 45%. This increase is expected to continue.*[28]

In response, a group of financial institutions recently developed guidelines to deal with the regulatory uncertainties concerning regional and national climate change policies. In February 2008, Citigroup, JPMorgan Chase, and Morgan Stanley announced the formation of The Carbon Principles, climate change guidelines for advisors and lenders to power companies in the United States. The Principles, developed by those three institutions in consultation with, and in consultation with American Electric Power, CMS Energy, DTE Energy, NRG Energy, PSEG, Sempra, Southern Company, Environmental Defense, and the Natural Resources Defense Council, creates an approach for a rigorous analysis of the carbon risks in power plant investments.[29]

The fight against global warming makes it imperative that we avoid planning an energy future based on increased imports of coal-based electricity from the Midwest and Southeast. For the reasons discussed above, major investments in infrastructure designed to facilitate those increased imports would be economically unwise as well as environmentally irresponsible.

Capacity prices will continue to be set through RPM. As noted above, the first four years of RPM will cost New Jersey electricity customers nearly $6 billion. Changes proposed by PJM would increase RPM costs even more. The State is

[28] Energy Information Administration data from January 2002 through February 2008.
[29] Citigroup Inc., Press Release, "Leading Wall Street Banks Establish the Carbon Principles," February 4, 2008, http://www.citigroup.com/citigroup/press/2008/080204a.htm, accessed April 10, 2008.

challenging RPM, as it is currently structured, in federal court and will continue to advocate for a more cost-effective method to encourage the increase of electric generation capacity that is consistent with the New Jersey's environmental policies, into the New Jersey market.

Since the retail price of electricity generally tracks wholesale prices, and most importantly the wholesale prices of energy and capacity, efforts to reduce electricity costs to New Jersey customers must focus on strategies likely to lead to lower wholesale energy prices, lower wholesale capacity prices, or both.

HEATING FUEL CHALLENGES

Like electricity, the prices of heating fuels such as oil and natural gas are high, and rising. The cost of heating oil to residential customers, in the northeast has increased nearly 200% since January 2002. Figure 13 shows the monthly cost of heating oil to residential customers during this period of time.

Unlike the price of electricity, the prices of heating oil and natural gas are essentially immune to any influence by New Jersey. Since electricity cannot yet feasibly be stored in large quantities and must be generated and delivered to the customers who need it almost simultaneously, the local conditions affect electricity markets significantly, making those markets amenable to some local influence. In contrast, the markets for heating fuels are national or global in character. Prices on those markets respond to national or global supply and demand, and New Jersey's actions alone will not noticeably affect those prices.

Since the commodity prices cannot be expected to respond to New Jersey actions, strategies to reduce the cost of heating fuels to Jersey homes, businesses, and institutions are conceptually much simpler than strategies to reduce electricity costs. Most importantly, reducing costs depends on reducing consumption, through efficiency and through conservation. In addition, with respect to natural gas, longer-term reductions in consumption makes it possible for gas utilities to ensure reliable supplies with less cost for the capacity needed to transport and store sufficient natural gas.

Like electricity, the use of heating fuels is contributing to global climate change. Like electricity, reducing consumption through efficiency and conservation reduces that contribution.

Recent volatility and large spikes in the prices of crude oil and natural gas are discussed elsewhere in this document and are widely known. Using those fuels as wisely as possible is the best way to protect ourselves from future price spikes.

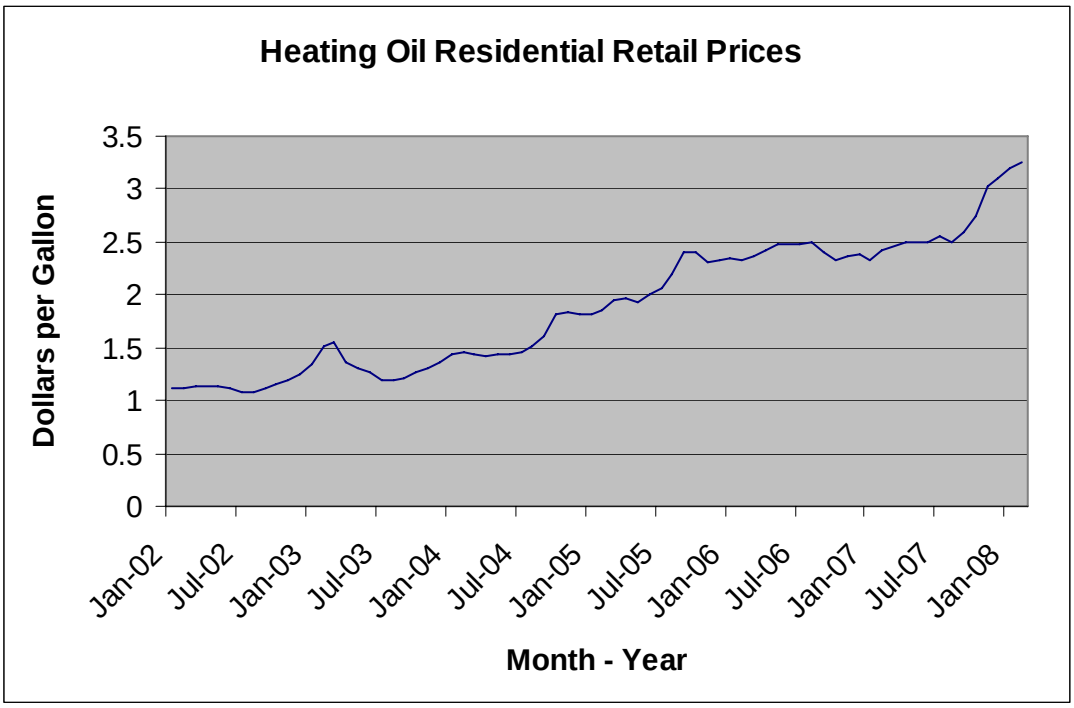

Figure 13: Heating Oil Residential Retail Prices*. Prices have increased for residential customers in the northeast nearly 200% since January 2002.*[30] *These prices exclude taxes.*

The CEEEP and R/ECON™ has projected total heating fuel costs for New Jersey for 2020. Under the "business as usual," without changes in State actions, based on EMP projection of the State's 2020 demand for heating fuels (natural gas and heating oil) of 590 trillion Btu, CEEEP and R/ECON™ projects a cost of nearly $1,800 per household.

"BUSINESS AS USUAL"SCENARIO

The CEEEP and R/ECON™ at Rutgers University has projected total electricity costs for New Jersey for 2020. Under the "business as usual" scenario, without changes in State actions, the EMP projects that in 2020, New Jersey's homes and businesses will use 100,000 GWh of electricity and over 590 TBtus of natural gas and heating oil. Under this scenario, they will spend more than $26 billion, and the average household will spend approximately $1,700 on electricity, nearly $1,800 on natural gas and $1,900 on heating oil. It is projected that commercial businesses would face a 99 percent increase in electricity costs, while industry costs would increase by 38 percent. As a result of this energy environment, it is estimated that under the business as usual model, New Jersey's energy infrastructure would be responsible for up to 90 million metric tons of carbon dioxide.

[30] Energy Information Administration data from January 2002 through February 2008.

Addressing the State's energy challenges will first require slowing the growing electricity demand. Energy efficiency offers the most financially and environmentally responsible solution to these challenges. Increasing energy efficiency will by definition strengthen the State's economy as it will result in homes and businesses using energy more efficiently and effectively doing "more with less." To do this, the State will need to expand its energy efficiency and conservation initiatives to reduce the energy demand that would necessitate the construction of new energy generation facilities or increase the reliance on imported energy from other states.

Unfortunately, energy efficiency and conservation will not fully meet the State's energy demand. The combination of aging power plants, lack of new baseload generation, increasing exports, and reliance on imports over long transmission lines, demands action from the State to ensure a competitively priced and reliable energy infrastructure in the future. Therefore, the State must continue to address its energy challenges by developing policies that maintain and increase the State's electricity generation capacity, while remaining consistent with the State's greenhouse gas emission policies.

PLAN FOR ACTION

New Jersey must implement a series of well-developed, long-term action items that will effectively create an energy infrastructure that is clean, competitively priced and reliable and responsive to the following energy challenges:

- Energy demand is outpacing energy supply.
- The price of electricity continues to rise.
- The serious threats of global climate change, and the need to assure that New Jersey's energy policies do not, to the greatest extent possible, contribute to this problem.
- New Jersey does not have complete jurisdictional control of its energy infrastructure and energy future.

The economic and environmental consequences of not addressing these challenges, the "business as usual" scenario, are tremendous:

- PJM forecasts, that the State's electricity reliability could be jeopardized.
- Energy prices will continue to rise, costing New Jersey customers $26.8 billion, which is 60% more in 2020 than in 2005.
- The State's contributions to global climate change will increase resulting in, among other things, a significant rise in sea level, whose effects could be detrimental to coastal states like New Jersey.

An understanding of these challenges makes it clear what types of goals need to be pursued to answer those challenges.

1. Maximize the State's energy conservation and energy efficiency to achieve reductions in energy consumption of at least 20% by 2020.
2. Reduce peak demand for electricity by 5,700 MW by 2020.
3. Stimulate growth in renewable and alternative energy technologies.
4. Develop new low carbon emitting, efficient power plants and close the gap between the supply and demand of electricity.
5. Invest in innovative clean energy technologies and businesses to stimulate the industry's growth in New Jersey.

Also, the DEP is currently working on its Global Warming Response Act Plan, which will provide a plan for the State to meet its 2020 and 2050 greenhouse gas emission targets. While this Plan will include many of the energy efficiency related action items that are listed here, it will also propose changes to the State's land use policies, and other initiatives that focus on the 2050 goals.

GOAL 1: Maximize the State's energy conservation and energy efficiency to achieve reductions in energy consumption of at least 20% by 2020.

The success of a business is often determined by its ability to produce more while using fewer resources than its competitors. New Jersey is faced with a similar challenge, in that it its future competitiveness depends on creating an energy environment that encourages its homes and businesses to be more efficient in their consumption of electricity. Currently, there is a tremendous amount of energy that is wasted due to inefficient appliances, poor insulation, or unnecessary usage, such as lights being left on. We must change the way we think about energy, and must find ways to "do more with less" by growing the State's economy while increasing its overall efficiency.

Even if the prices of electricity and heating fuels were never to increase again, unabated growth in our overall demand for those products would increase our cost. Buying more of the same product, even if the price is unchanged, costs more. Cutting our overall demand for electricity and heating fuels will cut our energy costs.

Unabated growth in our overall demand for electricity means that we will call on more expensive supplies of electricity more of the time, leading to higher electricity prices. Cutting our overall demand will mitigate the trend toward higher prices.

In addition, if current trends continue and our growing demand for electricity is to be met largely by power plants fueled by natural gas, then unabated growth in our demand for electricity will put a growing strain on supplies of natural gas, reinforcing trends toward higher natural gas prices for heating and for electric generation.

Conservation and energy efficiency are the most economical methods of lowering energy costs. By using less energy by turning off lights in empty rooms and replacing incandescent light bulbs with compact fluorescent light bulbs, the entire state benefits from savings on electric and heating bills through decreased energy demand.

Reducing electricity demand leads to increased reliability for New Jersey's electricity grid, which in turn reduces the potential for brownouts and blackouts. Reducing electricity demand also lowers the need to generate electricity leading to a decrease in New Jersey's air pollution and greenhouse gas emissions.

To reach the aggressive goal set forth in this draft Plan, more must be done to accelerate the rate of energy efficiency implementation across all sectors. Therefore the following initiatives are proposed to achieve the energy efficiency goal:

- Redesign and enhance the State's current energy efficiency programs to achieve the desired results while remaining cost-effective.
- Increase energy efficiency in new buildings with a statewide building code that will make new construction at least 30% more energy efficient than buildings under current State code by July 2009.

- Increase energy efficiency in existing buildings through enhanced energy efficiency standards for new appliances and other types of equipment currently not covered by existing standards by 2009.
- Increase awareness about the importance of energy conservation and energy efficiency upgrades by developing an education and outreach program for the public.

ACTION ITEM 1: Redesign and enhance the State's current energy efficiency programs to achieve the desired results while remaining cost-effective.

If New Jersey is going to meet its aggressive energy reduction goals, it will need to dramatically increase the implementation of energy efficiency and energy conservation measures in its existing building stock. This will include determining how to provide an energy efficiency program in the areas of the State that are not served by one of the four public electric or natural gas utilities, such as the areas that are served by municipal electric utilities.

Through the BPU's New Jersey Clean Energy Program, the State has been investing in energy efficiency and renewable energy projects around the state with tremendous success. This program is currently funded by a societal benefits charge that is currently placed on consumers' electricity and natural gas bills. The Clean Energy Program reinvests these dollars into energy efficiency and renewable energy projects.

Between 2001 and 2006, the New Jersey Clean Energy Program, assisted in avoiding 1,200 GWh of electricity consumption, and 2.7 trillion Btus of natural gas usage. These savings were broken down between the following electricity consumer groups:

- 68.5% of the electricity savings and 27.4% of the natural gas savings were through the commercial and industrial energy efficiency program.
- 31.2% of the electricity savings and 77.3% of the natural gas savings were through the residential energy efficiency program.

Customers saved about $11 for every dollar spent in the commercial and industrial energy efficiency program. Customers saved about $4 for every dollar spent in the residential energy efficiency program.

Further energy efficiency efforts must target both new buildings and existing buildings. Changes in building codes can ensure that new buildings will be more energy-efficient; however, existing buildings must be targeted one by one for energy efficiency upgrades. Cost-effective improvements to energy efficiency in all of the 3.7 million existing buildings already in place could save about 15,000 GWh of electricity by 2020, as well as about 98 trillion Btus of heating fuels.

Improving energy efficiency in 3.7 million existing buildings by 2020 involves a massive effort to address more than 300,000 buildings each year. In contrast, energy efficiency efforts under the current Clean Energy Program between 2001 and 2006 reached

significantly less than 300,000 buildings; those efforts targeted specific types of energy efficiency improvements rather than comprehensively improving energy efficiency throughout the whole building.

The State directly owns or leases a miniscule fraction of the 3.7 million existing buildings. Accordingly, improving energy efficiency in almost all of those existing buildings will depend on education and outreach to the owners and lessees of those buildings, a means of identifying the energy efficiency opportunities in each building, and a means of delivering the improvements in a way that is advantageous to the owners and lessees.

The BPU plans to work with the Northeast Energy Efficiency Partnership (NEEP), which has the expertise needed to evaluate and design a new energy efficiency program for existing buildings. Working with stakeholders, NEEP will closely examine the current programs that are being implemented by the State, and propose additional actions that should be considered.

The State will make decisions on the design of this program, in conjunction with stakeholder input, by the end of 2008. A full portfolio of strategies will be considered to ensure the best mix of strategies, while remaining cost-effective. The program will seek to strike the most effective blend of participants in the energy efficiency market and shall consider their concerns, including competition and decoupling. This program will be funded through the reallocation of existing Clean Energy Program funds, upfront capital costs provided by private investors and/or electric and gas utilities, and auction revenue from the Regional Greenhouse Gas Initiative.

At the same time, the BPU is evaluating improvements and expansions to the existing Clean Energy Program. These decisions are being evaluated as part of an ongoing process for setting the Clean Energy Program funding levels for 2009-2012. The BPU expects to complete that process in the summer of 2008.

Electric and gas utilities' relationships with their customers position them to help those customers improve the energy efficiency of existing buildings. In January 2008, Governor Corzine signed into law measures that will increase the utilities' ability to implement energy efficiency programs and invest in energy efficiency projects.

Currently, the rates at which utilities sell a commodity such as electricity or natural gas are designed to produce revenues to cover the wholesale cost of the commodity, the fixed cost of infrastructure to deliver the commodity, and a return on investment. Reduced consumption reduces revenues, creating a disincentive for utilities to work aggressively toward energy efficiency and conservation. Utility rates could be designed in any number of ways to eliminate that disincentive.

As of September 2007, 10 states have adopted natural gas rate designs intended to eliminate disincentives for utilities to pursue efficiency and conservation. These states include Delaware, Maryland, Ohio, Indiana, Missouri, Arkansas, Utah, California,

Oregon and Washington. In addition, several other states are considering similar programs, including New York, Virginia, Tennessee, Illinois, Wisconsin, Colorado, and Arizona.

In New Jersey, the BPU approved a pilot program of this type in October 2006, known as the Conservation Incentive Program, for New Jersey Natural Gas Company and South Jersey Gas Company. The pilot program creates an incentive for the utilities to achieve sustainable reductions in natural gas consumption; success in that effort is rewarded by incentives that are shared between the utility and the customers.

In addition, states such as California and New York have implemented decoupling for electric utilities, which has proven to be very successful in increasing investment in demand-side management expenditures, including energy efficiency and conservation. According to the New York State Department of Public Service, New York State has experienced an increase of 370% of their demand side expenditures since their adoption of decoupling. Also, California and New York have the two lowest per-capita electricity usages in the United States, and both states have instituted decoupling as a state policy.

Heating oil and propane providers do not have any rates that are regulated by the BPU that can be decoupled. Therefore, the BPU, working with the NEEP, the Fuel Merchants Association, the Propane Gas Association Rate Counsel and other stakeholders, will examine how to develop an energy efficiency program to incentivize the heating oil and propane providers' investment in energy efficiency projects. The design of this program needs to be coordinated with other energy efficiency programs, to identify and evaluate energy efficiency opportunities throughout an entire building, and to minimize any inconvenience to customers. Legislation may be needed to establish the recommended program.

IMPACTS. The goal of this program will be to identify and implement cost-effective energy efficiency measures that could achieve over 15,000 GWh of electricity savings and almost 98 trillion BTUs of total heating savings by 2020.

ACTION ITEM 2: Work with the Legislature to authorize the development of statewide building codes to result in new construction being at least 30% more energy efficient than current state code by July 2009.

It is generally simpler and cheaper to incorporate energy efficiency measures into a building at the time of construction or renovation than it is to retrofit an existing building. The payback period for the investment in greater efficiency is anticipated to be less than seven years. The quick payback suggests that a statewide building code setting higher energy efficiency for new buildings will be cost-effective. Pending State legislation (S702) would authorize the development of such a code. In order to have the code in place by July 2009, legislation would need to be enacted by July 2008.

In addition, the State will support energy-efficient new homes by offering financial assistance to low and moderate income families for the down payment on a new energy-efficient home, through reallocation of existing monies in the Clean Energy Program.

IMPACTS: If fully implemented, this legislation is estimated to achieve electricity savings of about 2,300 GWh and total heating savings of nearly 10 trillion BTUs per year by 2020.

ACTION ITEM 3: Work with the Legislature to set minimum energy efficiency standards for new appliances and other types of equipment currently not covered by existing standards by 2009.

Pending State legislation (A1763, S1253) would allow New Jersey to set minimum energy efficiency standards for certain types of equipment including:

- bottle-type water dispensers;
- commercial hot food holding cabinets;
- compact audio products;
- DVD players and recorders;
- metal halide lamp fixtures;
- portable electric spas (hot tubs);
- State-regulated incandescent reflector lamps;
- residential furnaces and residential boilers;
- residential pool pumps;
- walk-in refrigerators and freezers; and
- single-voltage external AC to DC power supplies.

IMPACTS: While setting minimum energy efficiency standards will increase the cost of the products, the payback period will be less than three years. Savings under these initial future standards are projected to be over $219 million to businesses and consumers in 2020. Additionally, the State will seek waivers from federal standards to mandate stricter minimum-efficiency standards.

If fully implemented, this legislation and other recently approved standards are estimated to achieve about 2,500 GWh of electricity savings and total heating savings of about 7.3 trillion BTUs by 2020.

ACTION ITEM 4: Increase education and outreach in the public and private sectors.

Working with business organizations like the New Jersey Business and Industry Association, and the New Jersey Utilities Association, the BPU's Office of Business Energy Ombudsperson will select up to ten industry sectors to create Best Practice Manuals featuring recommendations for energy efficiency improvements.

Localized workshops and one-on-one consultations through the Office of the Business Energy Ombudsperson will be utilized in the areas of energy efficiency, on-site generation (including renewable sources), demand response and energy supply purchase.

Additionally, the BPU will create a partnership of representatives from utilities, businesses, environment, academia, county/municipal/state governments, K-12 educators, and consumer advocacy groups. This group will review existing education efforts in the public and private sectors and recommend an ongoing mix of education program and resources to help New Jersey achieve its energy efficiency goals.

IMPACTS: The development of Best Practice Manuals will allow entire industry sectors to reduce their energy costs. Coupled with the other Actions Steps in this Goal, businesses will be able to reduce their energy usage in a cost-effective manner and thus become more cost competitive and be able to remain in New Jersey.

Every citizen of the State needs to know the importance of the energy decisions that are made and how they impact the State's economy and environment. Improving the information that is provided to students and adults should allow for greater utilization of the energy efficiency opportunities that each person can utilize to save on their energy costs and reduce their carbon footprint.

GOAL 2: Reduce peak demand for electricity by 5,700 MW by 2020.

Unabated growth in our peak demand for electricity drives the need for expensive expansions of our electricity infrastructure to be able to meet that peak demand reliably. That need, in turn, drives our costs for the necessary capacity higher. By far, the most cost-effective way to preserve our reliability and reduce capacity costs is to reduce peak demand.

To meet peak demand, additional transmission lines, and electricity generators are needed to ensure reliability. However, this additional reliance on transmission lines and peak generators significantly drives up energy costs, as indicated in Figure 4. If the State is successful in meeting its goal, the total cost savings to consumers in their electricity rates could be great compared to the "business as usual" scenario.

To achieve the goal, it is estimated that 2,200 MW of peak demand can be reduced through specific peak demand initiatives. An additional 3,500 MW of peak demand can be reduced through the energy efficiency and cogeneration action items described in this document. The State's work with the NEEP will examine how energy efficiency efforts can best be coordinated with programs that provide demand response.

Therefore, the following demand response action items are proposed to effectively reduce peak demand by 750 MW by 2011 and a total of 2,200 MW by 2020:

- Expand real-time pricing for commercial and industrial customer with a peak demand of at most 600 kW or greater by 2010 and at most 500 kW or greater by 2012.
- Expand incentives for participation in regional demand response programs.
- Evaluate a strong "inverted tariff" pricing system for residential customers.
- Move the State's electricity grid toward the development of a 'smart grid' infrastructure.
- Monitor the results of all demand response initiatives through 2011 and implement the most effective mix of action steps to achieve a total peak demand reduction of 5,700 MW by 2020.

In addition, implementing the energy efficiency actions under Goal 1 will help to reduce peak demand as they reduce overall energy consumption. Fostering the development of clean and efficient on-site cogeneration capacity, as discussed under Goal 4, will reduce overall demand on electricity from the grid, and therefore will help to reduce peak demands on the grid as well.

Figure 14 shows the estimated breakdown of the peak load reductions that could be achieved through the implementation of these action items.

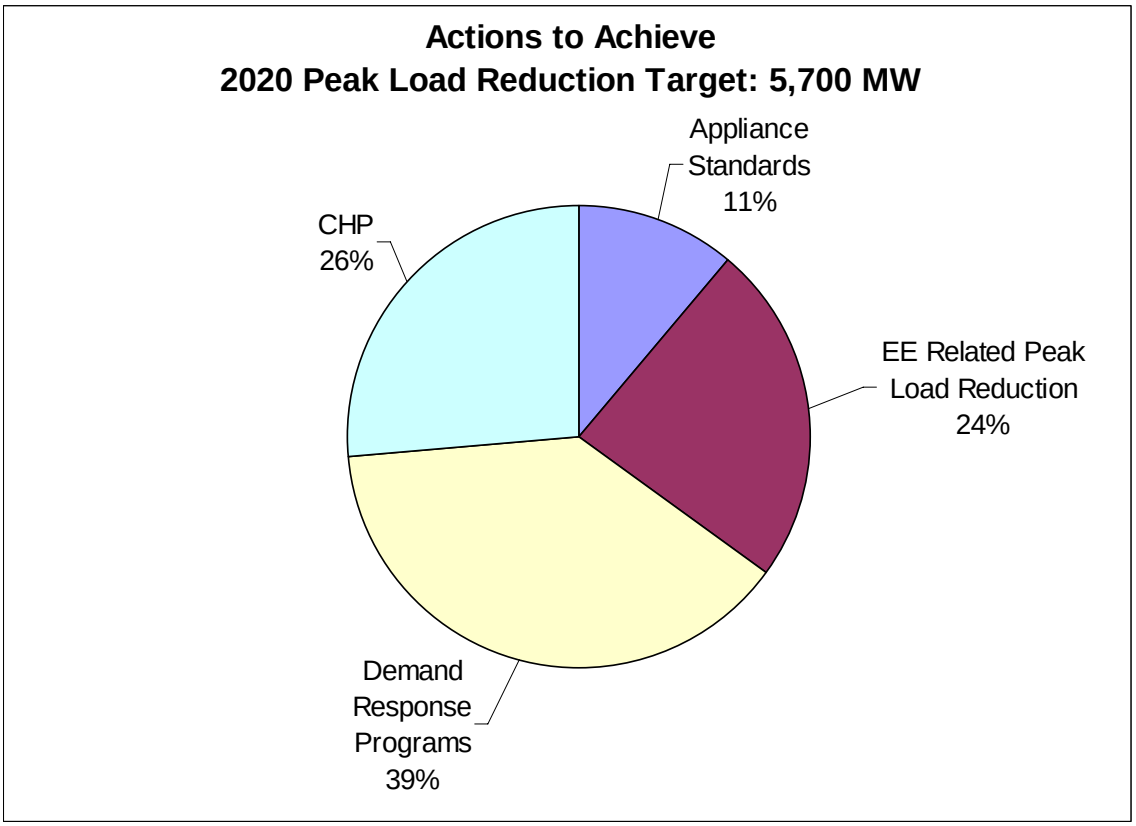

Figure 14: Actions to Achieve Peak Load Reduction Target. Reducing peak load requires a combination of strategies, including energy efficiency, combined heat and power (CHP), and demand response programs. Demand response strategies, discussed in this section, will achieve 2,200 MW of peak load reduction, or nearly 40% of our peak load target.

ACTION ITEM 1: Expand real-time pricing for commercial and industrial customers to customers with a peak demand of at most 600 kW or greater by 2010 and at most 500 kW or greater by 2012.

The commercial and industrial electricity users in New Jersey, consume about 64% of the State's total electricity consumption, and contribute substantially to the peak demand (see Figure 15). These large energy consumers provide the state with a tremendous opportunity to reduce peak electricity usage, and further incentivize investment in energy efficiency, by instituting real-time pricing for their electricity usage.

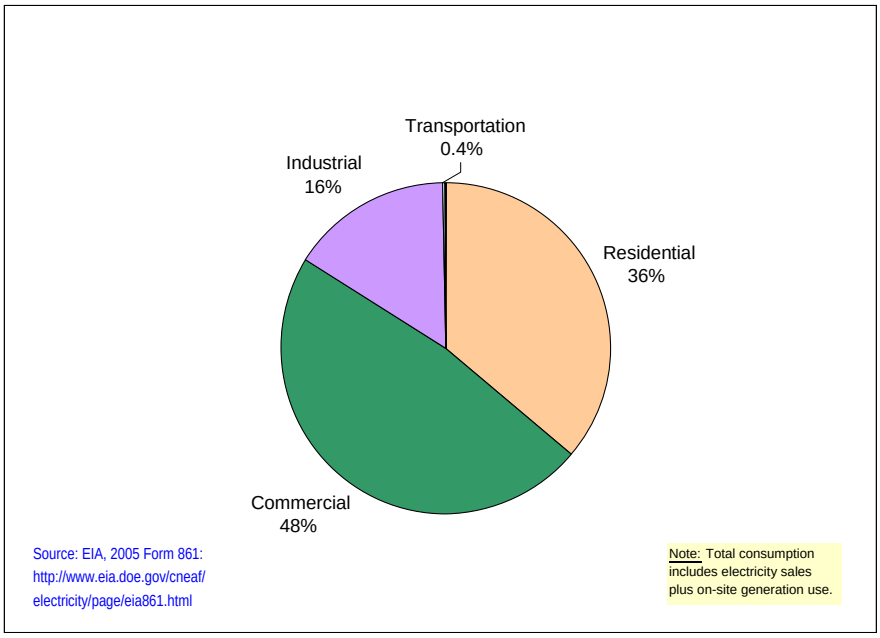

Figure 15: New Jersey End-Use Electricity Consumption by Sector (83,120 GWh - 2005)

The vast majority of New Jersey's electricity customers receive their electricity at a fixed price, set through the yearly BGS auction. Unlike in the cell phone industry, where customers can make informed decisions about when to make calls based on price variations, electricity customers are paying a fixed price which offers them no economic incentive to adjust their use in response to changes in price.

Currently, in New Jersey, customers with a demand of 1000 kW and higher face real-time electricity prices. The BPU will evaluate expanding real-time pricing to customers with an electricity demand of at most 600 kW or more by 2010, and to customers of at most 500 kW or more by 2012. The BPU will initiate consideration of the initial shift through a proceeding that will begin in summer 2008 and conclude by the end of the year. The BPU will evaluate this shift on a yearly basis for opportunities to further expand real-time prices.

IMPACTS. Real-time pricing, for New Jersey's largest energy consumers, will incentivize these users to reduce their demand during peak demand, when electricity prices are the highest. The impacts to rate payers are difficult to project, as this action item involves behavioral changes.

ACTION ITEM 2: Expand incentives for participation in regional demand response programs.

Currently, PJM offers demand response programs that pay certain customers to reduce their load during peak demand periods. For example, a manufacturer may have a predetermined arrangement with the grid operator to turn off certain equipment on short notice without disrupting production during a time of high demand.

In order to expand the level of demand response in New Jersey, the BPU will work with stakeholders to identify the need for additional incentive programs for all customers through an approach that targets three categories of customers according to their peak electricity usage profile:

1. large commercial and industrial (C&I) customers with a peak load share greater than 1,000 kW;
2. customers with a peak load share from 500 kW to 1,000 kW and
3. customers with peak load share below 500 kW.

In 2008, the BPU will evaluate current levels of large customer participation in PJM programs and make recommendations for action to the Board. Examination of demand response programs and opportunities for the remaining tiers of customers will begin as the BPU works with the NEEP to assess energy efficiency, demand response and renewable energy opportunities and cost-effective investments for New Jersey.

In addition, the BPU will specifically work with the utilities and industry associations to develop a voluntary load management programs for customers to shave peak demand during periods of high electricity use or emergency situations.

The following financial incentives should be considered by the BPU to encourage expanded participation in demand response programs:

- State incentives tied to PJM's demand response programs that pay customers to reduce their load during peak demand periods.
- The "real-time electricity pricing" action item, described above, will provide for increased financial incentives to these large commercial and industrial customers to reduce their peak demand.
- Modifications that can be made to the BGS that would incentivize the reduction in energy consumption.

By participating in demand response programs, customers would be eligible for financial incentives depending on their ability to shed load. This demand response could be achieved through direct load control by the utilities, by competitive demand response

firms that contract with and/or aggregate intermediate and smaller customers or by the customer individually receiving a signal from their utility.

IMPACTS. Specific programs will be designed and evaluated so that any cost to ratepayers will be cost-effective. Incentivizing demand response for all consumers will reduce peak demand, thereby reducing overall electricity prices by reducing demand for high priced electricity generators to operate during peak time, which will benefit all ratepayers.

ACTION ITEM 3: Evaluate a strong "inverted tariff" pricing system for residential customers.

It is currently uncertain whether the infrastructure needed to provide real-time price information to small customers will eventually prove cost-effective and reliable, or whether smaller users will have the capacity to respond fully to pricing variations and be able to pay for the up front capital costs of installing the necessary equipment.

The BPU will examine an expansion of the "inverted tariff" pricing for residential customers with a demand to be determined by the BPU. An "inverted tariff" would charge consumers a higher rate for exceeding an electricity usage amount, or for using electricity during a specific time. Under this model, the BPU may work with the utilities, Rate Counsel and consumer groups to design rates that charge electricity customers less per kWh if their monthly electricity usage is below a specified level, or if they participate in energy efficiency and demand response programs, and conversely charge more if their usage exceeds the specified level or if they do not participate in energy efficiency or demand response programs.

"Inverted tariff" pricing is currently taking place in all of the utility territories in New Jersey. For example, between the months of June and September, PSE&G charges a higher rate for residential customers that exceed 600 kWh of electricity usage a month. These customers are charged one rate for their energy usage up to 600 kWh, and then are charged a higher rate for every kWh consumed in excess of 600 kWh.

The BPU will also examine using the Societal Benefits Charge (SBC) to achieve the same result. As customers' monthly electricity usage exceeds a specified level, their SBC charge could be increased. This additional SBC revenue could be used by the BPU to fund projects that reduce peak demand and overall energy consumption.

IMPACTS. The only economic impact, in the implementation of this action item, will be to the residential customers that exceed a specified monthly energy usage amount, and will pay more for their additional energy usage. The rate could be designed to be essentially revenue-neutral, or to provide utilities with additional revenues that would be required to be invested in measures that reduce peak demand and overall energy consumption.

ACTION ITEM 4: Move the State's electricity grid toward the development of a 'smart grid' infrastructure.

"Smart grid" technology offers the hope of transforming the electric power grid, by using advanced communications, automated controls and other forms of information technology, to provide two-way communication between the utilities and the customers. Using currently available communications technology, a smart grid could integrate a utility's electric distribution network into a customer's home and be used to support energy efficiency and demand response actions to reduce energy consumption. A smart grid could use devices at all levels within the grid (from utility to customer) to independently sense, anticipate and respond to real-time conditions by accessing, sharing and acting on real-time information.

As part of a smart grid, smart meter technologies can give customers real-time usage and price information to underscore the value of controlling consumption at specific times. It can also be coupled with end-use technologies capable of responding to price signals automatically. For example, air conditioners could be equipped with technology that could receive a signal from the smart grid infrastructure to cycle on and off during peak demand periods.

While some states are experimenting with this technology, it has not yet been implemented on a broad scale in tandem with demand response programs. The BPU, working with utilities, Rate Counsel, and various consumer groups will determine the costs and benefits of smart grid infrastructure. If successful, the State will encourage the expansion of this infrastructure to all customers.

The BPU will also work with the utilities, Rate Counsel, consumer groups and the New Jersey Apartment Association to determine the economic feasibility of changing from master meters for multi-family homes to sub-metering or individual metering of each customer's consumption.

Currently, PSE&G and Atlantic City Electric, have both made proposals to the BPU to install smart meter technologies. PSE&G has proposed a smart meter pilot program to compare three smart meter technologies and determine which technology is most effective. Atlantic City Electric has already identified a smart meter technology that it would like to install for all of its customers. Both proposals are in the process of being reviewed by the BPU.

IMPACTS: There are different costs associated with different technologies; there are different benefits as well. The BPU will work closely with all stakeholders, and support pilot projects to evaluate different technologies and different programs, to ensure that the technologies and programs used in each utility's service territory provide cost-effective benefits to customers overall.

ACTION ITEM 5: Monitor the results of all demand response initiatives through 2011 and implement the most effective mix of action steps to achieve a total peak demand reduction of 5700 MW by 2020.

The demand response initiatives, in this draft Energy Master Plan, are progressive, but still experimental and largely untested on a substantial scale. Therefore, the State will continually assess the results of these programs, and their interaction with energy efficiency efforts, and determine which programs bring the maximum results at the least cost to consumers.

To achieve the total reduction in peak demand of 5,700 MW, the State will engage in an ongoing assessment of the initiatives outlined in this Plan, and utilize a mix of the best performing programs to achieve the results through 2020. This action step will be revised for the annual Energy Master Plan performance evaluation in the year 2010.

IMPACTS: Reducing peak demand by 5700 MW will greatly assist in achieving a reliable electricity infrastructure at a more reasonable price than the business as usual scenario. Eliminating the need to either generate or import this amount of energy will significantly reduce greenhouse gas emissions and assist in meeting the targets specified in the Global Warming Response Act.

GOAL 3: Meet 22.5% of the State's electricity needs from renewable sources.

Renewable energy and other alternative energy technologies, provide New Jersey with an opportunity to meet many of its energy challenges. These technologies provide electricity using resources that are plentiful in the State, and either emits zero or much less greenhouse gas emissions than their fossil fuel counterparts. The capital costs to install these technologies are typically much more expensive than fossil fueled based generation. Despite the rising costs of fossil fuels, and the declining costs of renewable energy technologies, there is still a substantial price gap between these technologies.

In response to this price gap, in April 2006, the BPU approved an aggressive expansion of the Renewable Portfolio Standard (RPS) for the State. These standards now require the local utilities and other electricity retailers to supply an increasing portion of the electricity they deliver from renewable sources, with renewable sources providing a total of 22.5% of electricity sales by 2020. Figure 16 shows the State's RPS requirements, and the additional work that is necessary to meet the 2020 goals.

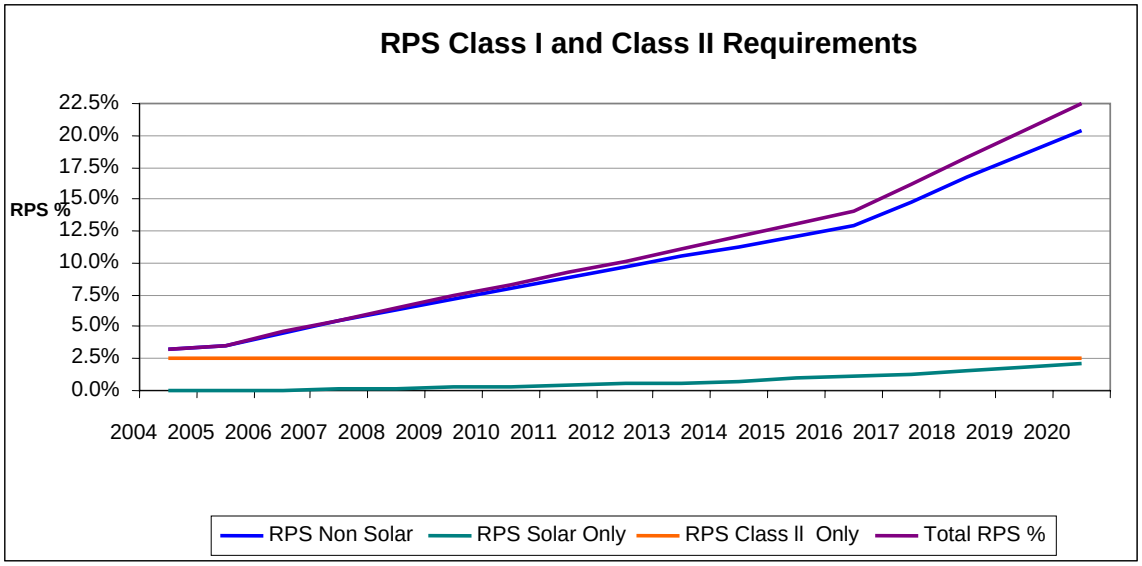

Figure 16: New Jersey's RPS requirements through 2020.

There are three specific standards: one for "Class I" renewable energy, one for solar energy, and one for "Class II" renewable energy. By 2020, 20% of electricity delivered to New Jersey customers must be "Class I" renewable energy, including electricity generation from solar energy, wind energy, wave or tidal action, geothermal energy, landfill gas, anaerobic digestion, fuel cells using renewable fuels, and other forms of sustainable biomass. Solar electric generation can be used to help meet the "Class I" RPS, but there is also a separate solar RPS that specifically requires 2.12% of electricity delivered by 2020 to be generated from solar energy. By 2020, 2.5% must be "Class II" renewable energy, including electricity generated by hydropower facilities no greater than 30 MW, and resource-recovery facilities approved by the DEP and located in New Jersey.

The BPU, working with the DEP will continue to advance the State's support of renewable energy generation by implementing the following action items:

- Complete the transition of New Jersey's solar program to a fiscally responsible market that will foster the continued growth of solar energy use.
- Develop New Jersey's wind energy resources, including up to 1000 MW of offshore wind and up to 200 MW of onshore wind by 2020.
- Increase the amount of biofuels and biomass in the State's energy portfolio.
- Increase the RPS for the years 2021 to 2025.

ACTION ITEM 1: Complete the transition of New Jersey's solar program to a fiscally responsible market that will foster the continued growth of solar energy use in the State.

Since 2001, over 57 MW of solar have been installed in New Jersey, assisted by about $200 million in rebates from the Clean Energy Program. While New Jersey is a nationally recognized leader in solar installation, it has been clear since the inception of

the program that the initial model of relying heavily on upfront rebates would not be financially sustainable to achieve New Jersey's long-term goals. The BPU has been decreasing the rebate level over time, from 70 percent of the installed cost of the solar system to 50 percent. In December 2007, the BPU approved a phase-out of rebates as an incentive for installing solar, and a transition toward incentives based on the market value of Solar Renewable Energy Certificates (SRECs) earned by generating electricity from solar energy. Electricity suppliers satisfy their obligations under the solar RPS using SRECs for compliance, or by paying a Solar Alternative Compliance Payment.

This transition of the solar program continues strong incentives to support the installation of solar electric generation, while safeguarding ratepayers against potentially prohibitive costs. These protections include a 2% cap on the impact to consumers' annual bills to fund the solar program, and limits on the solar RPS linked to the 20% reduction in electricity consumption called for in this draft Plan.

Sustained, orderly growth in New Jersey's solar industry depends on an environment that supports investor confidence that will ease financing of solar installations. The transition to SRECs and away from unsustainable rebates helps to create that environment. Further help will come from the availability of community-based solar programs, which would allow residential and small commercial customers to participate in the solar market through participation in larger, lower- cost community-based systems and by grid supply projects. This would also provide for increased distributed generation, which places less stress on the transmission system, while providing communities with increased control over their local energy portfolio. The BPU will begin a stakeholder process to develop proposed regulations for community-based solar programs.

A source of long-term financing will also help to continue the growth of the solar industry and will further efforts to meet the solar RPS. To that end, the BPU recently approved a program under which PSE&G will invest about $100 million over two years to support the installation of about 30 MW of solar electric generation capacity.

IMPACTS: The price of the SRECs is expected to create the financial environment necessary to substantially grow the solar industry and solar energy installations between now and 2020. The impacts to rate payers will be minimized with a 2% cap on the cost of the solar incentives which will help to mitigate the risk.

ACTION ITEM 2: Develop New Jersey's wind energy resources, considering at least 1000 MW of offshore wind and up to 200 MW of onshore wind by 2020.

It is estimated that on-shore and off-shore wind energy could provide 20% of the State's 2020 RPS requirements of 16,000 GWh. Unlike solar energy, wind energy resources are limited to specific areas of the state. At present time, off-shore wind energy offers tremendous potential, while on-shore wind energy resources appear to be limited.

Through multi-agency coordination, the State is gathering the necessary environmental and economic information needed to make an informed and thoughtful decision on how to proceed with offshore wind.

Several closely coordinated steps were undertaken in 2007 to determine the potential for an offshore wind project in New Jersey. The DEP began an ecological baseline study of the State's ocean natural resources, designed to inform the development of an offshore wind project. No construction will begin until the results of the environmental analysis are completed. The New Jersey Commerce Commission undertook an assessment of the potential costs and benefits of off-shore wind turbines to New Jersey's economy, including tourism. Finally, the BPU announced a competitive solicitation to encourage the development of an offshore wind generation project, up to 350 MW capable of producing about 1,000 GWh per year—over 1% of the State's annual electricity consumption. Five responses were submitted in response to the solicitation and the BPU will make a determination which, if any, should receive a grant in the Summer of 2008. Any pilot project will be coordinated with the DEP ecological baseline study.

In addition, New Jersey has installed 11 onshore wind turbines since 2001. Currently, New Jersey's Clean Energy Program provides rebates for wind energy systems less than 1 MW in size, while the Renewable Energy Project Grants and Finance Program provides subsidies for systems larger than 1 MW.

In order to responsibly encourage the development of onshore wind turbines the State will:

- Shift from a rebate-based on system rated capacity to a program based on performance.
- Modify the Renewable Energy Project Grants and Finance Program to reflect the needs of large-scale wind projects.
- Publish a guidebook for small wind energy systems.

The BPU will continue to monitor the progress that is being made with wind energy generating technologies. As technology breakthroughs occur, the BPU will act quickly to adjust its policies to ensure the aggressive development of wind energy, as part of the State's energy portfolio. The BPU is currently obtaining stakeholder input on the funding, including what is needed to support the renewable energy actions proposed in the draft Energy Master Plan for the period 2009-2012. A determination on these funding levels will be made in the Summer of 2008.

IMPACTS: Wind power has great potential to reduce the State's reliance on fossil fueled based electricity generation. The studies by the Commerce Commission and the DEP will determine ecological and economic impacts that offshore wind energy projects may have on the region.

ACTION ITEM 3: Increase amount of biofuels and biomass in the State's energy portfolio.

New Jersey has tremendous biomass energy potential. This potential was analyzed by the Rutgers New Jersey Agricultural Experiment Station, in its "Assessment of Biomass Energy Potential in New Jersey" yielded the following major findings:

- New Jersey produces an estimated 8.2 million dry tons (MDT) of biomass annually.
- Approximately 5.4 MDT of New Jersey's biomass could ultimately be available to produce bioenergy.
- Almost 75% of New Jersey's biomass resources are produced directly by the State's population, a majority of which in solid waste. The state's five municipal solid waste incinerators currently convert about 17% of that solid waste into energy.
- Agriculture and forestry management account for majority of remaining amount.
- New Jersey's estimated practically recoverable biomass resource of 5.5 MDT could deliver up to 1,124 MW of power or 311 million gallons of gasoline equivalent if appropriate technologies and infrastructure were in place.
- The large proportion of waste-based biomass, suggests that New Jersey pursue the expansion of an energy from waste industry.

Currently, approximately 7,000 customers in South Jersey are currently using 5% biodiesel blended with 95% petroleum-based heating oil for space heating purposes. If this blend were to be adopted by the State, based on 2020 projected consumption, it would require approximately 31 million gallons of biodiesel by 2020 and result in over 4 trillion BTUs of space heating savings. This blend should be expanded to cover the entire State, and the Administration will work with the Legislature to create a 2% biofuel standard for all sales of space heating oil in New Jersey beginning 2015 and increasing to 5% by 2020.

In addition, New Jersey has one of the highest per capita income in the United States, and one of the highest rates of trash generated per person. New Jersey residents generate 6.7 pounds of trash per person per day, nearly 50% higher than the national average. This offers a significant opportunity to pursue conversion of trash into energy and fuel products. Conversion of this waste into energy will also reduce the need for future landfill development, and consequently reduce the amount of methane, a greenhouse gas, that is emitted from these landfills.

The BPU, in conjunction with the DEP and the State Universities will work to evaluate the following proposals to stimulate the growth of biofuels in New Jersey and develop a minimum of 900 MW of electric production capacity using biomass resources by 2020.

- Identify and alleviate regulatory concerns across permitting agencies to streamline and simplify approval processes.
- Consider a societal benefits charge on petroleum based fuels to support bioenergy incentive programs.

- Establish bioenergy enterprise zones around concentrations of biomass feedstocks where bioenergy can be strategically utilized.
- Develop a consumer-based biofuels incentive program.
- Consider expanding the amount of Class 2 Renewables in the State's RPS.

IMPACTS: New Jersey has considerable biomass and waste resources that should be further analyzed to determine the economic and environmental impacts of their conversion into energy. These technologies could provide the State with a fuel source that is produced locally and emits fewer emissions.

ACTION ITEM 4: Increase the Renewable Portfolio Standard for the years 2021 to 2025.

The current RPS maintains the 2020 requirements to any future year. It is appropriate to begin the process of evaluating the appropriateness of increasing the Standard for the years 2021 to 2025. This evaluation will be undertaken by the BPU and will consider issues such as grid reliability, the possibility of electricity storage using plug-in hybrids or hydrogen, the cost and environmental impacts of additional offshore wind, possibly coupled with wave technology and the projected costs of solar technology. The BPU will complete a preliminary evaluation by the end of 2008. Future updates of the Energy Master Plan will address this evaluation within the State's overall energy context.

IMPACTS: Increasing the RPS for the years 2021 to 2025 will send a clear signal to investors, renewable energy companies and the utilities, that renewable energy technologies will continue to make up a large portion of New Jersey's energy future. The impacts and capacity of the electricity grid will be part of this evaluation to determine which, if any, infrastructure improvements are necessary to support an aggressive renewable energy commitment through 2025.

GOAL 4: Develop new low carbon emitting, efficient power plants and close the gap between the supply and demand of electricity.

Aggressive steps to reduce our peak demand and our overall demand will not only help ease prices and costs, but will also reduce our contribution to global warming as well as other air pollutants. Although those steps will help us meet our legal requirement to reduce greenhouse gas emissions to 1990 levels by 2020, we cannot expect that they will provide much additional progress toward our mandate of reducing those emissions 80 percent by 2050. Meeting our greenhouse gas reduction requirements and ensuring a reliable supply of competitively priced electricity depends on the development of generation capacity to produce electricity at a lower cost per megawatt-hour and with lower carbon dioxide emissions.

Therefore, the State will take the following steps to work toward the future energy infrastructure we need to:

- Use the State's current authorities to influence the development of that infrastructure, and work with the Legislature to obtain additional authorities that may be needed.
- Foster development of 1500 MW of new cogeneration capacity in New Jersey by 2020.
- Create new electricity generation to meet the State's generation demands that will delay or eliminate forecasted problems with the reliability of the electricity supply, serve the State's greenhouse gas targets, and provide electricity at a reasonable price.

ACTION ITEM 1: Use the State's current authorities to influence the development of that infrastructure, and work with the Legislature to obtain additional authorities that may be needed.

In "deregulated" states such as New Jersey, decisions to invest in or retire power plants are almost entirely made by the developers and owners of the plants. As a result, since 1999, New Jersey has had to rely almost entirely upon market forces to provide a sufficient incentive for new power plants. At the same time, questions have been raised about whether those same market forces create incentives for generators to countenance shortages of capacity that increase prices, and to refrain from building new capacity.[31]

Those market forces have not yielded results. A spurt of new power plants from the mid-1990s into the early part of this decade has been followed by an almost total absence of new plants, while demand has continued growing. We cannot continue to hope that market forces alone will lead to the construction of new plants by the market participants. Neither can we rely on the market to produce the lower-emitting, more efficient plants that we need most, because those plants tend to be more costly and more time-consuming to construct than the less efficient "peaking" generation. Since the peaking plants, despite being cheaper to build, produce electricity at a higher cost than more efficient plants, they are unlikely to provide much help in mitigating wholesale energy prices.

At the same time, the speed with which peaking plants can be brought to market makes them useful in the short term for addressing reliability problems likely to arise if we lose one or more major power plants with little warning. Smaller "distributed generation" plants serving more localized needs, perhaps even at a single industrial facility, can also be developed quickly, can be cleaner and much more efficient than peaking plants. Combined-cycle plants, that are more efficient take a little longer to develop, but are substantially more efficient than peaking plants and therefore more consistent with our goals for reducing both greenhouse gas emissions and electricity prices. Finally, baseload plants can take 7-10 years to develop, but can be an essential part of a longer-term strategy to ease electricity prices. All of these types of plants therefore can play an important role in planning our energy future through 2020 and beyond.

[31] See, e.g., American Public Power Association, "Consumers in Peril: Why RTO-Run Electricity Markets Fail to Produce Just and Reasonable Electric Rates," February 2008.

Although the State can establish laws and regulations to help align the interests of the shareholders with the interests of the people of New Jersey, and PJM can design markets in an effort to do the same, these indirect measures have proven insufficient to accomplish their goal. With respect to the design of the markets, the results are not only insufficient but unreasonably expensive.

Several tools are needed to ensure the development of a more reasonably priced and reliable energy infrastructure that meets the State's greenhouse gas and environmental standards. The following tools could be useful for the State to meet its energy challenges:

- Enter into short and long-term power purchase agreements for energy or capacity using an open and transparent procurement process.
- Provide long-term low-interest financing to facilitate the construction of new generation facilities.
- Develop new generation facilities directly through public-private partnerships.
- Closely monitor the balance between the State's energy demand and energy supply.
- Constantly monitor the State's Energy Portfolio to ensure generation diversity that result in a reliable supply, at a reasonable price, that is consistent with the State's environmental policies.
- Update the State's Energy Master Plan.

Hopes that the market would produce the types of new power plants that the State needs may not be sufficient to meet New Jersey's energy goals. Therefore, it is necessary to examine the existing capabilities of the state agencies to determine if there is sufficient ability to ensure that the amount and types of new power plants that the State wants built are actually constructed so that the future generation needs are met. The Governor's Policy Office will direct this examination, which will be completed by the end of 2008. As part of this examination, the Policy Office will work with the Attorney General to evaluate the State's current authority to utilize the tools listed above.

If the examination determines that new tools are necessary, the possibility of creating a power authority or a State Energy Council will be evaluated. The creation of an authority could help the State better meet its energy challenges, by among other options, entering into short and long-term power purchase agreements for energy or capacity. Legislation establishing a power authority would need to provide for initial funding source, with the goal to be self-supporting.

Another option to achieve the desired energy infrastructure future, for New Jersey would require the creation of a State Energy Council to coordinate the State's energy policies. This Council would be chaired by an Energy Director, appointed by the Governor, and would convene monthly meetings with the BPU, DEP, DOT, DCA, and EDA to do the following:

- Coordinate the siting and financing of new electricity generation and transmission lines.
- Coordinate the development of policies to meet New Jersey's energy challenges, including energy efficiency and renewable energy programs.

- Target State energy investments in regions of the State that experience serious transmission line congestion.
- Update the State's Energy Master Plan.

The Energy Director would be responsible for reviewing energy rules and regulations that are adopted by the State, to ensure consistency with the Energy Master Plan and the State's energy policy. Under this model, the State minimizes its financial risk, while leveraging its resources in a more coordinated manner to ensure that the energy challenges facing the State are addressed. It would also reduce the perception of added regulatory risk that could be created if the power authority were to be adopted.

IMPACTS: Getting the amount of new generation built that will meet the State's electricity needs and having those plants fueled in a manner that assists in meeting the State's greenhouse gas emission targets must be achieved using either existing authorities and tools or having new ones developed. The fastest and possibly most effective means to achieve these objectives is through the use of existing authorities and tools. However, if it is determined that these authorities and tools are insufficient, then other options need to be considered if the State is going to meet its energy challenges.

ACTION ITEM 2: Foster the development of 1500 MW of new cogeneration capacity in New Jersey by 2020.

Conventional power plants emit heat as a byproduct of electricity generation. Combined Heat and Power (CHP), or "cogeneration" technology, captures the heat byproduct and "reuses" it, either by heating a building or by using the heat for an industrial process. Cogeneration is already a commercially viable technology today that can produce lower-cost power with significantly lower greenhouse gas emissions than separate fossil-fueled power plants and boilers. By strategically placing cogeneration units where both the power and heat byproduct can be used most efficiently, we can improve the reliability of the power supply, reduce the cost of electricity, and lower emissions of air pollutants.

No significant new cogeneration plants have been built in New Jersey since 1999. The barriers have included the sizable initial investment, rising and unstable fuel costs, unfavorable changes in the tax structure and various legal and regulatory concerns. Companies or communities seeking to construct or install low-carbon generation should be given preference by the State.

The State will develop economic and regulatory incentives to spur clean generation construction, especially cogeneration, and to smooth regulatory and legal hurdles to turn waste energy into economically smart and environmentally sounder energy. Regulatory incentives to be explored include:

- Identify and alleviate regulatory conflicts across permitting agencies to streamline and simplify approval processes.
- The use of the Retail Margin Fund to provide rebates to new combined heat and power facilities. Legislation (A2507) has been introduced to support the use of this fund for combined heat and power facilities.

- Exempt all fuels used by new and existing cogeneration facilities that meet a minimum efficiency from sales and use tax.

These incentives can help stimulate the development of cogeneration in the State.

IMPACTS: These incentives could help to stimulate the development of cogeneration facilities in the State which will result in a decreased electricity demand on the electricity grid, thereby further reducing the need for additional generation capacity. Recently, the development of these facilities has been extremely slow, and these incentives should help to encourage the development of new cogeneration facilities.

ACTION ITEM 3: Create new electricity generation to meet the State's generation demands that will delay or eliminate forecasted problems with the reliability of the electricity supply, serve the State's greenhouse gas targets, and provide electricity at a reasonable price.

After achieving a 20% reduction in electricity consumption, generating 10,000 GWh of electricity through CHP, and using renewable resources to produce 22.5% of the remaining demand for electricity, 54,000 GWh of our 2020 demand remains to be met by other generation sources.

Demand increases annually at a more rapid pace, given our citizens' increasing reliance on appliances like computers and plasma televisions. Our current fleet of power plants cannot be expected to supply all of this electricity, especially when much of the fleet is aging, expected to retire, or likely to be exporting its power. We have set aggressive goals for maximizing renewable energy and energy efficiency, we have the commitment and the ability to achieve these goals, but we cannot realistically expect that we can meet even our substantially reduced needs through these means alone.

Power plants using either coal or nuclear energy can generate electricity at a much lower cost per megawatt-hour than a plant using natural gas. A large power plant of either type could help to mitigate energy and capacity prices.

However, to date, coal generation plants using carbon sequestration technology have not been placed in commercial operation and no sites in or near New Jersey appropriate for sequestration have yet been identified. Therefore, it is unclear at the present time whether new coal-based plants will be a viable alternative to help the State achieve the greenhouse gas emission reductions called for in the Global Warming Response Act. The 2050 greenhouse gas mandates point towards the need to produce carbon-free electricity at a lower price per megawatt-hour than fossil-fueled plants, including greater reliance on renewable energy technologies, developing nuclear or clean coal technologies, or a combination of these options.

Accordingly, the State will review siting, permitting, financing and waste disposal issues in evaluating the feasibility of bringing a new nuclear plant to New Jersey. That process will include public meetings to explore these issues concerning a new nuclear power

generating facility in New Jersey, and to review the feasibility of other types of technologies with minimal or no carbon dioxide emissions.

While natural gas based generation units emits fewer greenhouse gas emissions than coal fired plants, its fuel source can be less reliable and its cost per BTU is roughly three times the cost for coal. However, natural gas fired plants, have the ability to power up and power down much quicker than its coal and nuclear counterparts, and therefore is better suited to meet the State's peak energy demand.

Natural gas is an essential fuel for the development of CHP and for peaking power. The development of these plants will add to the demand for natural gas. Therefore, the BPU will work with the local distribution gas companies (LDCs) and consumer groups to assess the future natural gas needs for New Jersey. The BPU will work with the DEP and the LDCs to conduct comprehensive analysis and future needs assessment of pipeline capacity and regional natural gas and liquid natural gas supply to ensure a level of stability in prices impacting New Jersey consumers. The proposed liquefied natural gas facilities proposed in southern New Jersey and offshore will be included as part of this analysis. This analysis will assist the State in reviewing possibilities to increase liquid natural gas imports, while recognizing security and Middle East trade issues.

In addition, the State will need to designate an entity (such as the BPU or the DEP) to constantly monitor the advancements in technology, including advancements in renewable energy and waste to energy technologies, to ensure that the correct mix of energy generation technologies are represented in the State's energy portfolio.

IMPACTS: Making sure that there is sufficient infrastructure capacity to meet the State's electricity and natural gas needs in the near and longer term requires constant monitoring of the supply and demand equation so that decisions can be made to ensure its reliability. In the near term, new generation needs to be built to ensure there is sufficient peak electricity capacity to meet growing demand while the demand response and energy efficiency Action Steps are implemented. For the longer term, 2020 and beyond, decisions will need to be made in the near future as to the type and amount of electricity generation that will be needed. As it can take a decade to get all the approvals and build a large capacity plant, making those decisions in the next couple of years will allow the State to determine how to achieve the 2050 greenhouse gas emission targets in the Global Warming Response Act.

GOAL 5: Invest in innovative clean energy technologies and businesses to stimulate the industry's growth in New Jersey.

New Jersey has a long history of being the home of innovation and is now home to more than 500 environmental, energy and engineering companies. Building on this history, Governor Corzine's *Economic Growth Strategy for the State of New Jersey 2007,* laid the groundwork to continue the State's commitment of encouraging innovation and commercialization of technologies. Among its many recommendations, it aggressively

encouraged the expansion and creation of clean energy solutions, and declared the clean energy technology sector as a cornerstone of the Edison Innovation Fund and the EDA.

The state has an opportunity to build upon these commitments, and establish itself as the home for an emerging clean energy industry. If fully implemented, the goals and action items in this Plan will necessitate significant investment in New Jersey's energy infrastructure.

The clean energy technology sector offers hopes to provide a new industry sector that creates jobs while providing new solutions to our energy challenges. With its strong workforce, culture of innovation and large renewable energy and efficiency markets, New Jersey is well positioned to become a major participant in the clean energy technology sector. Therefore, the State must further its investment by expanding efforts to attract and grow the clean energy technology sector. Therefore, the State will work to implement the following action items:

- Expand the Edison Innovation Fund to invest in innovative clean energy technologies including both energy efficiency and renewable energy manufacturing businesses to stimulate the industry's growth in New Jersey.
- Develop a "Green Collar" jobs program to ensure that sufficient numbers of New Jersey workers have the skills demanded by industry to fill the jobs that are created from the action items in this Master Plan.

ACTION ITEM 1: Expand the Edison Innovation Fund to invest in innovative clean energy technologies including both energy efficiency and renewable energy manufacturing businesses to stimulate the industry's growth in New Jersey.

The Governor's Economic Growth Strategy has committed to aggressively encourage the expansion and creation of clean energy solutions, and highlights the clean energy technology sector as a cornerstone of the Edison Innovation Fund administered by the NJ Economic Development Authority (EDA) in partnership with the NJ Commission on Science and Technology. Currently, New Jersey is home to over 500 environmental, energy, and engineering companies. With its skilled workforce and culture of innovation, New Jersey is well positioned to become a major participant in the clean energy technology sector.

The BPU, EDA, and CST are partnering to expand the Edison Innovation Fund to include an *Edison Innovation Clean Energy Technology Commercialization Fund* and an *Edison Innovation Clean Energy Manufacturing Fund*. The overall mission of these new financing sources is to fund innovative renewable energy and energy efficiency technologies which will decrease electricity and heating costs, improve electric reliability and maximize economic and environmental benefit to New Jersey's ratepayers by driving down the cost of key market-transforming efficiency and renewable energy technologies. Achieving this mission will include:

- Providing a range of tools to integrate policies across programs for the commercialization of clean energy technologies including R&D support, gap funding, equity investments, and generating market demand;
- Developing a balanced clean energy industry cluster;
- Supporting technologies that will provide the most benefit to New Jersey ratepayers; and
- Enhancing consumer choice

Through this fund, created through allocation of existing agency resources, the State will leverage $75 million over five years to attract over $200 million in private venture investment in clean energy technology companies. The CST will offer assistance by providing commercialization grants to develop or commercialize prototype renewable energy and energy efficient equipment, and products. The EDA will offer assistance in the form of grants and loans to companies manufacturing renewable energy, clean and energy efficiency equipment and products in New Jersey. The expanded Fund will ultimately provide NJ consumers with greater access to these products by developing state of the art renewable energy manufacturing facilities in New Jersey.

This Fund will partner with other organizations that represent capital sources, including private industry and NJ's research universities to help commercialize promising new technologies.

The early stage financing risk and the high capital costs of constructing commercial-scale facilities often proves to be a difficult obstacle for these clean energy generation tech companies to overcome. However, as advancements in renewable and alternative energy sources advance, New Jersey will be served well to establish itself as the home to these new technology businesses.

IMPACTS: While using existing State resources, the Fund offers New Jersey with an opportunity to invest in and host leading new clean energy solutions. This will help grow the clean energy industry in New Jersey, and should be coordinated with the State's green collar jobs initiative.

ACTION ITEM 2: Develop a "Green Collar" jobs program to ensure that sufficient numbers of New Jersey workers have the skills demanded by industry to fill the jobs that are created from the action items in this Master Plan.

Meeting the Energy Master Plan's aggressive targets for energy efficiency, renewable energy, demand response, and new generation will require tremendous growth in the "green collar" jobs sector, from solar manufacturing and energy audits to HVAC installers and smart grid technology installations.

To meet this job demand, the State will need to grow its green collar local labor force. Curriculum alignment and workforce training will be an essential component to driving this development. In addition, because our urban centers are often centers for electricity

congestion and industry, growing green collar jobs in our cities will play an important part in meeting our goals.

The Department of Labor has formed an Industry Workforce Advisory Council (IWAC) to convene senior human resources representatives from the energy sector with the State's agencies working on workforce development, higher education, and training programs. The IWAC will provide a forum for representatives from the energy sector to tell the state about the critical workforce skill needs of their industry. The State will use this information to help shape curriculum development, ensure that New Jersey's education and training institutions are able to deliver industry-recognized credentials that are in demand by businesses, and allocate training funds strategically.

IMPACTS: If New Jersey is to compete with its surrounding states, it will need to demonstrate that it has the skilled workforce for these companies to locate, expand and stay in the state. The development of a "Green Collar" jobs program will ensure that New Jersey's workforce has the job training and skills necessary to support these companies. These jobs will keep energy dollars that might have been exported out of New Jersey in the State and help employ New Jersey citizens.

THE STATE MUST LEAD BY EXAMPLE

The State will work with its counties, local municipalities and school boards to implement policies and programs to lead in meeting the goals of the Energy Master Plan. It will lead by example to reduce its energy consumption, increase its use of renewable and alternative fuels, and reduce its overall contributions to greenhouse gas emissions.

New Jersey State Government spends an estimated $171 million a year on energy, consuming 7 trillion Btus which results in the emission of 739,000 metric tons of carbon dioxide. State agencies occupy space in over 4,000 buildings and operate a fleet of over 14,000 vehicles.

Figure 17 and Figure 18 show the State's total energy consumption by fuel type and its energy expenditures by department. Electricity and natural gas make up 64% of the State's total energy consumption.

With such a significant infrastructure, State operations have a meaningful impact on New Jersey's carbon footprint. By implementing initiatives outlined in the Energy Master Plan within State government operations, the State will assume its responsibility to set an example of energy conservation and management.

To ensure that the State is leading the way, Governor Corzine created the Office of Energy Savings through an Executive Order signed on April 22, 2006. Through this Office the State has centralized its efforts to increase energy efficiency, reduce energy use and improve the procurement of energy for all State facilities.

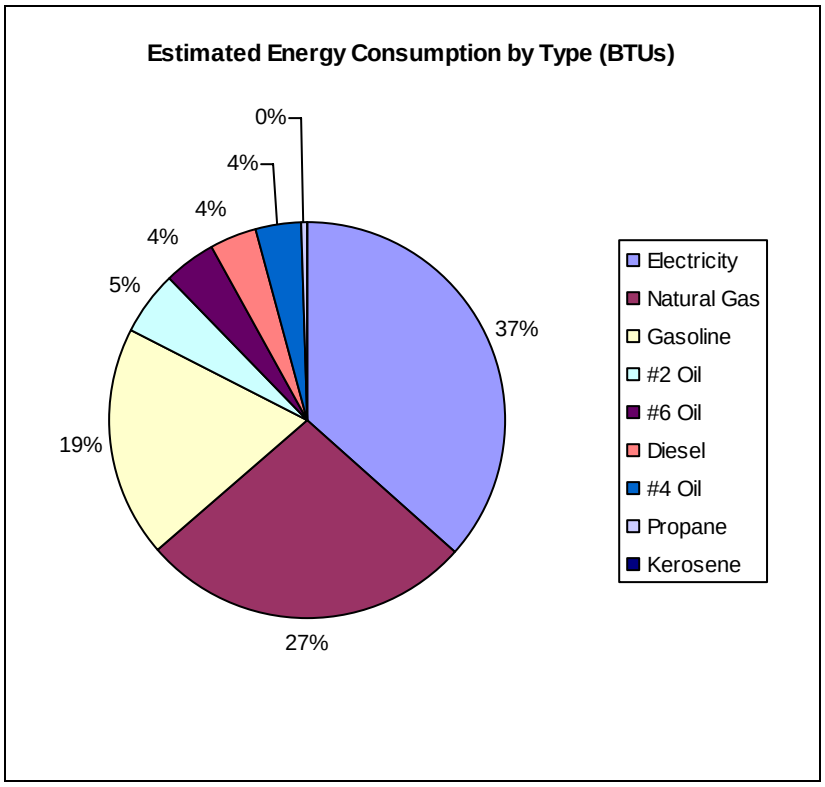

Figure 17: Energy Consumption by the State.

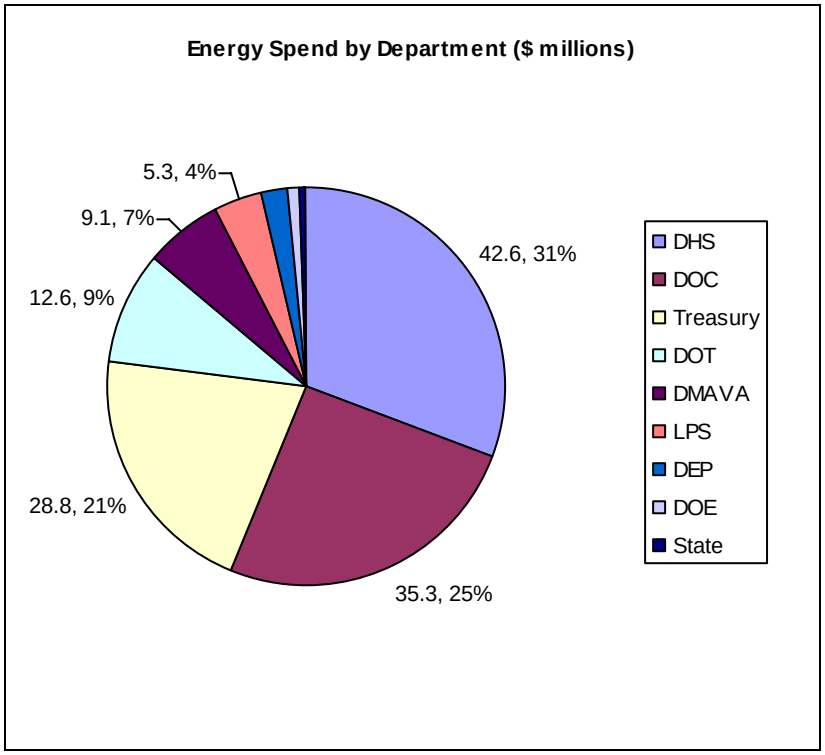

Figure 18: Energy Expenditures by Department

The Office of Energy Savings continues to identify cost effective projects that will substantially reduce the State's energy consumption and cost. In fact, eleven more facility projects are in the design stage and are expected to reduce energy use by another 25 billion Btus, reduce carbon dioxide emissions by another 8,000 metric tons, and reduce energy costs by $1.5 million annually. Further, these projects are expected to pay for themselves in less than six years.

Action Item 1: Operate State facilities and equipment as efficiently as possible.

Over the past year, the Office of Energy Savings has begun to implement new management practices for reducing energy use that can be emulated by New Jersey's businesses and residences. The following is a list of the illustrative actions taken over the past year that have laid the groundwork for changing the State's energy future.

- Prioritized energy audits in the downtown Trenton office buildings and implemented immediate energy conservation measures, like adjusting the operating schedules for lighting, heating and cooling systems. These measures are expected to reduce annual energy consumption by 22 billion BTUs, reduce energy cost by $820,000 and reduce carbon dioxide emissions by 3,000 metric tons. That is equivalent to removing 400 cars from our roads.
- As a demonstration project, embarked on a lighting upgrade in the Statehouse, to increase energy efficiency and reduce lighting electricity consumption by 58%. This project uses fluorescent lighting technology with low-wattage and low-mercury lamps. The new lamps last much longer, resulting in reduced maintenance costs for the State.
- Negotiated a new State recycling contract related to all paper, glass, aluminum and plastic to increase our recycling rates. A review of the State's recycling program showed that performance was far below industry benchmarks. The new vendor will help us track recycling data so the State can address these shortfalls. Eventually, the program should become self-funded. The Office of Energy Savings will also work to identify other opportunities to capture waste streams for recycling or energy production, such as wood pallets and food waste.

In addition, the State will develop a statewide Energy Tracking System to hold departments accountable for their energy use through regular performance reports. The State processes about 18,000 utility and energy supplier bills a year. A statewide ETS will allow energy usage data to be retrieved from all utility/supplier invoices so that energy consumption tracking and performance reporting can be provided for each State building and department. The ETS will also permit centralized oversight of State energy consumption by the Office of Energy Savings and increase the State's ability to hold each agency accountable and focus its energy efficiency efforts.

Utilizing the information obtained through the ETS, the Office of Energy Savings will provide meaningful energy information to state employees to educate them on energy conservation measures. In addition, to maintain the momentum on energy reduction

projects building maintenance personnel will be trained on appropriate operational and system controls.

Also, the State will explore a new revenue stream by providing relief to the electricity grid during high demand times. By shutting off pre-selected, non-essential equipment during times of great electrical congestion, the State can remove electricity load from the grid, and be eligible for financial incentives. This type of demand response program should be in place by the end of 2008.

Action Item 2: Invest in cost-effective energy projects.

Currently the state has already begun investing in energy efficiency and renewable energy projects. Recently the State opened the Regional Operations Intelligence Center (ROIC), a cutting-edge building that now serves as the foundation for the state's homeland security operations. The facility is heated and cooled by a geothermal system, which will eliminate 89,000 pounds of carbon dioxide annually versus using conventional energy sources. Additionally, a photovoltaic system mounted on the roof is generating one-third of electricity needs for the facility on an annual basis, further reducing electricity use and costs an estimated $2.4 million over the life of the system.

To encourage the continued investment in cost-effective energy projects the State will work with the Treasury's Division of Purchase and Property, the Office of Energy Savings to issue standards and guidelines for the purchase of energy-efficient products by the end of 2008. The Office will also emphasize energy efficiency and renewable energy in design and construction work, exemplified by the construction of the Regional Operations Intelligence Center. Pending legislation would require new State facilities to be designed and managed in accordance with high performance "green" standards.

Action Item 3: Work with the State Legislature over the next year to create an Energy Savings Contracting Program.

Given its current fiscal constraints, the State and government agencies at all levels must look beyond issuing long-term debt to fund energy improvement projects. Existing law creates a variety of obstacles for the State, local governmental units and educational institutions seeking to enter into comprehensive contracts for energy efficiency. A comprehensive Energy Savings Contracting Program would use government-appropriate contracting mechanisms, and introduce technical resources and new funding options for energy improvements for a wide range of government facilities.

It would also allow all government agencies to undertake a more comprehensive approach to becoming energy efficient and enable moving beyond low-hanging fruit, such as lighting retrofits, to higher value projects, such as boiler replacement and comprehensive facility re-engineering. This program would eliminate the need to appropriate new funds to pay for these projects and allows monthly payments to be sourced from existing energy cost resources. By working with the State Legislature and

Stakeholders, we will address obstacles for State buildings to engage in energy savings contracts and explore the opportunities for local governments and schools.

Action Item 4: Optimize our Energy Supply Portfolio to reduce greenhouse gas emissions.

In addition to its efforts to curb the State's energy demand, the Office of Energy Savings will spearhead the State's effort to increase its use of renewable energy technologies, increase the efficiency of its existing Combined Heat and Power plants, phase out number 4 and number 6 oil in boilers from its energy portfolio, and increase the use of biodiesel.

The Office of Energy Savings will identify an existing State building to showcase a variety of renewable energy and green building technologies. For example, work is underway to determine the feasibility of "greening" the Department of Environmental Protection building, including the potential for a solar electric system on the roof. This will serve as a demonstration project of how the State can better utilize renewable energy technologies.

Over the next year, the Office of Energy Savings will also work with our two Combined Heat and Power (CHP) plant vendors to increase plant capacity and efficiency through equipment replacement and system upgrades. We will also seek to develop new CHP projects by 2010, as these plants simultaneously produce electrical and thermal energy from a single fuel source and can be more energy efficient than conventional energy supplies.

The State will also work to phase out heavier fuels in government facilities beginning in 2008. As an illustration, Trenton Psychiatric Hospital is currently using #6 fuel oil, but is scheduled to be converted to natural gas, resulting in fewer emissions and increased energy efficiency at the facility.

Instead of using these diesel fuels, the State needs to expand its use of biodiesel to more State fueling locations. Conventional petroleum diesel will be replaced by B20 (20% biodiesel /80% diesel blend) to reduce the State's petroleum consumption and greenhouse gas emissions. The DEP's oversight will ensure that the State purchases biodiesel produced using sustainable methods.

CONTINUED ADVOCACY& ANALYSIS

Unfortunately, New Jersey does not have absolute control over the future of its energy infrastructure. Many decisions that affect the State's energy infrastructure are made by the regional transmission organization, PJM and the federal regulatory body FERC. The policies and actions of the PJM and FERC can affect the type of generation that is being built, the location and expansion of transmission lines, and the cost of electricity. As the State moves forward with implementing the action items in this Master Plan, it will need to work closely with PJM and FERC to coordinate investments in the regions electricity

infrastructure. Changes in peak demand or energy consumption may change the infrastructure improvement plans being developed by PJM and FERC, and the opposite is true.

Therefore, New Jersey must ensure that it is part of the decision making at PJM and FERC by implementing the following action items:

- Work with PJM and the FERC to modify or replace the RPM, with a mechanism that focuses incentives on new generation capacity, demand response, and energy efficiency.
- Actively participate in PJM's planning of the electric transmission system to better protect New Jersey's economy and the environment.
- Litigate decisions by the FERC that threaten substantial increases in New Jersey electricity prices, substantial decreases in reliability, or increases in our contribution to global warming.

Work with PJM to modify or replace the Reliability Pricing Model, with a mechanism that focuses incentives on new generation capacity, demand response, and energy efficiency. RPM has dramatically increased capacity prices paid to all power plants, including existing plants that were in no danger of imminent retirement. The first four years of higher capacity prices will cost New Jersey customers more than $6 billion – more than enough to fund the construction of several new power plants outright. Unfortunately, that money is being spread amongst all capacity resources, with only a sliver reaching new power plants or demand response.

Both RPM and the direct State actions described above are intended to narrow the gap between supply and demand in New Jersey. However, the direct State actions will achieve more certain results than RPM, and will tailor those results more closely to New Jersey's specific economic and environmental needs. New Jerseyans should not have to pay for RPM above and beyond the costs of more wisely targeted efforts.

Therefore, the State will continue its advocacy, with the goal of modifying or replacing the RPM with something that will produce more results while being much more cost-effective.

Help to shape PJM's planning of the electric transmission system to better protect New Jersey's economy and the environment. PJM has determined that the reliability of our supply of electricity will be jeopardized over the next several years, unless steps are taken to address the state's energy demand and supply. Since PJM is responsible for planning and operating the transmission grid reliably, it is in the process of directing upgrades to the grid that will enable New Jersey to import more electricity. These imports will come primarily from coal production regions where coal-based electric generation is prevalent. In other words, our efforts to cut greenhouse gas emissions within New Jersey's borders will be undermined if the shortage of electricity supply is solved by importing more coal-based electricity.

The prospect of increased greenhouse gas emissions is only one reason to avoid increasing our reliance on imports of coal-based electricity. Just as importantly, hopes that these imports would bring us greater reliability and lower prices are likely to be dashed. The prospect of federal limits on power plant emissions of greenhouse gases is creating major uncertainty about what coal-based power will cost. In addition, demand for coal is increasing, as coal is becoming more difficult and expensive to mine and transport, and recent history has featured disruptions in coal supply and spikes in coal prices. All of these factors suggest that it would be irresponsible to stake our energy future on increased imports of coal-based electricity.

New Jersey will continue to work closely with PJM, to ensure that the transmission planning will reflect real State actions to increase in-state supply and reduce demand, and that transmission planning does not undermine the State's economic and environmental goals.

Concerns about future fuel supplies. New Jersey's energy decisions cannot be made in a vacuum, without taking into consideration national and international concerns. The Energy Information Administration is a statistical agency of the U.S. Department of Energy. Every year the EIA provides an annual overview of the country's current and projected energy supply and demand.

This information is useful as recent increases in demand for electricity coupled with recent disruptions in the supply of fuel sources have resulted in increased costs of generating electricity. Changes in energy supply and demand are difficult to predict, and are influence by many factors including; increasing energy prices; increased demand for energy in developing countries; increased costs to transport energy fuel sources; and recently adopted legislation and regulations in the United States and other countries (such as the Regional Greenhouse Gas Initiative).

Table 4 shows the EIA estimate of total energy supply and demand from 2006 through 2030.

Energy and economic factors	2006	2010		2020		2030	
		AEO2008	*AEO2007*	*AEO2008*	*AEO2007*	*AEO2008*	*AEO2007*
Primary energy production (quadrillion Btu)							
Petroleum	13.16	15.03	14.42	15.71	14.85	14.15	13.71
Dry natural gas	19.04	19.85	19.93	20.24	21.41	20.00	21.15
Coal	23.79	23.97	24.47	25.2	26.61	28.63	33.52
Nuclear electricity	8.21	8.31	8.23	9.05	9.23	9.57	9.33
Hydroelectricity	2.89	2.92	3.02	3.00	3.08	3.00	3.09
Biomass	2.94	4.05	4.22	6.42	4.69	8.12	5.26
Other renewable energy	0.88	1.51	1.18	2.00	1.33	2.45	1.44
Other	0.50	0.54	0.67	0.58	0.89	0.64	1.12
Total	**71.41**	**76.17**	**76.13**	**82.21**	**82.09**	**86.56**	**88.63**
Net imports (quadrillion Btu)							
Petroleum	26.69	23.93	25.19	24.03	28.92	26.52	34.74
Natural gas	3.56	3.96	4.67	3.66	5.48	3.28	5.59
Coal/other (- indicates export)	-0.28	-0.84	-0.19	1.06	0.93	1.86	1.57
Total	**29.98**	**27.04**	**29.66**	**28.75**	**35.33**	**31.66**	**41.90**
Consumption (quadrillion Btu)							
Liquid fuels	40.06	40.46	41.76	42.24	46.52	43.99	52.17
Natural gas	22.30	23.93	24.73	24.01	27.04	23.39	26.89
Coal	22.50	23.03	24.24	25.87	27.29	29.90	34.14
Nuclear electricity	8.21	8.31	8.23	9.05	9.23	9.57	9.33
Hydroelectricity	2.89	2.92	3.02	3.00	3.08	3.00	3.09
Biomass	2.50	3.01	3.30	4.50	3.64	5.51	4.06
Other renewable energy	0.88	1.51	1.18	2.00	1.33	2.45	1.44
Net electricity imports	0.19	0.18	0.04	0.17	0.04	0.20	0.04
Total	**99.50**	**103.30**	**106.50**	**110.80**	**118.16**	**118.00**	**131.16**
Liquid fuels (million barrels per day)							
Domestic crude oil production	5.10	5.93	5.67	6.23	5.89	5.59	5.39
Other domestic production	3.19	3.69	4.03	4.46	4.49	4.85	5.08
Net imports	12.45	11.39	11.79	11.36	13.56	12.41	16.37
Consumption	20.65	20.99	21.59	21.96	24.03	22.80	26.95
Natural gas (trillion cubic feet)							
Production	18.57	19.35	19.42	19.73	20.86	19.49	20.61
Net imports	3.46	3.85	4.55	3.55	5.35	3.18	5.45
Consumption	21.66	23.25	24.02	23.33	26.26	22.72	26.12
Coal (million short tons)							
Production	1,177	1,179	1,202	1,281	1,336	1,467	1,704
Net imports	-15	-34	-7	46	41	78	68
Consumption	1,114	1,145	1,195	1,327	1,377	1,545	1,772
Prices (2006 dollars)							
Imported low-sulfur, light crude oil (dollars per barrel)	66.02	74.03	59.23	59.70	53.64	70.45	60.93
Imported crude oil (dollars per barrel)	59.05	65.18	52.76	51.55	47.89	58.66	53.21
Domestic natural gas at wellhead (dollars per thousand cubic feet)	6.42	6.33	5.93	5.44	5.39	6.63	6.16
Domestic coal at minemouth (dollars per short ton)	24.63	26.16	24.94	22.51	22.24	23.32	23.29
Average electricity price (cents per kilowatthour)	8.9	9.2	8.3	8.6	8.1	8.8	8.3
Economic indicators							
Real gross domestic product (billion 2000 dollars)	11,319	12,453	12,790	15,984	17,077	20,219	22,494
GDP chain-type price index (index, 2000=1.000)	1.166	1.26	1.253	1.52	1.495	1.871	1.815
Real disposable personal income (billion 2000 dollars)	8,397	9,472	9,568	12,654	13,000	16,246	17,535
Value of manufacturing shipments (billion 2000 dollars)	5,821	5,997	6,298	7,113	7,779	7,997	9,502
Primary energy intensity (thousand Btu per 2000 dollar of GDP)	**8.79**	**8.30**	**8.33**	**6.93**	**6.92**	**5.84**	**5.83**
Carbon dioxide emissions (million metric tons)	**5,890**	**6,011**	**6,214**	**6,384**	**6,944**	**6,851**	**7,950**

Notes: Quantities are derived from historical volumes and assumed thermal conversion factors. Other production includes liquid hydrogen, methanol, and some inputs to refineries. Net imports of petroleum include crude oil, petroleum products, unfinished oils, alcohols, ethers, and blending components. Other net imports include coal coke and electricity. For nuclear electricity, both production and consumption numbers are based on its fossil-fuel-equivalent energy content.

Table 4. Total energy supply and disposition in the EIA's AEO2008 Overview.[32]

While this information paints a national picture of the future energy supply and demand, it is unable to take into consideration regulatory changes that may work to encourage the development of one fuel source over another. Specifically, the outlook acknowledges that liquefied natural gas (LNG) is a key uncertainty and with increased competition for

[32] Energy information Administration *AEO 2008 Overview*

LNG fuel supplies, the amounts available to the United States may "vary considerably from year to year."

Some infrastructure upgrades of the local transmission systems and pipelines can help to mitigate some of these impacts by increasing local reliability and supply. However, given the plethora of factors that influence energy prices, it is uncertain as to whether these upgrades will also provide price stability.

The State will continue to monitor the data, forecasts and analysis that are provided by the EIA in the formulation and evaluation of future and current energy policies.

Complete the review of the BGS auction process. Since 2002, the BPU has been overseeing auctions for the right to supply energy, capacity, and all other needs for BGS. The price resulting from the auctions has nearly doubled since 2002. Accordingly, the BPU will intensify its examination of the auction, thoroughly reviewing not only the details of the current auction process but also the concept of the auction itself. The process will be a transparent, public proceeding with all necessary expertise and will conclude before any auction in 2009.

ALTERNATIVE SCENARIO

In 2005, New Jersey's homes and businesses used almost 83,000 gigawatt-hours (GWh) of electricity and over 600 trillion British Thermal Units (BTU) of natural gas and heating oil, at a total cost of over $16.8 billion. In 2005, these energy costs consumed about 4.4% of total New Jersey personal income.[33]

Unless New Jersey acts decisively to reduce energy demand and increase supply of low carbon emitting, reliable and reasonably priced energy the state faces an increasingly costly and unsustainable energy future. If no action steps are taken, and the "business as usual" scenario is pursued, in 2020 New Jersey's homes and businesses will use 100,000 GWh of electricity and over 590 trillion Btus of natural gas and heating oil at a cost of $26.8 billion. The average household would spend approximately $1,700 on electricity, nearly $1,800 on natural gas or $1,900 on heating oil, depending on the heating fuel.

However, the series of action items proposed in this draft Energy Master Plan will effectively reduce the State's energy consumption 20% by 2020, contribute to the goal of reducing greenhouse gas emissions to 1990 levels by 2020, and ensure that the energy infrastructure provides reasonably priced and reliable energy to New Jersey's homes and businesses. The DEP's report in response to Executive Order 54 and the Global Warming Response act will also expand on the measures that need to be taken to ensure that the State is on target to meet its 2020 and 2050 greenhouse gas targets. All future policies concerning energy generation will be evaluated to ensure that they are consistent with these targets.

If the action items are fully implemented, the electricity and heating fuels sectors will decrease significantly. In 2004, the electricity and heating fuels sectors emitted a total of 80 million metric tons (MMT) of carbon dioxide. The "business as usual" has this amount increasing to nearly 90 MMT of carbon dioxide emissions in 2020, while the current "alternative" scenario (including the energy efficiency, demand response, cogeneration, and renewable energy action items), effectively reduces the amount of carbon dioxide to 65 MMT in 2020. Further investment in low carbon emitting power plants will further reduce New Jersey's 2020 greenhouse gas emissions. This reduction in greenhouse gas emissions will help New Jersey meet its aggressive 2020 and 2050 greenhouse gas targets.

In addition, the actions in this Plan will also help save the State and its consumers, money between now and 2020. It is estimated that, if the action items in this Plan are fully implemented, by 2020 New Jersey's homes and businesses will use 80,000 GWh of electricity and almost 474 trillion Btus of natural gas and heating oil, and save nearly $20 billion in its total annual energy expenditures between 2010 and 2020.

[33] New Jersey Department of Labor & Workforce Development, Total Personal Income by State,1998 – 2006, http://www.wnjpin.net/OneStopCareerCenter/LaborMarketInformation/lmi10/tpi.htm.

Table 5 compares the 2020 electricity consumption, electricity rates and average customer bill, for each of the consumer classes in the "business as usual" scenario, the "alternative" scenario, and the data from 2005.[34]

Electricity

2005 Baseline	Retail PRICE $/kWh	Average kWh/Customer	Average Annual Customer Bill	Total Sector Expenditures (billions of nominal $)
Residential	$ 0.12	8,970	$ 1,053	$ 3.52
Commercial	$ 0.11	87,335	$ 9,266	$ 4.22
Industrial	$ 0.10	868,014	$ 84,718	$ 1.16
TOTAL				$ 8.90
2020 BAU				
Residential	$ 0.18	9,180	$ 1,682	$ 6.48
Commercial	$ 0.17	93,011	$ 15,553	$ 8.38
Industrial	$ 0.14	743,236	$ 102,211	$ 1.60
TOTAL				$ 16.47
2020 Alternative				
Residential	$ 0.19	6,663	$ 1,241	$ 4.78
Commercial	$ 0.17	66,287	$ 11,488	$ 6.19
Industrial	$ 0.13	597,810	$ 76,948	$ 1.21
TOTAL				$ 12.18
% Change from BAU to Alternative in 2020				
Residential	1.7%	-27%	-26%	-26%
Commercial	3.6%	-29%	-26%	-26%
Industrial	-6.4%	-20%	-25%	-25%
TOTAL				-26%

Table 5: Electricity Price and Consumption Comparison of 2005 Baseline, 2020 BAU and 2020 Alternative Scenarios.

The "alternative" scenario reduces total electricity expenditures by 26% in 2020 compared to the "business as usual" scenario. While electricity rates largely stay the same between the scenarios, the amount of energy consumed is greatly reduced through efficiency measures. Also, the "business as usual" model assumes greater risk in energy supplies and prices as it has an increased reliance on fossil fuel based generation, while global demand for energy continues to increase. The additional risks assumed under this model are not able to be quantified given the uncertainty about future risks and trends.

[34] Source: 2005 data from EIA Form 861; projection data from R/Econ™ model output 12/03/07; projected growth rates for # of customers calculated using historical growth rates from EIA Form 861.

Table 6[35] and Table 7[36] below show the projected impacts on heating fuels and natural gas and consumption in each of the consumer classes in the "business as usual" scenario, the "alternative" scenario, and the data from 2005. These projections include the total impacts if all of the action items in this Plan are implemented, including energy efficiency, energy conservation and cogeneration.

Distillate Fuel Oil

(includes No. 2 Distillate, Kerosene, Propane in the Consumption Values)

2005 Baseline	Retail PRICE $/mmBtu	Average mmBtu/Customer	Average Annual Customer Bill	Total Sector Expenditures (billions of nominal $)
Residential	$ 15.95	102	$ 1,620	$ 0.817
Commercial	$ 13.01	851	$ 11,075	$ 0.241
Industrial	$ 12.78	9,080	$ 116,053	$ 0.117
TOTAL				$ 1.18
2020 BAU				
Residential	$ 17.36	111	$ 1,930	$ 0.566
Commercial	$ 14.29	530	$ 7,579	$ 0.236
Industrial	$ 13.99	23,109	$ 323,260	$ 0.201
TOTAL				$ 1.00
2020 Alternative (includes EE and Biodiesel)				
Residential	$ 18.01	81	$ 1,461	$ 0.429
Commercial	$ 14.81	409	$ 6,057	$ 0.189
Industrial	$ 14.07	21,538	$ 302,966	$ 0.189
TOTAL				$ 0.81
% Change from BAU to Alternative in 2020				
Residential	4%	-27%	-24%	-24%
Commercial	4%	-23%	-20%	-20%
Industrial	1%	-7%	-6%	-6%
TOTAL				-20%

Table 6: Distillate Fuel Oil Price and Consumption Comparison of 2005 Baseline, 2020 BAU and 2020 Alternative Scenarios.

The expansion in cogeneration capacity in the State is responsible for the increases in natural gas consumption in the "alternative" scenario compared to the "business as usual"

[35] Source: 2005 data from EIA; projection data from R/Econ™ model output 10/17/07; projected growth rates for # of customers calculated using historical growth rates from the U.S. Census American Community Survey. 1 gallon of # 2 Distillate Fuel Oil = 138,690 Btu.

[36] Source: 2005 data from EIA; projection data from R/Econ™ model output 12/03/07; projected growth rates for # of customers calculated using historical growth rates from EIA. The Combined Heat and Power program as part of the Energy Master Plan assumes that new CHP plants will run on natural gas. 80% of this CHP is assumed to be "behind-the-meter", which requires additional natural gas to be delivered to residential, commercial, and industrial customers. It is assumed 10% of the behind- the-meter CHP will be installed in residential applications and the rest will be apportioned to the commercial and industrial sectors relative to these sectors' electricity consumption. The additional gas off-sets some of the energy efficiency measures, but replaces the usage with more efficient natural gas applications. This will be an area for further research and consideration.

scenario. The economic impacts of cogeneration on electricity rates are captured in the Table 5.

Natural Gas (Total *INCLUDING* Combined Heat and Power)

2005 Baseline	Retail PRICE $/mmBtu	Average mmBtu/Customer	Average Annual Customer Bill	Total Sector Expenditures (billions of nominal $)
Residential	$ 14.44	95	$ 1,372	$ 3.44
Commercial	$ 13.52	851	$ 11,506	$ 2.37
Industrial	$ 11.52	9,080	$ 104,643	$ 0.89
TOTAL				$ 6.70
2020 BAU				
Residential	$ 21.57	83	$ 1,789	$ 5.88
Commercial	$ 18.67	610	$ 11,379	$ 2.87
Industrial	$ 15.33	5,480	$ 84,025	$ 0.57
TOTAL				$ 9.33
2020 Alternative				
Residential	$ 23.88	66	$ 1,585	$ 5.21
Commercial	$ 19.65	684	$ 13,429	$ 3.39
Industrial	$ 15.39	7,441	$ 114,509	$ 0.78
TOTAL				$ 9.38
% Change from BAU to Alternative in 2020				
Residential	11%	-20%	-11%	-11%
Commercial	5%	12%	18%	18%
Industrial	0.37%	36%	36%	36%
TOTAL				1%

Table 7: Natural Gas Price and Consumption Comparison of 2005 Baseline, 2020 BAU and 2020 Alternative Scenarios.

In total the action items in this Plan are estimated to save New Jersey energy consumers $4.5 billion in 2020 and $20 million from 2010 through 2020, compared to the "business as usual" scenario. Figure 19 compares the total cost savings to each consumer group in the "alternative" scenario to the 2020 "business as usual" scenario and the 2005 annual expenditures.

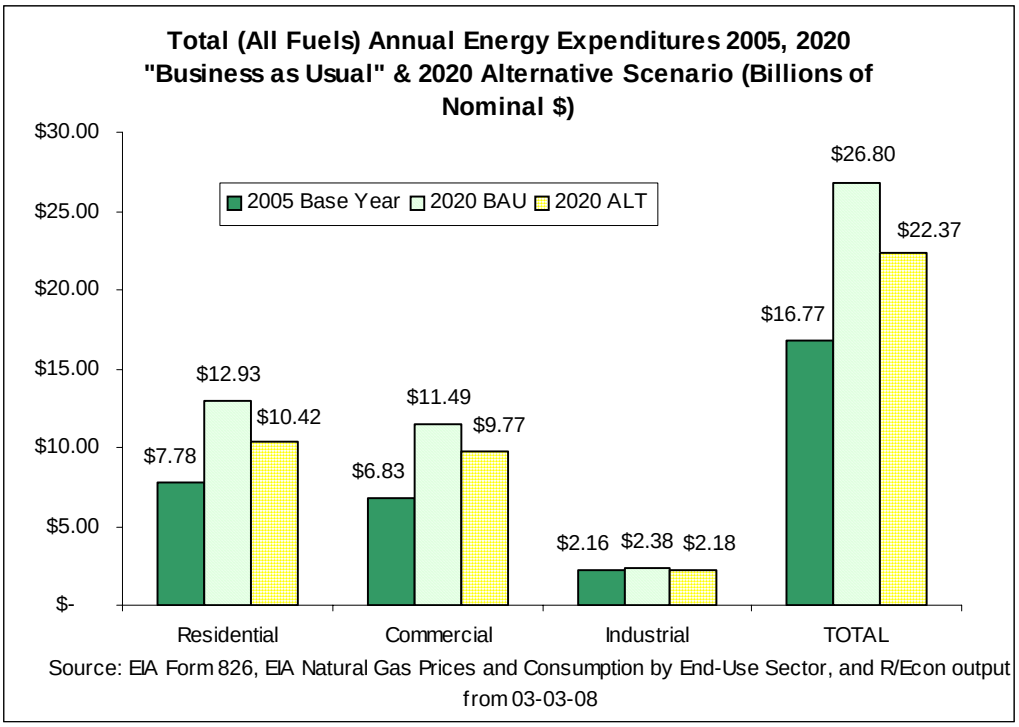

Figure 19: Total Annual Energy Expenditures for all Sectors.

CONCLUSION

New Jersey faces serious energy challenges that if not addressed responsibly, could have significant environmental and economic impacts to the State. Growing energy demand, rising energy prices, energy's contribution to global climate change, and the fact that the State has much less authority to meet these challenges then it used to, are all challenges that face New Jersey. To meet these challenges, the State and its consumers will need to change the way energy is used and produced. The draft Energy Master Plan proposes a series of goals and action items that, if implemented, could effectively create an energy future that is environmentally and economically sustainable.

Of the goals and action items listed in this Plan, energy efficiency and conservation offers the fastest and cheapest method to meeting the energy challenges. Policies that encourage demand response measures, continued investment in renewable and alternative energy technologies, and development of combined heat and power units must also be implemented to further meet these challenges. However, these actions may not be enough to ensure a responsible energy future for the State and its consumers. Even if these goals and action items are fully realized, it is estimated that there will be 54,000 GWh of electricity demand that will need to be satisfied.

Therefore, the State must ensure that policies are in place to ensure that there is enough energy supply to meet the energy demand. The State's current energy supply infrastructure is aging, and policies that encourage the development of new low-carbon emitting electricity generation would be an important step in developing a reliable, reasonably priced energy environment that is consistent with the State's greenhouse gas goals.

Together, these goals and action items will reduce the electricity sectors contributions to greenhouse gas emissions, from 90 million metric tons (MMT) in the 2020 "business as usual" scenario, and 80 MMT in 2004 to 65 MMT in 2020. It will also result in nearly $20 billion in total annual energy savings between 2010 and 2020. These reductions in greenhouse gas emissions and in energy savings will build the foundation for an environmentally and economically responsible energy environment in New Jersey.

The difficulty of these decisions makes the next phase of this Energy Master Plan process crucial. Upon release of the draft Plan, a series of stakeholder meetings and public hearings will be scheduled to review, modify and finalize the goals and action items in this Plan. Those meetings and hearings will inform the decisions that will be incorporated into the final Plan document, and will also support detailed strategies to implement those decisions and an approach to the annual assessment of the progress being made on the goals of the Plan.