

COMMENTS OF PUBLIC SERVICE ENTERPRISE GROUP ON THE DRAFT ENERGY MASTER PLAN

Public Service Enterprise Group (“PSEG”) submits these comments in response to the Draft Energy Master Plan (“Draft Plan” or “Draft EMP”), issued April, 2008.

PSEG is fully supportive of Governor Corzine’s goals for reducing energy demand, increasing the use of renewable energy, and reducing greenhouse gas emissions. As part of our commitment to helping New Jersey meet these goals, PSEG has been a fully engaged stakeholder in the EMP drafting process.

The Draft EMP is a thoughtful and important plan for guiding State policy so that New Jersey can combat global warming while ensuring reliable and competitively priced energy. PSEG strongly supports the EMP’s focus on improving energy efficiency, increasing conservation and demand response, deploying more renewable energy, and developing clean central station power. These are the same priorities that PSEG has committed to as our core principles for fighting climate change (see attached white paper).

PSEG is dedicated to helping the State meet these energy policy goals. PSEG is leading the way by developing proposals for investing in energy efficiency, investing in renewable generation, and operating New Jersey’s largest source of carbon-free electricity. PSEG is also committed to ensuring universal access to the benefits of the green economy, so that all New Jersey businesses and households – no matter their geographic location, economic strata or other circumstances – have a chance to benefit from this transformation.

The attached comments provide feedback on the Draft EMP, with a particular focus on areas where we believe the document would benefit from further revisions. In summary, our comments make the following points:

Energy Efficiency and Demand Response

- The EMP should place greater emphasis on the role utilities will need to play in helping the State achieve its aggressive demand reduction goals. The EMP should note that encouraging utility investment in energy efficiency and demand response will require regulatory certainty and cost recovery for utilities consistent with traditional utility investments.
- The EMP should be more aggressive in pushing development and deployment of smart grid and Advanced Metering Infrastructure (AMI) technologies, which are critical to the State meeting its demand reduction goals. In particular, the EMP should stress the importance of regulatory support for these types of investments.
- The EMP should emphasize the critical importance of accurate price signals in promoting Demand Response (DR). In particular, the EMP should recognize that PJM's Reliability Pricing Model (RPM) has led to a dramatic increase in DR.

Energy Supply

- PSEG strongly supports the Draft EMP's renewable energy goals. PSEG believes the EMP's target for wind deployment should be even more aggressive. PSEG also believes the EMP should put greater emphasis on the importance of utility investment in reaching the state's renewable energy goals.
- The EMP should continue to recognize need for clean central station power and the important role nuclear power must play in New Jersey's energy future. The EMP should also recognize the risks associated with a decision to build a new nuclear plant, including regulatory and policy driven risks, and identify as an objective exploring a constructive role for the State in helping private industry mitigate these risks, while also sharing rewards with consumers.
- PSEG believes a more thorough cost-benefit analysis is needed to fully evaluate the impact of the State's Combined Heat and Power (CHP) goal. Specifically, PSEG has concerns about the cost of meeting this goal, and believes a cost cap should be included to protect consumers from excessive costs.
- There is ample evidence that the RPM, while in place for a relatively short period of time, has led to the retention of existing supply resources and a significant

- increase in new supply resources, in furtherance of the Draft EMP's environmental and supply goals. The EMP should cite these successes in order to provide an accurate assessment of how this market mechanism is working.
- PSEG supports the Board-approved BGS review process as a means for continuing to effectively evaluate the BGS process.

Transmission, Regional Planning and Reliability

- Transmission has an important role to play in ensuring that New Jersey has reliable and affordable access to electricity. The EMP should emphasize the need for the State to participate in the PJM planning process and at relevant Federal Energy Regulatory Commission (FERC) proceedings to ensure that New Jersey's energy policies are reflected accurately in these planning processes.
- The EMP should acknowledge the robust processes that are already in place to ensure electric reliability in order to add the proper context to concerns expressed in the EMP about future reliability. The EMP should also identify the significant economic and reliability benefits from being part of a regional transmission system.

Pricing and Consumer Impacts

- The EMP should place more stress on the importance of programs and policies to help households cope with higher electric prices caused by rising fuel costs. This should include improved outreach and enrollment for assistance programs, such as the Universal Service Fund program and LIHEAP, and expanding the Comfort Partners low-income weatherization program. The EMP should also stress the important role utilities can play in bringing energy efficiency benefits to low-and moderate-income households to help them cope with high energy costs.
- PSEG opposes an expanded inverted block tariff and believes it would lead to unjust treatment of households that have inelastic energy demands. The EMP should note these concerns about the potential negative impact on certain customers.

Green Workforce

- The EMP should stress the importance of specific programs, policies and partnerships to develop a green workforce that will enable the State to meet its energy goals. The EMP should also voice support for efforts to ensure that green jobs pay prevailing wages, which will help attract workers to the green energy industry.

Energy Policy Coordination and Planning

- PSEG supports efforts to better coordinate statewide energy policy across state government.

Modeling and Analysis

- PSEG has some concerns about the data and assumptions used in EMP modeling and recommends that the State revise its data and assumptions before finalizing the EMP.

1. ENERGY EFFICIENCY AND DEMAND RESPONSE

Most parties involved in the EMP discussions agree that unleashing the potential of energy efficiency must be the first step toward achieving the plan's energy and environmental goals. Efficiency and conservation are the least expensive and most accessible options available. McKinsey and Company in its 2007 report, "Reducing U.S. Greenhouse Gas Emissions: How Much and at What Cost," estimated that energy efficiency measures using technologies available now could achieve approximately 19-24% of U.S. carbon reductions necessary to protect the climate. New Jersey's energy users – residential consumers as well as businesses – have so far been reluctant to invest in efficiency. All EMP stakeholders seem to agree that it will take considerable intervention and an "all hands on deck" approach to change this dynamic in a way that will accomplish the EMP goal of a 20% reduction in projected energy consumption by 2020.

- **Utility Role in Energy Efficiency**

The EMP should place greater emphasis on the role utilities will need to play in helping the State achieve its aggressive demand reduction goals. The EMP should note that encouraging utility investment in energy efficiency and demand response will require regulatory certainty and cost recovery for utilities consistent with traditional utility investments.

Utilities have a unique ability to contribute toward meeting the State's energy efficiency goals, which include the following:

- Utilities can reach all customers, from residents of urban centers, low income customers, and renters, to large industrial and commercial customers.
- Utilities have brand recognition and engage in millions of customer contacts annually. Utility companies employ a dedicated, highly skilled union workforce that should be enlisted to promote energy efficiency. Utilities also can work in partnership with builders, developers, and trade allies that provide a variety of energy services.
- Utilities can deploy capital over the long-term that will help ensure that all ratepayers have the opportunity to participate in, and benefit from, efficiency programs.
- Utilities have a more accurate understanding of the actual risks and returns of efficiency investments and can overcome the high hurdle rate barriers that now are limiting customer participation in efficiency.

PSE&G is ready to take the first step in demonstrating the ability of utilities to deliver energy efficiency. We recently proposed a \$46 million carbon abatement investment plan to the BPU. The proposal includes: residential programs including home energy audits, programmable thermostats, insulation, lighting upgrades, and other energy saving measures; small business efficiency plans; programs for large commercial and industrial customers; and specific programs for making new and existing hospitals more efficient.

PSE&G's proposal represents a small fraction of what will be an enormous task. The State must take advantage of utilities' unique assets and encourage them to play a prominent role in delivering the energy efficiency services. This will require a new regulatory model that encourages utilities to invest in energy efficiency and renewable technologies in the same way they invest in pipes and wires, with the same opportunity for a reasonable return. It will also require a greater degree of regulatory certainty, so that utilities can develop and deploy efficiency programs in a timely manner. The recently enacted Regional Greenhouse Gas Initiative legislation and the Draft EMP correctly acknowledge the need for utility participation in order to achieve the Governor's aggressive goals. The EMP should continue to emphasize the importance of utility participation and the need to deploy efficiency across all customer classes, geographic areas, business sectors, and economic strata.

- **Smart Grids and Advanced Metering Infrastructure (AMI)**

The EMP should be more aggressive in pushing development and deployment of smart grid and AMI technologies, which are critical to the State meeting its demand reduction goals. In particular, the EMP should stress the importance of regulatory support for these types of investments.

A "Smart Grid" enabled by AMI's advanced communications, automated controls, and other real time information technologies will integrate a utility's electric distribution network into customers' homes and businesses. It will enable and enhance customer participation in energy efficiency and demand response. And these technologies will improve the reliability of the electric transmission and distribution system.

The implementation of AMI technologies will also be important to facilitate other energy-related transformations necessitated by climate change and the increasing costs of fossil fuels. For example, plug-in hybrid electric vehicles (PHEVs) hold great promise for dramatically reducing the expense and carbon emissions associated with

transportation. Off-peak pricing, facilitated by AMI, can help make charging PHEVs more economical for consumers, as they can charge their vehicles more affordably during off-peak hours. The ability to sell back PHEV power during times of peak use, also facilitated by AMI technology, can further improve the attractiveness of PHEVs.

Similarly, deployment of distributed generation (DG) resources, like residential solar panels, can be aided by AMI technologies. DG has many benefits, including reducing the strain on transmission and distribution systems, potentially improving reliability and reducing costs. AMI can make DG more attractive by facilitating off-peak pricing and net metering (the ability to sell energy from DG back into the grid).

PSE&G recently completed a pilot program called “myPower” to test the impact of advanced metering technologies. MyPower provided residential customers access to time-of-use rates with critical peak pricing plans and additional information on how to manage energy consumption. The results were promising. Over the last two summers customers made significant reductions -- 20% to 47% in usage during peak periods (1 p.m. to 6 p.m.). And by reacting to energy prices 87% of customers with in-home technology were able to save an average of more than \$100 annually.

As a next step, PSE&G has filed an AMI technology evaluation plan with the BPU designed to test and validate the capabilities of various AMI technologies. The results will help guide PSE&G in the final selection of a full-scale AMI solution. We would expect this trial to run from September of this year through September, 2009, and include a stakeholder process.

Building a smart grid will be a difficult challenge. The transmission and distribution system in New Jersey is owned and operated by different companies, each with unique business and regulatory considerations that drive their investments. As a result, companies may take different paths in creating smart networks. Building a smart grid will take many years as the system evolves and integrates the incremental deployment of these new technologies.

Therefore, regulatory support is critical if we are to transform our system to a smart grid. Current recovery of the costs of pilots and other investments will provide the certainty for utilities to develop the innovative projects and partnerships necessary to make these investments in order to meet the State's goals. PSEG believes that the EMP should be more aggressive in encouraging development and widespread deployment of smart grid and AMI technologies throughout the State, and in particular should stress the importance of regulatory support for these types of investments.

Finally, we also understand that deploying this technology is part of the transformation of our business that will also transform our workforce. Strong union partnerships are a priority for our company. PSE&G has communicated to union leadership and membership that AMI could make the role of meter reading and field collection redundant. We have also reiterated our commitment that all impacted employees who wish to remain with the company will have a place at PSEG. We are committed to keeping talented employees who can help us navigate this transformation.

- **Demand Response**

The EMP should emphasize the critical importance of accurate price signals in promoting Demand Response (DR). In particular, the EMP should recognize that PJM's Reliability Pricing Model has led to a dramatic increase in DR.

Demand Response – a systematic reduction or shift of energy use at peak usage times – is another important alternative to increasing peak energy supplies. PSEG has been actively seeking ways to enhance the potential of this resource and to improve the business rules so that measurable and verifiable DR has full and equal access to PJM wholesale energy, capacity, and reserve markets. PSEG also is working with the BPU to ensure that New Jersey's potential for economic DR is fully realized.

The EMP should emphasize the critical importance of accurate price signals in promoting DR. In particular, the EMP should recognize the recent significant increase in DR that has occurred recently in response to the PJM's RPM. The amount of DR bidding into the RPM capacity market has increased and the amount of emergency load management available to PJM has doubled to almost 4,500 megawatts (MW) in 2008.

2. ENERGY SUPPLY

PSEG strongly supports the Draft EMP's focus on aggressively increasing the deployment of renewable energy. The attainment of the EMP's efficiency and renewable goals will still leave the majority of New Jersey's energy needs to be supplied by traditional sources. Therefore, the EMP correctly recognizes that meeting New Jersey's energy needs, while also combating climate change, will require a greater emphasis on carbon-free central station power. Nuclear energy is currently the only commercially available source of carbon-free central station (baseload) power. The state can promote much-needed investment in nuclear energy by helping private industry mitigate the risks associated with new nuclear development. Continuation of the RPM pricing capacity system is also critical for ensuring development and retention of electric supply.

- **Renewable Energy**

PSEG strongly supports the Draft EMP's renewable energy goals. PSEG believes the EMP's target for wind deployment should be even more aggressive. PSEG also believes the EMP should put greater emphasis on the importance of utility investment in reaching the state's renewable energy goals.

PSEG strongly supports the State's aggressive renewable energy goals as a way to mitigate climate change and further diversify New Jersey's energy portfolio. PSEG believes meeting these goals will require investment by both unregulated generation companies and regulated utilities.

Utilities can promote development of renewable energy technologies that are not price competitive in ways that will help lower the cost impact for customers. This already is being demonstrated by PSE&G's \$105 million program to help finance solar installations at homes, businesses, and government facilities in New Jersey. PSE&G loans are structured in a way that helps reduce the price uncertainty of solar projects, which incents solar development and helps aid the transition of solar energy to a competitive force in the generation market. The program is designed to support 30 MW of solar generating capacity, which is approximately 50% of the solar Renewable Portfolio Standard in PSE&G service territory for 2009 and 2010. This is enough power to supply 24,000 homes and the associated emissions reductions are the equivalent of taking 3,700 cars off of the road.

The program, which was approved by the BPU in April, has already been a resounding success for non-residential customers. As of June 30, 2008 applications totaling 10.9 MW have been received for projects in Hoboken, South Plainfield, Bordentown, Bayonne, Woodbridge, Hamilton, Carlstadt, Secaucus, and Paterson. These applications represent 48% of the 24 MW available to non-residential customers. The 12 MW market segment cap for commercial and industrial customers is almost fully subscribed. To date, \$16 million of project loans have been approved and construction is under way on 4.3 MW of new solar power.

On July 17, 2008, after obtaining agreement from a collaborative stakeholder group, PSE&G began offering this innovative program to residential customers. The program, the first of its kind in the country, will help homeowners install solar energy systems on their homes, enabling them to take an active part in greening their homes and reducing greenhouse gases.

PSEG believes that wind power offers even greater potential for New Jersey, especially in the short term. PSEG also is exploring potential investments in wind energy on a non-utility basis. A subsidiary, PSEG Renewable Generation, in conjunction with Winergy Power Holdings, recently submitted a joint bid to build a 350 MW wind farm off the

coast of South Jersey. We are competing to develop this project under a pilot program being administered by the New Jersey Office of Clean Energy. The initial review process and project development could yield important lessons on how government and private enterprise can site, develop, and move these projects into operation. We believe the benefits of offshore wind energy will become readily apparent as this initial pilot program moves forward. Given the vast potential of wind energy, the EMP goal for wind deployment should be increased, and the Office of Clean Energy and the BPU should consider funding more than just one proposed project.

- **Clean Central Station Power**

The EMP should continue to recognize the need for clean central station power and the important role nuclear power must play in New Jersey's energy future. The EMP should also recognize the risks associated with a decision to build a new nuclear plant, including regulatory and policy driven risks, and identify as an objective exploring a constructive role for the State in helping private industry mitigate risks, while also sharing rewards with consumers.

The Draft EMP acknowledges that New Jersey will need additional sources of clean, low- and zero-carbon central station power. New fossil fuel technologies that can capture and sequester carbon emissions are still in the research and development phase and will not be commercially available for a considerable period. Nuclear generation will be a critical contributor in meeting the State's need for carbon-free power. Most leading institutions focused on climate change have indicated that nuclear power must be part of the solution. For these reasons, the draft plan reaches the correct conclusion that nuclear power must be an essential element of New Jersey's energy future.

This realization is reflected elsewhere in the U.S. Seventeen energy companies and consortia are working on proposals to build more than 30 nuclear plants across the country and the Nuclear Regulatory Commission has begun reviewing the first submittals of new licensing and plant construction applications. PSEG is seriously evaluating, but

has not reached a decision, whether to develop additional nuclear capacity at its Artificial Island site in Salem County.

The Draft EMP recognizes the need to explore the feasibility of additional nuclear power. The final plan also should recognize the risks associated with a decision to build a new nuclear plant, including regulatory and policy driven risks, and identify as an objective exploring a constructive role for the State in helping private industry mitigate risks, while also sharing rewards with consumers.

- **Combined Heat and Power (CHP)**

PSEG believes a more thorough cost-benefit analysis is needed to fully evaluate the impact of the State's CHP goal. Specifically, PSEG has concerns about the cost of meeting this goal, and believes a cost cap should be included to protect consumers from excessive costs.

The Draft EMP sets an aggressive target for deployment of CHP. While there are efficiency benefits to be gained from CHP, this must be weighed against the cost to consumers. Given recent trends in the price of natural gas, the primary fuel for CHP, it is possible that 1,500 MW of CHP could be very costly to consumers. Recent high natural gas prices suggest that even with capital cost incentives and subsidies the operating costs for CHP could be very expensive.

PSEG recommends that the state complete a more thorough cost-benefit analysis of this proposal. In addition, the EMP should propose a cost cap for CHP deployment, much like the cost cap for solar energy that limits the total economic burden to consumers to 2%.

Finally, utility investment in CHP should be explored and PSE&G expects to gain valuable input and experience from the CHP component in its Carbon Abatement proposal which provides incentives from \$450/kw to \$600/kw of installed cost in targeted

segments based on system efficiency and installation in areas with substation congestion. However, PSEG opposes mandated utility long-term contracts for CHP, as such contracts can be very costly to ratepayers.

- **Incenting capacity: Reliability Pricing Model**

There is ample evidence that the Reliability Pricing Model (RPM), while in place for a relatively short period of time, has led to the retention of existing supply resources and a significant increase in new supply resources, in furtherance of the Draft EMP's environmental and supply goals. The EMP should cite these successes in order to provide an accurate assessment of how this market mechanism is working.

The RPM has had positive impacts on the PJM market that are not described in the Draft EMP. These have been recently catalogued in a report prepared by the Brattle Group commissioned by PJM and filed at FERC on June 30, 2008. Highlights include the following benefits to PJM and New Jersey:

- Incremental commitments that amount to over 14,500 MW of resources that likely would not have been available in the absence of RPM including:
 - 4,248 MW of generation additions of various types, including 3,069 MW of new gas, coal, and renewable generation committed through RPM auctions and 599 MW of reactivated generating units that were previously retired;
 - Over 2,900 MW of uprates to existing generating capacity, which exceed derates by more than 1,260 MW;
 - Close to 1,800 MW of demand response (“DR”) in addition to approximately 1,400 MW of interruptible load for reliability (“ILR”) resources;

- Decreases in net exports of almost 2,200 MW (not counting almost 3,200 MW of committed imports from generating units in the Duquesne service area);
- Withdrawn requests to deactivate 1,170 MW of existing resources and an additional 3,500 MW of planned retirements that were cancelled or deferred due to RPM;
- Assistance in retaining over 20,000 MW of other existing resources that “likely would not be financially viable in the absence of capacity payments.”

Reliability has also improved under RPM:

- On a PJM RTO-wide basis, committed capacity consistently exceeds target reliability levels by at least one percent in each year through the 2011/12 delivery year.
- Capacity margins have markedly improved within Locational Delivery Areas. The increase in generation, demand response, and transmission capacity committed to serve Eastern MAAC (which includes New Jersey) and Southwestern MAAC locational delivery areas has integrated these regions into the RTO-wide capacity market and improved reserve margins within these regions from levels that were one percent to two percent *below* target to RTO-wide levels of one percent to two percent above target reliability levels.

Prospects for necessary future capacity resources additions are promising:

- Market participants competed with an additional 6,000 MW of resources that did not clear in the recent auction for the 2011/12 delivery year. This substantial amount of uncleared capacity included approximately 500 MW of uncleared new generating units, almost 300 MW of uncleared DR resources, and 670 MW of uncleared import offers.

- RPM has stimulated the development of significant levels of potential new resources, including approximately 33,000 MW of effective capacity from new generation projects in PJM's interconnection queue that are already eligible to offer into future RPM auctions. The vast majority of these proposed generation projects did not exist before 2006, the year in which RPM was approved and finalized.

The Brattle Group reports concludes:

The impacts RPM has had on new and existing resources show that capacity price signals are important for facilitating the most cost-effective entry, investment, and retirement decisions. RPM capacity prices have also been important for stimulating demand-side investments that can effectively compete with supply-side resources.

Further, PSEG is one of the companies contributing to these impressive results. RPM has already had a direct and very sizable impact on PSEG Power's own capital expenditures for generation and deferred retirements:

- Approximately \$1 billion in environmental investments for the Hudson Station that PSEG Power would likely not have made if RPM had not been in place. The Hudson Station is located in an electrically constrained area of northern New Jersey.
- Planned investments to a large portion of PSEG Power's peaking fleet to meet more stringent emission requirements taking effect in the future that otherwise might not have been made.
- PSEG Power placed new entry bids for more than 300 MWs into the RPM auction and has significant additional potential projects in the PJM interconnection queue.
- Planned retirement of Sewaren Station in September 2008 withdrawn based on RPM revenue stream; Sewaren units are currently committed through 2011/2012 delivery year.

These facts are necessary to provide an accurate picture of the impact of the RPM, to evaluate its effectiveness of incenting generation to be built and to consider the effect of demand reduction.

- **Competitive Supply: BGS**

PSEG supports the Board-approved BGS review process as a means for continuing to effectively evaluate the BGS process.

The Draft EMP suggests conducting a review of the BGS procurement process before the 2009 BGS auction. The BGS auction has been very successful in mitigating volatility in retail electric rates caused by significant increases in fuel costs. Each year the BPU conducts a comprehensive review of the electric procurement process and invites comments and alternative proposals from interested parties. Parties filed initial comments and proposals in this process on July 1, 2008. In its June 19, 2008 BGS procedural order the Board states that: “The process adopted by the Board to determine how to procure BGS for the past several years has provided an opportunity for participation by all interested parties through both written comments and at public hearings which resulted in a wide range of BGS suggestions, a timely Board decision and, ultimately a successful procurement process. Accordingly, consistent with the Draft EMP, the Board intends to initiate a proceeding to determine what type of process should be used to procure BGS-FP and BGS-CIEP Service for the Period beginning June 1, 2009, similar to the process that has been employed for the past seven years, including an invitation for all parties to propose how to procure BGS supply, the ability for all parties to issue discovery, provide comments to the Board, and provide oral testimony at both legislative and public hearings where the Board encourages expert testimony. The proposed schedule anticipates a Board decision on the process in November 2008, and a BGS procurement process February 2009.”

PSEG supports this Board approved review process.

3. TRANSMISSION, REGIONAL PLANNING AND RELIABILITY

- **Transmission**

Transmission has an important role to play in ensuring that New Jersey has reliable and affordable access to electricity. The EMP should emphasize the need for the State to participate in the PJM planning process and at relevant Federal Energy Regulatory Commission (FERC) proceedings to ensure that New Jersey’s energy policies are reflected accurately in these planning processes.

The Draft EMP properly recognizes that transmission must play a significant role in New Jersey’s energy future. Transmission is an essential element in ensuring reliable and reasonably priced supply. New Jersey is part of a regional transmission grid and receives significant benefits from that grid both in terms of reliability and economics.

The Draft EMP is correct that if we continue the current course, an increasing amount of transmission will be built to maintain reliability and increase west to east transfer capability. This also could facilitate moving additional supplies of lower cost power to congested areas.

Transmission planning for the region focuses on meeting reliability criteria and reducing congestion. Both are accomplished by increasing import capability and by having generation available in the right locations regionally.

PJM’s transmission planning focuses on the transmission system capabilities, existing and planned generation, and forecasts of demand and supply. New Jersey can make a considerable difference in how transmission planning impacts New Jersey’s energy policy by continuing to work to influence the PJM planning process and its outcomes in several respects. New Jersey can engage in PJM Stakeholder and Federal Energy Regulatory Commission (FERC) processes. Transmission planning is dynamic and

continuously evaluates new information including generation construction and verifiable and measurable demand reduction. As new generation and demand response are committed into the capacity market, those new forecasts are reflected in the transmission planning process. This coordination between capacity and transmission is new and continues to need adjustment. New Jersey can play an important role in working through the process to ensure that PJM is utilizing accurate and reliable information.

- **Reliability and the Importance of a Regional Market**

The EMP should acknowledge the robust processes that are already in place to ensure electric reliability in order to add the proper context to concerns expressed in the EMP about future reliability. The EMP should also identify the significant economic and reliability benefits from being part of a regional transmission system.

The reliability of PSEG's electric service is the result of our operational excellence and considerable investment in our system, as well as effective regional and national reliability regimes.

The federal government in 2007 implemented a mandatory reliability regime under the auspices of the North American Electric Reliability Corporation (NERC) and FERC with regular audits and significant penalties to ensure compliance. It was devised in response to the August 2003 blackout, which the Draft EMP notes has been estimated to have caused economic damage of between \$4 billion and \$10 billion.

The 2003 blackout taught the industry that electric reliability can suffer even when there are sufficient generation and transmission resources. The 2003 blackout emphasized the importance of ensuring that generation capacity and transmission and distribution facilities are properly planned, operated and maintained.

The new mandatory reliability regime applies to over 1,000 users, owners and operators of the bulk electricity system -- from load serving entities, power generators, system

operators such as PJM, to transmissions owners and municipal utilities. The standards are exhaustive, covering such things as emergency operations, cyber security, reporting of grid disturbances, and even clearing of vegetation.

New Jersey's reliability is further bolstered by PJM, the regional transmission organization that plans and operates the transmission grid and the dispatch of power in 13 states. In addition to managing the flow of electricity for the greatest economic efficiency, PJM ensures that an adequate supply of electricity is generated to meet demand at any given hour, and that a reserve capacity is arranged as a safeguard. It also has the power to order transmission owners to build or repair transmissions lines to ensure reliability.

Being part of the larger PJM system yields significant benefits to New Jersey. If the State were not part of this regional system, it would need at least 4,000 MW of new generating capacity to satisfy the load requirement and its reserve requirement would need to increase substantially beyond these 4,000 MWs to meet reliability requirements.

PJM will also play a key role as the region adds more renewable resources like wind and solar generation. These power sources present new challenges to reliability because they are intermittent and also because they are often clustered together and are dependent on a common transmission line.

4. PRICING AND CONSUMER IMPACTS

New Jersey's effort to reshape its energy sector comes as sharp increases in fuel prices are driving up electricity rates across the nation. That creates an added challenge for policymakers. Measures are needed to ensure that price impacts on customers, particularly low-income households, are mitigated.

- **Mitigating price impacts**

The EMP should place more stress on the importance of programs and policies to help households cope with higher electric prices caused by rising fuel costs. This should include improved outreach and enrollment for assistance programs, such as the Universal Service Fund program and LIHEAP, and expanding the Comfort Partners low-income weatherization program. The EMP should also stress the important role utilities can play in bringing energy efficiency benefits to low- and moderate-income households to help them cope with high energy costs.

The EMP should stress the importance of increasing enrollment in low-income assistance programs such as LIHEAP and the Universal Service Fund (USF) program. The State should also press federal lawmakers to provide more money for LIHEAP to answer the growing demand for help.

The longer term solution for reducing bills is to increase energy efficiency. Therefore, it is crucial that the State expand the Comfort Partners program, and ensure universal access to the array of efficiency and renewable incentive programs.

Utilities can play a particularly effective role in accessing underserved markets and bringing the benefits of the green economy to low- and moderate-income households. As described above, PSE&G recently filed a \$46 million energy efficiency program with the BPU that embodies this approach. If the Board agrees, our work crews will team up with neighborhood groups in Trenton and Newark to identify families who need help. We will go into those homes to plug leaks, add insulation, and offer tips on ways to save energy. And we will aim our efforts at working families who are caught in the middle – they earn too much to qualify for programs like Comfort Partners, but not enough to handle their energy bills. Our programs offers help to hospitals and small businesses as well.

The EMP should underscore the importance of enlisting utilities like PSE&G as partners in the effort to conserve. We have the skilled workforce to get the job done, and trusting relationships with millions of customers, which should be utilized in this effort.

- **Inverted Block Tariff**

PSEG opposes an expanded inverted block tariff and believes it would lead to unjust treatment of households that have inelastic energy demands. The EMP should note these concerns about the potential negative impact on certain customers.

PSEG believes there is no clear cut-off above which energy usage can be deemed as “excessive” and thus worthy of a higher rate. There are many reasons why one household uses more electricity than another, including family size, age of family members, and types of electric appliances. Some households may have already invested in energy efficiently but would still be penalized by an “Inverted Tariff” simply because of their overall usage. In addition, an “Inverted Tariff” may not have any direct or appreciable impact on peak demand since it does not measure when energy is used.

Time of Use (TOU) and Critical Peak Pricing (CPP) rate designs have been demonstrated as more effective methods in reducing peak demand for residential customers. To be fully effective, these rates need to be implemented with the smart meter technology discussed above.

5. GREEN WORKFORCE

The EMP should stress the importance of specific programs, policies and partnerships to develop a green workforce that will enable the State to meet its energy goals. The EMP should also voice support for efforts to ensure that green jobs pay prevailing wages, which will help attract workers to the green energy industry.

PSEG has written a policy paper on this topic entitled “Developing New Jersey’s Green Energy Workforce” (attached). This paper outlines strategies for green workforce development and details initiatives PSEG is already pursuing to develop a green workforce, including:

- Expanding PSEG’s energy utility technology degree program, which is offered at four community colleges throughout New Jersey, to prepare students for the green energy industry.
- Partnering with Essex County Vocational Schools to create a green energy academy at Bloomfield Tech.
- Partnering with the cities of Newark and Trenton to promote green economic development and job creation.
- Supporting the State’s efforts to create a green jobs training facility.
- Joining with educational institutions, such as Rutgers, to develop model green curricula for New Jersey.

PSEG is committed to utilizing its highly skilled, unionized workforce to deliver energy efficiency and renewable energy to its customers. And PSEG believes that green jobs must pay good wages so that they are attractive career options. As such, PSEG supports efforts to require that public investments in energy efficiency and renewable energy pay prevailing wages, which are the average local wages paid for similar jobs under collective bargaining agreements.

PSEG looks forward to continuing to work with the State on policies to develop New Jersey’s green workforce.

6. ENERGY POLICY COORDINATION AND PLANNING

PSEG supports efforts to better coordinate statewide energy policy across state government.

PSEG agrees the State should improve oversight and coordination of energy policy. As currently structured, responsibility for energy policy resides among many different agencies, making policy coordination a challenge. Coordinating the siting, financing and permitting of new generation; monitoring the energy supply and demand balance; and

helping develop energy efficiency and renewable energy programs can likely be accomplished with increased cooperation among state agencies and by providing the regulatory certainty that New Jersey businesses need. PSEG believes the creation of a State Energy Council comprised of relevant cabinet members has the potential to improve coordination of the activities of various state agencies around one coherent energy policy aimed at meeting the goals laid out in the Energy Master Plan.

In contrast, a state power authority would require legislative approval and substantial up-front funding that would further strain state finances. A power authority also would place additional financial risk on the state and could also undermine significant private investment in new generating capacity, demand response, and the life extension of older plant capacity.

7. MODELING AND ANALYSIS

PSEG has some concerns about the data and assumptions used in the EMP modeling and recommends that the State revise its data and assumptions before finalizing the EMP.

A major public policy initiative like the EMP should be supported by sound economic modeling and analysis. The Modeling report provided with the Draft EMP provides a good overview of the kind of analysis that will be required. PSEG, however, has a number of concerns about the economic models being used to develop this analysis and some of the assumptions and data inputs associated with them. We have discussed these issues with staff at the Bloustein School of Planning and Public Policy at Rutgers University, and we appreciate their willingness to consider updating and revising model data and assumptions.

PSEG also has concerns about several of the assumptions which drive the R/ECON analysis. For example, oil price inputs in the model are very low; oil starts at \$66/bbl (2006) and is projected to drop to under \$57/bbl by 2015. Natural gas prices are projected

to increase more rapidly. As a result, residential and industrial oil consumption is projected to increase while natural gas use declines. The model also does not reflect the significant increases in coal prices over the last two years.

PSEG also urges caution in relying on the DAYZER wholesale energy market modeling results. As presented in the Draft EMP, model results predict a 25% reduction in PJM Locational Marginal Prices (LMP). We believe this outcome may stem from very low fossil fuel prices, an assumed lack of supply-side response, inclusion of uneconomic levels of additional non-traditional supply as well as the Draft EMP's aggressive CHP goals.

PSEG also recommends careful review of some of the historical aspects of electric generation supply and projections of future electric demand referenced in the Draft EMP. The discussion of historical supply, for example, is based on a short time frame that depicts insufficient generation supply growth. Electric generation supply, in fact, has grown by more than 4,000 MW since the New Jersey's electricity markets were restructured in 1999.



Addressing New Jersey's Climate & Energy Challenges

Summer 2007

 **Printed on recycled paper**

**PUBLIC SERVICE ENTERPRISE GROUP (PSEG):
ADDRESSING NEW JERSEY'S CLIMATE
AND ENERGY CHALLENGES**

Executive Summary

Climate change is the most important environmental challenge of our time, with far-ranging implications for New Jersey, the nation and the world. Climate change is a real phenomenon and must be addressed now. This global environmental and political issue will define the future of the energy industry and reshape energy supply and energy use. PSEG, New Jersey's leading energy company, is tackling this issue aggressively.

There is no simple or short-term solution to address global climate change. Immediate action on a multi-pronged approach is required. There are three critical strategies that New Jersey's energy industry must employ to help meet this challenge:

- Conservation through energy efficiency improvements.
- Development of renewable energy resources.
- Clean, zero- and low-carbon central station electric generating capacity.

Conservation

Initiatives to conserve energy can have a measurable and immediate impact on reducing both CO₂ emissions and customers' energy bills. In the near term, conservation has an unmatched potential to address climate change through high-impact, low-cost investments. PSEG is prepared to make significant investments to reduce electric and natural gas demand over the next five years. Investments in conservation and efficiency must be treated by both providers and policymakers as investments in critical sources of energy.

Renewables

Renewable energy supply must be part of the climate change solution. The state faces particular challenges in developing solar and wind resources because of geographic and weather-related limitations in New Jersey¹ and because solar generation and wind-powered electric generation are intermittent energy sources. As a result, the cost of such generation is much greater than conservation measures and central station supply. Financial incentives are needed to spur research, development and deployment of these resources.

Central Station Power Generation

New, zero- and low-carbon power plants will be required to meet energy demand and assure the reliability of the electric system. Coal-fired electric generation technologies are being researched and developed to improve the efficiency of the combustion process and to capture and store carbon, but this technology is not well-suited for New Jersey's geology. New Jersey will need to invest in expanding nuclear power, which is the most economic source of carbon-free electricity supply under current market conditions. Because new nuclear power will take at least ten years to come online, new nuclear generation options need to be investigated now and will require state and federal support to address regulatory and siting risks involved in the process.

The Challenge Ahead

Governor Corzine and his Administration have provided strong leadership in seeking greenhouse gas (GHG) reductions through the Energy Master Plan (EMP), Executive Order 54, and through participation in the Regional Greenhouse Gas Initiative (RGGI). All of the strategies referenced above – conservation, renewable resources, and low- and zero-carbon central station power generation – will be required to meet the state's objectives. Regional and state-specific CO₂ reduction policies can serve an important role as catalysts for private action and federal policy, but they must be crafted to maximize the intended environmental benefit and to minimize the economic burden on New Jersey consumers and energy providers.

To make progress in combating climate change, action cannot be focused solely on the energy sector. Transportation is New Jersey's largest source of CO₂ emissions from human activity, estimated to account for 50 percent of emissions,² and must be included in a CO₂ reduction strategy. In comparison, electric power accounts for approximately 14% of CO₂ emissions in New Jersey. Policymakers should encourage greater use of hybrid electric vehicles, and as the technology matures, promote the deployment of plug-in electric hybrid vehicles (PHEVs).

PSEG will apply its expertise and capital in new ways to reduce energy demand, spur investment in renewable resources and develop new sources of carbon-free supply. This transformation of the energy business requires heightened collaboration with state and federal policymakers. Innovative legislation, regulations and funding mechanisms will be necessary to establish markets for new technologies, spur investment and create employment opportunities. PSEG will do its part as a leader in the energy industry and responsible corporate citizen, working closely with other stakeholders to tackle the most important environmental challenge of our time.

PUBLIC SERVICE ENTERPRISE GROUP (PSEG):

ADDRESSING NEW JERSEY'S CLIMATE

AND ENERGY CHALLENGES

Understanding the Challenge

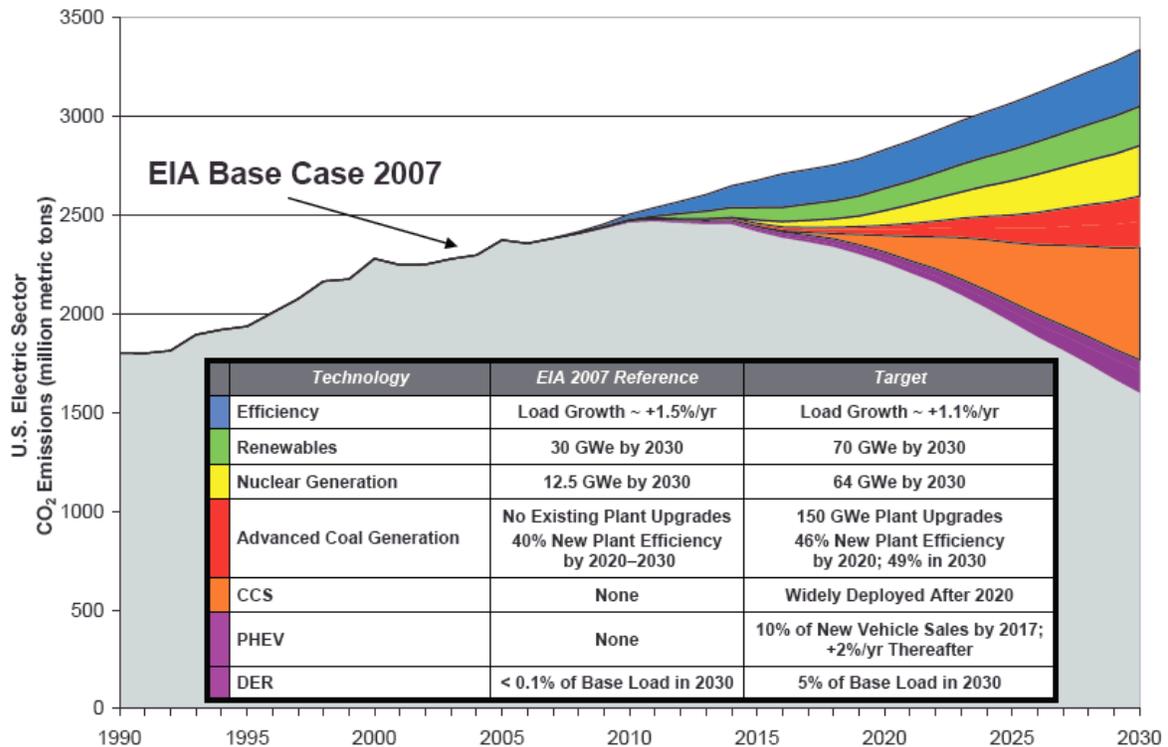
Governor Corzine's GHG reduction objectives require significant contributions from all sectors of the economy in New Jersey. In Executive Order No. 54, Governor Corzine established goals to reduce GHG emissions to 1990 levels by 2020, which will require a 20 percent reduction equal to approximately 46 million tons annually of CO₂. The Executive Order further requires an 80% emissions reduction below 2006 levels by 2050. The passage of the Global Warming Response Act of 2007 supports the implementation of key elements of the Executive Order.

Key to achieving these objectives is the development of the new Energy Master Plan (EMP). In announcing the plan, the Governor set additional and related goals of reducing electric consumption in the state 20% by 2020 and meeting 20% of the electric energy supply requirements through renewable resources by 2020. Approximately 1,200 megawatts of the renewable energy target are expected to come from in-state solar photovoltaic (PV) installations.³

The Electric Power Research Institute (EPRI) has identified a range of potential solutions available to the electric power sector for reducing national GHG emissions.⁴ EPRI has estimated the potential technical feasibility of solutions -- including efficiency, renewables, nuclear generation, advanced coal generation, carbon capture and storage, and other new technologies -- in contributing to carbon reduction targets over the next few decades. A few of these technologies, notably carbon capture and storage, hold very little technical promise in New Jersey due to geological constraints and, therefore, the other solutions will need to be developed and relied upon more significantly in our state.

As illustrated below, the EPRI analysis indicates that energy efficiency and renewable initiatives alone will not be sufficient to yield the aggressive carbon reductions needed by society and sought by Governor Corzine. New Jersey will need to employ a combined approach of conservation/energy efficiency, renewable energy, and zero- and low-carbon central station power, along with significant reductions in the transportation sector in order to achieve substantial reductions in emissions.⁵

EPRI Assessment of United States Greenhouse Gas Reduction Opportunities in the Electric Power Sector



EPRI’s findings are consistent with the "New Jersey Energy Efficiency and Distributed Generation Market Assessment" final report submitted to Rutgers University Center for Energy, Economic and Environmental Policy by Kema, Inc.⁶ The Kema study found that among the potential sources of electric demand reductions from the 2020 “business as usual” electricity usage, 17% of such sources are technically possible; 11% are achievable with considerably more funding; and 5% are likely achievable based on the performance of current programs. Consequently, creative and aggressive initiatives are necessary to change the trajectory of carbon emissions in New Jersey.

Just as different policy solutions offer different levels of technical feasibility, the costs of the solutions vary significantly. Not all carbon abatement programs have similar costs. McKinsey & Company recently completed a study of the GHG abatement opportunities in North America and identified a range of options, beginning at relatively low-cost options, such as energy efficiency and vehicle fuel efficiency, and then moving higher in cost to nuclear and hydroelectric power, and then to higher cost options such as wind, solar, and carbon capture and storage technologies.⁷

Energy costs to consumers will likely increase as a result of transforming the energy supply mix in New Jersey to rely more on zero- and low-carbon sources, including renewable supply alternatives. Such costs will reflect the societal benefits of reducing carbon emissions and building a more sustainable energy and economic future.

PSEG: Catalyst For Change

PSEG is ready to make investments that can be catalysts for low-carbon and carbon-free supply technologies. However, given the technical and cost challenges of realigning the power mix in New Jersey to achieve a much lower-carbon footprint, PSEG must realize a fair return on these investments. PSEG's public utility subsidiary, PSE&G, has the ability to invest capital on a long-term basis if it is allowed a reasonable regulated return. Regulated utilities have historically been efficient vehicles for capital deployment in pursuit of initiatives yielding broad societal benefits.

PSEG proposes a three-pronged strategy for reducing high-carbon reliance in New Jersey's energy sector: Conservation, Renewables and Clean Central Station Power Plants.

Conservation: Reducing Energy Demand

Conservation through energy efficiency is an available near-term strategy to reduce GHG emissions. Conservation is low-hanging fruit that state leaders and the energy sector should move quickly to harvest. Improving the efficiency of household appliances and business equipment will reduce emissions directly. Electric utilities can play an important role in financing and facilitating investments in energy-efficient equipment for customers. Market imperfections undermine investment in economically prudent energy conservation. Customers associate risks with these kinds of investments that are higher than the technologies warrant. Many customers do not fully account for future savings from conservation. For example, most customers purchase short-lasting incandescent light bulbs, when high-efficiency light bulbs would be cheaper in the long run, and much less harmful to the environment.

According to McKinsey & Company, nearly 25% of the global reduction needed in CO₂ is already economical,⁸ so there is both technical and economic opportunity to achieve significant carbon reductions by channeling capital into efficiency investments. Electric utilities are uniquely positioned to invest in technologies, such as advanced metering infrastructure, that enable and empower customers to use electricity more efficiently and increase conservation on a large scale.

PSEG has reviewed studies by energy efficiency experts, including those retained by the New Jersey Board of Public Utilities (BPU), and estimates that approximately 50% of the Governor's energy efficiency goal can be achieved by leveraging utilities as a source of "patient capital" to support conservation investments. Later this year, PSE&G expects to

propose specific demand side management (DSM) initiatives that, with timely approval by state regulators, can be implemented in the near future.

Renewables: Creating New Sources of Energy Supply

Renewable energy is the second prong in the strategy to achieve carbon emissions reductions. PSE&G proposed in April 2007 to invest \$100 million in a solar energy initiative that could satisfy a part of New Jersey's solar energy requirements for 2009 and 2010 and serve as a catalyst for additional investment in solar resources.⁹ If approved by the Board of Public Utilities, PSE&G will provide \$100 million in financing to solar developers to install solar photovoltaic (PV) panels on homes and businesses and municipal facilities throughout PSE&G's service territory. This initiative will fund 30 megawatts of solar energy capacity, which is half of the state's solar PV target for 2009 and 2010. This source of stable, secure capital is expected to spur additional investment in the state's solar industry. If successful, this program may be expanded to support additional solar development.

While an important part of the state's energy strategy, renewable energy cannot be the sole long-term energy supply solution. Based upon renewable energy potential estimates from the National Renewable Laboratory, wind- and solar-energy will be insufficient to meet a significant portion of the state's future energy needs.¹⁰

The potential for wind and solar energy is constrained by weather conditions and land availability in New Jersey. Intermittent generation availability ranges from 12% for solar systems in New Jersey¹¹ and approximately 30% for wind.¹² On-shore wind energy requires large amounts of land to host wind turbines. It is estimated that 12,820 wind turbines would be necessary to replace the electric power output of all of New Jersey's nuclear power plants.¹³ This would require placing wind turbines tip to tip from Boston to Washington, DC. Offshore locations and a small region in the Northwest corner of the state may be technically suitable for wind energy but the development potential may be limited by siting challenges.

Solar energy holds greater promise than wind energy in New Jersey, particularly since peak summer load clearly coincides with electricity generated by solar systems. However, the economics of solar energy require participation from both the public and private sectors, with significant financial incentives through regulated incentive rates of return, customer rebates and federal investment tax credits. PSE&G's solar proposal employs an innovative program design that maximizes ratepayer benefits by both fully capturing available tax incentives for non-utility solar investors and leveraging the long-term support that a utility can bring to the table.

Clean Central Station Power Plants: Ensuring Reliability

The third part of the carbon reduction strategy must be the continuing reduction of emissions produced by existing electric generating units and the development of zero- or low-carbon power plants to meet future demand. In addition to conservation and renewable resources, central station power plants will be necessary to meet the energy demands of New Jersey's economy. Environmental and reliability objectives must be pursued in tandem to ensure that the public is served by safe, reliable, affordable, and environmentally sustainable energy supplies.

PSEG has invested more than \$3 billion since 1990 to replace inefficient, older generating units and upgrade existing facilities. Had these efficiency improvements not been made, PSEG's annual CO₂ emissions would be approximately 845,000 tons higher than they are today.¹⁴

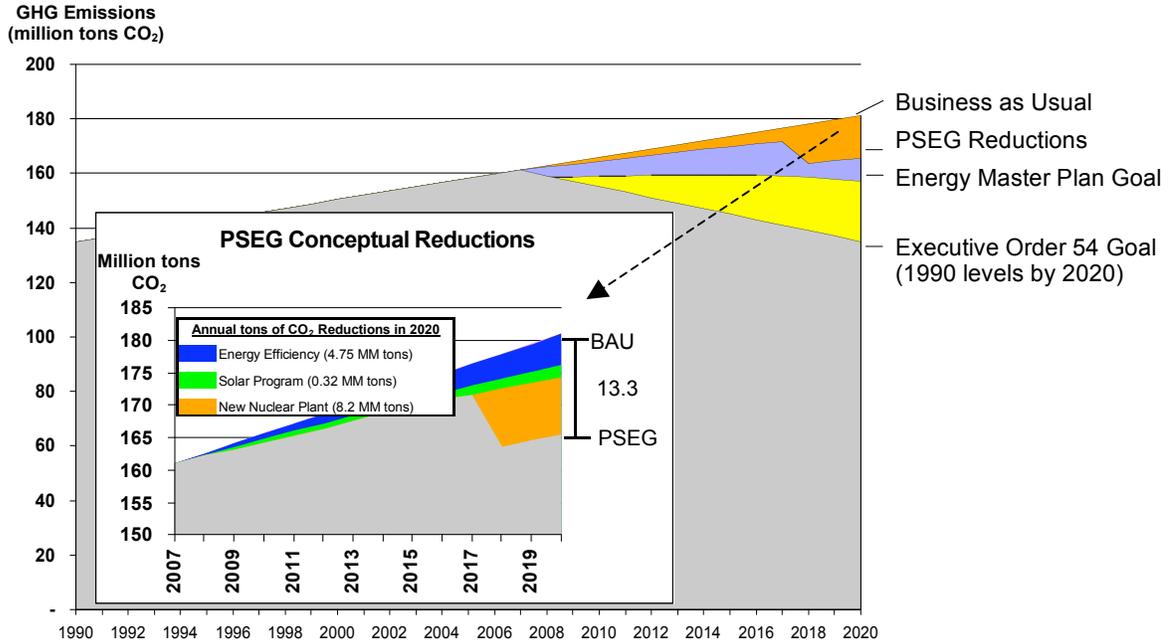
Advanced fossil fuel generating technologies with the potential to reduce or eliminate carbon emissions are still in the research and development stages. The most promising option may be technology that captures CO₂ from the coal-combustion process and then stores it for thousands of years. There are three primary areas of R&D underway: 1) developing technologies to capture CO₂ at a reasonable cost; 2) demonstrating that large-scale, long-term, safe CO₂ storage works; and, 3) demonstrating that Integrated Gasification Combined Cycle (IGCC) plants can operate at a commercially viable large scale. Most of the current research relative to carbon storage is focused on injecting CO₂ into deep underground geologic formations suitable for long-term storage. Unfortunately, New Jersey lacks the preferred geologic formations within or near state boundaries to support such storage in any meaningful way.

Nuclear power currently is the source of 50 percent of the electricity generated in New Jersey. Given the demand for electricity and the higher cost and uncertainty associated with other forms of low-carbon or carbon-free energy, nuclear power must remain a significant part of the energy mix. Nuclear power has its challenges, which must be resolved, including issues associated with spent fuel storage and an exceptionally long licensing and construction timeframe. PSEG believes that in a carbon-constrained future, nuclear power must continue to play an important role in meeting New Jersey's energy needs and supporting electric system reliability while reducing GHG emissions.

Because a new nuclear plant will take at least ten years to come online, PSEG believes active planning must begin now to prepare for the regulatory review process. PSEG is exploring the feasibility of an additional nuclear plant at its existing nuclear power installation at Artificial Island (Lower Alloways Creek, Salem County) in southern New Jersey. It is estimated that an additional nuclear plant could avoid the production of over 8 million tons of CO₂ emissions per year (a statewide reduction of over 17%) by replacing fossil-fueled energy sources, including out-of-state, coal-based electricity.

By implementing this three-pronged approach, PSEG can make substantial contributions towards carbon reduction in New Jersey. The chart below demonstrates the initiatives being considered by PSEG to support the New Jersey EMP and the Executive Order 54 targets. With regulatory support, PSEG can make additional contributions towards renewable energy and energy efficiency.

NJ Greenhouse Gas Emissions & Goals



A Stable Regulatory Environment for Investment

As discussed above, not all carbon abatement programs have similar costs. Policymakers need to recognize the costs associated with meeting aggressive emissions reduction and conservation programs. In the chart below, PSEG estimates the costs per ton of carbon reduction that can be achieved statewide in New Jersey by the energy sector from solar power, efficiency and clean central power options.

		All-in Capital Costs		Potential NJ additions by 2020	Projected Capacity Factor	Annual Generation	Total Potential CO ₂ Reduction	Net Cost of CO ₂ Reduction	
		\$/kW		MW		GWh/yr	thousand tons	\$/ton	\$/ton
Solar	PV	\$ 5,000	\$ 9,000	1,200	12%	1,261	820	\$1,156	\$3,289
Nuclear		\$ 2,500	\$ 3,500	1,600	92%	12,614	8,199	(\$41)	\$3
Efficiency - Gas&Elec				(3,000)		(9,500)	6,175	(\$82)	(\$52)

Represents PSEG Conceptual Initiatives Extrapolated to Statewide Totals

The chart illustrates the range of costs for three carbon reduction methods over the approximately 20-year life of the investment based on capital costs. The most economical carbon reduction method is energy efficiency, yielding significant reductions at a net profit, due to avoided electricity costs by the investor. Implementation of these carbon reduction methods in a reasonable timeframe will require billions of dollars in new investment. Business and industry must be assured of a predictable and efficient regulatory process in order to take the actions necessary to meet the state's GHG reduction objectives. Utilities, such as PSE&G, are well-suited to make necessary investments in renewable energy and energy efficiency but must be provided a fair return on the capital invested.

A National Solution Is Required

“PSEG believes that global climate change represents a real environmental threat and significant business challenge, as well as an opportunity. We support mandatory greenhouse gas reductions on a national level and a cap - and - trade mechanism to achieve those reductions.”

--Ralph Izzo before the U.S. House Energy and Commerce Committee

PSEG supports a robust, national cap-and-trade system to reduce greenhouse gas emissions.

Ten northeast states have proposed a Regional Greenhouse Gas Initiative (RGGI) designed to reduce power plant CO₂ emissions. RGGI and individual state GHG programs can be effective catalysts for the creation of national greenhouse gas policies. However, policymakers should not lose focus of the fact that climate change is a global problem that extends beyond state borders and beyond the electricity market. RGGI does not address the other sectors of the economy such as transportation, other industry sources and the residential sector. Further, unlike New York and many of the New England states that have electric power markets that are almost exclusively contained within their borders, New Jersey is part of a larger PJM power grid that extends to Illinois. Therefore, PSEG believes that while a regional solution, such as RGGI, can serve as a building block to a national solution, a national solution is required to achieve significant results.

The RGGI program is expected to begin in January 2009 and would implement a cap on power plant CO₂ emissions at today's level through 2014 and achieve a further 10% reduction through 2018.

One of the central challenges facing the RGGI system is to ensure that its intended benefits are not erased by “leakage” of CO₂ from coal-fired plants in non-participating PJM states that do not require emissions controls.

Governor Corzine and the Legislature took an important first step towards mitigating the leakage problem by requiring implementation of an emissions portfolio standard (“EPS”) or other similar mechanism in the 2007 Global Warming Response Act. PSEG supported

this requirement and stands ready to work with policymakers, environmental organizations and other stakeholders to make sure that implementing regulations effectively control leakage. Without an effective emissions portfolio standard or other similar mechanism, electricity generation will switch from New Jersey to Pennsylvania or other non-RGGI states which are part of the PJM electricity market, resulting in increased costs for New Jersey consumers and a likely increase in CO₂ emissions from out-of-state coal-based plants.

A second challenge for the RGGI implementation relates to the lack of certainty surrounding the price of carbon that will result from a RGGI auction. While initial estimates predict relatively low carbon prices, experience in Europe with carbon auctions shows that prices can fluctuate significantly and in doing so can significantly impact the costs of providing power. PSEG seeks to work in partnership with policymakers and stakeholders to develop a RGGI auction mechanism and other program elements that will achieve significant carbon reductions, while also limiting related cost and price shocks on providers, workers and consumers.

PSEG believes that a properly structured RGGI program that minimizes leakage and cost variability can serve as a model for a national solution. Carbon knows no boundaries and therefore, once a national solution is in place, it should supplant the regional and local initiatives that are being developed across the country.

Conclusion: PSEG Determined To Address Climate Change

Meeting the climate change challenge will require local, regional, national, and international actions and a transformation of the ways in which energy is produced and consumed. This challenge will require PSEG and other energy companies to change the way they run their businesses. State and federal policymakers will need to develop innovative legislation, regulations and funding mechanisms that will foster investment, develop markets for new technologies, and create new employment opportunities.

PSEG will work aggressively to address global climate change nationally and in New Jersey. The company is a leading advocate for federal legislation that will require mandatory GHG reductions on a national basis. PSEG is prepared to help New Jersey meet its GHG reduction goals through an integrated three-pronged approach of conservation, renewable energy, and development of new zero- or low-carbon central station power plants, including a new nuclear power plant. PSEG is well-positioned to invest in advanced technologies that can provide energy efficiency savings and new renewable energy sources for customers.

Developing and implementing integrated energy and environmental policies will require leadership and a long-term commitment to these solutions. PSEG is ready to partner with New Jersey to tackle the greatest environmental challenge of our time.

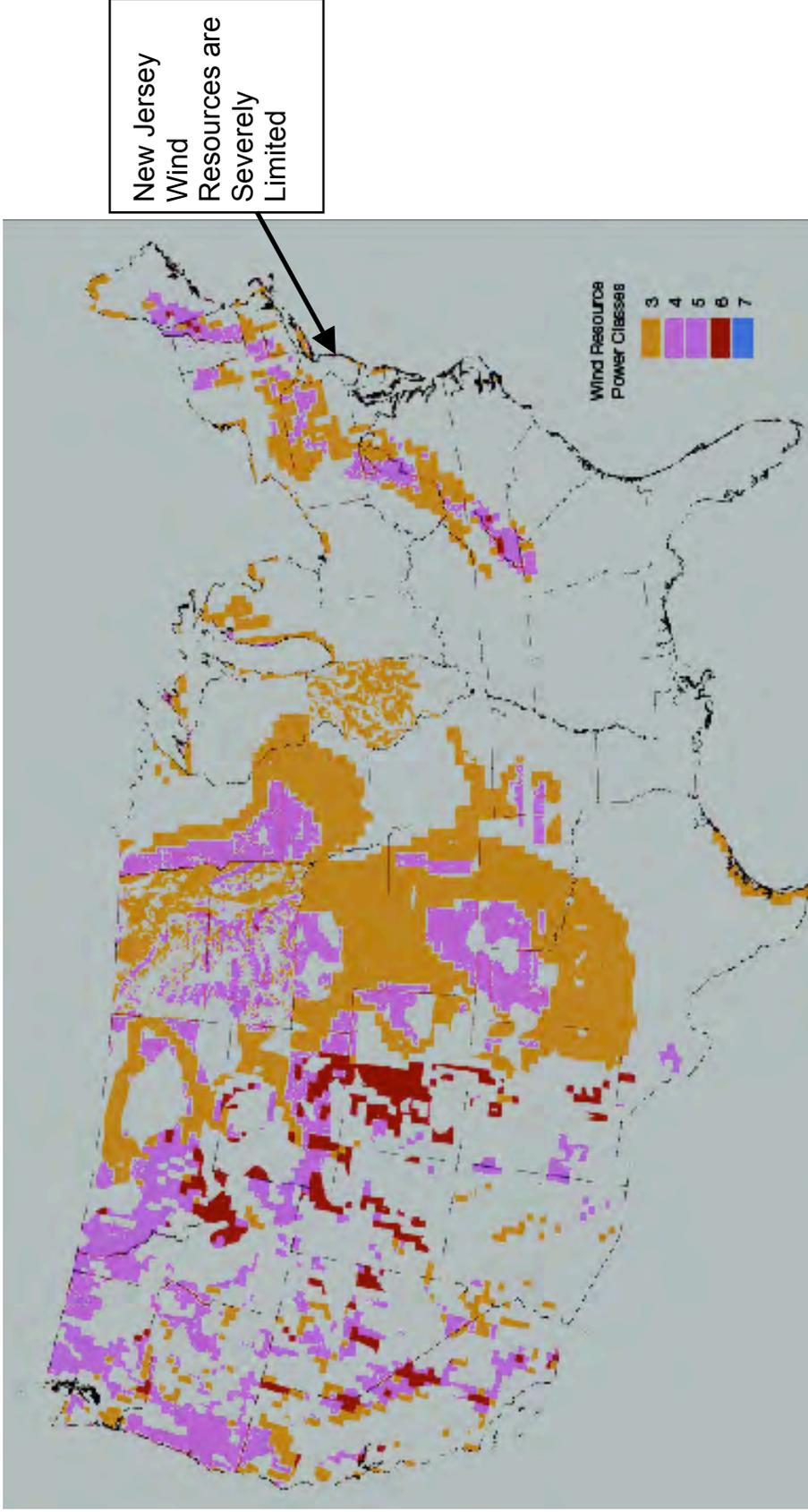
Appendices

Appendix 1: NJ Land-Based Wind Constraints - map

Appendix 2: CO₂ Storage Potential - map

Land Based Wind Resources in New Jersey are Severely Limited

Location of Class 3 – 7 Wind Resources



Wind Resource maps estimate the resource in terms of wind power classes. These classes range from class 1 (the lowest) to class 7 (the highest). Good wind resources generally fall above a class 3 level, with an average annual wind speed of at least 13 mph.

APPENDIX 1

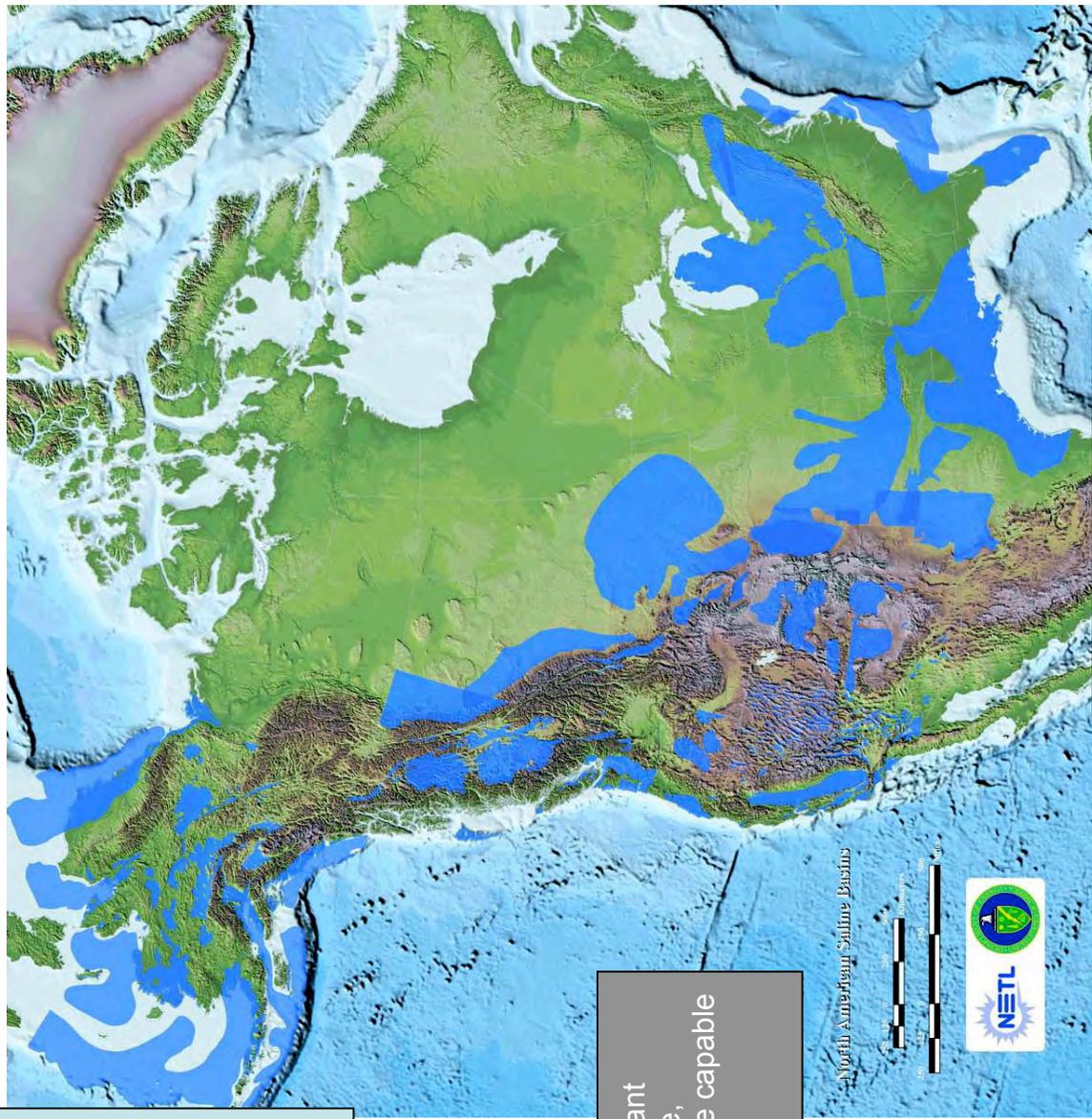
Source: National Renewable Energy Laboratory (NREL)

Deep Saline Formations

Saline formations are layers of porous rock that are saturated with brine. They are much more extensive than coal seams or oil and gas-bearing rock, and represent an enormous potential for CO₂ storage. However, much less is known about saline formations because they lack the characterization experience that industry has acquired through resource recovery from oil and gas reservoirs and coal seams. Therefore, there is a greater amount of uncertainty regarding the suitability of saline formations for CO₂ storage.

While not all saline formations in the U. S. have been examined, the RCSP's have documented the locations of such formations with an estimated sequestration potential ranging from 919 to more than 3,300 billion metric tons (from 1,014 to more than 3,700 billion tons) of CO₂

Deep saline aquifers are considered important potential CO₂ sinks because many are large, generally contiguous reservoirs and may be capable of storing large volumes of carbon dioxide.



This map displays saline formation data compiled by NATCARB

APPENDIX 2

Source: http://www.netl.doe.gov/publications/carbon_seg/atlas/National%20Perspectives.pdf

¹ Map of New Jersey showing the wind resources for the vast majority of the state are classified as “poor to marginal”:

http://www.eere.energy.gov/windandhydro/windpoweringamerica/images/windmaps/nj_50m_800.jpg
NREL Annual PV Solar Radiation http://www.nrel.gov/gis/images/us_pv_annual_may_2004.jpg.

² Energy Information Administration, “2003 State Emissions by Sector”,
http://www.eia.doe.gov/oiaf/1605/ggrpt/excel/tbl_statesector.xls.

³ Solar projection based on current Renewable Portfolio Standard regulation (NJAC 14:8-2), which requires that 2.12% of energy sold in New Jersey in 2020, must come from in-state solar sources.

⁴ Electric Power Research Institute (EPRI), “Electricity Technology in a Carbon Constrained Future”,
http://mydocs.epri.com/docs/CorporateDocuments/Newsroom/EPRIUSElectSectorCO2Impacts_021507.pdf.

⁵ Transportation is the largest New Jersey source of CO2 emissions from human activity, equaling half of all emissions, and the transportation sector must be included in a CO2 reduction strategy. Energy Information Administration, “2003 State Emissions by Sector”,
http://www.eia.doe.gov/oiaf/1605/ggrpt/excel/tbl_statesector.xls.

⁶ KEMA, “New Jersey Energy Efficiency and Distributed Generation Market Assessment”,
<http://www.state.nj.us/bpu/cleanEnergy/KemaReport.pdf>.

⁷ The McKinsey Quarterly 2007 Number 1.

⁸ The McKinsey Quarterly 2007 Number 1.

⁹ “PSE&G Marks Earth Day With A Bold New Plan Designed To Spur Investment In Solar Energy In N.J.”, April 19, 2007, http://www.pseg.com/media_center/pressreleases/articles/2007/2007-04-19.jsp.

¹⁰ Map of New Jersey showing the wind resources for the vast majority of the state are classified as “poor to marginal”:

http://www.eere.energy.gov/windandhydro/windpoweringamerica/images/windmaps/nj_50m_800.jpg
NREL Annual PV Solar Radiation http://www.nrel.gov/gis/images/us_pv_annual_may_2004.jpg.

¹¹ Modeled AC output per DC watt installed using PVWATTS 1 for an installation in Newark, NJ
http://rredc.nrel.gov/solar/codes_algs/PVWATTS/version1/.

¹² Upper end estimate for a Class 3 wind area utilizing a GE 1.5 MW wind turbine designed for deployment in low wind speed area.

¹³ Calculation based on replacing the 2006 net generation from New Jersey’s nuclear plants using GE 1.5sl 1.5 MW wind turbines with a 29% capacity factor. Distance calculations are based on assuming that each turbine has a swept diameter of 77 meters and are arranged from rotor tip to rotor tip. These calculations are offered for illustrative purposes only.

¹⁴ Based on improved generation efficiency from 1990 – present expressed in kWh generated per unit of fuel consumed.

*Developing
New Jersey's*

Green Energy Workforce



PSEG

**PUBLIC SERVICE ENTERPRISE GROUP (PSEG):
DEVELOPING NEW JERSEY'S
GREEN ENERGY WORKFORCE**

Executive Summary

Combating climate change is the most important environmental challenge of our time. Meeting this challenge will require that we transform our economy to one that is more energy efficient and less carbon-intensive. This transformation will fuel significant job growth.

While policy changes, such as carbon regulation, are beginning to create the framework for this green economy, initiatives to prepare our workforce are lagging behind. Without adequate workforce planning, we will be unable to meet the greenhouse gas reduction targets that are necessary to prevent the damaging effects of climate change. Moreover, green workforce development is crucial to addressing climate change in a manner that maximizes job creation and long-term economic growth.

PSEG is seeking to become a leader in developing New Jersey's green energy workforce. We will do so by pursuing three critical strategies:

1. Attract and train a greater number of diverse and skilled workers for the green energy industry.
2. Create workforce development partnerships that help the energy industry adapt to the evolving green economy.
3. Facilitate knowledge transfer between our green and traditional workforce.

PUBLIC SERVICE ENTERPRISE GROUP (PSEG): DEVELOPING NEW JERSEY'S GREEN ENERGY WORKFORCE

Understanding Green Jobs

A green job is defined generally as one that reduces humans' negative impact on the environment. This includes jobs in green industries, such as recycling or forest management, or green jobs within traditional industries, like appliance or automobile manufacturing.

In the electric and gas industry, green jobs include any function that reduces negative environmental impacts from the wellhead or generating station to the end user. This encompasses a wide range of professions. It includes both a Ph.D. scientist who develops solar panel technologies and a solar panel installer trained at a community college. It includes a building analyst with a master's degree who performs complex energy audits on large facilities and a worker with a vocational high school education who retrofits homes with insulation and more efficient equipment. It also includes the range of employees who design, build and run nuclear power plants – by far our nation's largest source of zero-carbon generation.

Green jobs are generally not brand new career paths, but rather modifications of existing careers. To implement energy efficiency upgrades or install and operate renewable energy systems requires heating, ventilating and air conditioning (HVAC) technicians, pipefitters, plumbers, electricians, electrical engineers, carpenters, welders, machinists and a range of other existing professionals who have received additional training in green methods and technologies.

While there remains some debate about the precise definition of a green worker, for New Jersey's energy industry the answer is simple: a green worker is anyone who the energy industry will need to help meet New Jersey's aggressive energy efficiency, renewable energy and carbon reduction goals.

Workforce Challenges in the Energy Industry

The State of New Jersey has set three energy goals to be reached by 2020:

- Reduce demand for electricity and non-electric heat by 20 percent of projected levels.

- Generate 20 percent of electricity from renewable resources.
- Reduce greenhouse gas emissions to their 1990 levels.

One of the characteristics of the renewable energy and energy efficiency industries is that they are labor intensive and promote local job creation. According to the Apollo Alliance, energy efficiency creates 21.5 jobs for every \$1 million invested compared to 11.5 jobs for new natural gas generation, and renewable energy requires four times as many jobs per megawatt of installed capacity as natural gas.¹ The labor intensive nature of these industries means that workforce development is one of the central challenges to growing green industries and meeting the State's goals.

To put in perspective the workforce that will be needed to reach these goals, consider that implementing basic efficiency measures on every single-family home in New Jersey would achieve less than one fifth of the electric demand reduction goal, and only one third of the natural gas demand reduction goal.² The installation of solar energy systems on 100,000 homes would achieve only about 5 percent of the renewable energy goal.³

New Jersey will face competition for this green workforce as other states are also pursuing green energy goals. More than half the states in the nation, including every state in our region, have set renewable energy targets.⁴ At least 14 other states have energy efficiency goals.⁵ And 10 northeast states have agreed to mandatory caps on carbon emissions starting in 2009, with a national carbon regulation system expected to be established within the next few years.

Evidence already suggests that we are not prepared to respond to this rising demand for green workers. Across the country, and in New Jersey, workforce shortages are starting to emerge in green industries, as well as some of the professions from which green industries will have to draw:

- The National Renewable Energy Lab has identified a shortage of skills and training as a leading barrier to growth in the fields of renewable energy and energy efficiency.⁶ Washington State estimates that it will need an additional 25,000 workers to meet its renewable energy goals, and the lack of a green workforce stands as one of its biggest barriers to meeting those goals.⁷
- At a recent meeting convened by the New Jersey Department of Labor and Workforce Development, a wide range of representatives from New Jersey's renewable energy and advanced energy technology industries stated that they are struggling to find enough workers with electrical and mechanical skills at various levels of employment – from laborers and skilled technicians to engineers of all kinds.⁸
- A recent survey by the National Association of Manufacturers revealed that 90 percent of respondents indicated a moderate to severe shortage of qualified, skilled production employees, such as machinists and technicians.⁹

- According to the U.S. Department of Energy (DOE), university programs for power engineering, and the availability of professors to teach those programs, are waning. Without support for these programs, DOE believes a shortage of power engineers will emerge.¹⁰
- According to the Nuclear Energy Institute, 35 percent of the current nuclear workforce will be eligible to retire by 2012.¹¹ Yet, over the last two decades, training programs for nuclear careers have atrophied, with just 30 American colleges offering a course in nuclear engineering – less than half of what was offered in 1980.¹² At the same time, 31 new nuclear units are being considered for construction, which would require roughly 50,000 workers during construction and upward of 20,000 workers to operate.¹³ As demand for nuclear energy increases, the lack of a ready labor force is one of the constraints to growth in this industry.

The electric and gas utility industry also is facing challenges with its traditional workforce. The average age for workers in the energy industry is nearly 50 years old, whereas for all U.S. workers it is just above 40.¹⁴ At least half of electric utilities' technical workforce will be eligible for retirement in the next five to ten years.¹⁵ By 2010, the shortfall in the supply of electric lineworkers nationwide may reach 10,000 – 20 percent of the current lineworker workforce.¹⁶ Therefore, the energy industry will be engaged in a major effort to develop a new generation of workers to fill traditional energy industry jobs at the same time it is trying to develop a green workforce.

Assessing New Jersey's Green Workforce Needs

The natural first step toward establishing effective workforce development policies is to conduct a detailed assessment of New Jersey's green employment needs that identifies skills gaps and barriers to workforce expansion. Based on this analysis, policies can be developed to address these skills gaps and remove barriers to workforce expansion. The State of New Jersey is planning initial steps toward gathering this information. The draft of New Jersey's Energy Master Plan (EMP) – a blueprint for energy policy being prepared by state government – directs relevant state agencies to assess the workforce needs and challenges of New Jersey's existing green businesses.¹⁷

However, given the magnitude of the tasks ahead, and the short time frame in which New Jersey must meet its goals, immediate actions are also required. Without completing a full workforce analysis, we know that achieving dramatic reductions in greenhouse gas emissions will require an infusion of green workers at almost all educational levels. This will include workers to conduct energy audits and implement energy efficiency measures on homes, businesses and industrial facilities. In fact, the draft EMP projects the completion of efficiency upgrades on all of New Jersey's 3.7 million existing buildings by 2020.¹⁸ Achieving the State's goals also will require an increased number of workers who can install, operate and maintain solar, wind and biomass energy generation – all technologies for which the draft EMP sets specific targets for deployment.

Therefore, in addition to conducting a detailed green workforce assessment, New Jersey must begin mapping out strategies for developing a green workforce today if we are to meet the State's energy goals by 2020.

Strategies for Developing New Jersey's Green Workforce

PSEG is starting to make significant investments in energy efficiency and renewable energy and already has major investments in clean central-station power. PSEG is committed to becoming an industry leader in green workforce development. In this effort, we will pursue the following three strategies:

Strategy #1: Attract and train a greater number of diverse and skilled workers for the green energy industry.

The pipeline of green workers coming into New Jersey's energy industry must flow faster if we are to meet the State's energy goals. Increasing the flow of green workers will require a range of actions from government, industry and educational institutions.

For example, federal and state education agencies should take steps to further promote career and technical education. Current standards and regulations place significant value in college admission rates and standardized testing, and relatively less value in apprenticeships, experiential learning and job placement. In response to diminished focus on career and technical education, Florida passed the Florida Career and Professional Training Act, which required each district to have a career and professional academy with a curriculum tailored to meet industry-recognized certifications for high-demand occupations, and streamlined the regulatory approval process for such programs.

The energy industry also should forge stronger working relationships with secondary schools to help attract future workers and better align public education with industry needs. For example, many vocational schools are teaching students to install inefficient and outdated technologies. Energy companies could conduct teacher trainings and donate the latest technologies so that schools are better preparing students for the green economy.

In addition, there are steps the energy industry can take to broaden and strengthen its outreach and recruitment efforts to both mid-career and young professionals. This could range from targeting recruitment efforts at veterans with applicable skills, to utilizing the Internet and social networking applications to attract younger workers.

Preparing a green workforce will also require a focus on re-training New Jersey's existing workforce in green methods and technologies. This will be important to ensure that service professionals, such as HVAC technicians, are installing clean and efficient equipment throughout New Jersey.

PSEG is already taking steps to begin attracting and training more diverse and skilled workers for the green energy industry:

- **Expanding PSEG’s energy utility technology degree program to prepare students for the green energy industry.** PSEG created an energy utility technology degree program as a means to recruit and train our workforce of the future. This program, which is available at four two-year community colleges, combines classroom instruction with technical apprentice-level training at PSEG’s Edison Training and Developmental Center. As part of the program, students complete two internships, and are mentored by PSEG employees on the job and in the classroom. The program has been highly successful, as PSEG has hired 62 students to date – 86 percent of the program’s graduates. A four-year bachelor’s degree in energy utility technology is also available at Thomas Edison State College.

PSEG now is adapting this program to prepare students for the green workforce. In September 2008, a 101-level course called Alternative Energy Sources will be added to the curriculum at Mercer County Community College. This course will help students understand the green economy and expose them to green industries like energy efficiency and the full range of renewable energy technologies. By January 2009, this course will be added at three other community colleges, and PSEG plans to further expand its curriculum with courses to prepare students for specific green jobs.

PSEG plans to make its green curriculum available for use at colleges or high schools nationwide, in an effort to increase student exposure to the green economy.

- **Creating a green energy academy at Essex County Vocational Technical School in Bloomfield.** PSEG is working with the Essex County Vocational Technical School system to create a green energy academy dedicated to preparing students for the green workforce. This academy would combine classroom and experiential learning to equip high school students with the skills necessary to follow one of three paths upon graduation: 1) enter the green workforce as an apprentice or full-time employee, 2) enroll in a community college program, such as the energy utility technology degree program, or 3) enroll in a four-year institution.

A similar model is working in Florida, where Gulf Power Company has partnered with West Florida High School to create a highly successful energy academy, from which Gulf Power has hired 22 graduates in the program’s first three years. Since beginning at West Florida High, this program has been expanded to two additional Florida high schools.¹⁹

- **Working with the State and community development organizations to create a green jobs training facility.** PSEG is partnering with the New Jersey Department of Labor and Workforce Development (DLWD); Isles Inc., a Trenton-based community development corporation; and other organizations to develop plans for a green workforce development training center where industry, educational institutions and government come together to prepare New Jersey’s green workforce for fields such as green building, energy efficiency retrofits, and renewable energy installation. Preliminary plans are for the center to serve as a resource to retrain current energy industry employees, develop new employees, train trainers, and promote urban economic development. The center may also help coordinate statewide industry

certifications for various professions. With the assistance of DLWD funding, the goal is for the center to begin training workers in 2009.

- **Developing additional training capabilities for New Jersey's nuclear workforce.** To help address the looming nuclear workforce shortage, PSEG is implementing a curriculum at Salem County Community College to prepare the next generation of nuclear workers. We anticipate the first course to be in place by September 2008.

In addition, PSEG is partnering with the Stevens Institute of Technology to help build a nuclear power engineering program. PSEG will help develop the curriculum, provide experiential learning opportunities to students and assist with program assessment and review.

- **Promoting urban economic development and job creation.** One of the key roles that utilities will play in the green economy is ensuring universal access to its benefits. This not only means access to renewable energy and improved efficiency, but also access to the jobs and economic growth created by the green economy. To take advantage of these opportunities, the energy industry must work with community development organizations, foundations, and state and local governments to create workforce development programs that allow urban residents to serve their communities by making them greener.

PSEG is a partner in the Trenton Green initiative, which is aimed at creating green jobs and making Trenton more environmentally friendly. PSEG is donating staff resources to help the city evaluate its energy use and create programs to develop a green workforce.

PSEG is also working with a coalition in Newark to create programs to develop the city's green workforce. We hope these will become models for such efforts throughout the state.

- **Paying good wages.** It is critical that green jobs pay good wages. If someone cannot support a family by working a green job, it will not be an attractive career option and we will fall short of developing the workforce we need. PSEG is committed to utilizing our highly skilled unionized workforce to participate fully in the green economy. In addition, publicly funded programs hiring green workers should pay prevailing wages, which are the average local wages paid for similar jobs under collective bargaining agreements.

Strategy #2: Create workforce development partnerships that help the energy industry adapt to the evolving green economy.

Many of the key elements of New Jersey's green economy are already in place. The State has imposed legislative and regulatory mandates that will help drive the development of green industries; policymakers and business leaders have expressed and demonstrated their desire to foster a green economy; and funding opportunities, including federal, state and private investments, are growing rapidly.²⁰

At the same time, much about the green economy remains uncertain. The legal and regulatory landscape is still evolving; green industries are still in periods of rapid initial growth; and green technologies continue to change. These factors make it difficult to predict the kind of green workforce New Jersey will need.

The complexity of this challenge demands thoughtful collaboration among interested parties – government, industry, labor, non-profits and educational institutions – to establish workforce development partnerships that can meet the evolving needs of the green economy. Such partnerships are crucial to ensuring that these groups are sharing information and effectively coordinating their resources to meet New Jersey’s green workforce needs.

Other states have begun to establish models for this type of collaborative workforce development effort. For example, Florida has established an energy workforce consortium of more than 50 members from across the private and public sectors that meets regularly to help the state coordinate resources and map out workforce development strategies.

Some states have created centers for energy workforce development, which pool resources to create a physical home for workforce development. These centers can jumpstart the development of a reliable supply of workers by identifying workforce skill and training needs; coordinating the development of curricula and certification criteria; conducting trainings; helping match workers and employers; and serving as a clearinghouse for model programs and best practices. Such centers have been established in Florida and Washington.²¹

Other states have established green energy research and development institutes at universities. These institutes leverage university resources to attract federal and private research funding; help bridge the gaps between research, commercialization and implementation of green energy technologies; and drive classroom learning toward green industries. In New York, the Syracuse University Center for Environment and Energy fulfills this role. New York is also in the preliminary stages of creating a Wind Energy Research and Testing Center at one of the state’s universities.²²

New Jersey is beginning to develop its own workforce development partnerships to help prepare for the emerging green economy. This has been spurred by the leadership of Governor Corzine and his administration; local leaders, such as Newark Mayor Corey Booker and Trenton Mayor Douglas Palmer; non-profit organizations, such as Green-for-All, the Apollo Alliance and Isles Inc; labor organizations, such as the IBEW; and industry leaders, such as PSEG.

As described above, PSEG is collaborating with high schools, colleges, the State, and broad coalitions in Newark and Trenton to develop and implement green workforce development programs. In addition to these efforts, PSEG is participating in the following partnerships:

- **Participating in New Jersey’s Industry Workforce Advisory Councils (IWAC).** PSEG is a member of two IWACs established by the New Jersey Department of Labor and Workforce Development: the Conservation / Green Collar Jobs IWAC and the Clean Energy / Clean Technology IWAC. These groups seek to identify the green workforce needs of employers, and develop policies to help meet those needs.
- **Serving as Chair of the Center for Energy Workforce Development (CEWD).** PSEG President and CEO Ralph Izzo recently became chairman of CEWD, a non-profit consortium of electric and gas utilities and power companies focused on creating workforce development initiatives to serve the industry. PSEG will use this role, in part, to help improve industry efforts to recruit, train and hire a green workforce.
- **Partnering with nuclear energy trade organizations to address workforce shortages.** PSEG is working with nuclear industry organizations, such as the Nuclear Energy Institute (NEI) and the Institute for Nuclear Plant Operators (INPO), to develop strategies to recruit and train more nuclear workers. Among the strategies being considered is an initiative to better coordinate and standardize pre-employment training programs so that employees are more uniformly prepared once they enter the nuclear industry.
- **Joining with educational institutions to establish Innovation Partnership Institutes (IPI) to develop model green curricula for New Jersey.** IPIs would bring together industry and educational institutions to develop model curricula for New Jersey’s secondary schools and higher education system to prepare students for green careers. PSEG is supporting several educational institutions, including Rutgers University, Essex and Sussex County Community Colleges, and the Stevens Institute of Technology, in their applications for grants from the New Jersey Commission on Higher Education to establish IPIs.

Strategy #3: Facilitate knowledge transfer between our green and traditional workforce.

The increasing public focus on green jobs can at times overshadow the importance of the traditional energy workforce. However, traditional energy functions – central station power, transmission and distribution – will still be important in a green economy. Moreover, PSEG strives to infuse green concepts – clean and efficient processes that minimize negative impact on the environment – into all areas of our business, rather than create two silos of workers: green and non-green.

Conversely, the institutional knowledge and skills of our traditional energy workforce will be crucial to the execution of green jobs. For example, many PSEG employees already enter customers’ homes and perform utility and appliance services, which requires many of the skills necessary to perform home energy audits. And the installation of distributed renewable generation will require connecting to the electric grid that PSEG workers have maintained for over a century.

Therefore, energy companies must ensure that knowledge is transferred between the green and traditional workforce, and between new and more experienced employees. This is particularly important given the wave of retirements expected in the next five to 10 years. PSEG is beginning to do this with the following initiatives:

- **Reinventing retirement.** Rather than the traditional model where employees abruptly depart the workforce, PSEG is developing options for employees to start departing on a more gradual basis, by progressively reducing their workload. Some green jobs, such as conducting home energy audits, could be ideal for a phased retirement as an employee might have the option of working close to home in his or her community.
- **Strengthening mentorship programs.** Formalized mentorship programs are an important way to pass institutional knowledge. PSEG is developing plans to expand and enhance its mentorship programs in anticipation of increased worker retirements.
- **Beginning to re-staff before the wave of retirements to facilitate knowledge transfer.** Energy companies should not wait until they are hit with mass retirements before starting to hire a new generation of workers. PSEG is developing recruitment and hiring strategies to create an overlap between retiring employees and new hires to more effectively facilitate knowledge transfer.

Conclusion

If New Jersey is to meet its goals for combating climate change and transitioning to a green economy, it must begin to develop its green workforce today. PSEG has outlined a strategic framework for developing that workforce, but the real work lies ahead. Meeting this challenge will require careful analysis and planning, and close collaboration among industry, government, labor, non-profits and educational institutions. We are starting to see such efforts in New Jersey and across the nation, and we must build upon these initial successes.

While we are becoming familiar with the litany of consequences of failing to combat climate change, there are equally compelling and positive benefits to be realized if we meet this challenge. Chief among them is economic growth and the creation of well-paying green jobs. PSEG is committed to working with partners across the state to develop our green workforce so that New Jersey can realize the full potential of the green economy.

Questions or comments?

Email PSEG at workforce@pseg.com

¹ “New Energy for America,” The Apollo Alliance, www.apolloalliance.org, January 2004.

² In this example, the basic efficiency measures include laying attic insulation, sealing ducts, installing programmable thermostats, caulking, weather stripping and adding five compact fluorescent light bulbs. Based on PSEG’s analysis, projected savings from these measures is roughly 7% of the average annual residential energy bill. According to the U.S. Census, there are roughly 2.2 million single-family homes in New Jersey.

³ This calculation is based on the installation of 5 KW solar panel systems with a capacity factor of 18%. According to modeling by the State of New Jersey, approximately 16,000 gigawatt hours of renewable energy will be needed to meet the State’s goals; the solar panels in this example would contribute less than 800 gigawatt hours. As an aside, New Jersey also has a specific requirement for solar energy; the installation of 100,000 5 KW systems would achieve roughly one third of this solar requirement.

⁴ U.S. Department of Energy, http://www.eere.energy.gov/states/maps/renewable_portfolio_states.cfm

⁵ “Greener Pathways: Jobs and Workforce Development in the Clean Energy Economy,” Sarah White and Jason Walsh, Center on Wisconsin Strategy/The Workforce Alliance/The Apollo Alliance, March 2008.

⁶ “Nontechnical Barriers to Solar Energy Use: Review of Recent Literature,” R. Margolis and J. Zuboy, National Renewable Energy Laboratory, 2006.

⁷ “Where the Jobs Are: As the renewable-power industry takes off, so does the demand for green-collar workers,” Rebecca Smith, The Wall Street Journal, March 24, 2008.

⁸ Letter from New Jersey Department of Labor and Workforce Development Commissioner David Socolow to member of the Clean Energy / Clean Technology Industry Workforce Advisory Council, February 29, 2008.

⁹ “2005 Skills Gap Report: A National Association of Manufacturers Survey of the American Manufacturing Workforce,” The National Association of Manufacturers, 2005.

¹⁰ “Workforce Trends in the Electric Utility Industry,” U.S. Department of Energy report to Congress, 2006.

¹¹ Carol L. Berrigan, Director, Industry Infrastructure, Nuclear Energy Institute, testimony before the U.S. Senate Committee on Energy and Natural Resources, November 6, 2007.

¹² “Nuclear Help Wanted,” William Underhill, Newsweek Magazine, January 21, 2008.

¹³ Berrigan, op. cit.

¹⁴ “Identifying and Addressing Workforce Challenges in America’s Energy Industry,” U.S. Department of Labor, Employment and Training Administration and U.S. Bureau of Labor Statistics, 2007.

¹⁵ “An Action Plan for Workforce Development,” prepared for the Center for Energy Workforce Development by the John J. Heldrich Center for Workforce Development, 2007.

¹⁶ “Workforce Trends in the Electric Utility Industry,” U.S. Department of Energy, 2006.

¹⁷ Draft New Jersey Energy Master Plan Implementation Strategies, www.nj.gov/emp, April 2008, pg. 56.

¹⁸ Draft New Jersey Energy Master Plan, April 2008, pg. 52-53, and Draft New Jersey Energy Master Plan Implementation Strategies, April 2008, pg 55.

¹⁹ Andra Cornelius, Vice President of Business Outreach for Workforce Florida, Inc, testimony before the U.S. Senate Committee on Energy and Natural Resources, November 6, 2007.

²⁰ At the state level, funding that could be devoted to green workforce development includes the Global Warming Solutions Fund, the Clean Energy Program, and DLWD's Customized Training Grants. At the federal level, the U.S. Department of Labor has funding available for green workforce development initiatives through programs such as the High Growth Job Training Initiative, the Community-Based Job Training Grants program, and the Workforce Innovation in Regional Economic Development (WIRED) initiative. In addition, the 2007 federal energy bill authorized \$125 million in green jobs funding, which has yet to be appropriated. Finally, Democratic presidential candidates Hillary Clinton and Barack Obama have respectively proposed \$5 billion and \$15 billion annually to promote green jobs (Source: "Hillary's Plan to Create a Green Jobs," www.hillaryclinton.com, and "Obama Proposes \$210 Billion for New Jobs," Associated Press, February 13, 2008).

²¹The Employ Florida BANNER Center for Energy is housed at the Lake-Sumter Community College. It develops and delivers energy workforce training and information services. The Center for Excellence for Energy Technology in Washington is located at Centralia College. It coordinates a number of workforce development programs in partnership with the local IBEW, and its stated goal is to "serve as a point-of-contact and resource hub for industry trends, best practices, innovative curriculum, and professional development opportunities" (source: <http://www.centralia.edu/coe/about.html>).

²² NYSERDA press release, February 2008, http://www.nyserda.org/Press_Releases/2008/PressRelease20082502.asp