CHAPTER 8

NEED FOR POWER

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Acronym	Definition
AE	Atlantic City Electric Power Company
ARR	auction revenue rights
Btu	British thermal unit
CAES	compressed air energy storage
CO_2	carbon dioxide
COLA	combined license application
COL	combined license
CP	coincident peak
DFO	diesel fuel oil
DOE	U. S. Department of Energy
DPL	Delmarva Power & Light
DR	demand response, demand resources
DSM	demand side management
EMAAC	Eastern Mid-Atlantic Area Council
EPACT	Energy Policy Act of 2005
EA	environmental assessment
EE	energy efficiency
EFORd	equivalent demand forced outage rate
EIA	Energy Information Administration
ER	environmental report
ESP	early site permit
FERC	Federal Energy Regulatory Commission
FPR	forecast pool requirement

Acronym	Definition
GADS	Generator Availability Data System
GDP	gross domestic product
GMP	gross metropolitan product
GWh	gigawatt hour(s)
ILR	Interruptible Load for Reliability
IRM	Installed Reserve Margin
JCP&L	Jersey Central Power & Light
kV	kilovolt(s)
LCAPP	Long-Term Capacity Agreement Pilot Program
LDC	local distribution companies
LFG	landfill gas
LMP	locational marginal prices
LOLE	Loss of Load Expectation
MAAC	Middle Atlantic Area Council
MSB	municipal solid waste biogenic
MSW	municipal solid waste
MWe	megawatt electric
NCP	non-coincident peak
NEPT	Neptune Regional Transmission System
NERC	North America Electric Reliability Corporation
NJBPU	New Jersey Board of Public Utilities
NJDEP	New Jersey Department of Environmental Protection
NJEMP	New Jersey Energy Master Plan

Acronym	Definition
NJPDES	New Jersey Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NYISO	New York Independent System Operator
PECO	PECO Energy Co.
PJM	PJM Interconnection, LLC
PRSG	Planned Reserve Sharing Groups
PSEG	PSEG Power, LLC and PSEG Nuclear, LLC
PSE&G	Public Service Electric & Gas
PV	photovoltaic
RECO	Rockland Electric Company
RFC	Reliability*First* Corporation
RFO	residual fuel oil
RG	Regulatory Guide
RGGI	Regional Greenhouse Gas Initiative
RPM	Reliability Pricing Model
RRS	reserve requirement study
RSA	relevant service area
RTEP	Regional Transmission Expansion Plan
RTO	Regional Transmission Organization
SREC	Solar Renewable Energy Credit

CHAPTER 8

NEED FOR POWER

8.0 NEED FOR POWER

This chapter assesses the need for baseload electric power in support of the early site permit (ESP) application for the new nuclear power plant at the PSEG Site. The new power plant will serve as a merchant generator to provide baseload power for sale on the wholesale market. The need for power analysis establishes a framework for evaluating project benefits for the region where a majority of the benefits are distributed. The analysis is organized into the following four sections:

- Description of Power System (Section 8.1)

  Section 8.1 describes the Relevant Service Area (RSA) and the overall power market for the new plant, addressing such characteristics as the geographic scope, population, major load centers, electric distribution companies, independent system operator requirements, status of deregulation, and competitive wholesale markets.

- Power Demand (Section 8.2)

  Section 8.2 describes the historical and forecasted demand for electricity in the market area served by the new plant.

- Power Supply (Section 8.3)

  Section 8.3 describes the existing and planned power supply available to meet the demand for power in the market area served by the new plant.

- Assessment of Need for Power (Section 8.4)

  Section 8.4 assesses the need for the power to be generated by the new plant by comparing the forecasted demand for electricity to the planned power supply. Other considerations are also assessed, such as the impact the new plant's generation will have on imports, transmission congestion, regional emissions including greenhouse gases, and cost of power.

Per NUREG-1555, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan*, guidance, the need for power analysis time frame extends three years past the planned commercial operation date. Accordingly, forecasts for demand, supply and the need for power are provided through 2024, three years after the planned new plant commercial operation date of 2021.

The forecasts for electricity demand, supply and need for power in this chapter were prepared in early 2010 using data and information available at that time. The impact of key changes in the economy and electric power markets that have occurred since that time have been analyzed based on data and information available in the summer of 2012. The original conclusion that there is a significant need for new baseload capacity in New Jersey (NJ) is unchanged. The chapter has been updated accordingly to describe the key changes since 2010 and their impact on the need for power analysis.

Summary of Chapter 8 Findings and Conclusions

The following is a summary of the results of the need for power analysis, which is presented in detail in the remaining sections of this chapter.

The RSA for the new plant is the State of New Jersey (NJ), which is part of PJM Interconnection LLC (PJM), the Regional Transmission Organization (RTO) for the area. Electricity in the RSA is bought and sold in competitive wholesale markets administered by PJM and into which the new plant's baseload capacity is expected to be bid.

Within the RSA, the cost of electric power is impacted by the following factors:

- The mix of baseload, intermediate and peaking power generation used to meet the demand for electric power[a];
- The difference between the amount of electric power generation capacity in the RSA as compared to the demand for electric power in the RSA; and
- The cost of importing power generated from outside the RSA required to fill the gap between the supply and demand for electricity. This cost is impacted by transmission system congestion and reliability issues.

Electric rates in NJ are relatively high due to the lack of baseload generation in the RSA. In many situations, intermediate and peaking units within NJ are operated to provide baseload power to assure grid reliability or because they are less expensive than the combined cost of imported baseload power plus transmission costs, especially when the transmission system is congested. In addition to being more expensive, using intermediate or peaking units to provide baseload power also contributes to higher emissions because they are fossil-fueled.

Electricity demand in NJ is approximately 40 percent higher than indigenous generation capacity creating the need to import both baseload and peaking electric power into the State. NJ relies on the PJM transmission system to import power as needed from the western region of PJM to meet its peak load and energy needs, as well as to supply power to New York City[b]. PJM has authorized projects to assure that resulting power flows on the transmission system do not exceed design or operational limits and degrade reliability in NJ. However, wholesale power prices in NJ are higher than most other areas of PJM due to a higher demand for power and a higher cost of electric power generated in the RSA available to serve load.

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[a] Baseload resources are those that are operated with a capacity factor greater than 75 percent. Intermediate resources are those that operated with a capacity factor greater than 15 percent and less than 75 percent. Peaking resources are those that operated with a capacity factor of less than 15 percent.

[b] Three transmission projects which provide power from northern New Jersey to New York City are planned or are already in operation

Choosing NJ as the RSA is also aligned with two of the five overarching goals of the 2011 New Jersey Energy Master Plan (NJEMP): 1) to drive down the cost of energy for all customers; and 2) to promote a diverse portfolio of new, clean, in-State generation. The marginal cost of PSEG's proposed nuclear plant (fuel and variable O&M expenses) is low and will contribute to lower locational marginal prices (LMP) in NJ. The proposed plant is new, clean with respect to pollutant and carbon dioxide emissions when compared to the fossil-fueled generation it will displace, and located in-State.

As part of an overall effort to reduce electric rates by reducing demand for electricity, the NJEMP also has set aggressive targets for reducing peak load and energy needs. Forecasted power needs within the RSA are based on the PJM peak load and energy forecast. The 2008-2009 recession resulted in a reduction in PJM forecasted power needs. The projected peak load in NJ is expected to grow modestly at a rate of 1.1 percent annually. The projected annual energy use in NJ is expected to grow at an annual rate of 1.6 percent. The increase in forecasted NJ power needs is driven by economic and population growth and takes into account the long term effects of current energy efficiency and demand side management programs. Demand response and energy efficiency projects are also bid into competitive markets in the same manner as generation and transmission resources and have been incorporated in the need for power analysis as supply resources.

Contributing to the complexity of the NJ power supply situation is the changing composition of electric generating resources in NJ. Almost 3,000 MWe of existing NJ generating capacity is projected to be retired by 2019. The 637 MWe Oyster Creek Generating Station (OCGS) will be decommissioned starting in 2019. PJM anticipates another 2,300 MWe of NJ generation deactivations through 2015, composed of natural gas, oil, kerosene, coal and landfill gas resources. Older fossil-fueled plants in NJ, as well as in other areas of PJM, are becoming increasingly less competitive due to inefficiencies caused by aging, lower prices for natural gas relative to petroleum liquids and coal, and the impact of stricter EPA regulations on emissions. Fossil fueled power plants, such as coal, oil and kerosene fueled units, typically must add both flue gas desulphurization (FGD) and selective catalytic reduction (SCRs) equipment to reduce emissions to meet new regulatory limits. This will require millions of dollars of pollution control modifications to the plants. Generating companies will in many cases choose to shutdown these units rather than incur the added expense.

Offsetting these retirements are a number of new capacity additions planned in NJ. NJ's Long-Term Capacity Agreement Pilot Program (LCAPP) has resulted in three projected new natural gas fired combined cycle generation projects totaling 1,949 MWe. Due to NJ's support for renewable energy development, about 1,780 MWe of solar projects are in the analytical or under-construction phase and 1,440 MWe of offshore wind projects are in the analytical phase within PJM's generation interconnection queues. Other capacity additions include a natural gas repowering of the B. L. England coal and oil fired plant, increases in energy efficiency and demand response resources that have cleared recent PJM capacity auctions and a capacity allocation correction of 50 MWe for PSEG's Hope Creek Generating Station. [c]

[c] PSEG Nuclear has requested a 50 MWe increase in PJM capacity rights to recognize the final net increase in capacity resulting from the Hope Creek extended power uprate completed in 2008.

Despite the reduction in forecasted load due to the recession and the net positive capacity additions, the projected peak capacity in NJ is forecast to be about 2600 MWe less than the expected peak load in 2021; the projected date of new plant commercial operation. In addition, the forecast shows that the shortfall in the capacity that NJ needs to supply the PJM targeted reserve margin of 15.4% is greater than 5800 MWe.

Similarly, the projected baseload capacity in NJ is forecast to be about 7,300 MWe less than the 11,000 MWe of baseload capacity projected to be needed in NJ in 2021. The greater deficit in baseload resources reflects NJ's dependence on higher cost intermediate and peaking resources, which contribute to higher power costs. The new plant at the PSEG Site operates as a merchant baseload plant producing between 1350 and 2200 MWe. It provides 18 to 30 percent of the 7,300 MWe projected baseload capacity need in the relevant service area served by the new plant in 2021.

As discussed in Subsection 9.2.1.3, the alternative of purchasing power to provide baseload capacity in NJ is neither feasible nor desirable. Importing additional baseload power into New Jersey instead of generating it with new nuclear units at the PSEG Site is not a feasible option because there is not expected to be any surplus baseload capacity available in PJM or New York Independent System Operator (NYISO) near the PSEG region of interest in the 2021 time period. In addition, there is insufficient transfer capability in the PJM operated transmission system to provide for additional imports into New Jersey from western areas of PJM projected for the 2021 time period. Furthermore, PJM does not plan upgrades to the bulk electric system (BES) to provide for imports beyond what is required to resolve the North America Electric Reliability Corporation (NERC) reliability criteria violations.

Imports of baseload capacity from western PJM to NJ also is not desirable because imports cannot be increased without causing increased congestion, higher power prices, and potential reliability issues. The only potential baseload capacity additions in regions near NJ which could be available for importation to address the baseload capacity need in NJ are 650 MWe of nuclear uprate projects and the proposed 1,600 MWe Bell Bend nuclear plant in Eastern Pennsylvania. The completion of the Susquehanna-Roseland (SR) 500 kV Transmission Line, currently scheduled for 2015, will resolve numerous overloads on critical 230 kV circuits in Eastern Pennsylvania and Northern NJ, and will facilitate limited imports of baseload capacity from Eastern Pennsylvania. Even considering the congestion relief projected by the approved SR transmission project, the types of generating units that supply imported power from the western portion of PJM are often fossil-fueled and typically coal-fired. Due to lower load growth, the installation of new intermediate and peaking gas fired power plants, and the increase in demand response programs, PJM cancelled the Middle Atlantic Power Pathway (MAPP) and Potomac-Appalachian Transmission Highline (PATH) projects, which in combination, were designed to increase the capability to transfer power from western PJM into the Eastern Mid-Atlantic Area Council (EMAAC), of which NJ is a part. While nuclear baseload capacity additions planned in areas near NJ will displace imports from fossil fueled resources, any substantial increase in the levels of imports is not considered feasible as discussed in Subsection 9.2.1.3.

Due to its location and operating characteristics, the new plant provides several ancillary benefits that supplement the overall need for baseload capacity. As a baseload nuclear plant, the new plant generates electricity while operating at a high capacity factor and producing negligible greenhouse gas or other air emissions, which is consistent with the NJEMP goal of promoting a diverse portfolio of new, clean, in-State generation. Operating the new plant will result in the following net benefits within the RSA:

- Reduces the amount of CO_2 generating imports needed to meet baseload demand in NJ
- Supports Global Warming Response Act, P.L. 2007, goals for the reduction of greenhouse gas emissions in NJ to 80 percent below 2006 levels by 2050.
- Reduces other emissions from fossil fueled generation in NJ and from imports
- Lowers LMP due to reduced generation from fossil fueled resources in NJ. Fossil fueled resources are projected to have increased generation costs due to pending costs associated with increased air emissions regulations, including those pending for carbon dioxide.
- Supports the NJEMP goal of fulfilling 70 percent of the State's electric needs from "clean" energy sources by 2050
- Reduces potential for transmission congestion
- Reduces reliance on imported petroleum to the extent that generation from oil-fired resources is reduced
- Increases the diversity of the NJ generation portfolio, which is currently comprised of 73 percent fossil fuel fired plants (Figure 8.3-1)
- Increases NJ's reserve margins to improve the capability of generating resources within NJ to meet the summer peak load with less dependence on imports and their associated challenge to transmission congestion

8.1 DESCRIPTION OF POWER SYSTEM

The new plant's RSA, which consists of the State of NJ, defines the region where the majority of electricity is expected to be delivered and where the greatest benefit from the new plant will be received. The structure of the power markets, reliability requirements, and subsequent rationale for selecting NJ as the RSA is discussed below. Subsection 8.4.1 contains a discussion of the marketability of the new plant's power output together with any significant market competition and risks.

Structure of Power Markets Serving NJ

New Jersey is part of PJM, the RTO for the area. PJM serves to maintain the bulk electricity power supply system reliability for 13 states and the District of Columbia. PJM serves 51 million people and includes the major U.S. load centers from the western border of Illinois to the Atlantic coast including the metropolitan areas in and around Baltimore, Chicago, Columbus, Dayton, Newark, and northern NJ, Norfolk, Philadelphia, Pittsburgh, Richmond and Washington, D.C. (Figure 8.1-1). (Reference 8.1-2)

The service territories of the electric delivery companies (EDCs) serving NJ are identified and depicted in Figure 8.1-2. These companies are Public Service Electric & Gas (PSE&G), Rockland Electric Company (RECO), Jersey Central Power & Light Company (JCP&L), and Atlantic City Electric (AE).

> PSE&G is one of the largest combined electric and gas companies in the United States, and is also New Jersey's oldest and largest publicly owned utility. PSE&G currently serves nearly three quarters of the state's population in a service area consisting of a 2600 square-mile diagonal corridor across the state from Bergen County in the Northeast portion of the state to Gloucester County in the Southwest. PSE&G is the largest provider of electric and gas service in NJ, with over 1.7 million gas and 2.1 million electric customers in more than 300 urban, suburban and rural communities, including New Jersey's six largest cities (Newark, Jersey City, Paterson, Elizabeth, Edison, and Woodbridge Township)(Reference 8.1-1).
>
> JCP&L is headquartered in Morristown, NJ and provides electric service to one million residential and business customers within 3200 square miles of northern and central NJ. JCP&L is a member of the FirstEnergy family of companies (Reference 8.1-1).
>
> Atlantic City Electric, a subsidiary of Pepco Holdings, Inc., is a regulated utility that provides electric service to more than 500,000 customers in southern NJ.
>
> Rockland Electric Company, a wholly owned subsidiary of Orange and Rockland Utilities, Inc. (Orange and Rockland), an electric and gas utility headquartered in Pearl River, New York (NY), is a public utility authorized by the Board of Public Utilities to provide electric service within the northern parts of Bergen and Passaic Counties and small areas in the northeastern and northwestern parts of Sussex County, NJ. RECO, along with Orange and Rockland, and Orange and Rockland's PA subsidiary, Pike County Light & Power Company, operate a fully integrated electric system serving parts of NJ, New York (NY), and PA (Reference 8.1-1).

Electricity in the region is bought and sold in competitive wholesale markets into which the new plant is expected to be bid. The majority of electricity from the new plant is expected to be delivered to NJ, which is where the greatest benefit from the new plant is received. The region encompasses commercial and industrial load centers and major cities such as Newark, Passaic, Jersey City, Hoboken, New Brunswick, Trenton, Camden, and Atlantic City. The estimated population of the region in 2008 is 8.7 million people (Reference 8.1-8).

New Jersey has restructured the manner in which utilities are regulated and utilities no longer engage in traditional integrated resource planning. In 1999, NJ electricity customers were granted the option to choose the company that supplies them with electric power. This choice is available due to the enactment of the Electric Discount and Energy Competition Act, which, among other things, allows competition in the power generation portion of the electric industry (Reference 8.1-4). As a result of this Act, the different utility responsibilities were unbundled and the power industry was separated into four divisions: generation, transmission, distribution, and energy services. Utilities were essentially required to divest generating plants and, as a result, utilities are no longer the sole producers of electricity. New Jersey, in turn, no longer issues certificates of convenience and necessity for deregulated merchant power vendors. The transmission and distribution sectors remain subject to regulation by the federal government through the Federal Energy Regulatory Commission (FERC) and the New Jersey Board of Public Utilities (NJBPU). The NJBPU has adopted an auction mechanism for procurement of electric supply covering the power needs for the state.

Electricity customers can elect to participate in the Basic Generation Service (BGS) where power is supplied by the regulated utilities within NJ (e.g., PSE&G) or select a Third Party Supplier (TPS) who is independent of the utilities. The BGS offered by the four NJ utilities is the default supply service for those customers who do not choose a TPS. Retail electric rates generally consist of three components: generation services (either under BGS or provided by a TPS); distribution charges that cover the local distribution system and regional transmission system and customer service; and other charges associated with state and federal programs. The generation services charge includes all of the components required to reliably supply electricity including: the cost of wholesale energy; capacity cost, which is the cost resulting from having adequate generation resources available to call upon as needed to meet peak demand for energy; and costs for ancillary services which ensure proper power delivery throughout the grid. These ancillary costs are procured through the PJM markets. There are also supplier's cost to hedge and manage both price and quantity risks associated with electrical generation. These cost components are discussed in more detail below. Distribution and customer service costs are regulated by the NJBPU, which also supervises the process by which BGS is procured.

Each year since 2002, the four NJ EDCs have procured several billion dollars of electric supply to serve their BGS customers through a statewide auction process held in February. Starting in 2003, the needs of residential and smaller commercial customers, who are on a fixed-price service, are met through a statewide auction called the BGS-FP Auction, while the needs of larger commercial and industrial customers, who are on a mandatory hourly service, are met through a second and concurrent statewide auction called the BGS-CIEP Auction. Each auction uses a descending clock auction format and bids are submitted on-line.

Electricity provided to consumers in NJ through BGS or a TPS is bought and sold in the competitive wholesale electricity markets administered by PJM. PJM coordinates the continuous buying, selling and delivery of wholesale electricity through its security constrained dispatch system.[d] PJM balances the needs of suppliers, wholesale customers and other market participants and continuously monitors market behavior to ensure transparency and compliance with FERC regulations. PJM also coordinates reliability assessments with adjacent RTOs. Generators that sell electricity in PJM, including those in NJ, are contractually obligated to meet the reliability requirements in accordance with PJM rules and Reliability*First* Corporation (RFC) as described in more detail below. Working via market forces to encourage independent owners to build the needed generating facilities, PJM directly procures electric supply only when the market does not appear to be providing sufficient incentive to ensure adequate capacity to meet regional demand and ensure continuing system reliability (Reference 8.1-3).

Energy, measured in kilowatt-hours (kWh), is the bulk electricity generated by electric power generation resources. Wholesale energy prices, commonly referred to as LMPs, are established in two separate but inextricably linked markets – the Day-Ahead Market (DAM) and the Real-Time Market (RTM). Wholesale energy markets are cleared at specific locations on the grid on an hourly basis by PJM, thus accounting for power flow limitations caused by transmission congestion and setting energy prices on a locational basis within NJ and the remainder of the PJM market area. Auction clearing prices are the result of PJM's matching bids received by generators to supply energy for a given hour, to demand for energy (system load) in that hour. The DAM is conducted one day prior to the delivery. Bids for supply are received from generators on Thursday for delivery on Friday, for example. Prices are set based on the bids received and PJM's expectation of the following day's demand, which is based primarily on a one-day-ahead weather forecast. On the day of delivery, deviations in the amounts of supply and demand cleared in the DAM can occur. Weather may change unexpectedly, causing demand to increase or decrease. Suppliers may not be able to meet their obligations due to unscheduled outages. These and other factors mean that the system requires a reconciliation market to deal with variances between expected conditions and actual delivery day conditions. This is the role of the RTM.

Capacity, measured in megawatts (MW), is the ability to generate electricity when needed. Capacity prices pay for the costs resulting from having adequate generation resources available to call upon as needed to meet peak demand for energy. PJM administers the capacity market using the Reliability Pricing Model (RPM). Resources that are paid for capacity obligations commit to being available to PJM to generate or to reduce load when called on. Some resources, such as inefficient peaking units, will only be required to generate during the few hours a year when demand is highest. Under RPM, capacity prices are set for each Delivery Year by auctions held three years in advance. Prices are set by the intersection of bids received from generators and energy efficiency and demand response resources and an administratively-determined demand curve designed to procure enough capacity to maintain reliability, based on the then-prevailing PJM load forecast. Additional information on RPM is provided in Section 8.3.

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[d] Security constrained economic dispatch is the operation of generation facilities to produce energy at the lowest cost to reliably serve consumers, recognizing any operational limits of generation and transmission facilities.

PJM operates the high voltage transmission system that gives EDCs and suppliers access to cost effective energy resources and assures them of adequate reliability. PJM is responsible for grid reliability and implements transmission upgrade projects when regions are forecast to have inadequate capacity supplies relative to their peak load requirements due to operational limitations of the transmission system.

Electric System Reliability in NJ

New Jersey is under the jurisdiction of RFC for electric system reliability. RFC was organized to develop regional standards for reliable planning and operation of the regional electric power system and to provide non-discriminatory compliance monitoring and enforcement of both the North America Electric Reliability Corporation (NERC) and RFC standards in its region (Reference 8.1-5). RFC was incorporated in mid-2005. NERC approved RFC as a regional reliability council in late 2005 and RFC officially assumed its regional responsibilities from predecessor organizations in 2006. PJM establishes reserve margin requirements in compliance with RFC standards, and coordinates a capacity market to assure that generation is available to meet these requirements. RFC standards affecting PJM reserve requirements are further discussed in Section 8.4.

New Jersey is part of a larger region of PJM known as the EMAAC. The EMAAC region of PJM includes all of NJ, Delaware (DE) and parts of Maryland (MD) and Pennsylvania (PA). This area includes the service territories of the electric delivery companies of PECO Energy (PECO) and Delmarva Power & Light (DPL) as well as the electric delivery companies in NJ. The EMAAC region also imports power from western PJM to serve its needs.

The new plant increases power grid reliability by adding 1350 to 2200 MWe of baseload generation within NJ. The agreements that PJM holds with adjacent NERC regions and sub-regions allow the new plant to support and potentially alleviate conditions that can create localized areas of congestion in the region. As shown in Figure 8.1-3 (Reference 8.1-7), the U.S. Department of Energy (DOE) has identified NJ and EMAAC as part of a larger region within PJM having congestion problems adversely effecting consumers and local economies, or, Critical Congestion Areas (Reference 8.1-6). PJM expects expanded power exports into NY, further challenging the situation. Limitations in the west-to-east transmission of energy across the Allegheny Mountains and the growing demand for baseload power at load centers in NJ and along the east coast are also contributing to localized areas of congestion. Section 8.3 discusses regional 500 kV transmission projects that have been approved within PJM to help address congestion issues.

Rationale for Choosing NJ as the RSA

The chosen RSA for the new plant is the State of NJ, which is part of PJM, the RTO for the area. The RSA for the new plant is based on the region where the majority of current generation and future expected new plant energy will be delivered and where the greatest benefit from the new plant will be received. The RSA geographic area contains a large population and major load centers, and a majority of its baseload power needs are imported. The new plant location is a favorable geographic area for serving the RSA because the new plant will reduce reliance on intermediate and peaking power generation sources in the RSA and will decrease the amount of baseload power currently imported into the RSA. In addition, a significant portion of the existing transmission system directly servicing the PSEG Site extends directly into the regions of major load within NJ.

PJM expects that NJ will continue to rely on transmission capability to replace retired generation and to meet growth in peak power demand. On an annual basis, NJ imports more than half of its baseload power needs. Large amounts of power importation often lead to transmission congestion; a condition where increased power flows challenge the operational limits of critical portions of the transmission system. To assure the reliability of the power grid in congested areas of NJ, transmission congestion is relieved by dispatching higher cost intermediate and peaking units in NJ because insufficient baseload capacity with lower dispatch costs is available. This results in higher LMPs in NJ. In addition, the potential for more power exports to New York City and Long Island further increase the demand for in-state generating resources and/or transmission capability.

Construction of new transmission lines and upgrades to existing transmission lines is a long, costly and publicly contentious process that is required to allow increased importation of power into the RSA. The new SR 500 kV transmission line project creates a strong link from generation sources in northeastern and north-central PA, across northeastern PA and into NJ. This new link is required by PJM as part of its Regional Transmission Expansion Planning (RTEP) process, to meet system reliability requirements in the immediate future. However, due to lower regional load growth, the installation of new intermediate and peaking gas fired power plants, and the increase in demand response programs, the PJM Board cancelled the 500 kV circuit MAPP and the 765 kV PATH projects. These projects were designed to increase the capability to transfer power from western PJM into the EMAAC region of the system. Consequently, imports of baseload capacity from western PJM to NJ cannot be increased to accommodate increasing demand without causing increased congestion, higher power prices, and potential reliability issues.

The intermediate and peaking units in NJ that are dispatched due to the lack of baseload capacity are fossil-fueled. Even considering the congestion relief projected by the approved SR transmission project, the types of generating units that supply imported power from the western portion of PJM also are often fossil-fueled and typically coal-fired. While nuclear baseload capacity additions planned in areas near NJ will displace imports from fossil fueled resources, they will still cause increased congestion, higher power prices, and potential reliability issues. Therefore, choosing NJ as the RSA is aligned with two of the five overarching goals of the NJEMP: 1) to drive down the cost of energy for all customers; and 2) to promote a diverse portfolio of new, clean, in-state generation (Reference 8.1-9).

8.1.1 REFERENCES

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8.2 POWER DEMAND

The PJM load forecast described in this section is compared to the available New Jersey (NJ) power supply (Section 8.3) to develop a basis for an overall baseload power need in Section 8.4. This comparison of forecast demand and supply identifies a need for the baseload capacity that is provided by the new plant.

The power demand presented in this section was developed in 2009 and is based on the load forecast published by PJM in January of 2009 (Reference 8.2-4). The 2012 PJM load forecast has been reviewed to assess any changes in the demand for both peak load and baseload energy over the three year period (Reference 8.2-24). As described below in Subsection 8.2.1.2, the forecasted growth in peak and energy demand within NJ is substantially lower than prior forecasts due to the impact of the 2008-2009 economic recession. However, despite this suppressed load growth, the need for power analysis, as described in this chapter, still identifies a substantial need for baseload generation in NJ for the year 2021; the expected service date for the new plant. Based on this observation, many of the discussions, bases and references regarding power demand from the original 2009 need for power analysis are still retained.

The increase in peak power and net energy needs forecasted by PJM is driven by economic and population growth and is offset by energy efficiency and demand side management programs and the promotion of distributed generation using renewable resources. These parameters are assessed in detail in the following sections.

8.2.1 POWER AND ENERGY REQUIREMENTS

8.2.1.1 Methodology

PJM produces and publishes an annual peak load and energy forecast report with sufficient detail to determine a 15-year load and energy forecast for NJ. As discussed below, the PJM projection is an acceptable basis for the need for power analysis because it is (1) systematic; (2) comprehensive; (3) subject to confirmation; and (4) responsive to forecasting uncertainty. The PJM load and energy forecasts are reviewed by both its Load Analysis Subcommittee and Planning Committee to ensure the accuracy of the forecast. Note that no other current load forecast for NJ is publicly available. Although the Energy Information Administration (EIA) performs a load forecast for the Middle Atlantic Area Council (MAAC[e]) region, it does not provide a breakdown at the state level.

The PJM Load Forecast Model employs econometric multiple regression processes to estimate and produce 15-year monthly peak demand forecasts assuming normal weather for each PJM zone and the RTO as a whole. The model incorporates three classes of variables: (1) calendar effects, such as day of the week, month, and holidays, (2) economic conditions, and (3) weather conditions across the RTO (Reference 8.2-4). The model is used to set the expected peak loads for capacity obligations, for reliability studies, and to support transmission planning. PJM uses gross metropolitan product (GMP)[f] in the econometric component of its forecast model to

[e] The Middle Atlantic Area Council (MAAC) region as defined by EIA includes NJ, northeast PA, and NY.

[f] GMP is defined as the market value of all final goods and services produced within a metropolitan area in a given period of time.

account for localized treatment of economic effects within a zone. Ongoing economic forecasts for all areas within the PJM market area are also inputs into the analysis. Weather conditions across the region are considered by calculating a weighted average of temperature, humidity, and wind speed as the weather inputs. PJM has access to weather data from approximately 30 weather stations across the PJM area (Reference 8.2-4). All non-coincident peak (NCP)[g] models used GMP and coincident peak (CP) forecasts and were modeled as zonal shares of the PJM peak. PJM incorporates estimates of load management, energy efficiency and distributed generation to supplement the base forecast. This accounts for changes in energy use resulting from actions taken to achieve the 2011 NJEMP goal to reward energy efficiency and energy conservation and reduce peak demand. Forecasted power needs within the RSA are based on the PJM peak load and energy forecast. The PJM CP and zonal NCP forecasts are published in the annual PJM Load Forecast Report (Reference 8.2-2).

PJM develops 15-year monthly energy forecasts assuming normal weather for each PJM zone and the RTO. These forecasts are used to meet reporting requirements for NERC and the Federal Energy Regulatory Commission (FERC). The methodology used for these forecasts is the same as the load forecast model except that the dependent variable of the econometric model is daily energy consumption instead of daily peak load.

The analysis to determine power and energy requirements has been adapted to use the available data to determine the energy and capacity forecasts for NJ in Subsection 8.2.1.2. PJM does not forecast hourly loads or load duration curves. In addition, forecasts of residential, commercial and industrial loads are not prepared. Load and energy forecasts are not available from electric distribution companies operating within NJ, because load forecasts have been characterized by FERC as market information that may not be shared with merchant generators. To develop these projections, PSEG obtained historical energy forecasts from published PJM Load Forecast reports and compared them to historical annual energy consumption in NJ. Peak load forecasts and actual peak loads could not be compared because weather normalized peak load data are not available. Figure 8.2-1 compares the annual NJ energy for 1999 to 2008 (available on the PJM website, References 8.2-5 and 8.2-6) with forecasts for each year prepared from 1999 through 2008. Based on this comparison, the annual error for PJM energy forecasts is estimated to be 2.0 percent over the ten years from 1999 to 2008. Load forecasts were compiled by PJM from forecasts supplied by member companies from 1999 to 2005 and produced by PJM thereafter to maintain independence from market participants and to improve forecast accuracy (Reference 8.2-3). Energy forecasts were not included in the published Load Forecast reports for 2006 and 2007 and are not available from PJM.

The process conducted by PJM is responsive to forecasting uncertainty. Through its annual load forecast development, changes in economic inputs affecting the forecasted loads are made. For example, the 2009 Load Forecast showed a reduction in forecasted peak load and energy due to the effects of the recession beginning in 2008 (Reference 8.2-4). By incorporating recent load history into its econometric model, trends such as the potential load growth associated with plug-in electric vehicles is captured in the PJM load forecast methodology.

[g] The non-coincident peak is the peak load of the zone. The coincident peak is the load of a zone, coincident with one of the five highest loads used in the weather normalization of the PJM seasonal peak.

PJM serves to maintain the bulk electricity power supply system reliability for 13 states and the District of Columbia and therefore is accountable for developing the peak load and energy forecast for NJ and the region. The annual peak load and energy report produced and published by PJM provides sufficient detail to accurately forecast load and energy requirements for NJ, and is the only publicly available forecast for NJ. The PJM forecast is the appropriate basis for the need for power analysis because it is:

(1) Systematic: The PJM forecast process is documented in PJM Manual 19, Load Forecasting and Analysis. The forecast is developed annually and is reviewed by market participants and stakeholders through the PJM committee system. PJM's forecast methodology is routinely assessed by stakeholders and independent parties to ensure its accuracy.

(2) Comprehensive: The PJM forecast covers the four local distribution companies (LDCs) in NJ and considers the relevant factors driving peak loads and energy, including calendar, weather, and economic input variables.

(3) Subject to confirmation: The PJM forecast is reviewed by both PJM's Load Analysis Subcommittee and Planning Committee to ensure the accuracy of the forecast. A third party review of the PJM forecast concluded that the PJM forecasts for the summer of 2006 were generally consistent with EDC forecasts, what are developed independently.

(4) Responsive to forecasting uncertainty: A distribution of NCP forecasts is produced using a Monte Carlo simulation process based on observed historical weather data. The median result is used as the base (50/50) forecast; the values at the 10^{th} percentile and 90^{th} percentile are assigned to the 90/10 weather bands. Changing economic conditions and energy usage as a result of energy efficiency and demand response programs are captured through updating of inputs in the annual forecasting process.

8.2.1.2 Forecasts of Energy and Capacity

This section presents the historical energy and demand from 1999 to 2008 and the 2008 PJM forecast from 2009 to 2024 for annual energy and peak summer loads. In addition, a comparison of the forecast to historical actual values is presented for 2009 to 2011, and a revised forecast presented for 2021 based on the 2012 PJM forecast. The 2009 projected peak load within the RSA, as determined in the 2008 load forecast report, was 20,200 MWe; the actual peak load was 18,400 MWe, reflecting the impact of the recession. The actual 2010 and 2011 peak loads of 20,480 MWe and 20,900 MWe were only 2-3 percent lower than the forecasted peaks of 20,620 MWe and 21,330 MWe, respectively. The 2008 PJM forecasted peak demand in 2021 was 24,400 MWe. The 2012 PJM forecast for 2021 peak demand is 21,180 MWe, reflecting an expectation of slow growth in peak demand in NJ through the remainder of this decade. From a gross energy perspective, the 2012 forecasted energy use in 2021 is 95,300 gigawatt-hours (GWh), an increase of 14,700 GWh over the actual usage in 2009.

The need for additional baseload capacity in NJ can be established by comparing the 2012 PJM load forecast described in this section to the available NJ power supply described in Section 8.3. This comparison, described in Section 8.4, identifies a definitive need for baseload capacity in NJ in 2021 that can be provided by the new plant.

Figure 8.2-2 shows the actual and forecast energy requirements for NJ based on the 2009 PJM forecast (Reference 8.2-2). Energy consumption grew at an annual rate of 1.8 percent from 1993 to 2005, but fell at an annual rate of 0.9 percent from 2005 to 2008. The forecast projected energy requirements to grow at an annual rate of 2.9 percent from 2008 to 2012 as the economy recovers, and in the long term at an annual rate of 1.2 percent from 2012 to 2024. The growth rate forecast for energy consumption of 1.2 percent from 2012 to 2024 is lower than the historical growth rate of 1.8 percent before the 2008-2009 recession, and reflects the economic forecast driving the 2009 PJM load forecast.

Figure 8.2-3 shows the actual and forecasted peak hourly load for NJ. The forecasted peak load is projected to always be in the summer months. The peak load grew at an annual rate of 2.2 percent from 1993 to 2005. From 2005 to 2008, the annual peak load fell at an annual rate of 0.6 percent, reflecting the impact of the economic recession. The peak load is projected to grow at an annual rate of 2.4 percent from 2008 to 2012 as the economy recovers and, in the long term, at an annual rate of 1.1 percent from 2012 to 2024. The subsequent 2012 load forecast shows an average growth rate of slightly less than 1.1% for the four LDC's within NJ.

Table 8.2-1 shows the historical and forecast load factor for NJ for 1993 to 2024. The actual and forecasted annual load factor is calculated using the peak load and energy forecasts. The annual load factor is the ratio of the average load supplied in a year to the peak load occurring in that period. Changes in load factor are an indication of whether growth in the demand for electricity is primarily in the peak hour periods or generally affecting all hours. The forecasted load factor is nominally constant at 48.9 percent to 49.8 percent, indicating that the load duration curves for forecast years can be assumed to be nominally constant.

Figure 8.2-4 shows the load duration curves for 2003 through 2008 compiled from PJM hourly load data for NJ (Reference 8.2-19). An average load shape is constructed from the load duration curves for 2003 through 2008 by expressing the average hourly load at each percentile on the load duration curve as a percentage of the annual energy. The load duration curve for future years is developed by applying these percentages to the forecasted annual energy. Figure 8.2-4 shows the load duration curve for 2021 based on this approach using the 2021 energy projection in the 2009 load forecast

Figure 8.2-5 shows the historical and forecasted average hourly load, minimum hourly load and minimum of the daily maximum hourly loads of each year. The average load is the annual energy divided by the number of hours in the year. Historical data are analyzed to determine the minimum load during the year and the minimum of the 365 daily peak loads each year. The forecasted minimum load and the minimum of daily maximum load are estimated using the forecasted load duration curves illustrated in Figure 8.2-4. A review of 2003 to 2008 hourly data shows that the minimum of daily maximum loads ranged from 68 percent to 76 percent on the load duration curves for each of these years. Based on analysis of the updated 2012 load forecast, the forecasted minimum of daily maximum loads is estimated to be the 71st percentile on the load duration curve (Reference 8.2-24). The average annual growth rate of the average load, minimum load, and the minimum of daily maximum loads is 1.6 percent for 2009 through 2024 (Figure 8.2-5).

Forecasted Baseload Demand

Given that PJM only forecasts peak and gross energy demand and does not project the demand for baseload power, the forecast minimum of daily maximum loads is used to serve as the basis for determining future baseload demand. The minimum of the daily maximum load is the basis used by PJM for how load serving entities (LSEs)[h] are allocated auction revenue rights (ARRs) in the annual allocation process (Reference 8.2-22). Stakeholders within PJM (transmission customers, market participants, etc.) have agreed that the baseload level, as defined as the minimum of the daily maximum loads, is the level up to which network customers are guaranteed ARRs.

Baseload demand is defined in the PJM load forecast as the average peak load on non-holiday weekdays with no heating or cooling load (Reference 8.2-23). However, insufficient publicly available data exists to estimate baseload demand using this definition. Defining baseload demand as the minimum of the daily maximum load is a reasonable substitute for the PJM load forecast definition and can be estimated with publicly available data. Based on this definition of baseload demand and its average occurrence at the 71st percentile on the load duration curve, the 2012 PJM load forecast is used to determine a 2021 demand for baseload power of 11,000 MWe.

To summarize the overall energy needs in NJ, the forecast peak demand in 2021, based on the latest PJM load forecast, is 21,180 MWe. The forecasted energy use in 2021 is 95,300 GWh, an increase of 14,700 GWh or 18 percent for the period 2009 to 2021. These forecasts are used to establish a baseload demand, defined as the minimum of daily maximums, forecasted to 2021 based on the expected growth in energy usage. This demand for baseload power is projected to be 11,000 MWe in 2021. Section 8.4 compares the overall baseload demand to the available baseload resources to identify a need for the baseload capacity that can be provided by the new plant.

8.2.2 FACTORS AFFECTING POWER GROWTH AND DEMAND

This section describes several factors affecting the growth of electricity demand in NJ, including economic and demographic trends, substitution effects, energy efficiency and demand side management programs, and price and rate structures. In each case, the effects are incorporated indirectly through the econometric model used to prepare the PJM load forecast, or, in the case of energy efficiency programs, directly through explicit bidding of energy efficiency or demand side management programs into the PJM Reliability Pricing Model (RPM) auction. The RPM process is more fully described in Section 8.3.

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[h] A Load Serving Entities (LSE) is any entity, including a load aggregator or power marketer that (a) serves end-users within the PJM Control Area, and (b) is granted the authority or has an obligation pursuant to state or local law, regulation or franchise to sell electric energy to end-users located within the PJM Control Area.

8.2.2.1 Economic and Demographic Trends

As discussed in Subsection 8.2.1.1, the PJM load forecast for NJ is driven by three factors; calendar effects, economic and demographic trends, and weather variations, with economic and demographic trends having the most significance in the period of interest. This section provides background on economic and demographic trends that impact the load forecast. The Econometric model and its supporting data used by PJM's consultant (Moodys) for load forecasting is proprietary and not publicly available. However, an estimate for the economic and demographic trends within NJ is prepared based on publicly available information. The trends identified from the publicly available sources support the PJM load forecast for growth in electricity demand identified in Subsection 8.2.1.

New Jersey economic trends are examined using historical gross domestic product (GDP) (Reference 8.2-13). Historical data are used because data used to support PJM load forecasting are not publicly available. Figure 8.2-6 shows that about half of NJ's economy is dependent on services such as professional, scientific, technical, health care, and finance and insurance services. The remainder of GDP is split roughly equally among trade, government and construction, manufacturing, utilities, with less than one percent dependent on farming. Historical data for NJ indicate an average annual GDP growth rate of 4.2 percent from 1997 to 2008. Table 8.2-2 shows the annual GDP for NJ from 1997 to 2008.

Historical population trends and projections are available for the NJ from the U.S. Census Bureau (Reference 8.2-12). The NJ population grew at an annual rate of 0.9 percent between the 1990 and 2000 census years, from 7,700,000 in 1990 to 8,400,000 in 2000. The estimated population in 2008 was 8,700,000. Table 8.2-3 shows the historical and forecasted annual population growth rates for NJ. While Table 8.2-3 shows that the Census Bureau projects that NJ will experience population growth over the next 20 years, the state's population growth rate is forecasted to slow from 0.6 percent per year for 2005 to 2010 to 0.3 percent per year in 2025 to 2030.

Historical personal income data are available for the NJ from the Bureau of Economic Analysis (Reference 8.2-13). Figure 8.2-7 shows the personal income for NJ has increased during the 1993 to 2008 period. The average annual income growth rate was 4.4 percent over the 15-year period.

In summary, the PJM load forecast for NJ is substantially driven by economic and demographic trends. Economic data used by PJM for load forecasting is not publicly available; however, economic and demographic trends identified from publicly available sources identified above support PJM's forecasted growth in electricity demand identified in Subsection 8.2.1.

8.2.2.2 Substitution and Energy Efficiency

This section reviews substitution effects and energy efficiency programs in NJ, and how these effects are incorporated into the PJM load forecast. The estimates of the need for baseload capacity in Section 8.4 are based on the PJM load forecast; therefore these effects are incorporated into the need for power analysis. The regional investments in alternative energy projects and efficiency described in this section have produced results in terms of additional electrical production and net reduction in electrical demand. The effect of these results are reflected in and carried through subsequent peak load and energy forecasts developed by PJM.

The discussion below provides background information on alternative energy and energy efficiency initiatives in the RSA.

Current Pattern of Electricity Use

Table 8.2-4 shows that NJ commercial and transportation energy use per customer was greater than the national average. NJ ranks ninth among the 50 states and District of Columbia in commercial energy consumption, and eleventh in transportation use. Table 8.2-4 also shows that NJ residential and industrial use per customer was less than the national average.

Substitution

Substitution describes the effects of changes in relative prices of electricity and alternative fuels on consumption. For example, a decrease in the price of electricity might cause consumers to switch from natural gas to electricity for residential heating, because electricity use for home heating has become relatively inexpensive, and vice versa. The costs of conversion, such as replacement of home heating equipment, must be considered in determining the long term impact on consumption. The effect of substitution is inherent to an econometric model as used by PJM to develop its regional load forecasts.

Energy Efficiency, Demand Response and Renewables

Energy conservation and use of renewable energy sources, such as solar photovoltaic (PV) are being promoted as a replacement for electricity produced from thermal sources within NJ as well as imported from outside of NJ. In an effort to enact energy conservation measures and reduce energy demand, several government and corporate programs have been established. These can be characterized as (1) energy efficiency programs designed to permanently reduce the consumption of energy by residential, commercial and industrial users; (2) demand side management (DSM) programs, designed to reduce peak power demand by temporarily reducing load or by shifting peak period load to off-peak periods; and (3) distributed generation programs, designed to encourage the use of renewable technologies by end users to self-supply some of their electricity need.

The effect of these programs on future projections of power needs has been incorporated into PJM planning indirectly through the development of its load forecast and directly through the bidding of Energy Efficiency (EE) and Demand Response (DR) resources into the annual RPM auctions. As described in Subsection 8.2.1.1, PJM uses an econometric modeling approach to forecasting of future peak power demand and energy use. Energy efficiency, DSM and distributed generation programs affect the forecast to the extent that the historical data used to develop the econometric model reflects the impact of the programs. As discussed in Section 8.3, the EE and DR resources that clear the RPM auction become part of the regional power supply and reduce the need for additional generation. Both these effects, indirectly through the load forecast and directly through the supply forecast, are incorporated into the need for power forecast discussed in Section 8.4.

State Sponsored Energy Efficiency and DSM Programs

New Jersey released an Energy Master Plan in December 2011 that outlines a strategy for developing an adequate, reliable energy supply of electricity that keeps up with the growth in demand. The major energy conservation goals of the Energy Master Plan are: (1) Maximize energy conservation and energy efficiency by reducing energy consumption at least 20 percent by 2020 using 1999 energy consumption as the baseline; and (2) Reduce peak electricity demand to 18,000 MWe by 2020, a reduction of 3,364 MWe relative to the 2011 PJM load forecast (Reference 8.2-10).

New Jersey's Clean Energy Program™, administered through the New Jersey Office of Clean Energy, is a New Jersey Board of Public Utilities (NJBPU) initiative that provides education, information, and financial incentives for energy efficiency measures. New Jersey's Clean Energy Program is a statewide program that supports technologies that save electricity and natural gas and increase the amount of electricity generated from renewable resources. The Program establishes a set of objectives and measures to track progress in reducing energy use while promoting increased energy efficiency. Each year, the program provides an average of $145 million in financial incentives, programs, and services to residential customers, businesses, schools, and municipalities that install energy efficient and renewable energy technologies.

PSE&G has explored various disciplined investments and implemented programs to address the NJ state goals regarding energy efficiency in the following manner (Reference 8.2-7):

Residential Programs

- Residential Whole House Efficiency
- Residential Programmable Thermostat Installation Program

Industrial/Commercial Program

- Small Business Direct Installation Program (over 4 years)
- Large Business Best Practices and Technology Demonstration Program
- Hospital Efficiency Program

PSE&G's Energy Efficiency Economic Stimulus Initiative also includes the following (Reference 8.2-8):

Residential Programs

- Residential Whole House Efficiency Program
- Multi-Family Housing program

Industrial/Commercial Programs

- Small Business Direct Install Program
- Municipal/Local/State/Government Direct Install Program
- Hospital Efficiency Program
- Data Center Efficiency Program
- Building Commissioning/O&M Pilot Program
- Technology Demonstration Program

In July 2009, PSE&G received NJBPU approval for $190 million in energy efficiency projects. The energy efficiency program is part of nearly $1.7 billion in spending planned by Public Service Enterprise Group to expand its investment in energy efficiency programs. The efficiency plan results in a slight rate increase for PSE&G customers. The energy efficiency projects include residential customers, businesses and government projects (Reference 8.2-1).

In addition, AE and JCP&L have plans to support 61 MW of solar energy projects and increase the New Jersey renewable energy portfolio by seeking proposals for solar renewable energy certificates (References 8.2-20 and 8.2-21).

Distributed Generation

In July 2009 the NJBPU approved a PSE&G request to invest $515 million through 2013 to install, own and operate up to 80 MWe of solar photovoltaic cells in the state. This initiative includes the world's largest installation of solar panels on utility poles. New Jersey currently ranks second in the nation behind California in installed solar capacity. The new PSE&G program is intended to demonstrate that renewable resources can be deployed at a reasonable cost even in less-than-sunny states. The 200,000 pole-mounted PV systems total 40 MWe of solar energy capacity. (Reference 8.2-11). Through the American Recovery and Reinvestment Act and other government grants, several small-scale PV installations are planned across NJ in locations such as landfill sites, hydropower plants and on rooftops. The solar generation installations described above are not capacity resources that are included in PJM's annual Reliability Pricing Model (RPM) auctions. In this application, solar generation acts as an offset to demand and is not taken into account in the generation profile statistics presented in Figure 8.3-1.

The PSE&G Solar Loan program supports solar PV installation, which may be considered a distributed generation system, on residential, commercial or industrial rooftops or other similar flat surfaces. The Solar Loan program was developed to help achieve the aggressive NJEMP goal to meet 22.5 percent of the state's electricity needs with renewable energy sources by the year 2021. The Solar Loan program also aligns with the NJEMP goal of fulfilling 70 percent of the State's electric needs from "clean" energy sources by 2050. Under the PSE&G Solar Loan program, PSE&G has committed approximately $105 million towards financing the installation of solar power systems over the next two years. The program is intended to reduce the overall cost of project development, installation, financing and maintenance, while providing the best solar energy value for stakeholders. The borrower is able to repay the loans with Solar Renewable Energy Credits (SRECs) or cash. Loans will be granted on a first come, first served basis until the funds are expired. The loans are intended to provide financing for a portion of the overall project cost (Reference 8.2-9).

Under the Federal Energy Policy Act of 2005 (EPACT 2005) a rebate program was established for dwellings and small businesses that install energy efficient systems in their buildings. The rebate was set at the lesser of $3000 or 25 percent of the expenses. EPACT 2005 authorized $150 million for 2006 and up to $250 million in 2010. According to the Act, renewable energy sources included geothermal, biomass, solar, wind, or any other renewable energy used to heat, cool, or produce electricity for a dwelling (Reference 8.2-14). This new act was established to encourage homeowners and small businesses to become more aware of energy efficient technologies.

8.2.2.3 Price and Rate Structure

The effect of price and rate structures has been implicitly incorporated into the PJM load forecast through econometric modeling. Price and rate structures at the retail level can affect electricity consumption by end users. In the traditional model of state regulation of retail prices, rate structures proposed by vertically integrated utilities can have significant influence on consumption patterns. However, in a region such as NJ, where wholesale electricity prices are determined by market outcomes and retail shopping is permitted, the traditional model of state regulation of rates for end users has been replaced by varying degrees of wholesale and/or retail competition. A summary of the status of the restructuring of retail electric services in NJ is provided in Section 8.1.

8.2.3 SUMMARY

The effect of electricity prices and alternative fuel prices on electricity demand are included in the economic forecast upon which the PJM load forecast is based. The effect of energy efficiency programs on future projections of power needs has been incorporated into PJM planning indirectly through load forecast development and directly through the bidding of EE and DR into the annual RPM auctions. The above described regional investments in efficiency and alternative energy projects have produced results in terms of additional electrical production and net reduction in electrical demand. The effect of these results are included in and carried through subsequent peak load and energy forecasts developed by PJM. In addition to the above described EE and DR efforts, the effects of economic and demographic trends, and substitution, as well as price and rate structure impacts on NJ's electricity consumption are incorporated into the PJM load forecast and in its power supply forecast.

The PJM load forecast described in Section 8.2 is analyzed to determine the forecast demand for baseload power in 2021. This baseload forecast is based on PJM's assessment of baseload being defined as the minimum of maximum daily loads for a given year. This minimum of daily maximum load is projected to future years based on PJM's energy forecast to determine a 2021 baseload demand of 11,000 MWe. This need for baseload power is compared to the available NJ baseload power supply described in Section 8.3 to determine the need for additional baseload capacity. This comparison of projected supply and demand, performed in Section 8.4, identifies a definitive need for baseload power that will be provided by the new plant in 2021 and beyond.

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Table 8.2-1
Historical and Forecast Load Factor, New Jersey, 1993 to 2024

Year	Historical Load Factor	Year	Historical Load Factor	Year	Forecast Load Factor	Year	Forecast Load Factor
1993	51.0%	2001	48.7%	2009	48.9%	2017	49.4%
1994	53.0%	2002	49.0%	2010	48.9%	2018	49.5%
1995	50.6%	2003	50.7%	2011	48.9%	2019	49.5%
1996	56.3%	2004	54.3%	2012	49.2%	2020	49.7%
1997	49.3%	2005	48.7%	2013	49.1%	2021	49.5%
1998	51.3%	2006	45.3%	2014	49.3%	2022	49.6%
1999	49.1%	2007	50.3%	2015	49.3%	2023	49.6%
2000	53.1%	2008	48.2%	2016	49.5%	2024	49.8%

Load factor = annual energy use in New Jersey / (peak New Jersey load x 8760 hours).
Energy use and peak load values taken from Reference 8.2-6.

Table 8.2-2
Annual Gross Domestic Product (GDP), New Jersey – 1997 to 2008

(In millions of dollars)

Year	GDP	Year	GDP
1997	$300,910	2003	$389,077
1998	$314,117	2004	$410,096
1999	$327,263	2005	$425,455
2000	$344,824	2006	$445,738
2001	$362,987	2007	$461,295
2002	$372,754	2008	$474,936

Reference 8.2-13

Table 8.2-3
Historical and Forecast Annual Growth Rate of Population, New Jersey, 1990 to 2030

	Actual			Forecast			
	1990-2000	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030
New Jersey	0.9%	0.8%	0.6%	0.5%	0.4%	0.4%	0.3%

Reference 8.2-12 (2009 Forecast)
Reference 8.2-18 (Historical)

Table 8.2-4
Energy Consumption by Customer Class, New Jersey - 2007

	Annual Use in 2007 Per Customer (kWh)				National Rank			
	Residential	Commercial	Industrial	Transpor-tation	Residential	Commercial	Industrial	Transpor-tation
NJ	8765	87,719	811,032	41,857,143	38	9	37	11
U.S.	11,232	76,900	1,294,879	10,897,333				

Reference 8.2-15

8.3 POWER SUPPLY

On a day to day basis, the load in the RSA is supplied by the amount of power generated in NJ, plus the amount of power that can be imported into NJ, less the amount of power that can be exported. Power is imported into the RSA from western PJM to meet the projected power demand and the expansion of exports to New York City and Long Island. Additional exports to NY and Long Island will result from current and planned merchant transmission projects between NJ and NY such as the Neptune transmission line project and the Linden Variable Frequency Transformer (VFT) project described later in this section. The aggregate power supply is negatively affected by the likely increase in deactivation and retirement of generation resources in the foreseeable future due to heightened environmental emission costs and constraints, including potential regulatory constraints on emission of carbon dioxide.

New Jersey's generation resources were determined using data obtained in 2009 from PJM's Reliability Pricing Mode (RPM) auctions (Reference 8.3-7), generator deactivations (Reference 8.3-6), and generation interconnections and upgrades (Reference 8.3-5). These information sources were reviewed in 2012 to determine if there were any changes in NJ's projected generating resources since the 2009 analysis. An updated composition of NJ generation sources in noted later in this section.

The RPM was developed by PJM to ensure adequate capacity resources are available to provide reliable service to loads within the region. Capacity resources in the auction include planned and existing generation resources, planned and existing DR and EE resources, and merchant transmission projects (Reference 8.3-8):

- Generation resources may consist of existing generation, planned generation (new and increases in capacity to existing generation), and bilateral contracts for unit-specific capacity resources.

- DR are load management products by which the resource provider can reduce the metered load, either manually or automatically. DR must be interruptible up to ten times per year for up to six hours per interruption during the peak hours.

- EE resources are projects that achieve a permanent, continuous reduction in electricity consumption that is not included in the load forecast. EE resources may participate in RPM auctions for up to four consecutive years, after which the impact of the resource will be incorporated into the PJM load forecast via econometric modeling. EE resources involve the installation of more efficient devices and equipment, or the implementation of more efficient process and systems, exceeding then-current building codes, appliance standards, or other relevant standards (Reference 8.3-8).

- Merchant transmission projects are projects that increase import capability into a constrained region of PJM or across RTO interfaces.

Base residual auctions are held three years before the beginning of the delivery year when supply offers are cleared against demand. The RPM develops a long term pricing signal for capacity resources and load serving entity (LSE) obligations that is consistent with the PJM RTEP process (Reference 8.3-8). These pricing signals are intended to spur development of additional capacity resources to meet the projected demand.

PJM's existing and planned power supply portfolio consists of nuclear, fossil, renewable, demand and energy efficiency resources, and others. Table 8.3-1 is developed from available PJM data (Reference 8.3-9), and shows a breakdown of NJ's generation resources by fuel type that qualified for the RPM base residual auction through 2013, the last year of the most recent RPM auction in the year the need for power analysis was originally developed. The MWe values in the table reflect the summer installed capacity rating of the units in the region. The table includes generator deactivations and new generator interconnections, including generator upgrades, from the PJM queue-based interconnection process. The table also includes demand and energy efficiency resources within NJ that cleared the Base Residual Auction, and excludes supply resources outside the state such as qualified transmission upgrades. A unit level breakdown of Table 8.3-1 is provided per NUREG-1555 requirements in Appendix 8A. Average variable cost data for the units are not publicly available.

Table 8.3-1 does not include the supply resources that did not clear the RPM Auction. The amount of such resources not clearing the auction in the EMAAC region each year up through the 2011-12 auction has been no more than about 3100 MWe or ten percent of the generation that cleared, and is usually four percent or less (Reference 8.3-10). New Jersey, in which about half of the EMAAC resources are located, would have a similar proportion of un-cleared capacity. Information regarding un-cleared resources specific to NJ is not publicly available. Un-cleared offers can be bid in subsequent Incremental Auctions in which resources can be procured to satisfy potential changes in market dynamics that are known prior to the beginning of the delivery year. Un-cleared capacity also may be sold for export on a short term contract basis from NJ to other PJM regions or NYISO, the independent system operator for the state of New York. There are no known long term (ten years or longer) contracts obligating these resources to serve load outside of NJ, or obligating unit capacity outside of NJ to serve NJ's load.

The current portfolio of NJ generating resources consists largely of fossil fuels, which give rise to growing concerns regarding emissions and greenhouse gasses. Figure 8.3-1 compares the breakdown of NJ resources by fuel type for 2009-2010 and 2012-2013 (Reference 8.3-9). DR and EE resources increase from one percent of supply in 2009-2010 to 5 percent of supply in 2012-2013. Most of this increase resulted from the elimination of the Interruptible Load for Reliability (ILR) product from the auction[i] (Reference 8.3-2). The combined amount of nuclear and fossil resources increased from 2009-2010 to 2012-2013 (Table 8.3-1), but decreased for each resource as a percentage of supply due to load growth (Figure 8.3-1). Renewable generation percentages essentially remain the same over this time period as shown in Figure 8.3-3. Although PSE&G has committed the funds to install, own and operate an additional 80 MW of solar PV cells in NJ, the type of solar power being installed, distributed generation such as solar panels on utility poles, is not a capacity resource that must be included in the RPM Auction process. Long term fuel availability issues that limit capability of the resources shown in Table 8.3-1 are not anticipated. Figure 8.3-2 and Figure 8.3-3 compare a breakdown of the Table 8.3-1 NJ capacity for fossil resource and renewable resources, respectively, for 2009-2010 and 2012-2013. The breakdown of fossil and renewable resources does not change

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[i] The Interruptible Load for Reliability (ILR) was a capacity resource that was not offered into the RPM auction, but received the final zonal ILR price after the close of the auction.

significantly over time. Statistics for 2009-2010 indicate that NJ has a diversified fossil portfolio of 63 percent natural gas, 11 percent dual fuel (natural gas and other, coal and other), 15 percent coal, 9 percent oil, and the remaining 2 percent diesel fuel oil (DFO), residual fuel oil (RFO), kerosene, and diesel. The renewable portfolio shown for 2009-2010 is comprised mostly of hydro resources (68 percent pumped storage [capacity while generating] and 1 percent conventional hydro), 7 percent landfill gas (LFG), and 24 percent municipal solid waste and municipal solid biogenic waste (MSW and MSB, respectively). The amount of renewable resources is projected to increase marginally in 2012-2013 and consequently does not increase the relative share of renewable resources in NJ.

The resources included in Table 8.3-1 are further characterized by duty in Table 8.3-2 (Reference 8.3-9). Baseload, intermediate, and peaking capacity resources are differentiated by the historical capacity factor of the generation technology and/or fuel source for 2008-2009. Baseload resources are those that operated with a capacity factor greater than 75 percent. EE resources are assumed to be baseload resources due to their constant net reduction in energy usage. Intermediate resources are those that operated with a capacity factor greater than 15 percent and less than 75 percent. Peaking resources are those that operated with a capacity factor of less than 15 percent. DR resources are assumed to be peaking resources because they are interruptible and typically called upon during peak hours. Figure 8.3-4 compares a breakdown of resources by duty for 2009-2010 and 2012-2013. There is little change in the breakdown of baseload, intermediate and peaking resources forecasted in NJ.

Since 2003, a number of factors have continued to challenge system reliability in NJ. These factors include load growth, power exports to New York City and Long Island, deactivation and retirement of generation resources, modest development of new natural gas fired generation facilities due to low natural gas prices and retirement of coal fired generation due to heightened environmental regulations, and reliance on transmission to meet load deliverability requirements and to obtain access to economical, yet CO_2 intensive, sources of power from the west (Reference 8.3-4). On an annual basis NJ imports more than half of its baseload power needs.

Updated 2012 information on deactivation and retirement of generation resources shows an increased number of retirements of fossil and nuclear units. Almost 3,000 MWe of existing NJ generating capacity is projected to be retired by 2019. The 637 MWe OCGS, a baseload resource, will be decommissioned starting in 2019. PJM anticipates another 2,300 MWe of NJ generation deactivations through 2015, composed of natural gas, oil, kerosene, coal and landfill gas resources. Older fossil-fueled plants in NJ as well as in other areas of PJM are coming under increasing economic pressure caused by age, lower prices for natural gas relative to petroleum liquids and coal, and stricter environmental regulations. Fossil fueled power plants such as coal, oil and kerosene fueled units typically must add both FGD and SCR equipment to reduce emissions. This will require millions of dollars of pollution control modifications to the plants. Generating companies, will in many cases, choose to shutdown rather than incur the added expense of these modifications.

Updated 2012 information on new capacity additions also shows an increased amount of new generation planned in NJ. NJ's LCAPP has resulted in three new natural gas fired combined cycle generation projects totaling 1,949 MWe of projected intermediate generating resources. NJ supports solar photovoltaic and offshore wind energy development. Approximately 1,780 MWe of solar are in the active or under-construction phases and 1,440 MWe of wind projects are in the analytical phase in PJM's generation interconnection queues. The NJ Renewable

Portfolio Standard (RPS) requires that retail suppliers procure 22.5 percent of electricity sold in NJ from qualified renewable resources by 2021. The 2010 Solar Energy Advancement and Fair Competition Act imposes a separate obligation to procure an increasing amount from in-State solar resources, reaching 2518 GWh by 2021. The 2010 Offshore Wind Economic Development Act calls for at least 1100 MWe of offshore wind generation on the outer continental shelf hear NJ. It is important to note that capacity additions presented by renewables are intermittent resources and do not provide baseload capacity. Other capacity additions include the natural gas repowering of the B. L. England coal and oil fired plant, increases in energy efficiency and demand response resources that have cleared recent PJM capacity auctions and an increase in capacity allocation for PSEG's Hope Creek Nuclear Plant.[j]

Table 8.3-3 shows the forecasted composition of NJ generation resources by fuel type in 2021, the planned commercial operation date for the new plant, and in 2018 and 2024, three years before and after, respectively. The updated forecast is based on the PJM auction results reflected in Table 8.3-1 and the updated information on deactivation and retirement of generation resources and capacity additions. Table 8.3-3 shows 18,574 MWe of capacity in NJ in 2021, an increase of about 450 MWe from 2012-2013. Nuclear capacity is reduced due to the retirement of Oyster Creek. Capacity from DR and EE is increased based on the most recent RPM auction results and renewables are projected to increase to meet NJ RPS targets. The amount of fossil resources is almost unchanged, with capacity additions approximately offsetting generation deactivations and retirements.

Though not directly accounted for in load growth forecasts, exports across new merchant transmission facilities to New York City have the same impact as a new load in New Jersey. Beginning in 2007, the Neptune Regional Transmission System (NEPT) interconnected with Northern NJ at the Sayreville substation. In 2009, the Linden Variable Frequency Transformer (VFT) interconnected with Northern NJ at the Linden substation. Updated 2012 information shows that an additional merchant transmission project, the Hudson Transmission Project (HTP) is active in PJM's interconnection queue and will interconnect with Northern NJ at the Bergen substation. The combined potential of these three projects is about 1,650 MWe of exports from Northern NJ to New York City and Long Island (Reference 8.3-4). In 2008, 6938 GWh were exported via the NYISO interface and 5133 GWh were exported via the NEPT interface from the PJM region (Reference 8.3-1). The NEPT interface had a capacity factor of 89 percent in 2008.

One major new backbone transmission facility has been approved by the PJM Board to resolve NERC reliability criteria violations in the MAAC sub-region. The SR 500 kV transmission line creates a strong link from generation sources in northeastern and north-central PA, across northeastern PA and into NJ. The line could also be extended from Susquehanna at its western end to integrate large clusters of wind powered generation including those under consideration in the mid-western United States. Due to lower load growth, the installation of new intermediate and peaking gas fired power plants, and the increase in demand response programs, the PJM Board cancelled the 500 kV circuit MAPP and the 765 kV PATH projects on August 27, 2012. These projects were designed to increase the capability to transfer power from western PJM

[j] PSEG Nuclear has requested a 50 MWe increase in PJM capacity rights to recognize the final net increase in capacity resulting from the Hope Creek extended power uprate completed in 2008.

into the EMAAC, of which NJ is a part (Reference 8.3-3). Consequently, imports of baseload capacity from western PJM to NJ cannot be substantively increased without causing increased congestion, higher power prices, and potential reliability issues.

Overall, the 2009-2010 power supply within NJ is 17,235 MWe, and is projected to increase about 900 MWe by 2012-2013 (Table 8.3-2). Most of the increase results from changes in the PJM market that allow more demand side management resources and energy efficiency programs to be bid into the market with the addition of peaking and intermediate resources. Only 140 MWe of the supply increase by 2012-2013 are considered baseload resources (i.e., operate at a capacity factor of 75 percent or greater). By 2021, baseload resources will decrease by 570 MWe due to the retirement of Oyster Creek, offset by an increase in capacity allocation at Hope Creek, and increased landfill gas and energy efficiency resources. Imported baseload resources are secured as part of RPM to meet the required demand as necessary. The available NJ power supply described in this section is compared to the PJM load forecast, as described in Section 8.2. This comparison, performed in Section 8.4, identifies a need for the baseload capacity that can by provided by the new plant.

8.3.1 REFERENCES

8.3-1 Monitoring Analytics LLC, 2008 State of the Market Report for PJM, March 11, 2009.

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8.3-3 Pepco Holdings, Inc. News Release, “PJM Reinforces MAPP Need; Adds Year to Schedule,” May 19, 2009.

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8.3-7 PJM Interconnection, LLC, PJM Reliability Pricing Model, website http://www.pjm.com/markets-and-operations/rpm.aspx, accessed December 7, 2009.

8.3-8 PJM Interconnection, LLC, PJM Manual 18, “PJM Capacity Market”, Revision 7, August 18, 2009.

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8.3-10 The Brattle Group, “Review of PJM’s Reliability Pricing Model,” June 30, 2008.

Table 8.3-1
Generation Resources by Fuel Type, New Jersey – 2007-2008 to 2012-2013

Fuel	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Nuclear (MWe)	3984	3984	4012	4082	4112	4108
Fossil (MWe)	12,438	12,301	12,439	12,511	12,599	12,522
Renewable (MWe)	579	584	584	593	596	623
DR (MWe)	23	88	195	194	210	859
EE (MWe)	0	0	0	0	0	6
Other (MWe)	5	5	5	5	9	9
Total (MWe)	**17,029**	**16,962**	**17,235**	**17,384**	**17,525**	**18,126**

Information is a summary of data shown in Appendix 8A. Refer to Appendix 8A for data sources.

Table 8.3-2
Generation Resources by Type of Duty, New Jersey – 2007-2008 to 2012-2013

Duty	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Baseload (MWe)	4119	4126	4154	4227	4264	4293
Intermediate (MWe)	6923	6849	6955	7051	7131	7007
Peaking (MWe)	5988	5987	6126	6107	6131	6826
Total (MWe)	17,029	16,962	17,235	17,384	17,525	18,126

Information is a summary of data shown in Appendix 8A. Refer to Appendix 8A for data sources.

Table 8.3-3
Forecasted Generation Resources by Fuel Type, New Jersey – 2018, 2021, 2024[a]

Fuel	2012-2013[b]	2018	2021	2024
Nuclear	4108	4158	3521	3521
Fossil	12,522	12,604	12,604	12,604
Renewable	623	896	1057	1312
Demand Response	859	1375	1375	1375
Energy Efficiency	6	12	12	12
Other	9	5	5	5
Total	18,126	19,050	18,574	18,829

a) All values are in MWe
b) 2012-2013 is taken from Table 8.3-1

8.4 ASSESSMENT OF NEED FOR POWER

The new plant is intended to serve the PJM market and addresses a portion of the projected baseload capacity need in NJ. The new plant is expected to become operational in 2021 and operate as a merchant baseload plant producing up to approximately 2200 MWe. As discussed in detail below, the need for additional baseload capacity within NJ is currently over twice the maximum output of the new plant, and will grow to over three times the new plant capacity by 2021. In addition to supplying needed baseload power, the new plant provides benefits to the market area in terms of reducing conditions that can create localized areas of transmission congestion in the region; reduced power costs; reduced and avoided emissions of greenhouse gases from fossil fueled generation; and increased reserve margins.

8.4.1 NEED FOR CAPACITY OF ANY TYPE IN NEW JERSEY

PJM has the overall responsibility of establishing and maintaining the integrity of electricity supply within the PJM RTO. The PJM Operating Agreement and Reliability Assurance Agreement set down the specific rules and guidelines for determining the required amount of generating capacity for the region. PJM is responsible for determining the load forecast and calculating the PJM Reserve Requirement, based on the industry and federal guidelines and standards for reliability established by NERC and RFC.

The reliable supply of electric services within the PJM RTO depends on adequate and secure generation and transmission facilities. PJM is responsible for calculating the amount of generating capacity required to meet the defined reliability criteria. PJM is responsible for evaluating the market and approving a final generating reserve margin for the RTO. The final reserve margin value is the basis for defining the RTO reliability requirement for use in the RPM auction conducted three years prior to the delivery year. PJM conducts an annual Reserve Requirements Study (RRS) to determine the factors used to establish capacity requirements and obligations. The 2009 PJM reserve requirement for the planning period 2010-2011 to 2017-2019 was 15.5 percent (Reference 8.4-2). The reserve requirement for the same period updated by PJM in 2011 is 15.4 percent. The total capacity procured in the auction is allocated as a capacity obligation to all LSEs within PJM (Reference 8.4-4).

PJM uses several factors to establish capacity requirements and obligations. These factors are established three years prior to the applicable delivery year. Among these factors is the Installed Reserve Margin (IRM), which is the installed capacity percent above the forecasted peak load required to satisfy a Loss of Load Expectation (LOLE) of one day over ten years. PJM has adopted an LOLE planning criterion of 1-in-10, which is an RFC Standard [k] (Reference 8.4-1).

This RFC standard is based on a frequency metric and does not consider event duration or magnitude. The LOLE criterion for PJM can be expressed as 0.1 occurrences per delivery year. This standard applies to all RFC Planned Reserve Sharing Groups (PRSG) within the RFC area. The PJM RTO qualifies as one of those PRSGs (Reference 8.4-4).

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[k] RFC Standard BAL-502-RFC-01 effective April 1, 2006, R1. The Loss of Load Expectation (LOLE) for any load in RFC due to resource inadequacy shall not exceed one occurrence in ten years.

PJM also uses the Forecast Pool Requirement (FPR) to establish capacity requirements in the RPM capacity market. The FPR calculation is based on the IRM and the pool wide average equivalent demand forced outage rate (EFORd). This EFORd excludes outage events outside of management control as defined in the Generation Availability Data System (GADS) reporting of events. This EFORd definition is consistent with that used in the capacity market to establish the unforced capacity value of individual generators.

Maintaining adequate winter weekly reserve levels, after scheduling generator planned maintenance outages, ensures that the RFC LOLE standard is met with the recommended IRM. It is desirable to maintain a negligible loss of load risk over the winter period because virtually all the LOLE (99.9 percent) is concentrated in the summer weeks, despite the complete absence of unit planned outages in the summer. Since the summer risk cannot be reduced further (without installing additional capacity resources), winter reserve levels must be held greater than those over the summer to ensure the desired yearly LOLE. PJM coordinates equipment outages to obtain the desired LOLE while minimizing the need for additional generating capacity (Reference 8.4-4).

Table 8.4-1 compares the capacity available within New Jersey from Table 8.3-3 with the total capacity needed to achieve a 15.4 percent reserve margin over the 2012 PJM peak load forecast for NJ. Table 8.4-1 shows a shortfall of about 2600 MWe in generating resources to meet the peak load in NJ in 2021, and a shortfall of over 5800 MWe to meet the peak load and the 15.4 percent reserve margin. Unless new generation is constructed, both the EMAAC region and NJ will be short on capacity to meet the summer peak load and therefore will need to rely on imports to meet summer peak load (Reference 8.4-3).

8.4.2 NEED FOR BASELOAD CAPACITY IN NEW JERSEY

PJM’s Reserve Requirements Study establishes the need for all types of supply resources (baseload, intermediate, and peaking) necessary to meet the forecasted peak summer load. The need for additional baseload power is determined by comparing the forecasted NJ baseload demand in the year of expected commercial operation of the new plant (2021) with the forecast of NJ’s baseload resources available for that year.

Table 8.4-2 compares the baseload capacity available within NJ from Table 8.3-3 with the baseload demand for NJ for 2018, 2021, and 2024. The baseload demand is the annual minimum of daily maximum loads updated for the 2012 PJM load forecast using the methodology described in Subsection 8.2.1. Table 8.4-2 assumes that baseload capacity supplied to meet any difference between the baseload demand and the forecast for baseload resources is assumed to be operated at a capacity factor of 85 percent. Table 8.4-2 shows a shortfall of over 7,300 MWe in baseload generating resources in NJ in 2021 compared to the 11,000 MWe of baseload capacity needed in NJ. This need can be met with new baseload generation that the new plant provides. The need for additional baseload capacity in 2021 is over three times the proposed new plant capacity.

8.4.3 OTHER CONSIDERATIONS AFFECTING NEED FOR BASELOAD CAPACITY IN NEW JERSEY

The current NJ baseload capacity need is being met through imports and by increased use of peaking and intermediate resources. As discussed in Subsection 9.2.1.3, the alternative of purchasing power to provide baseload capacity in NJ is neither feasible nor desirable. Importing additional baseload power into New Jersey instead of generating it with new nuclear units at the PSEG Site is not a feasible option because there is not expected to be any surplus baseload capacity available in PJM or NYISO near the PSEG region of interest in the 2021 time period. In addition, there is insufficient transfer capability in the PJM operated transmission system to provide for additional imports into New Jersey from western areas of PJM projected for the 2021 time period. Furthermore, PJM does not plan upgrades to the bulk electric system (BES) to provide for imports beyond what is required to resolve NERC reliability criteria violations.

Imports of baseload capacity from western PJM to NJ also is not desirable because imports cannot be increased without causing increased congestion, higher power prices, and potential reliability issues. Utilization of higher operating cost (and often higher emitting) peaking and intermediate units is a likely cause for higher LMPs in NJ. In addition, the imports and the current fleet of intermediate and peaking resources are predominantly fossil fueled plants, with associated greenhouse gas and other air emissions that are projected to carry increased regulatory costs. As discussed in Section 8.3, exports from NJ to New York City are also increasing imports to NJ, which results in greater air and greenhouse gas emissions from generating units to the west of NJ and can increase the potential for transmission congestion resulting in higher LMPs.

Baseload capacity additions in the remainder of EMAAC and other areas of MAAC immediately adjacent to NJ present potentially importable baseload capacity to NJ. A combined license application (COLA) for the Bell Bend plant in Pennsylvania has been submitted to the U.S. Nuclear Regulatory Commission (NRC) and identifies an RSA that includes all of NJ (Reference 8.4-5). In addition, the RSA in the Bell Bend COLA includes the remainder of the EMAAC region and other portions of MAAC. The scheduled commercial operation date for the Bell Bend plant, which has a proposed capacity of approximately 1600 MWe, originally was 2018 but is now under review. The only other significant baseload capacity additions anticipated in areas near NJ are 648 MWe of uprates to the Limerick and Peach Bottom plants (in PECO territory), the Susquehanna plant in (Pennsylvania Power & Light [PPL] territory), and the Three Mile Island plant (in metropolitan Edison [MET ED] territory). As discussed in Section 8.3, the SR 500 kV transmission line creates a strong link from generation sources in northeastern and north-central PA, across northeastern PA and into NJ. This new line could facilitate limited imports from the Bell Bend plant and the Susquehanna uprates. To the extent that these and the PECO and MET ED plant uprates export into NJ, it may displace some of the imports from fossil-fueled resources.

As discussed in Section 8.3, the PJM Board cancelled the 500 kV circuit MAPP and the 765 kV PATH projects. Consequently, imports of baseload capacity from western PJM to NJ cannot be substantively increased without causing increased congestion, higher power prices, and potential reliability issues. The new plant at the PSEG Site can supply baseload power within NJ and reduce the potential for transmission congestion, and its impact to LMPs resulting from increased imports. This is consistent with the NJEMP goal to promote a diverse portfolio of new, clean, in-state generation and to fulfill 70 percent of the State's electric needs from "clean" energy sources by 2050 (Reference 8.4-6).

8.4.4 SUMMARY OF THE NEED FOR POWER

The new plant at the PSEG Site operates as a merchant baseload plant producing between 1350 to 2200 MWe and is expected to be operational in 2021. It provides 18 to 30 percent, respectively, of the additional 7300 MWe of the projected baseload capacity needed in the market area served by the new plant in 2021.

Overall, the new plant has several beneficial effects due to its location and operating characteristics. These ancillary benefits supplement the overall need for baseload capacity as discussed in Subsection 8.4.2. As a baseload nuclear plant, the new plant generates electricity at a high capacity factor and produces negligible greenhouse gas or other air emissions. The new plant:

- Reduces the amount of CO_2 generating imports needed to meet baseload demand in NJ
- Supports the NJ Global Warming Response Act, P.L. 2007, goals for the reduction of greenhouse gas emissions in NJ to 80 percent below 2006 levels by 2050.
- Reduces other emissions from fossil fueled generation in NJ and from imports
- Lowers locational marginal prices (LMP) due to reduced generation from fossil fueled resources in NJ. Fossil fueled resources are projected to have increased generation costs due to pending costs associated with regulations on carbon dioxide emissions
- Reduces potential for transmission congestion
- Reduces reliance on imported petroleum to the extent that generation from oil-fired resources is reduced
- Increases the diversity of NJ's generation portfolio, which is currently comprised of 73 percent fossil fuel fired plants (Figure 8.3-1)
- Increases NJ's reserve margins to improve the capability of generating resource within NJ to meet the summer peak load with less dependence on imports and their associated challenge to transmission congestion
- Supports the NJEMP's target of fulfilling 70 percent of the State's electric needs from "clean" energy sources by 2050.

8.4.5 REFERENCES

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Table 8.4-1
Forecasted Surplus (Shortfall) of Capacity in NJ, 2018, 2021, 2024[(a)]

	2018	2021	2024
2012 PJM Peak Load Forecast	20,699	21,181	21,640
Total Capacity Needed for 15.4% Reserve Margin	3,188	3,262	3,333
Total Capacity Required	23,887	24,443	24,973
Capacity Available Within NJ (from Table 8.3-3)	19,050	18,574	19,958
Surplus (Shortfall) of Capacity Within NJ	(4,837)	(5,869)	(6,143)

a) All values are in MWe

Table 8.4-2
Forecasted Surplus (Shortfall) of Baseload Capacity in NJ, 2018, 2021, 2024[(a)]

	2018	2021	2024
Baseload Demand in NJ[(b)]	9,133	9,386	9,685
Baseload Capacity @ 85% CF Needed in NJ[(c)]	10,745	11,042	11,394
Baseload Capacity Available Within NJ[(d)]	4,359	3,722	3,722
Natural Gas	0	0	0
Nuclear	4,158	3,521	3,521
Coal	0	0	0
NJ Energy Efficiency	12	12	12
Landfill Gas	44	44	44
Solid Waste	115	115	115
Biomass	30	30	30
Baseload Capacity Surplus (Shortfall)	(6,386)	(7,320)	(7,672)

a) All values are in MWe
b) The baseload demand in NJ is estimated as the forecasted annual minimum of the daily maximum load updated using the 2012 PJM Load Forecast.
c) Baseload capacity supplied to meet any difference between the baseload demand and the forecast for baseload resources is assumed to be operated at a capacity factor (CF) of 85 percent.
d) Baseload Capacity available in NJ is that portion of the capacity shown in Table 8.3-3 that is operated with a CF of 75 percent or greater.

Appendix 8A (Sheet 1 of 5)
New Jersey Unit Level Breakdown

					Capacity (MWe)			
RESOURCE	**PJM ZONE**	**STATE**	**DUTY**	**FUEL**	**2009**	**2010**	**2011**	**2012**
B.L. ENGLAND 1	AECO	NJ	Intermediate	Coal	113	113	129	113
B.L. ENGLAND 2	AECO	NJ	Intermediate	Coal	151	151	155	155
B.L. ENGLAND 3	AECO	NJ	Intermediate	Oil	148	148	150	148
B.L. ENGLAND EMER DIESEL	AECO	NJ	Peaking	Diesel	8	8	8	8
BALEVILLE	PSEG	NJ	Baseload	Other			4	4
BAYONNE COGEN TECH 1	PS Northern Region	NJ	Peaking	Dual (NG, others)	40	40	40	40
BAYONNE COGEN TECH 2	PS Northern Region	NJ	Peaking	Dual (NG, others)	40	40	40	40
BAYONNE COGEN TECH 3	PS Northern Region	NJ	Peaking	Dual (NG, others)	40	40	40	40
BAYONNE COGEN TECH 4	PS Northern Region	NJ	Peaking	Dual (NG, others)	40	40	40	40
BERGEN 1 CC	PS Northern Region	NJ	Intermediate	Natural Gas	675	675	675	675
BERGEN 2 CC	PS Northern Region	NJ	Intermediate	Natural Gas	550	550	550	550
BERGEN 3	PS Northern Region	NJ	Peaking	Natural Gas	21	21	21	21
BURLINGTON 111	PSEG	NJ	Peaking	Oil	42	46	46	46
BURLINGTON 112	PSEG	NJ	Peaking	Oil	46	46	46	46
BURLINGTON 113	PSEG	NJ	Peaking	Oil	46	46	46	46
BURLINGTON 114	PSEG	NJ	Peaking	Oil	46	46	46	46
BURLINGTON 121	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
BURLINGTON 122	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
BURLINGTON 123	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
BURLINGTON 124	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
BURLINGTON 8	PSEG	NJ	Peaking	Oil	21	21	21	21
BURLINGTON 91	PSEG	NJ	Peaking	Oil	46	46	46	46
BURLINGTON 92	PSEG	NJ	Peaking	Oil	46	46	46	46
BURLINGTON 93	PSEG	NJ	Peaking	Oil	46	46	46	46
BURLINGTON 94	PSEG	NJ	Peaking	Oil	46	46	46	46
BURLINGTON CTY LF	PSEG	NJ	Intermediate	LFG		6	6	6
CAMDEN COGEN TECH	PSEG	NJ	Peaking	Natural Gas	149	145	145	145
CAMDEN COUNTY R.R. NUG	PSEG	NJ	Intermediate	MSW	23	23	23	23
CARLLS CORNER CT 1	AECO	NJ	Peaking	Dual (NG, others)	36	36	36	36
CARLLS CORNER CT 2	AECO	NJ	Peaking	Dual (NG, others)	37	37	37	37
CEDAR STATION CT 1	AECO	NJ	Peaking	Kerosene	46	46	46	46
CEDAR STATION CT 2	AECO	NJ	Peaking	Kerosene	22	22	22	22
CHAMBERS CCLP	AECO	NJ	Intermediate	Natural Gas	225	225	225	225
CUMBERLAND 2	AECO	NJ	Intermediate	Dual (NG, others)		90	90	
CUMBERLAND CT	AECO	NJ	Peaking	Dual (NG, others)	80	80	84	81
CUMBERLAND CTY LF	AECO	NJ	Baseload	LFG		4	4	2
DEEPWATER 1	AECO	NJ	Intermediate	Dual (Coal, others)	78	78	78	78
DEEPWATER 6	AECO	NJ	Intermediate	Dual (Coal, others)	80	80	80	80
EAGLE POINT 1	PSEG	NJ	Peaking	Natural Gas	67	60	60	60
EAGLE POINT 2	PSEG	NJ	Peaking	Natural Gas	67	60	60	60
EAGLE POINT 3	PSEG	NJ	Peaking	Natural Gas	40	40	40	40

Appendix 8A (Sheet 2 of 5)
New Jersey Unit Level Breakdown

					Capacity (MWe)			
RESOURCE	PJM ZONE	STATE	DUTY	FUEL	2009	2010	2011	2012
EDGEBORO LANDFILL	PSEG	NJ	Baseload	LFG	9	9	9	9
EDISON 11	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 12	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 13	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 14	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 21	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 22	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 23	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 24	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 31	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 32	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 33	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
EDISON 34	PSEG	NJ	Peaking	Natural Gas	42	42	42	42
ESSEX 101	PS Northern Region	NJ	Peaking	Natural Gas	42	42	42	42
ESSEX 102	PS Northern Region	NJ	Peaking	Natural Gas	42	42	42	42
ESSEX 103	PS Northern Region	NJ	Peaking	Natural Gas	42	42	42	42
ESSEX 104	PS Northern Region	NJ	Peaking	Natural Gas	42	42	42	42
ESSEX 111	PS Northern Region	NJ	Peaking	Natural Gas	46	46	46	46
ESSEX 112	PS Northern Region	NJ	Peaking	Natural Gas	46	46	46	46
ESSEX 113	PS Northern Region	NJ	Peaking	Natural Gas	46	46	46	46
ESSEX 114	PS Northern Region	NJ	Peaking	Natural Gas	46	46	46	46
ESSEX 121	PS Northern Region	NJ	Peaking	Natural Gas	46	46	46	46
ESSEX 122	PS Northern Region	NJ	Peaking	Natural Gas	46	46	46	46
ESSEX 123	PS Northern Region	NJ	Peaking	Natural Gas	46	46	46	46
ESSEX 124	PS Northern Region	NJ	Peaking	Natural Gas	46	46	46	46
ESSEX 9	PS Northern Region	NJ	Peaking	Natural Gas	81	81	81	81
ESSEX CO. RES. RCRVRY 1	PS Northern Region	NJ	Baseload	MSW	33	33	33	33
ESSEX CO. RES. RCRVRY 2	PS Northern Region	NJ	Baseload	MSW	32	32	32	32
FORKED RIVER C-1	JCPL	NJ	Peaking	Natural Gas	34	34	34	34
FORKED RIVER C-2	JCPL	NJ	Peaking	Natural Gas	32	32	32	31
GILBERT 4	JCPL	NJ	Peaking	Natural Gas	49	49	49	49
GILBERT 5	JCPL	NJ	Peaking	Natural Gas	49	49	49	49
GILBERT 6	JCPL	NJ	Peaking	Natural Gas	51	51	51	51
GILBERT 7	JCPL	NJ	Peaking	Natural Gas	49	49	49	49
GILBERT 8	JCPL	NJ	Peaking	Natural Gas	90	90	90	90
GILBERT 9	JCPL	NJ	Peaking	Oil	150	150	150	150
GILBERT C-1	JCPL	NJ	Peaking	Oil	23	23	23	23
GILBERT C-2	JCPL	NJ	Peaking	Oil	25	25	25	25
GILBERT C-3	JCPL	NJ	Peaking	Oil	25	25	25	25
GILBERT C-4	JCPL	NJ	Peaking	Oil	25	25	25	25
GLEN GARDNER A-1	JCPL	NJ	Peaking	Natural Gas	20	20	20	20
GLEN GARDNER A-2	JCPL	NJ	Peaking	Natural Gas	20	20	20	20
GLEN GARDNER A-3	JCPL	NJ	Peaking	Natural Gas	20	20	20	20

Appendix 8A (Sheet 3 of 5)
New Jersey Unit Level Breakdown

					Capacity (MWe)			
RESOURCE	PJM ZONE	STATE	DUTY	FUEL	2009	2010	2011	2012
GLEN GARDNER A-4	JCPL	NJ	Peaking	Natural Gas	20	20	20	20
GLEN GARDNER B-5	JCPL	NJ	Peaking	Natural Gas	20	20	20	20
GLEN GARDNER B-6	JCPL	NJ	Peaking	Natural Gas	20	20	20	20
GLEN GARDNER B-7	JCPL	NJ	Peaking	Natural Gas	20	20	20	20
GLEN GARDNER B-8	JCPL	NJ	Peaking	Natural Gas	20	20	20	20
GLOUCESTER COUNTY NUG	PSEG	NJ	Baseload	MSW	12	12	12	12
GREAT FALLS HYDRO	PS Northern Region	NJ	Intermediate	Conventional Hydro	5	5	5	5
HOPE CREEK 1	EMAAC	NJ	Baseload	Nuclear	1061	1131	1161	1161
HUDSON 1	PS Northern Region	NJ	Intermediate	Natural Gas	355	355	355	355
HUDSON 2	PS Northern Region	NJ	Intermediate	Coal	568	568	568	608
JCPL COMPOSITE NUG	JCPL	NJ	Peaking	Other	5	5	5	5
KEARNY 10	PS Northern Region	NJ	Peaking	Natural Gas	122	122	122	122
KEARNY 11	PS Northern Region	NJ	Peaking	Natural Gas	128	128	128	128
KEARNY 121	PS Northern Region	NJ	Peaking	Natural Gas	44	44	44	44
KEARNY 122	PS Northern Region	NJ	Peaking	Natural Gas	44	44	44	44
KEARNY 123	PS Northern Region	NJ	Peaking	Natural Gas	44	44	44	44
KEARNY 124	PS Northern Region	NJ	Peaking	Natural Gas	44	44	44	44
KEARNY 9	PS Northern Region	NJ	Peaking	Natural Gas	21	21	21	21
KENILWORTH NUG	PSEG	NJ	Intermediate	Natural Gas	15	15	15	1
KINGSLAND	PS Northern Region	NJ	Baseload	LFG			3	3
KINSLEY LANDFILL	PSEG	NJ	Baseload	LFG	1	1	1	1
LAKEWOOD CT1	JCPL	NJ	Peaking	Dual (NG, others)	156	156	156	156
LAKEWOOD CT2	JCPL	NJ	Peaking	Dual (NG, others)	156	156	156	156
LAKEWOOD NUG	JCPL	NJ	Intermediate	Dual (NG, others)	222	222	222	222
LINDEN 1 CC	PSEG	NJ	Intermediate	Natural Gas	593	593	615	750
LINDEN 2 CC	PS Northern Region	NJ	Intermediate	Natural Gas	593	593	615	436
LINDEN 5	PSEG	NJ	Intermediate	Natural Gas	86	86	86	86
LINDEN 6	PSEG	NJ	Intermediate	Natural Gas	86	86	86	86
LINDEN 7	PS Northern Region	NJ	Peaking	Natural Gas	84	84	84	84
LINDEN 8	PS Northern Region	NJ	Peaking	Natural Gas	80	80	80	84
LOGAN KCS	AECO	NJ	Intermediate	Coal	219	219	219	219
MANCHESTER MRPC NUG	JCPL	NJ	Peaking	Natural Gas	5	5	5	5
MARCAL PAPER NUG	PS Northern Region	NJ	Intermediate	Natural Gas	47	47	47	47
MERCER 1	PSEG	NJ	Intermediate	Coal	319	319	316	316
MERCER 2	PSEG	NJ	Intermediate	Coal	319	319	316	316
MERCER 3	PSEG	NJ	Intermediate	Coal	115	115	115	115
MICKLETON 1 CT	AECO	NJ	Peaking	Natural Gas	53	53	59	59
MIDDLE 1 CT	AECO	NJ	Peaking	Kerosene	20	20	20	20
MIDDLE 2 CT	AECO	NJ	Peaking	Kerosene	20	20	20	20
MIDDLE 3 CT	AECO	NJ	Peaking	Kerosene	37	37	37	37
MISSOURI AVE CT B	AECO	NJ	Peaking	Kerosene	20	20	20	20
MISSOURI AVE CT C	AECO	NJ	Peaking	Kerosene	20	20	20	20
MISSOURI AVE CT D	AECO	NJ	Peaking	Kerosene	20	20	20	20
MONMOUTH NUG	JCPL	NJ	Baseload	LFG	7	7	7	7
NATIONAL PARK	PSEG	NJ	Peaking	Kerosene	21	21	21	21

Appendix 8A (Sheet 4 of 5)
New Jersey Unit Level Breakdown

					Capacity (MWe)			
RESOURCE	**PJM ZONE**	**STATE**	**DUTY**	**FUEL**	**2009**	**2010**	**2011**	**2012**
NEWARK BAY	PS Northern Region	NJ	Peaking	Dual (NG, others)	123	123	123	120
OCEAN COUNTY LF	JCPL	NJ	Baseload	LFG	9	9	9	9
OYSTER CREEK 1	JCPL	NJ	Baseload	Nuclear	619	619	619	615
PARLIN NUG	JCPL	NJ	Intermediate	Natural Gas	114	114	114	114
PEDRICKTOWN PCLP	AECO	NJ	Peaking	Dual (NG, others)	111	111	111	110
PLEASANTVILLE	AECO	NJ	Intermediate	Natural Gas	2	2	2	4
RED OAK CC 1	JCPL	NJ	Intermediate	Natural Gas	244	244	244	244
RED OAK CT 1	JCPL	NJ	Intermediate	Natural Gas	174	174	174	174
RED OAK CT 2	JCPL	NJ	Intermediate	Natural Gas	174	174	174	174
RED OAK CT 3	JCPL	NJ	Intermediate	Natural Gas	174	174	174	174
SALEM 1	EMAAC	NJ	Baseload	Nuclear	1174	1174	1174	1174
SALEM 2	EMAAC	NJ	Baseload	Nuclear	1158	1158	1158	1158
SALEM GT 3	EMAAC	NJ	Peaking	Oil	38	38	38	38
SAYREVILLE C-1	JCPL	NJ	Intermediate	Natural Gas	57	57	57	57
SAYREVILLE C-2	JCPL	NJ	Intermediate	Natural Gas	53	53	53	53
SAYREVILLE C-3	JCPL	NJ	Intermediate	Natural Gas	57	57	57	57
SAYREVILLE C-4	JCPL	NJ	Intermediate	Natural Gas	57	57	57	57
SEWAREN 1	PSEG	NJ	Peaking	Natural Gas	104	104	104	104
SEWAREN 2	PSEG	NJ	Peaking	Natural Gas	118	118	118	118
SEWAREN 3	PSEG	NJ	Peaking	Natural Gas	107	107	107	107
SEWAREN 4	PSEG	NJ	Peaking	Natural Gas	124	124	124	124
SEWAREN 6	PSEG	NJ	Peaking	Oil	105	105	105	105
SHERMAN AVENUE CT 1	AECO	NJ	Peaking	Dual (NG, others)	81	81	81	81
SOUTH RIVER NUG	JCPL	NJ	Intermediate	Natural Gas	260	260	280	280
TRENTON DISTRICT (TDEC)	PSEG	NJ	Peaking	Natural Gas	6	6	4	
UNION COUNTY RES. RCRVRY	PS Northern Region	NJ	Baseload	MSB	39	39	39	39
VINELAND 10	AECO	NJ	Peaking	Dual (NG, others)	23	23	23	23
VINELAND 8	AECO	NJ	Peaking	Dual (NG, others)	11	11	11	11
VINELAND 9	AECO	NJ	Peaking	Dual (NG, others)	17	17	17	17
VINELAND CT	AECO	NJ	Peaking	Dual (NG, others)	26	26	26	26
WARREN COUNTY LF	JCPL	NJ	Intermediate	LFG	4	4	4	4
WARREN COUNTY NUG	JCPL	NJ	Peaking	LFG	10	10	10	10
WERNER C-1	JCPL	NJ	Peaking	Oil	53	53	53	53
WERNER C-2	JCPL	NJ	Peaking	Oil	53	53	53	53
WERNER C-3	JCPL	NJ	Peaking	Oil	53	53	53	53
WERNER C-4	JCPL	NJ	Peaking	Oil	53	53	53	53
YARDS CREEK 1	JCPL	NJ	Peaking	Pumped Storage	140	140	140	140
YARDS CREEK 2	JCPL	NJ	Peaking	Pumped Storage	140	140	140	140
YARDS CREEK 3	JCPL	NJ	Peaking	Pumped Storage	120	120	120	120
MT HOPE MINE	JCPL	NJ	Baseload	Biomass				30
GLOUCESTER	PSEG	NJ	Peaking	Natural Gas				55
BORGATA D1	EMAAC	NJ	Peaking	Diesel	2			
BORGATA D2	EMAAC	NJ	Peaking	Diesel	2			
DEMAND RESOURCES	EMAAC	NJ	Peaking	DR	195	194	210	859
ENERGY EFFICIENCY	EMAAC	NJ	Baseload	EE	0	0	0	6

Appendix 8A (Sheet 5 of 5)
New Jersey Unit Level Breakdown

Abbreviations in Appendix 8A

AECO	Atlantic Electric Company
CC	Combined Cycle
COGEN	Cogeneration
CT	Combustion Turbine
DR	Demand Response
EE	Energy Efficiency
EMER	Emergency
GT	Gas Turbine
JCPL	Jersey Central Power & Light
LF	Landfill
LFG	Landfill Gas
MSB	Municipal Solid Waste Biogenic
MSW	Municipal Solid Waste
NUG	Non Utility Generator
PSEG	Public Service Electric & Gas
RES. RCRVRY	Resource Recovery

<u>Generator Data Resources</u>

PJM RPM Resource Model for each year (Reference 8.3-9)
PJM Interconnection Queue (Reference 8.3-5)
PJM List of Generator Retirements (Reference 8.3-6)
NERC GADS data (Reference 8.3-22)
Ventyx Velocity Suite data (Reference 8.3-23)
Supplemented with descriptions of generating units from websites of generation owners