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)
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
NJDEP	New Jersey Department of Environmental Protection
NJBPU	New Jersey Board of Public Utilities
NJPDES	New Jersey Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NYISO	New York Independent System Operator

Acronym	Definition
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 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 provides 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.

Summary of Chapter 8 Conclusions

The following is a summary of the results for the need for power analysis. The analyses are described in detail in the remaining sections of this chapter. The relevant service area (RSA) for the new plant is the State of NJ, which is part of PJM Interconnection LLC (PJM), the Regional

Transmission Organization (RTO) for the area. Electricity in NJ is bought and sold in competitive wholesale markets into which the new plant's baseload capacity is expected to be bid.

Forecasted power needs within the RSA are based on the PJM peak load and energy forecast. The increase in forecasted NJ power needs is driven by economic and population growth. This is offset by energy efficiency and demand side management programs and promotion of distributed generation using renewable resources.

Based on existing baseload resources and the PJM load forecast for 2009, there was a projected need for 5800 MWe of additional baseload capacity for NJ. Currently this need is met with western imports (and the associated carbon dioxide [CO_2] emissions that come with them). The forecasted baseload demand for 2021, the projected date of new plant commercial operation, is 10,400 MWe. The need for additional baseload capacity to meet this demand is forecasted to grow to 7900 MWe.

The new plant at the PSEG Site operates as a merchant baseload plant producing between 1350 and 2200 MWe. It provides 17 percent to 28 percent of the 7900 MWe projected baseload capacity need in the relevant service area served by the new plant in 2021.

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. Operating the new plant:

- Reduces the amount of CO_2 generating imports needed to meet baseload demand in NJ
- 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 carbon legislation
- Reduces potential for transmission congestion
- Reduces emissions from fossil fueled generation in NJ and from imports
- 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

The following sections provide the basis and detailed assessment supporting these conclusions.

8.1 DESCRIPTION OF POWER SYSTEM

The 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 and expected energy is delivered and where the greatest benefit from the new plant is received. Electricity in the region is bought and sold in competitive wholesale markets into which the new plant is expected to be bid. On an annual basis, NJ imports more than half of its baseload power needs.

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 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).
>
> AE, a subsidiary of Pepco Holdings, Inc., is a regulated utility that provides electric service to more than 500,000 customers in southern NJ.
>
> RECO 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 is a wholly owned subsidiary of Orange and Rockland Utilities, Inc. (Orange and Rockland), an electric and gas utility headquartered in Pearl River, NY. 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).

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 RSA's estimated population in 2008 is 8.7 million people (Reference 8.1-8).

Electricity used by consumers in NJ 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. PJM balances the needs of suppliers, wholesale customers and other market participants and continuously monitors market behavior. PJM also coordinates reliability assessments with adjacent RTOs. Generators that sell electricity in PJM, including 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. PJM is the regional entity that manages the electric system; 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 continuing system reliability (Reference 8.1-3).

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). 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. The transmission and distribution sectors remain subject to regulation by the federal government through FERC and the New Jersey Board of Public Utilities (NJBPU). The NJBPU has adopted an auction mechanism for procurement of electric supply covering the state requirements.

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 Eastern Mid-Atlantic Area Council (EMAAC). The EMAAC region of PJM includes Delaware (DE) and parts of Maryland (MD) and Pennsylvania (PA) as well as NJ. 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 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.

In summary, the new plant 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 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. Subsection 8.4.1 contains a discussion of the new plant power marketability together with any significant market competition and risks.

8.1.1 REFERENCES

8.1-1 Basic Generation Service (BSG), BSG Auctions – About Us, website, http://www.bgs-auction.com/bgs.auction.about.asp, date accessed October 14, 2009.

8.1-2 PJM Interconnection, LLC, About PJM, website http://www.pjm.com/about-pjm.aspx. , date accessed October 14, 2009.

8.1-3 PJM Interconnection, LLC, Open Access Transmission Tariff, 16. Reliability Backstop, issued September 29, 2006.

8.1-4 State of New Jersey, 208th Legislature, "An Act Concerning Competition in the Electric Power and Gas Industries and Supplementing, Amending, and Repealing Certain Sections of the Statutory Law," January 1999.

8.1-5 Transmission & Distribution World, “NERC Approves ReliabilityFirst Council”, website http://tdworld.com/news/NERC-approves-ReliabilityFirst/, date accessed October 14, 2009.

8.1-6 United States Department of Energy, DOE Designates Southwest Area and Mid-Atlantic Area National Interest Electric Transmission Corridors, website, http://www.energy.gov/news/5538.htm, date accessed November 12, 2009.

8.1-7 United States Department of Energy, National Electric Transmission Congestion Study, August 2006.

8.1-8 U. S. Census Bureau, website, http://www.census.gov/population/projections/SummaryTabA1.pdf, accessed November 9, 2009.

8.2 POWER DEMAND

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 increase in power 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. Based on this assessment, the projected 2009 peak load within the new plant RSA is 20,200 MWe. The forecasted peak demand in 2021, the projected date of new plant commercial operation, is 24,400 MWe, which is an increase of 4200 MWe or 21 percent for the period 2009 to 2021. The forecasted energy use in 2021 is 106,000 GWhs, an increase of 19,400 GWhs or 22 percent for the period 2009 to 2021. 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 forecasted demand and supply identifies a need for the baseload capacity that can by provided by the new plant.

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[a]) 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)[b] in the econometric component of its forecast model to 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)[c]

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

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

[c] 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.

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. 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 past 10 years (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 load growth associated with plug-in electric vehicles is captured in the PJM load forecast methodology.

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 PJM forecast is the appropriate basis for the need for power analysis because (1) it is revised annually; (2) it covers NJ and considers the relevant factors driving peak loads and energy; (3) it is reviewed by both PJM's Load Analysis Subcommittee and Planning Committee to ensure the accuracy of the forecast; and (4) it is revised to reflect changing economic conditions. The annual peak load and energy report produced and published by PJM provides sufficient detail to accurately forecast load and energy requirements for NJ.

8.2.1.2 Forecasts of Energy and Capacity

This section presents the historical energy and demand since 1999 and the forecast to 2024 for annual energy and peak summer loads. The 2009 projected peak load within the RSA was 20,200 MWe. The forecasted peak demand in 2021 is 24,400 MWe, which is an increase of 4200 MWe from 2009. The forecasted energy use in 2021 is 106,000 GWhs, an increase of 19,400 GWhs over the usage projected for 2009. The need for additional baseload capacity in NJ can be established by comparing the 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 need for the baseload capacity that can by 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. 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.

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. 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.

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 is 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. The forecasted minimum of daily maximum loads is estimated to be the 72nd percentile on the load duration curve. 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).

In summary, the forecasted peak demand in 2021 is 24,400 MWe, which is an increase of 4200 MWe or 21 percent for the period 2009 to 2021. The forecasted energy use in 2021 is 106,000 GWhs, an increase of 19,400 GWhs or 22 percent for the period 2009 to 2021. These forecasts are used in Section 8.4 to identify a need for the baseload capacity that can by 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.

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 last 15 years. 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.

<u>State Sponsored Energy Efficiency and DSM Programs</u>

New Jersey released an Energy Master Plan in October 2008 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 by 5700 MWe by 2020 (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).

<u>Distributed Generation</u>

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 New Jersey State Energy Master Plan targets that aim to reduce energy use 20 percent by the year 2020. Another initiative goal is to meet 20 percent of the state's electricity needs with renewable energy sources by the year 2020. 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.

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.

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 effects of economic and demographic trends, substitution, energy efficiency programs, demand side management programs and price and rate structures on the NJ electricity consumption are incorporated into the PJM load forecast or in the power supply forecast. The PJM load forecast described in Section 8.2 is compared to the available NJ 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 and hence the new plant in 2021 and beyond.

8.2.4 REFERENCES

8.2-1 Dow Jones Newswires, “PSE&G Wins NJ Approval For $190 Million In Efficiency Projects”, July 1, 2009.

8.2-2 PJM Interconnection, LLC, PJM Capacity Adequacy Planning Department, 2009 PJM Load Forecast Report, January 2009.

8.2-3 PJM Interconnection, LLC, PJM Load/Energy Forecasting Model White Paper, PJM Capacity Adequacy Department, February 22, 2007.

8.2-4 PJM Interconnection, LLC, PJM Manual 19: Load Forecasting and Analysis Revision: 14, Effective Date: 12/01/2008.

8.2-5 PJM Interconnection, LLC, website, http://www.pjm.com/planning/resource-adequacy-planning/load-forecast-dev-process.aspx, accessed January 27, 2009.

8.2-6 PJM Interconnection, LLC, website, http://www.pjm.com/planning/resource-adequacy-planning/load-forecast-dev-process/prev-load-reports.aspx, accessed January 28, 2009.

8.2-7 Public Service Electric & Gas, “PSE&G Carbon Abatement Programs – Summary”, May 5, 2009.

8.2-8 Public Service Electric & Gas, “PSE&G Energy Efficiency Economic Stimulus Initiative”, July 1, 2009.

8.2-9 Public Service Electric & Gas, PSE&G Solar Loan Program, website, http://www.pseg.com/customer/solar/about.jsp, accessed: September 16, 2009.

8.2-10 State of New Jersey, “New Jersey Energy Master Plan”, October 2008.

8.2-11 The Energy Daily, “New Jersey Boosts Solar Profile With PSE&G Project”, July 31, 2009.

8.2-12 U. S. Census Bureau, website, http://www.census.gov/population/projections/SummaryTabA1.pdf, accessed November 9, 2009.

8.2-13 U.S. Department of Commerce, Bureau of Economic Analysis, website http://www.bea.gov/regional/index.htm#gsp, accessed October 12, 2009.

8.2-14 United States of America Congress, “Energy Policy Act of 2005”, Public Law 109-58, 109th Congress, August 8, 2005.

8.2-15 U.S. Department of Energy, Energy Information Administration, website http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html, accessed October 12 2009.

8.2-16 North American Electric Reliability Corporation, Generating Availability Data System database, website http://www.nerc.com/page.php?cid=4|43, accessed October 13, 2009.

8.2-17 Ventyx Velocity Suite: EV Power database, website http://www.ventyx.com/velocity/ev-power.asp, accessed October 13, 2009.

8.2-18 U.S. Census Bureau, website http://factfinder.census.gov/home/saff/main.html?_lang=en, accessed November 9, 2009.

8.2-19 PJM, historical hourly load data, website http://www.pjm.com/markets-and-operations/compliance/nerc-standards/historical-load-data.aspx, accessed September 29, 2009.

8.2-20 Atlantic City Electric, ACE and JCP&L Launch Program to Support New Solar Energy Projects in New Jersey, website http://www.atlanticcityelectric.com/welcome/news/releases/archives/2009/article.aspx?cid=1220, accessed May 5, 2010.

8.2-21 Renewable Energy World, 42-MW JCP&L Solar Energy Plan Approved, website http://www.renewableenergyworld.com/rea/news/article/2009/03/jcp-l-receives-approval-for-42-mw-solar-energy-proposal, accessed May 5, 2010.

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 Project described later in this section. The 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 constraints on emission of carbon.

New Jersey's generation resources were determined using data from PJM's RPM auctions (Reference 8.3-7), generator deactivations (Reference 8.3-6), and generation interconnections and upgrades (Reference 8.3-5).

The RPM was developed 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)[d] obligations that is consistent with the PJM Regional Transmission Expansion Planning (RTEP) Process (Reference 8.3-8). These pricing

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[d] 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.

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. 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. 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[e] (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

[e] 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 the 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. 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 and include DR. Figure 8.3-4 compares 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 generation facilities due to low energy prices and heightened environmental requirements, 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. PJM projects that NJ will rely on transmission import capability to replace retired generation and to meet growth in demand.

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. With the six merchant transmission projects that are either under construction or active in PJM's interconnection queue, there is the potential to accommodate nearly 4000 MWe of exports from the Mid-Atlantic PJM area and power wheels from upstate NY region of the NYISO 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.

Two major new backbone transmission facilities have been approved by the PJM Board to resolve NERC reliability criteria violations in the MAAC sub-region. One of these facilities will increase the capability to import power into NJ. The Susquehanna-Roseland 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. The second facility, the 500 kV circuit Mid-Atlantic Power Pathway (MAPP), provides a conduit into the Delmarva Peninsula from new and existing generation in southern MD and northern Virginia (Reference 8.3-3). PJM is evaluating additional 500 kV projects to alleviate congestion within NJ and enhance overall power transfer capability into NJ.

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 are considered baseload resources (i.e. operate at a capacity factor of 75 percent or greater). 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.

8.3-2 Monitoring Analytics LLC, Analysis of the 2012/2013 RPM Base Residual Auction, August 6, 2009.

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

8.3-4 PJM Interconnection, LLC, “PJM 2008 Regional Transmission Expansion Plan”, 2009.

8.3-5 PJM Interconnection, LLC, PJM Generator Interconnection Queue, website http://www.pjm.com/planning/generation-interconnection.aspx, accessed December 7, 2009.

8.3-6 PJM Interconnection, LLC, PJM List of Generator Retirements, website http://www.pjm.com/planning/generation-retirements.aspx, accessed December 7, 2009.

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.

8.3-9 PJM Interconnection, LLC, RPM Auction User Information, website, http://www.pjm.com/markets-and-operations/rpm/rpm-auction-user-info.aspx, accessed December 14, 2009.

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**	**18,071**

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.

8.4 ASSESSMENT OF NEED FOR POWER

The new plant is intended to serve the PJM market and, in addition to imports, 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 almost three times the new plant capacity by 2021. In addition to supplying needed power, the new plant provides benefits to the market area in terms of reducing conditions that can create localized areas of congestion in the region; reduced power costs; reduced and avoided emissions and 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. 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 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. The PJM reserve requirement for the planning period 2010-2011 to 2017-2019 is 15.5 percent (Reference 8.4-2). The total capacity procured in the auction is allocated as a capacity obligation to all LSEs within PJM (Reference 8.4-6).

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 [f] (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 8.4-6).

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

[f] 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.

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 8.4-6).

PJM conducts an annual Reserve Requirement Study (RRS) to determine the factors used to establish capacity requirements and obligations. The 2008 RRS results are shown in Table 8.4-1 for the PJM RTO as a whole and for the EMAAC region, the smallest region containing NJ for which results are published. Table 8.4-1 indicates that the PJM RTO has adequate reserves as a whole projected through the year 2018, but that EMAAC region reserves consistently decrease each year[g]. Because more than half of the EMAAC load and resources are located in NJ, it is reasonable to assume that NJ reserves also decrease each year. 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

The RRS 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.

The baseload demand is estimated as the forecasted annual minimum of the daily maximum load, as presented in Subsection 8.2.1. The minimum of the daily maximum load is the basis used by PJM for how LSEs are allocated auction revenue rights (ARRs) in the annual allocation process (Reference 8.4-5). Stakeholders within PJM (transmission customers, market participants, etc.) have agreed that the base load level, as defined as the minimum of the daily maximum loads, is the level up to which network customers are guaranteed ARRs and that transmission upgrades would be built to accommodate this level.

Baseload demand also is defined in the PJM load forecast as the average peak load on non-holiday weekdays with no heating or cooling load (Reference 8.4-4). However, insufficient publicly available data exists to estimate baseload demand using this definition. Defining

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[g] Historical data on reserve margins are not available.

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.

Table 8.4-2 shows the forecast for NJ's baseload capacity need for the period 2009 to 2024. The baseload demand is shown as the minimum of daily maximum loads from Figure 8.2-5 and the forecast of NJ's baseload resources taken from Table 8.3-2. New Jersey's resources beyond 2013 are forecasted by adding the interconnections as of December 9, 2009 that have completed a facility study and/or have an Interconnection Service Agreement in place, and have an in-service date of 2013 or later. PJM assumes that facilities that have completed a facility study have at least a 50 percent probability of being completed based on historic generation queue information from 1999 to 2003 (Reference 8.4-2). There are no interconnections that show implementation dates after 2013 for NJ. Table 8.4-2 assumes that baseload capacity supplied to meet any difference between the baseload demand and the forecast for baseload resources would be operated at a capacity factor of 85 percent.

Table 8.4-2 indicates that there currently is a need for 5800 MWe of additional baseload capacity in NJ to serve baseload demand. This need may be met with western imports and their associated CO_2 emissions, and/or new baseload generation that the new plant provides. As shown in Table 8.4-2, the need for additional baseload is forecasted to grow to 7900 MWe by the year 2021. Table 8.4-2 shows that the NJ baseload capacity need is currently about 2-1/2 times the proposed new plant capacity. The data indicate that the need for additional baseload capacity grows to about 3-1/2 times the proposed new plant capacity in 2021.

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. 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. 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.

A combined license application (COLA) for the Bell Bend plant in Pennsylvania has been submitted to the U.S. Nuclear Regulatory Commission (NRC) that poses an RSA that includes all of NJ (Reference 8.4-7). In addition, the RSA in the Bell Bend COLA includes the remainder of the EMAAC region and other portions of MAAC. The Bell Bend plant, which has a proposed capacity of approximately 1600 MWe, is expected to begin commercial operation in 2018 and is located outside NJ. To the extent that this plant exports into NJ, it may displace some of the imports from fossil-fueled resources. However, 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.

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 17 percent to 28 percent, respectively, of the additional 7900 MWe of 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
- 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 carbon legislation
- Reduces potential for transmission congestion
- Reduces emissions from fossil fueled generation in NJ and from imports
- 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

8.4.5 REFERENCES

8.4-1 Reliability *First* Corporation Standard BAL-501-RFC-01 Automatic Reserve Sharing, website https://rsvp.rfirst.org/BAL501RFC01/default.aspx, accessed October 1, 2009.

8.4-2 PJM Interconnection, LLC, 2008 PJM Reserve Requirement Study, October 8, 2008.

8.4-3 PJM Interconnection, LLC, "PJM 2008 Regional Transmission Expansion Plan", 2009.

8.4-4 PJM Interconnection, LLC, PJM Capacity Adequacy Planning Department, 2009 PJM Load Forecast Report, January 2009.

8.4-5 PJM Interconnection, LLC, PJM Manual 6, "Financial Transmission Rights", Revision 12, July 1, 2009.

8.4-6 PJM Interconnection, LLC, PJM Manual 20, "Resource Adequacy Analysis", Revision 3, June 1, 2007.

8.4-7 NRC: Combined License Application Documents for Bell Bend Nuclear Power Plant Application, website http://www.nrc.gov/reactors/new-reactors/col/bell-bend/documents.html, accessed May 10, 2010

Table 8.4-1
Forecasted Reserve Margin, PJM RTO and EMAAC Region, 2008 to 2018

Planning Year	Summer Peak Forecasted Reserve Margin (%)	
	PJM RTO	EMAAC
2008-2009	26.4	2.1
2009-2010	25.0	1.8
2010-2011	24.4	1.3
2011-2012	25.1	-1.1
2012-2013	23.6	-1.0
2013-2014	22.6	-1.4
2014-2015	21.0	-3.0
2015-2016	19.3	-4.4
2016-2017	18.1	-5.9
2017-2018	16.4	-7.4

Reference 8.4-2

Table 8.4-2
Need for Baseload Capacity in New Jersey, 2009 to 2024

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	**2021**	2022	2023	2024
Baseload Demand (MWe)[(a)]	8487	8645	8942	9269	9446	9599	9725	9878	9972	10,087	10,182	10,316	10,386	10,486	10,574	10,693
Baseload Resources (MWe) [(b)]	4154	4227	4264	4293	4293	4293	4293	4293	4293	4293	4293	4293	4293	4293	4293	4293

a) Baseload demand taken from Figure 8.2-5.
b) Baseload resources for 2009 taken from Table 8.3-2 for 2009-2010; 2010 taken from Table 8.3-2 for 2010-11; etc.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	**2021**	2022	2023	2024
Baseload Resources Required to Meet Baseload Demand	9985	10,171	10,520	10,905	11,113	11,293	11,441	11,621	11,732	11,868	11,979	12,136	12,219	12,336	12,440	12,580
Need for Additional Baseload Capacity (MWe)[(c)]	5831	5944	6256	6612	6820	7000	7148	7328	7439	7575	7686	7843	7926	8043	8147	8287

c) Need for Additional Baseload Capacity assumes that Baseload Demand is met by Baseload Resources operated at a capacity factor of 85%. Example: For 2009, the Baseload Resources required to meet Baseload Demand equals 8487 MWe divided by 85% (9985 MWe). The Need for Baseload Capacity of 5831 MWe equals 9985 MWe minus the existing Baseload Resources of 4154 MWe.

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 Resources
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

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