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CHAPTER 8 NEED FOR POWER

The environmental report should include consideration of the benefits of the proposed action [10 CFR 51.45(c)]. To accurately characterize the benefits associated with the proposed action, the NRC must assess the need for power (NRC 2003). NRC guidance NUREG-1555 provides detailed instructions for NRC to use in reviewing the need for power. However, the guidance also identifies the NRC expectation that states may perform an evaluation of the need for power. NUREG-1555 indicates that if the state's evaluation is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty, no additional independent review by NRC is needed. This chapter describes the state of Florida process for determining need for power, the evaluation that it performed for Turkey Point Units 6 & 7, and how the evaluation meets the NRC criteria for not performing an additional review.

8.1 STATE OF FLORIDA PROCESS FOR DETERMINING NEED FOR POWER

Florida has a traditional system for regulating electric service in which utilities have a defined service territory and customers within a service territory purchase their electricity from the local utility. The state regulates rates and services of the utilities, electric grid reliability, and planning for and meeting electric needs. FPL is a regulated Florida electric utility and Figure 8.1-1 shows FPL's service territory. Descriptions of the FPL service territory, FPL's power system and resources, and the role of Florida Reliability Coordinating Council (FRCC) are provided in Subsections 8.1.3, 8.1.4, and 8.1.5, respectively.

The state has charged the Florida Public Service Commission (FPSC) with the responsibility of regulating electric utilities (FS 2007a, FS 2007b). In addition, the state has established the Florida Office of Public Counsel (FOPC) to advocate for utility customers before regulatory agencies such as the FPSC. Both state agencies have roles in the process of determining need for power. Finally, the FRCC, one of the North American Electric Reliability Corporation (NERC) regional councils, plays a role.[1]

The FPSC is the sole forum for determination of the need for power within Florida. By statute and by its own regulations, there are two key components to FPSC's evaluation of need for power:

- Ten-year site plans
- Determinations of need

The following sections describe each component and how each has addressed the need for power from Turkey Point Units 6 & 7.

1. There is no independent system operator or regional transmission organization within Florida.

8.1.1 TEN-YEAR SITE PLANS

Florida 10-year site plans are comparable to what other states call integrated resource plans. Florida requires the following:

(1) Each electric utility shall submit a 10-year site plan which shall estimate its power-generating needs and the general location of its proposed power plant sites [FS 186.801(1)]. The FPSC has made this an annual submittal requirement for utilities having generating capacity of 250 megawatts or greater and requires addressing fuel requirements [FAC 25-22.071(1)(a)].

(2) The FPSC must make a preliminary study of the plan and classify it as “suitable” or “unsuitable.” The FPSC study must review:

a. The need, including the need as determined by the Commission, for electrical power in the area to be served

b. The effect on fuel diversity with the State

c. Anticipated environmental impact of each proposed site

d. Possible alternatives to the proposed plan

e. Views of appropriate local, state, and federal agencies

f. The extent to which the plan is consistent with the state comprehensive plan

g. State information on energy availability and consumption [FS 186.801(2)]

(3) Utilities shall compile and submit to the FPSC aggregate data derived from individual plans. The FRCC prepares and submits these data for the utilities to the state of Florida and NERC.

As an example, in 2008 11 utilities submitted 10-year site plans. The FPSC held a public workshop to facilitate discussion of the plans. The FPSC made supplemental requests of reporting utilities and reviewed data from other sources, including the following documents prepared by the FRCC:

The 2008 *Regional Load and Resource Plan* contains aggregate data on demand and energy, capacity and reserves, and proposed new generating unit and transmission line additions for Peninsular Florida as well as statewide (FPSC 2008a).

The 2008 *Reliability Assessment* is an aggregate study of generating unit availability, forced outage rates, load forecast methodologies, and gas pipeline availability (FPSC 2008a).

The *Long Range Transmission Reliability Study* is an assessment of the adequacy of Peninsular Florida's bulk power and transmission system. The study includes both short-term (2009–2012) detailed analysis and long-term (2013–2017) evaluation of developing trends that would require transmission additions or other corrective action (FPSC 2008a).

The FPSC found the plans to be suitable and, in reporting on its annual review, addressed energy demand; energy generation; fuel price, supply, and transportation; transmission plans; and state, regional, and local comments. The FPSC uses the annual review report to meet its statutory requirement for reporting to the Florida legislature and for providing electricity forecasts to the Florida Energy and Climate Commission (FPSC 2008a).

FPL is one of the utilities that submitted 10-year plans to the FPSC in 2008. The FPL plan includes an estimate of the utility's electric power generating needs, a projection of how those needs will be met, and disclosure of information pertaining to the utility's preferred and potential power plant sites.

Chapter I of the FPL 10-year plan provides an overview of FPL's current generating facilities and other resources including purchased power, demand side management (DSM), and FPL's transmission system. Chapter II presents FPL's load forecasting methodology and its forecast of seasonal peaks and annual energy usage. Chapter III discusses FPL's integrated resource planning process and outlines FPL's projected resource additions, especially new power plants, based on FPL's integrated resource planning work in 2007 and early 2008. Chapter IV discusses environmental information as well as preferred and potential site locations for additional electric generation facilities. Chapter V addresses 12 "discussion items" which pertain to additional information that is to be included in a site-plan filing. Table 8.1-1 presents excerpts from the table of contents of the 2008 plan.

Site plans are long-term planning documents and should be reviewed in this context. A site plan contains tentative information, especially for the latter years of the 10-year time horizon, and is subject to change at the discretion of the utility. Detailed evaluation of the need for power takes place during the second of the Florida three-component system, determination of need. Although not specifically presented in the FPL 2008 10-year plan because the reporting period ends in 2017, the plan notes that FPL had petitioned the FPSC for a determination of need for two new nuclear units in the 2018 to 2020 timeframe at its existing Turkey Point power plant site. Subsection 8.1.2 addresses the FPL petition and the FPSC determination of need in detail.

8.1.2 DETERMINATION OF NEED

In 1973, the Florida Legislature enacted the Power Plant Siting Act (PPSA). The PPSA provides clear timelines and regulatory requirements for utilities seeking to build new power plants and directly associated facilities (such as transmission lines) in the State. Pursuant to the

requirements of Chapter 25-22.080 (F.A.C. 1997) and contained within the Florida PPSA, an applicant for a new plant that exceeds 75 MW of steam generating capacity must file a petition for a Determination of Need with the FPSC. As provided in F.S. Section 403.519, the FPSC is the sole forum for determining the need for construction of an electrical power plant in the state. This section of the statute further provides that in making its determination, the FPSC should take into account the need for electric system reliability and integrity, the need for adequate electricity at a reasonable cost, the need for fuel diversity and supply reliability, whether the proposed plant is the most cost-effective alternative available, and whether renewable energy sources and technologies as well as conservation measures are used to the extent reasonably available (FS 2007b).

In October 2007, FPL submitted to the Florida Public Service Commission (FPSC) its Petition to Determine Need for Units 6 & 7 (FPL 2007a) and the supporting documents, including the Need Study for Electrical Power (FPL 2007b) and the testimony of 15 witnesses. Table 8.1-2 presents the table of contents of the FPL Petition to Determine Need.

In the Petition to Determine Need for Units 6 & 7, FPL, proposed to add two new units, Units 6 & 7, at its existing Turkey Point generating plant site. These proposed units would collectively add between 2200 and 3040 MW (approximately 2234 MW with selection of two AP1000 reactors) baseload generating capacity to FPL's service area.

Several interested parties intervened in the need determination proceeding, including the FOPC, the independent ratepayer advocate appointed by the Legislature; five utilities, Florida Municipal Electric Association (FMEA), Florida Municipal Power Agency (FMPA), JEA, Orlando Utilities Commission (OUC), and Seminole Electric Cooperative, Inc.; and a private citizen.

In addition to the pre-filed testimony, the public was provided the opportunity to provide testimony at two public hearings. Topics of interest voiced in the public testimony portion of the hearings included system reliability and integrity; fuel diversity; environmental compliance costs; conservation, DSM and renewables; and cost-effectiveness.

FPSC Staff reviewed the information provided by FPL, the intervening parties, and public testimony, and performed an independent analysis of the information presented in FPL’s petition, which concluded that the FPSC should determine that there was a need for FPL’s proposed new nuclear units at Turkey Point. After conducting several days of hearings and upon a full review of an extensive administrative record, the FPSC determined that there was a need for FPL’s proposed new nuclear units at Turkey Point and granted FPL’s petition by a final order in April 2008 (FPSC 2008b). In its final order, the FPSC found:

Need for Electric System Reliability and Integrity

"FPL has a need for 8,350 MW of additional capacity beginning in the 2011 through 2020 period. Turkey Point 6 and 7 will provide only a portion of FPL's need for capacity. … If FPL's load forecast dramatically declines or the amount of DSM or renewable generation available substantially increases, the most likely result will be the cancellation of some gas-fired combined cycle plants that have not yet been certified. Based on this record, FPL has shown that it has a reliability need for either the 1,100 MW or 1,520 MW units (referring to the AP1000 or ESBWR designs respectively considered) in 2018 and 2020."

Need for Fuel Diversity

"…[T]he addition of nuclear generation will maintain FPL's fuel diversity and security. In 2006, FPL generated approximately 50% of its power from natural gas, approximately 21% from nuclear power, and 18% from coal. Without the addition of Turkey Point 6 and 7, FPL's fuel mix is projected to climb to approximately 75% from natural gas while the amount of nuclear generation would drop to approximately 16%. The addition of 2,200 to 3,040 MW of capacity (referring to the 2 - AP1000 or 2 - ESBWR designs respectively considered) associated with Turkey Point 6 and 7 would increase nuclear generation to approximately 26% and natural gas to 65% by the year 2021, the first full year of operation for both units."

Need for Baseload Generating Capacity

"…[B]y 2010 FPL will have approximately 15,235 MW of existing or certified base-load generation capacity which consists of coal (902 MW), gas-fired combined cycle (10,979 MW), and nuclear generation facilities (3,354 MW). As mentioned previously, FPL's peak load is expected to increase by over 6,000 MW by the year 2020. FPL's base-load needs are also projected to increase by approximately the same amount. Even with the addition of Turkey Point 6 and 7, FPL's base-load needs will continue to be met primarily with natural gas-fired combined cycle generators."

Need for Adequate Electricity at a Reasonable Cost

"…[W]e believe the cost estimate information presented in the record is appropriate. Accordingly, we find that construction of Turkey Point 6 and 7 will not only provide adequate electricity, but also ensure the most reasonable costs to ratepayers."

No Mitigating Renewable Energy Sources and Technologies or Conservation Measures

"…[W]e find that there are no additional cost-effective conservation measures available that might mitigate FPL's need for Turkey Point 6 and 7. FPL has identified an incremental increase of 1,899 MW of DSM summer peak demand reduction by the year 2020, as well as

over 280 MW of renewable energy from purchased power contracts. As previously discussed, FPL has demonstrated a reliability need in excess of these values for the years 2018 through 2020. A reduction in peak demand or an increase in renewable generation would likely result in the deferral of uncertified natural gas units. In addition, it is unrealistic to assume that FPL could achieve the amount of energy savings through DSM in ten years, that took 26 years to accomplish. As such, we find that there are no additional renewable energy sources or conservation measures which could effectively mitigate FPL's need for Turkey Point 6 and 7."

Most Cost-Effective Source of Power

"Turkey Point 6 and 7 will provide the most cost-effective source of power…. The results of FPL's break-even analysis indicate that Turkey Point 6 and 7 are projected to produce savings in 17 of the 18 scenarios considered. Such results indicate a high likelihood of FPL's ratepayers realizing net benefits over the life of the project. Turkey Point 6 and 7 are projected to produce annual fuel savings of over $1 billion dollars starting in 2021 and about $94 billion over the life of the units when compared to a combined cycle alternative. As environmental compliance costs increase, so do the benefits associated with Turkey Point 6 and 7 because nuclear generation is considered a "non-emitting" technology for GHG (Greenhouse Gas) emissions. Nuclear power plants have an initial licensed operating life of 40 years with the potential to renew the operating license for another 20 years. Therefore, the fuel and environmental benefits of Turkey Point 6 and 7 could continue beyond the analysis presented in this proceeding."

Regarding the information provided by FPL and its forecasting methodologies, the FPSC stated in its order granting FPL's Petition to Determine Need for Turkey Point Units 6 & 7 Electrical Power Plant:

"We reviewed FPL's forecast assumptions, regression models, and the projected system peaks demands, and find that they are appropriate for use in this docket. The forecast assumptions were drawn from independent sources which we have relied upon in prior cases. The regression models used to calculate the projected peak demands conform to accepted economic and statistical practices. Finally, the projected peak demands produced by the models appear to be a reasonable extension of historical trends" (FPSC 2008b).

The Florida Public Service Commission approval of the Petition for Need Determination can be found at their website (FPSC 2008b).

8.1.3 DESCRIPTION OF SERVICE AREA

As provided in its Ten Year Power Plant Site Plan, FPL's service area contains approximately 27,650 square miles and has a population of approximately 8.7 million people. FPL served an average of 4,509,729 customer accounts in 35 counties during 2008 (FPL 2009). FPL's service

area is shown in Figure 8.1-1. These customers were served from a variety of resources including: FPL-owned fossil and nuclear generating units, nonutility-owned generation, DSM, and interchange/purchased power (FPL 2009). FPL's customer categories include:

- Residential
- Commercial
- Industrial
- Railroad and railways, and street and highway lighting
- Other public authorities
- Sales for resale

8.1.4 FPL-OWNED RESOURCES

The existing FPL generating resources are located at 14 generating sites distributed geographically around its service territory and also include partial ownership of one unit located in Georgia and two units in Jacksonville, Florida. The current FPL-owned generating facilities consist of 4 nuclear units, 3 coal units, 12 combined-cycle units, 17 fossil steam units, 48 combustion gas turbines, 1 simple-cycle combustion turbine, and 5 diesel units (FPL 2009). The locations of these 90 generating units and major electrical load centers are shown in Figure 8.1-1.

FPL's bulk transmission system comprises 6727 circuit miles of transmission lines. Integration of the generation, transmission, and distribution system is achieved through FPL's 580 substations in Florida (FPL 2009).

The existing FPL power system, including generating plants, major transmission stations, and transmission lines, is shown in Figure 8.1-2. Figure 8.1-3 shows FPL's interconnection ties with other utilities.

8.1.5 FLORIDA RELIABILITY COORDINATING COUNCIL

FPL is a member of the Florida Reliability Coordinating Council (FRCC). The FRCC is one of the (NERC) regional councils and has approximately 25 members. These members include investor-owned utilities, such as FPL, cooperative systems, municipal utilities, power marketers, and independent power producers (FRCC 2007). There are no Independent System Operators or Regional Transmission Organizations operating in Florida (FERC 2009). The FRCC annually produces an annual Load and Resource Plan, which is a compilation of operating entities' 10-year site plans projecting the next 10 years, addressing, among other subject matter, regional

firm peak demand, available capacity, and reserve margin. This information is provided to the FPSC each July, and a Commission workshop is held in August for a more intensive review by the Commission.

Table 8.1-1
Table of Contents, Florida Power and Light Company Ten Year Power Plant Site Plan

Table 8.1-2
Table of Contents, Florida Power and Light Company Petition to Determine Need for Turkey Point Nuclear Units 6 & 7

Figure 8.1-1 FPL Service Territory

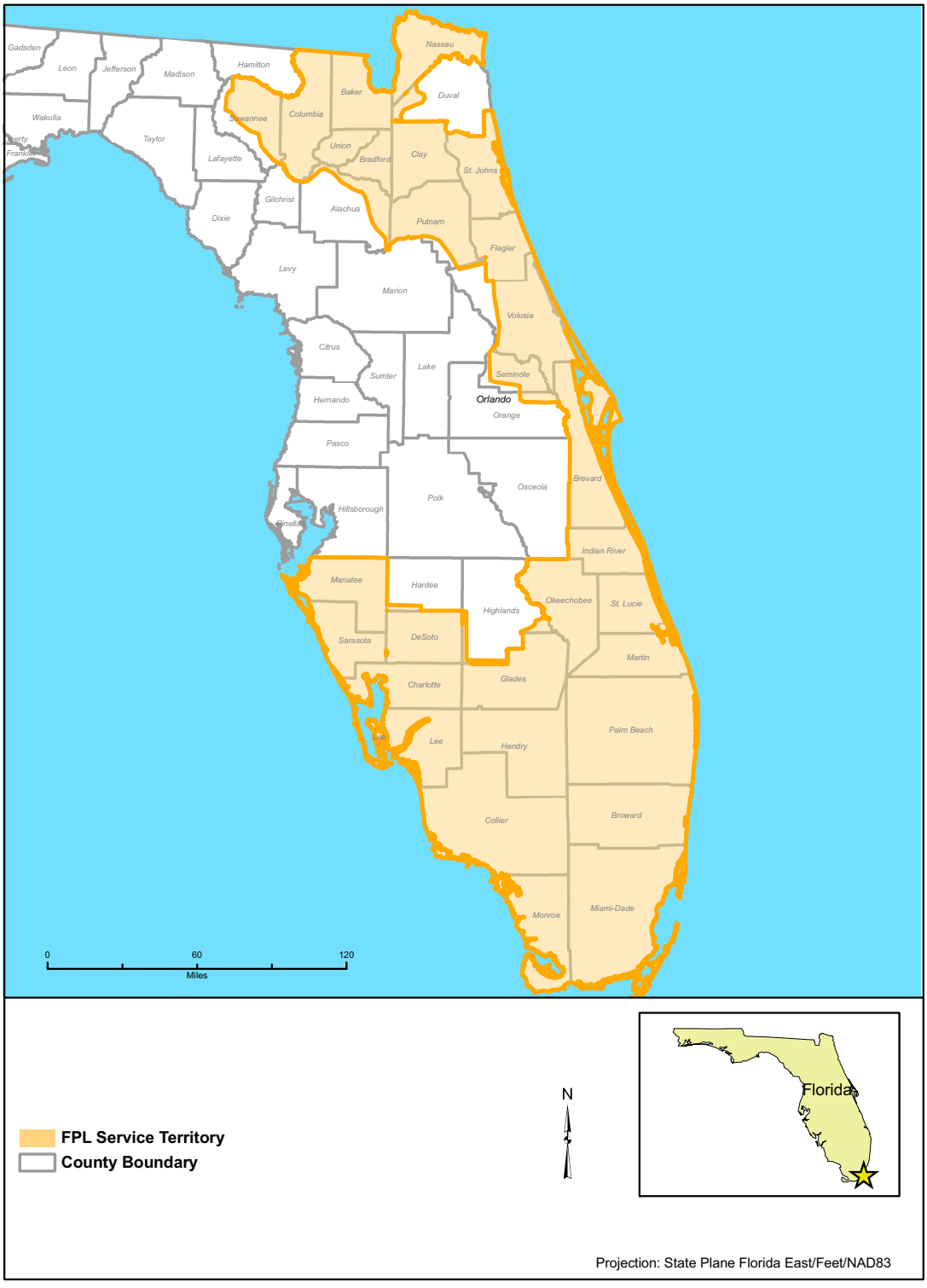


Figure 8.1-2 FPL Substation and Transmission System Configuration

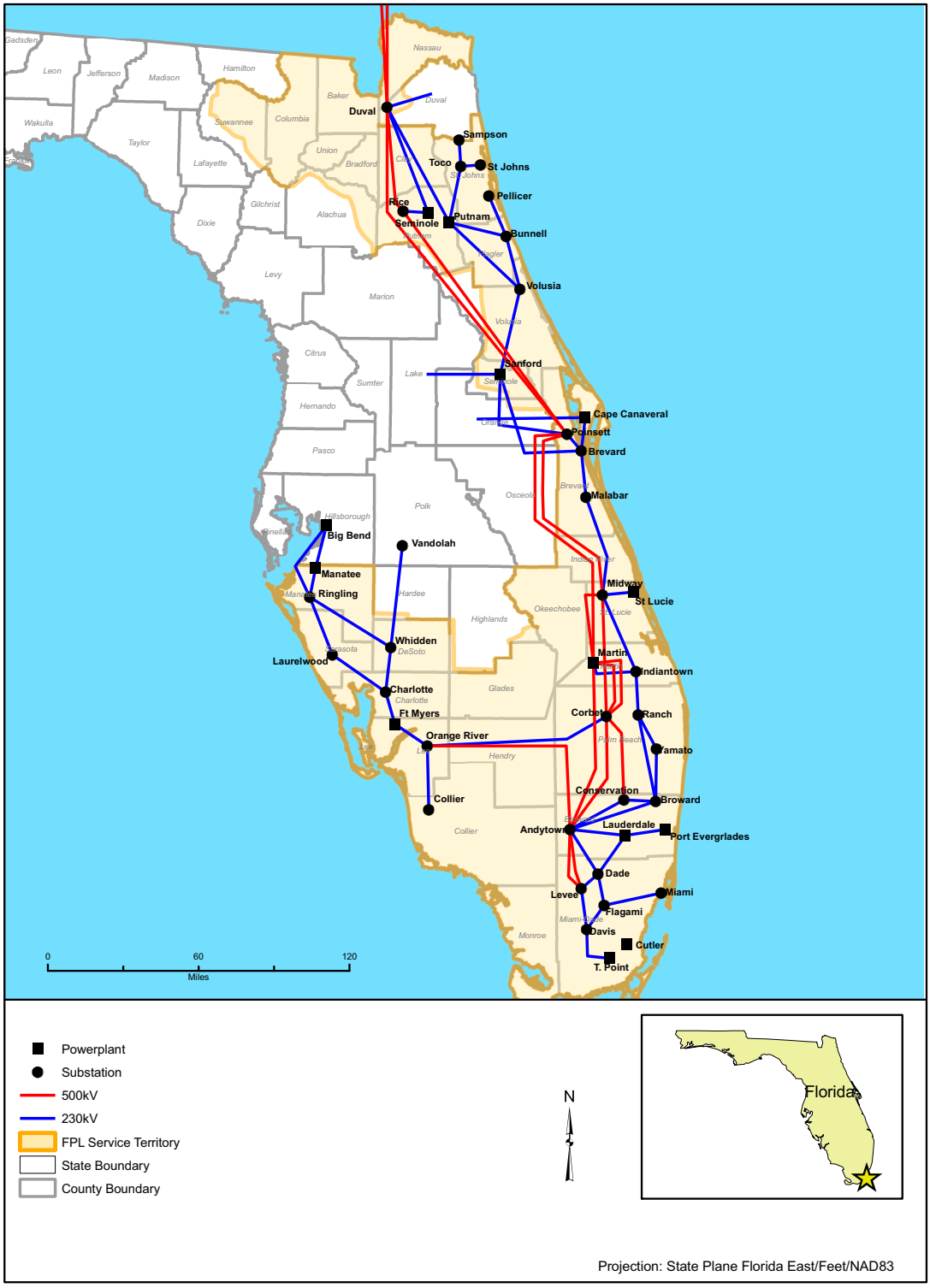
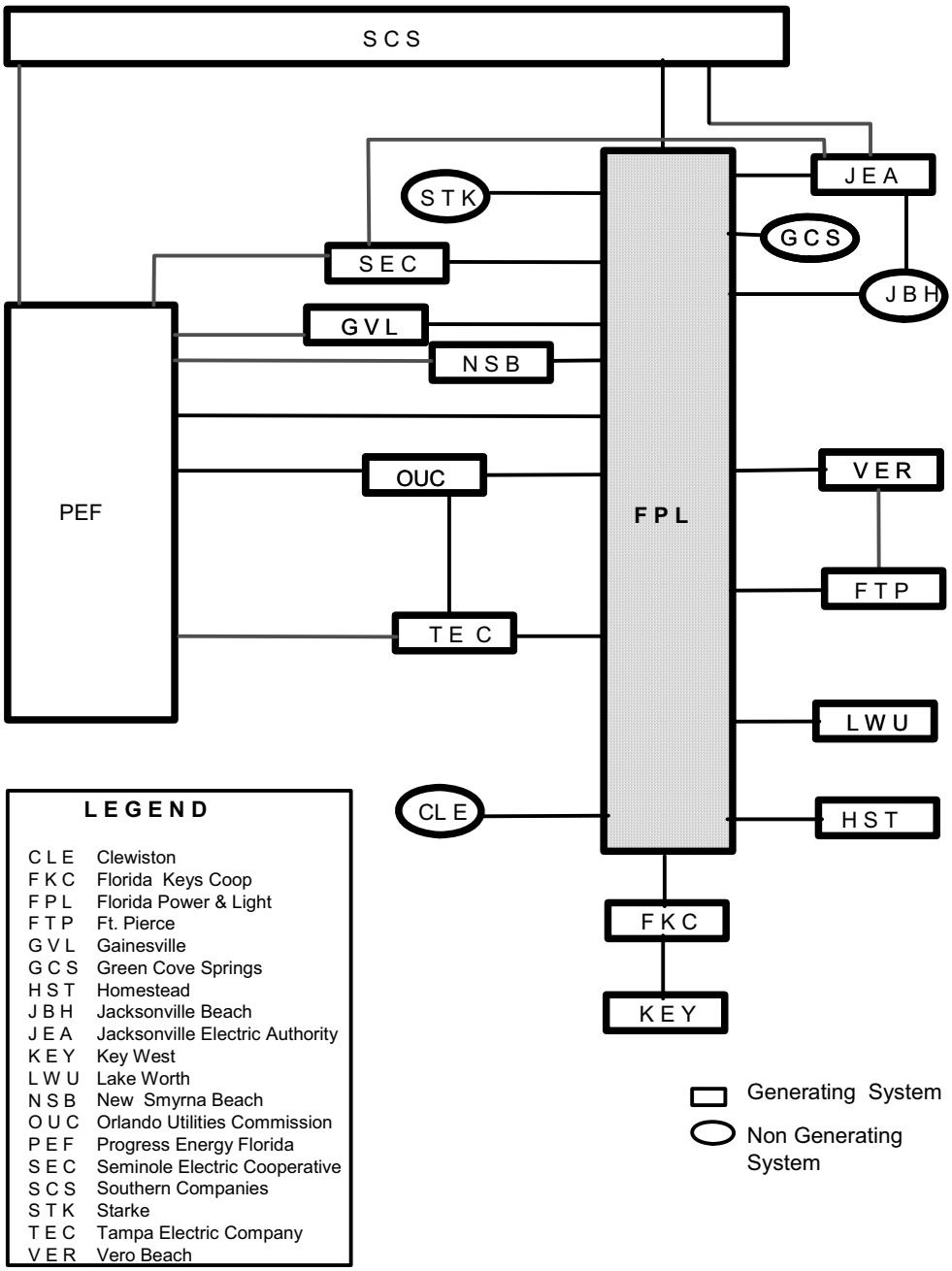


Figure 8.1-3 FPL Interconnection Diagram

FPL Interconnection Diagram



8.2 POWER DEMAND

This section describes the NRC requirements and how the Florida Statutes along with the approved Petition to Determine Need for Units 6 & 7 Electrical Power Plant fulfills those requirements that are provided in NUREG-1555, Sections 8.2 through 8.4.

8.2.1 ENVIRONMENTAL STANDARD REVIEW PLANS (ESRPS)

The ESRP 8.2.1 (Power and Energy Requirements), ESRP 8.2.2 (Factors Affecting Growth of Demand), ESRP 8.3 (Power Supply) and ESRP 8.4 (Assessment of Need for Power) data and informational needs are fulfilled by the state processes required by Florida Statutes (F.S.) Chapter 186 with Rules 25-22.070, 25 22.071, and 25-22.072, Florida Administrative Code (F.A.C.) along with F.S. Section 403.519 and the Petition to Determine Need for Turkey Point Units 6 & 7 Electrical Power Plant, all of which are described below.

8.2.2 POWER AND ENERGY REQUIREMENTS

As described in FPL's Ten Year Power Plant Site Plan (FPL 2008), there are four fundamental steps to FPL's resource planning process. These are summarized as follows:

Step 1: Determine the magnitude and timing of FPL's new resource needs

Step 2: Identify which resource options and resource plans can meet the determined magnitude and timing of FPL's resource needs (i.e., identify competing options and develop competing resource plans)

Step 3: Evaluate the competing options and resource plans regarding system economics and non-economic factors

Step 4: Select a resource plan and commit, as needed, to near-term options

The first step, often referred to as a reliability or resource adequacy assessment for the utility system, is essentially a determination of the amount of capacity or megawatts of load reduction, new capacity additions, or a combination of both load reduction and new capacity additions that are needed and when. This step starts with an updated load forecast. Several databases are also updated with the new information regarding forecasted loads, delivered fuel price projections, current financial and economic assumptions, and power plant capability and reliability assumptions, among other information. FPL also includes key assumptions regarding three specific resource areas: (1) near-term construction capacity additions, (2) firm capacity power purchases, and (3) DSM implementation.

These key assumptions, plus other updated information, are applied in determining the magnitude and the timing of FPL's resource needs. These determinations are accomplished by

system reliability analyses that are typically based on a dual planning criteria of a minimum peak period reserve margin of 20 percent (FPL applies this to both summer and winter peaks) and a maximum loss-of-load probability of 0.1 day per year. Both of these criteria are commonly used throughout the regulated utility industry.

The result of this first step of the resource planning process is a projection of how many new megawatts of resources are needed to meet both reserve margin and loss-of-load probability criteria and, thus, maintain system reliability, and when the megawatts are needed. Information regarding the timing and magnitude of these resource needs is used in the second fundamental step: identifying resource options and resource plans that can meet the determined magnitude and timing of FPL's resource needs.

During Step 2, feasibility analyses of new capacity options are conducted to determine which new capacity options appear to be the most competitive on FPL's system. These analyses also establish capacity size (MW) values, projected construction/permitting schedules, and operating parameters and costs. In similar analyses, feasibility evaluations of new DSM options and/or continued growth in existing DSM options are conducted. Resource plans are created by combining individual resource options so that the timing and magnitude of FPL's new resource needs are met. The creation of these competing resource plans is typically carried out using spreadsheet and/or dynamic programming techniques. At the conclusion of this planning step, a number of different combinations of new resource options (i.e., resource plans) of a magnitude and timing necessary to meet FPL's resource needs are identified.

In Step 3, FPL performs, among other evaluations, economic analyses of the competing resource plans focusing on total system economics. These analyses are performed using the following:

- Various spreadsheets/models such as the P-M area model, which is used by FPL to develop the fuel cost budget and to conduct other production cost-related analyses
- FPL's DSM cost-effectiveness spreadsheet model for analyzing the cost-effectiveness of individual DSM measures/programs
- FPL's nonlinear programming model for analyzing the potential for lowering system peak loads through additional load management capacity

The standard basis for comparing the economics of competing resource plans is their relative impact on FPL's electricity rate levels, with the intent of minimizing FPL's leveled system average rate (i.e., a Rate Impact Measure or RIM methodology).

The results of the above three steps are used to select the best resource plan.

Load Forecast

Long-term (20-year) forecasts of sales, net energy for load (NEL)[1], and peak loads are typically developed on an annual basis for resource planning work at FPL, and new forecasts were developed by FPL in February 2008 (FPL 2008) for use in the 2008 Ten Year Power Plant Site Plan and other filings that were taking place in that approximate time frame. These forecasts are a key input to the models used in FPL's integrated resource planning process. The primary drivers to develop these forecasts are demographic trends, economic conditions, and prices of electricity. The resulting forecasts are an integration of economic evaluations, inputs of local economic development boards, weather assessments from the National Oceanic and Atmospheric Administration (NOAA), and inputs from FPL's own customer service planning areas. In the area of demographics, population trends, plus housing characteristics such as housing starts, housing sizes, and vintage of homes, are assessed.

The projections for the national and Florida economies are obtained from Global Insight. Global Insight is a privately held company that provides comprehensive economic data to entities such as FPL for application and in-depth analysis. Population projections are obtained from the Bureau of Economic and Business Research of the University of Florida. The impacts of these projections are quantified and qualified in terms of their impact on the future demand for electricity using statistical models.

Two sets of weather variables are developed and used in FPL's forecasting models:

- Cooling and heating degree-hours are used to forecast energy sales
- Temperature data is used to forecast summer and winter peaks

The cooling and heating degree-hours are used to capture the changes in the usage of weather-sensitive electric appliances such as air conditioners and electric space heaters. A composite temperature hourly profile is derived using hourly temperatures across FPL's service territory. Miami, Fort Myers, Daytona Beach, and West Palm Beach are the locations from which temperatures are obtained. In developing the composite hourly profile, these regional temperatures are weighted by regional energy sales. This composite temperature is used to derive cooling and heating degree-hours which are based, respectively, on starting point temperatures of 72°F and 66°F. Similarly, composite temperatures and hourly profiles of temperatures are used for the summer and winter peak models.

1. NEL is determined as the sum of all energy sales plus utility use and losses.

Long-Term Sales Forecasts

Long-term forecasts of electricity sales were developed for each of the six revenue classes for the most recent forecasting period of 2008–2026 (FPL 2008). The first five classes represent retail sales and the sixth represents wholesale sales. These six revenue classes, based on customer categories listed in Subsection 8.1.1, are:

- Residential
- Commercial
- Industrial
- Railroad and railways, and street and highway lighting
- Other public authorities
- Sales for resale (wholesale)

These forecasts were adjusted to match the NEL forecast. The results of these sales forecasts for the years 2008–2017, as provided in the Ten Year Power Plant Site Plan (FPL 2008), are presented in Table 8.2-1.

8.2.3 FACTORS AFFECTING GROWTH OF DEMAND

As previously addressed, both FPL's Ten Year Power Plant Site Plan (FPL 2008), and the Need Study for Electrical Power (FPL 2007b) were based on FPL's integrated resource planning process. This process was used to determine the timing and magnitude of need for construction and operation of Turkey Point Units 6 & 7. The Need Study for Electrical Power was also part of FPL's filing with the FPSC for approval of Turkey Point Units 6 & 7 (which was approved by the FPSC). Consideration and application of basic factors affecting growth and demand for power, as detailed in the Site Plan and Need Study, are summarized in this section.

Econometric Modeling

Econometric models are developed for long-term energy sales forecasts for each revenue class using the statistical software. The methodologies used to develop energy sales forecasts for each revenue class and NEL forecast are outlined below.

Energy Sales Forecasts

Rural and Residential Sales

Residential electric usage per customer is estimated by using a regression model that contains the real residential price of electricity, Florida real personal income, cooling and heating degree-hours as explanatory variables, as well as a dummy variable for hurricanes and other outliers. The price of electricity plays a role in explaining electric usage because electricity, like all other goods and services, will be used in greater or lesser quantities depending on its price. To capture economic conditions, the model includes Florida's real personal income. The degree of economic prosperity can, and does, affects residential electricity sales. The impact of weather is captured by the heating and cooling degree-hours. Residential energy sales are forecast by multiplying the residential use per customer forecast by the number of residential customers forecasted.

Commercial Sales

The commercial sales forecast is also developed using a regression model. Commercial sales are a function of the following variables: Florida nonagricultural employment, commercial real price of electricity, cooling degree-hours, and a dummy variable for hurricanes. The price of electricity is also included as an explanatory variable in the model because it has an impact on customer usage. Cooling degree-hours are used to capture weather-sensitive load in the commercial sector.

Industrial Sales

Industrial sales are forecasted using a linear multiple regression model. The linear multiple regression model uses the following variables: Florida housing starts, cooling degree-hours, and several dummy variables for outliers, hurricanes, and months. The cooling degree-hour term is used to capture the weather-sensitive load in the industrial class.

Railroad and Railways Sales and Street and Highway Lighting Sales

The forecast of sales to railroad and railways is developed using an econometric model with the Florida population as the primary driver and several monthly dummy variables to capture seasonality. This class consists solely of Miami-Dade County's Metrorail system.

The forecast for street and highway lighting sales is developed using historical usage patterns and multiplying these usage levels by the number of forecasted customers.

Other Public Authority Sales

Other public authority sales are developed using historical usage patterns.

Sales for Resale

Resale (wholesale) customers are municipalities and/or electric co-operatives. These customers differ from jurisdictional customers in that they are not the ultimate users of the electricity they buy. Instead, they resell this electricity to their own customers.

Currently, there are three customers in this class: the Florida Keys Electric Cooperative (Florida Keys), City Electric System of the Utility Board of Key West, Florida (City of Key West), and Miami-Dade County. However, starting in January 2010, Lee County will also be a customer in this class.

Total Sales

Sales forecasts by revenue class are added to produce a total sales forecast for all retail sales. After an estimate of annual total sales is obtained, an expansion factor is applied to generate a forecast of annual Net Energy for Load (NEL).

Net Energy for Load

An econometric model is developed to produce an NEL forecast. The key inputs to the model are the real price of electricity, heating and cooling degree-hours, and Florida real personal income.

Once the NEL forecast is obtained using the above-mentioned methodology, the results are then compared for reasonableness to the NEL forecast generated using the total sales forecast. The sales by class forecasts previously described are then adjusted to match the NEL from the annual NEL model. The forecasted NEL values for summer and winter peak loads for 2008–2017 along with historical peak loads are presented in Table 8.2-1.

System Peak Forecasts

The rate of absolute growth in FPL system peak load has been a function of a growing customer base, varying weather conditions, continued economic growth, changing patterns of customer behavior (including an increased stock of electricity-consuming appliances), and more efficient heating and cooling appliances. FPL developed the peak forecast models to capture these behavioral relationships. The forecasting methodology of summer, winter, and monthly system peaks is presented below. The forecasted values for summer and winter peak loads for the years 2007–2020 are presented in Table 8.2-2.

System Summer Peak

The summer peak forecast is developed using an econometric regression model. This econometric model uses the following explanatory variables: total average customers, the real price of electricity, Florida real personal income, average temperature on peak day, and a heat

buildup weather factor consisting of the sum of the cooling degree-hours during the peak day and 3 days before.

System Winter Peak

The winter peak forecast is developed using the same econometric regression methodology as is used for summer peak forecasts. The winter peak model is a per customer model that contains the following explanatory variables: the square of the minimum temperature on the peak day and heating degree-hours for the day before as well as for the morning of the winter peak day. The model also includes an economic variable—Florida real personal income.

FPL forecasts continued growth of customers in its service territory. At the time that FPL filed for FPSC approval of Units 6 & 7, they were projecting an annual average increase of approximately 85,000 new customers for the next 14 years. Annualized retail customer growth was projected to be 2.1 percent for 2008 and an average of 1.7 percent for the next 12 years. In addition to significant projected customer growth, significant increases in per customer electrical load and energy were also forecast. Energy use per customer was forecast to increase 1.7 percent in 2008, with a compound annual average growth rate of 1.2 percent thereafter. Combining the growth in customers and the growth in energy use per customer yields a growth in energy sales estimated at 3.8 percent in 2008, and then an average of 2.9 percent for the next 13 years.

FPL also projected that summer peak demand would grow from approximately 22,260 MW in 2007 to approximately 30,090 MW in 2020. Similarly, the winter peak was forecast to grow from approximately 22,250 MW in 2007 to approximately 29,310 MW in 2020.

As stated in Subsection 8.1.2, in the FPSC's order approving FPL's Petition to Determine Need, it found:

> "We reviewed FPL's forecast assumptions, regression models, and the projected system peaks demands, and find that they are appropriate for use in this docket. The forecast assumptions were drawn from independent sources which we have relied upon in prior cases. The regression models used to calculate the projected peak demands conform to accepted economic and statistical practices. Finally, the projected peak demands produced by the models appear to be a reasonable extension of historical trends" (FPSC 2008b)

Demand Side Management

As described in FPL's Ten Year Power Plant Site Plan (FPL 2008), FPL has required and implemented cost-effective DSM programs since 1978. These programs include both conservation/energy efficiency and load management programs. FPL's DSM efforts through 2007 have resulted in a cumulative summer peak reduction of approximately 3958 MW at the generator and an estimated cumulative energy saving of approximately 42,301 gigawatt hour at

the generator. Accounting for reserve margin requirements, FPL's DSM efforts through 2007 have eliminated the need to construct the equivalent of approximately 12 new 400 MW generating units. FPL offers a wide variety of DSM programs and a DSM-based renewable energy option to its customers. In addition, FPL is actively engaged in DSM research and development.

DSM Programs

The DSM programs include residential and business programs. At the time FPL filed for FPSC approval for the Turkey Point Units 6 & 7, residential DSM programs included:

- Residential Building Envelope: Offers incentives to customers to install energy efficient roof and ceiling insulation measures.
- Duct System Testing and Repair: Provides reduced cost air-conditioning duct system testing to identify leaks, and encourages the repair of those leaks by qualified contractors.
- Residential Air-Conditioning: Offers incentives to customers to purchase higher efficiency heating, ventilating, and air-conditioning equipment.
- Residential Load Management (On Call Program): Offers load control of major appliances/ household equipment to residential customers in exchange for monthly electric bill credits.
- Residential New Construction (BuildSmart): Encourages the design and construction of energy-efficient homes by offering education to contractors on energy efficiency measures, and providing construction design reviews and home inspections.
- Residential Low-Income Weatherization: Combines energy audits and incentives to encourage low-income housing administrators to retrofit homes with energy efficiency measures.
- Residential Conservation Service: Offers a walkthrough energy audit, a computer generated Class A audit, and a customer-assisted energy audit.

Business DSM programs at that time included:

- Business HVAC: Offers business customers financial incentives to upgrade to higher efficiency HVAC equipment that exceed the minimum efficiencies mandated by the DOE.
- Business Efficient Lighting: Offers business customers financial incentives to install high-efficiency lighting measures at the time of replacement.

- Business Building Envelope: Offers financial incentives to business customers to install high-efficiency building envelope measures such as roof/ceiling insulation and reflective roof coatings.

- Business Custom Incentive: Serves as a “catch-all” program for cost-effective business efficiency measures that are not included in other FPL programs.

- Business On Call: Offers load control of central air-conditioning units to both small nondemand-billed and medium demand-billed business customers in exchange for monthly electric bill credits.

- Commercial Industrial Demand Reduction: Reduces peak demand by allowing the direct control of customer loads of 200 kW or greater during periods of extreme demand or capacity shortages.

- Business Energy Evaluation: Offers free standard level energy evaluations onsite and online, as well as more detailed shared costs evaluations.

- Commercial/Industrial Load Control: Reduces peak demand by controlling customer loads of 200 kW or greater during periods of extreme demand or capacity shortages in exchange for monthly electric bill credits. (This program was closed to new participants in 2000.)

- Business Water Heating: Encourages the installation of energy-efficient heat recovery units or heat pump water heaters.

- Business Refrigeration: Encourages the installation of controls and equipment to reduce the usage of electric strip heat for defrosting purposes.

- Cogeneration and Small Power Production: Facilitates FPL compliance with regulatory requirements concerning qualifying facilities and small power producers. One role of the program is to assist customers in the evaluation of potential cogeneration projects, including self-generation.

DSM goals were first set for FPL by an FPSC Order in 1994 (FPSC Oct 1994). The latest DSM goals were set for FPL by an FPSC Order in 2004 (FPSC Aug 2004). In this latest order, the Commission established an FPL goal of achieving an 883 MW of incremental summer megawatts at the generator through DSM during the period from 2005 through 2014. The next Commission-sponsored DSM goals-setting docket, which will be for 2015–2019, is expected to occur in 2009. While FPL does not have approved DSM goals past 2014, for purposes of the analyses conducted for FPL’s Petition to Determine Need for Turkey Point Units 6 & 7 Electrical Power Plant, FPL assumed a continuation of DSM signups at currently projected trends (see

Table 8.2-2). In determining its future capacity, FPL forecasts that it will achieve its DSM plan through the above DSM programs.

Greater DSM would not eliminate the need for baseload power from Units 6 & 7. As stated in Subsection 8.1.2, in the FPSC's order approving FPL's Petition to Determine Need, it found:

> "…[W]e find that there are no additional cost-effective conservation measures available that might mitigate FPL's need for Turkey Point 6 and 7. FPL has identified an incremental increase of 1,899 MW of DSM summer peak demand reduction by the year 2020, as well as over 280 MW of renewable energy from purchased power contracts. As previously discussed, FPL has demonstrated a reliability need in excess of these values for the years 2018 through 2020. A reduction in peak demand or an increase in renewable generation would likely result in the deferral of uncertified natural gas units. In addition, it is unrealistic to assume that FPL could achieve the amount of energy savings through DSM in ten years, that took 26 years to accomplish. As such, we find that there are no additional renewable energy sources or conservation measures which could effectively mitigate FPL's need for Turkey Point 6 and 7."

DSM Research and Development Programs

FPL's research and development programs include the Conservation Research and Development (CRD) Program and the Residential Thermostat Load Control Pilot Project. The CRD Program is an umbrella research project under which new DSM technologies are analyzed. Several FPL DSM programs have emerged from the CRD Program which has also resulted in the addition of cost-effective measures to existing programs. FPL operates the CRD Program based on DSM plan approval, or for 6 years, whichever occurs first, with a spending cap of $2,500,000 for the period.

In June 2007, FPL filed a petition with the FPSC for the Residential Thermostat Load Control Pilot Project. Under the project, FPL is proposing to evaluate whether the benefits of the existing On-Call Program can be expanded through use of a new generation of communication and control technologies that put residential customers in charge of decisions that could lower energy costs, while allowing customers to override FPL control of their heating and air-conditioning appliances. The FPSC approved FPL's request in August 2007.

Table 8.2-1
FPL History and Forecast of Energy Consumption, Capacity, and Peak Demand

Year	Energy Consumption (gigawatt-hours)									
	Residential	Commercial	Industrial	Railroads and Railways	Street and Highway Lighting	Other Public Authorities	Sales For Resale	Total Sales	Utility Use and Losses	Net Energy for Load
Historical										
1998	45,482	34,618	3,951	81	373	625	1,326	86,456	6,206	92,662
1999	44,187	35,524	3,948	79	473	465	953	85,629	5,829	91,458
2000	46,320	37,001	3,768	81	408	381	970	88,930	7,059	95,989
2001	47,588	37,960	4,091	86	419	67	970	91,182	7,222	98,404
2002	50,865	40,029	4,057	89	420	63	1,233	96,756	7,443	104,199
2003	53,485	41,425	4,004	93	425	64	1,511	101,007	7,386	108,393
2004	52,502	42,064	3,964	93	413	58	1,531	100,626	7,464	108,091
2005	54,348	43,468	3,913	95	424	49	1,506	103,802	7,498	111,301
2006	54,570	44,487	4,036	94	422	49	1,569	105,228	7,909	113,137
2007	55,138	45,921	3,774	91	437	53	1,499	106,914	7,401	114,315
Forecast										
2008	57,243	47,382	3,923	93	444	52	903	110,040	8,316	118,357
2009	59,323	48,862	3,931	93	456	50	903	113,618	8,233	121,852
2010	61,420	50,568	3,940	93	468	49	1,871	118,408	8,596	127,004
2011	6,016	52,364	3,947	93	481	48	2,001	122,949	8,913	131,862
2012	66,564	54,096	3,950	93	493	46	2,047	127,290	9,581	136,871
2013	69,483	55,638	3,952	93	506	46	2,089	131,807	9,567	141,374
2014	71,587	57,062	3,953	93	518	46	5,450	138,710	10,042	148,752
2015	73,170	58,498	3,955	93	530	46	5,919	142,212	10,283	152,495
2016	75,147	59,963	3,955	93	543	46	6,098	145,845	10,538	156,384
2017	77,121	61,426	3,955	93	555	46	6,251	149,447	10,799	160,246

Source: Schedules 2.1-2.3, 3.3 (FPL 2008).

Table 8.2-2 (Sheet 1 of 2)
Projection of FPL's 2007–2020 Capacity Needs (Without New Capacity Additions After 2012) Summer

August of the Year	Projections of FPL Unit Capacity (MW)	Projections of Firm Purchases (MW)	Projection of Total Capacity (MW)	Peak Load Forecast (MW)	Summer Demand Side Management Forecast[a] (MW)	Forecast of Firm Peak (MW)	Forecast of Summer Reserves (MW)	Forecast of Summer Reserve Margins w/o Additional (%)	MW Needed to Meet 20% Reserve Margin[b] (MW)
2007	22,123	2,993	25,116	22,259	1,768	20,491	4,625	22.6	(527)
2008	22,150	2,993	25,143	22,770	1,908	20,862	4,281	20.5	(109)
2009	23,370	2,562	25,932	23,435	2,034	21,401	4,531	21.2	(251)
2010	24,589	2,205	26,794	24,003	2,146	21,857	4,937	22.6	(566)
2011	24,589	2,255	26,844	24,612	2,264	22,348	4,496	20.1	(26)
2012	24,899	2,193	27,092	25,115	2,388	22,727	4,365	19.2	180
2013	25,003	2,193	27,196	25,590	2,516	23,074	4,122	17.9	493
2014	25,003	2,193	27,196	26,100	2,651	23,449	3,747	16.0	943
2015	25,003	2,193	27,196	26,772	2,790	23,982	3,214	13.4	1,582
2016	25,003	882	25,885	27,410	2,910	24,500	1,385	5.7	3,515
2017	25,003	882	25,885	28,079	3,030	25,049	836	3.3	4,174
2018	25,003	882	25,885	28,737	3,150	25,587	298	1.2	4,819
2019	25,003	882	25,885	29,391	3,270	26,121	(236)	–0.9	5,460
2020	25,003	882	25,885	30,091	3,390	26,701	(816)	–3.1	6,156

Table 8.2-2 (Sheet 2 of 2)
Projection of FPL's 2007–2020 Capacity Needs (Without New Capacity Additions After 2012) Winter

January of the Year	Projections of FPL Unit Capacity (MW)	Projections of Firm Purchases (MW)	Projection of Total Capacity (MW)	Peak Load Forecast (MW)	Winter Demand Side Management Forecast[a] (MW)	Forecast of Firm Peak (MW)	Forecast of Winter Reserves (MW)	Forecast of Winter Reserve Margins w/o Additional (%)	MW Needed to Meet 20% Reserve Margin[b] (MW)
2007	22,294	3,862	26,156	22,247	1,555	20,692	5,464	26.4	(1,326)
2008	23,503	3,026	26,529	22,627	1,649	20,978	5,551	26.5	(1,355)
2009	23,531	2,700	26,231	23,115	1,750	21,365	4,866	22.8	(593)
2010	24,866	2,239	27,105	23,587	1,814	21,773	5,332	24.5	(977)
2011	26,201	2,238	28,439	24,047	1,883	22,164	6,275	28.3	(1,842)
2012	26,305	2,382	28,687	24,498	1,954	22,544	6,143	27.2	(1,634)
2013	26,615	2,202	28,817	24,952	2,028	22,924	5,893	25.7	(1,308)
2014	26,615	2,202	28,817	25,416	2,106	23,310	5,507	23.6	(845)
2015	26,615	2,202	28,817	26,048	2,188	23,860	4,957	20.8	(185)
2016	26,615	882	27,497	26,692	2,264	24,428	3,069	12.6	1,817
2017	26,615	882	27,497	27,342	2,334	25,008	2,489	10.0	2,513
2018	26,615	882	27,497	27,994	2,404	25,590	1,907	7.5	3,211
2019	26,615	882	27,497	28,649	2,474	26,175	1,322	5.1	3,913
2020	26,615	882	27,497	29,308	2,544	26,764	733	2.7	4,620

(a) Demand Side Management values shown represent cumulative load management and incremental conservation capability. Source: Table III.C.I (FPL 2007b).
(b) No new FPL generating unit additions after West County Energy Center (WCEC) 1 in 2009 and WCEC 2 in 2010 are assumed to be added. Approximately 290 MW of renewable energy firm capacity purchases starting in the 2009–2012 time frame are assumed to be added. 414 MW of the proposed nuclear uprates is assumed. Approximately 104 MW are added in December 2011, 103 MW in May 2012, 103 MW in June 2012, and 104 MW by December 2012.

8.3 SATISFACTION OF NRC CRITERIA

The following analysis describes how the state and regional evaluations satisfy the NRC criteria for Units 6 & 7 that the evaluation of the need for power was: (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty (NUREG-1555).

8.3.1 SYSTEMATIC

The state of Florida and the FRCC approaches to determining need for power include processes that are systematic. The state of Florida has established its processes by statute, creating the FPSC to oversee need-for-power planning by public utilities such as FPL and the Office of Public Counsel to serve as a public interest advocate before the FPSC. The need-for-power planning must be reflected in annually updated Ten Year Power Plant Site Plans and, for Units 6 & 7 specifically, is subjected to a further detailed analysis at the Petition for a Determination of Need stage before the FPSC. These processes, created through statutes and implemented by regulations, provide for a transparent, systematic means by which interested parties may participate in a legal process that assures the state of Florida adequately addresses the expected electricity demands within the state.

The FRCC process is a national one, set up by the NERC to comply with the Energy Information Administration (EIA) data-gathering requirements. The FRCC gathers the data on an annual basis, compiles it, and submits it to the NERC as a region-specific composite. The NERC submits the data to the EIA as a national composite together with region-specific information. The statutory, regulatory, and administrative requirements that make up the Florida and FRCC processes comprise methodical state and regional processes for systematically reviewing the need for power that FPL is responsible for satisfying.

8.3.2 COMPREHENSIVE

Florida imposes requirements on FPL for annual comprehensive integrated resource planning and Petition for a Determination of Need that includes:

- Demand and energy forecast for at least a 10-year period
- Supplier's or producer's program for meeting the requirements shown in its forecast in an economic and reliable manner, including demand-side and supply-side options
- Brief description and summary of cost-benefit analysis, if available, of each option that was considered, including those not selected

- Supplier's or producer's assumptions and conclusions with respect to the effect of the plan on the cost and reliability of energy services, and a description of the external environmental and economic consequences of the plan to the extent practicable

FPL follows industry practices in performing its integrated resource planning, breaking its analyses down by types of customers, identifying economic inputs to modeling, performing more detailed analyses for short-term forecasts, and accounting for supply and demand uncertainties. This is further described in Subsection 8.2.3.

FRCC regional planning includes:

- Historical and projected peak demand and energy
- Existing capacity
- Historical and projected demand and capacity
- Historical and projected capacity purchases, sales, and transfers
- Bulk electric transmission system description
- Projected changes to bulk electric transmission system

The Florida and FRCC need-for-power planning processes comprise comprehensive state and regional processes that encompass all of the components that the NRC would cover if the NRC had to perform a detailed review, covering the subject completely. These processes take into account a vast amount of data from varied sources and are subject to judicial review and challenge.

8.3.3 SUBJECT TO CONFIRMATION

FPL need-for-power planning is subject to FPSC, FOPC, and public and other stakeholder review, particularly regarding its petition for need for Units 6 & 7. These processes each result in publicly reviewable data and forecasts in the Ten Year Power Plant Site Plans and Petition for a Determination of Need. The Florida need-for-power planning processes are also confirmable by comparing FPL forecasts to FRCC composite forecasts.

The Florida and FRCC need-for-power analyses are subject to corroboration at the level of the generator or supplier (e.g., FPL) and, by way of comparison, to overall regional data.

8.3.4 RESPONSIVE TO FORECASTING UNCERTAINTY

As described previously, FPL's integrated resource planning incorporates a number of steps to select a resource plan to address forecasted capacity needs. FPL incorporates key assumptions in the reliability assessment of its system and, in developing long-term load forecasts, uses statistical modeling to quantify and qualify data inputs, such as economic projections and population trends in terms of their impact on the future demand for electricity. FPL uses econometric modeling that enables it to perform analyses of the sensitivity of results to changes in model inputs and to create high- and low-range forecasts. This econometric modeling is described in Subsection 8.2.3. Uncertainty analysis is also used in establishing planning reserve margins, themselves an acknowledgement of uncertainty.

The results of FPL's most recent planning effort are represented in FPL's Ten Year Power Plant Site Plan (FPL 2009) and Need Study for Electrical Power (FPL 2007a) that have been approved by the FPSC. Importantly, the Florida Statutes require that FPL submit a Ten Year Power Plant Site Plan annually. This requires FPL to annually review its forecasted power needs and data inputs to its resource planning. Consequently, under this robust requirement, forecasting uncertainty is addressed on an annual basis by FPL, with adjustment forecasts made annually, as required, based on the most recent and up-to-date historical data.

8.3.5 CONCLUSION

NRC guidance identified the expectation that if the states perform an evaluation of need for power and the evaluation is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty, no additional NRC review is needed. This chapter demonstrates that the state of Florida process meets these criteria. Therefore, no additional review by the NRC is needed.

Chapter 8.0 References

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