ORIGINAL

BEFORE THE FLORIDA
PUBLIC SERVICE COMMISSION

DOCKET NO. 070098-EI
FLORIDA POWER & LIGHT COMPANY

IN RE: FLORIDA POWER & LIGHT COMPANY'S PETITION TO DETERMINE NEED FOR FPL GLADES POWER PARK UNITS 1 AND 2 ELECTRICAL POWER PLANT

CMP
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DIRECT TESTIMONY & EXHIBIT OF:

HECTOR J. SANCHEZ

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER AND LIGHT COMPANY

DIRECT TESTIMONY OF HECTOR J. SANCHEZ

DOCKET NO. 07____-EI

JANUARY 29, 2007

Q. Please state your name and business address.

A. My name is Hector J. Sanchez. My business address is Florida Power and Light Company, 4200 West Flagler Street, Miami, FL 33134.

Q. By whom are you employed and what is your position?

A. I am employed by Florida Power and Light Company (FPL) as the Director of Transmission Services and Planning.

Q. Please describe your duties and responsibilities in that position.

A. I am responsible for matters relating to the provision of transmission services on the FPL system and for planning the expansion of the FPL transmission system to meet the requirements of FPL's retail customers, wholesale customers, and its transmission service obligations.

Q. Please describe your educational background and professional experience.

A. In December 1985, I received a Bachelor of Science degree in Electrical Engineering from the University of Miami. In 1990, I completed the Southeastern Electric Exchange's Course in Modern Power Systems Analysis held at Auburn University. In 1991, I received a Master of Business

Administration degree from Florida International University. Additionally, I have completed various other power system courses offered by Power Technology Incorporated, courses offered internally at FPL, and business and management courses at Columbia University.

Since joining FPL in 1985, I have held positions of increasing responsibility. My first positions at FPL were as an Applications Engineer in the Power Systems Control group and as an Engineer in the Protection and Control department. In 1989, I joined the System Operations group in the area of operations planning where I was responsible for performing technical analyses associated with short-term planning and operation of the FPL system. In 1994 I became a Transmission Business Manager where I was responsible for issues associated with the provision of transmission service. Subsequent to that assignment, in March 2000, I held the position responsible for the planning of the bulk transmission system and interconnections. In January of 2006 I became responsible for the operation and dispatch of the FPL system on a real time basis. Lastly, in March of 2006 I assumed my current position as Director of Transmission Services and Planning.

Q. Are you sponsoring an exhibit in this case?

A. Yes. I am sponsoring an exhibit which consists of the following documents:

Document No. HJS-1: Summary of Required Facilities and Performance for the Fuel Diversity Expansion Plan with Coal;

Document No. HJS-2: Summary of Required Facilities and Performance for the Expansion Plan without Coal;

Document No. HJS-3: Peak Load Comparison of Transmission Losses for the Fuel Diversity Expansion Plan with Coal versus the Expansion Plan without Coal; and

Document No. HJS-4: Average Load Comparison of Transmission Losses for the Fuel Diversity Expansion Plan with Coal versus the Expansion Plan without Coal.

These documents tabulate the following transmission inputs provided for the economic analysis:

- FPL System – Interconnection and Integration Facilities Requirements
- Peak and Average Losses
- Annual Loss differences between plans
- Third party transmission service requirements and costs, if any
- Southeast Florida import limits

Q. Are you sponsoring any sections in the Need Study document?

A. Yes. I am sponsoring the portions of Section III. D. addressing Transmission Facilities – Interconnection and Integration. In addition, I sponsor Appendices A and J, and co-sponsor Appendix O of the Need Study document.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to describe how FPL developed the most cost effective transmission plan for the interconnection and integration of FPL's

Glades Power Park (FGPP). I discuss the overall transmission evaluation process, and the attendant results of power flow studies used in determining the most cost effective manner to interconnect and integrate into the transmission system the Fuel Diversity Expansion Plan with Coal (Plan with Coal) that includes the two ultra-supercritical pulverized coal units at FGPP for the period of 2012 through 2016. I also discuss the performance of, technical aspects related to, and the evaluation of transmission related costs associated with the interconnection and integration of the Fuel Diversity Expansion Plan with Coal. Mr. Coto discusses the physical characteristics, schedule, permitting requirements and estimated costs associated with the transmission upgrades and new transmission facilities required for the Fuel Diversity Expansion Plan with Coal.

Secondly, I provide an overview of the transmission related requirements for the Expansion Plan without Coal (Plan without Coal) for the same period that was provided to me by Dr. Sim for a comparative analysis associated with this Need Filing. The Expansion Plan without Coal includes only gas-fired, combined-cycle units in the same 2012 through 2016 time frame. Transmission requirements and performance for the Expansion Plan without Coal will be presented separately. The testimony of Mr. Coto also provides an assessment of the required transmission facilities and estimated costs for the Expansion Plan without Coal.

EVALUATION PROCESS FOR DETERMINING FPL'S TRANSMISSION SYSTEM REQUIREMENTS

Q. Please describe FPL's evaluation process for new generation resources that results in determining the most cost effective transmission interconnection and integration plan.

A. The process commences with a team, including engineers from transmission and substation planning, operations, engineering, project management, permitting and siting who together use their combined knowledge and years of experience to perform the evaluation and develop the most cost effective transmission interconnection and integration plan. The evaluation process considers many factors as outlined below in order to develop a feasible cost effective transmission plan. In some instances the determination of the most cost effective transmission interconnection and integration plan is relatively straight forward; however, other times it requires an iterative assessment of the various factors and a substantial amount of time to perform studies. The resultant plan is in compliance with North American Electric Reliability Council (NERC) reliability standards and will provide firm transmission service.

Generally, the first step in the process is to evaluate the proposed generating plant site location to determine its proximity to existing transmission facilities. To the extent there are existing transmission facilities nearby, they are then

assessed to determine their capabilities for reliably interconnecting and integrating the proposed new generation into the transmission system as a firm FPL generation resource. Next, other factors such as those listed below are considered as applicable:

- Amount of generation (MW) being added at the new generation site, and the dispatch profile of the new generation resource relative to FPL's other generation resources in serving FPL's load;
- Capabilities to upgrade existing facilities (e.g., can the conductor on an existing transmission line be upgraded on the existing structures or would the entire transmission line have to be rebuilt?);
- Capability of transmission lines needed, right-of-way requirements, existing right-of-way capabilities, siting of new right-of-way, permitting requirements, and expected time-frame to acquire right-of-way and necessary permits;
- Ability to transport power efficiently (e.g., would using higher voltages be more cost effective by reducing the amounts of transmission losses incurred when moving large amounts of power over long distances?);
- Existing and new substation requirements, capabilities and availability;
- Impact on existing facilities (e.g., does the proposed interconnection or integration plan result in an overload on an existing facility or does it result in a material adverse impact somewhere else on the transmission system?);

- Constructability (e.g., can the transmission facilities necessary be constructed without having to take clearances on existing operating facilities during periods that would result in an adverse reliability impact?);
- Overall compatibility with the system (e.g., do the new facilities being added require new material stocking requirements or the need for new tools to maintain?);
- Compliance with NERC and FRCC Reliability Standards;
- Operating considerations (e.g., what are the maintenance requirements of the proposed interconnection and integration facilities, and how will they impact the on-going operation of the system?);
- The timing and amount of power needed for testing of equipment such as pumps and motors;
- Expected in-service testing and commercial operations dates for new generation (e.g., which transmission facilities needed for interconnection and integration need to be in-service prior to the commercial operations in-service date for testing?);
- The need for procuring transmission service from a third party;
- Material adverse impact on third party transmission owner; and
- Costs (e.g., initial and on-going costs of facilities and operations).

The next step in the interconnection and integration evaluation process is to perform power flow studies for a proposed transmission interconnection and

integration plan. These power flow studies are used to evaluate the performance of the system, and to converge on specific new system facilities and upgrades that would be needed to interconnect and integrate the new generation into the transmission system.

When the evaluation team is satisfied that they have developed the most cost effective transmission interconnection and integration plan that is in compliance with NERC and FRCC reliability standards for the new generation resources being proposed to serve FPL's load, the process is deemed complete. If this result is not achieved, the evaluation process proceeds iteratively, as needed.

Q. Did the evaluation process discussed above result in the most cost effective interconnection and integration plan for FGPP?

A. Yes. FPL's evaluation resulted in the interconnection and integration plan discussed later in my testimony, which I believe to be the most cost effective plan to interconnect and integrate FGPP after considering the above factors.

I would also note that this evaluation process, including the power flow studies is the same as that used in FPL's most recent Need Determination proceedings in determining the most cost effective interconnection and integration plan.

Q. Please describe how FPL evaluated the transmission related costs associated with the generation plans.

A. FPL, in its evaluation of a generation plan, considers five different categories associated with transmission that could result in costs that arise from the proposed delivery of additional power over FPL's transmission system. These categories are:

1) Transmission interconnection;
2) Transmission integration;
3) Third party transmission service costs (as applicable);
4) Transmission system losses; and
5) Impact of operating existing FPL generation units in Southeast Florida out of economic order to maintain system reliability.

FPL evaluated each of these categories. FPL's Transmission Services and Planning department evaluated the first three categories under my direction, and provided transmission loss data and Southeast Florida import capabilities for categories 4 and 5 for use as inputs in Dr. Sim's economic analyses.

Q. Please describe in more detail each of the five categories associated with transmission costs that you have identified.

A. The five categories can be summarized as follows:

Transmission interconnection requirements

Transmission interconnection requirements are generally the facilities necessary to connect the new generation to the system. These facilities

typically include generator step-up transformers, connection facilities from the transformers to the switchyard and certain substation equipment at the point of interconnection. Mr. Coto discusses the physical attributes and cost estimates associated with the interconnection facilities.

Transmission integration requirements

Transmission integration requirements include system upgrades of existing transmission facilities and new transmission facilities that power flow studies have determined are necessary for the reliable operation and firm delivery of the new FPL generation resources to FPL's load. Mr. Coto discusses the physical attributes and cost estimates associated with the upgrades and new facilities required for transmission integration.

As part of this assessment, any adverse impacts that result in reliability criteria violations on third party transmission systems are identified. In such instances, FPL would check with the parties to confirm that the violation is valid and, if so, see if there is a mitigation measure already available, or jointly develop mitigation measures to address the violation.

Third party transmission service requirements and costs (as applicable)

Third party transmission service requirements and costs are considered when generation resources are connected to an external transmission provider's system(s). These requirements may include the payment of transmission

wheeling charges, ancillary services, and losses. Because neither of the FPL generation plans contains generation connected to a third party transmission system, there is no need to procure transmission service for the delivery of generation connected to a third party to the FPL system. Thus, third party transmission service costs are not applicable to any of the FPL generation plans evaluated.

Transmission losses

The two FPL generation plans contain new generation resources at the same specific locations in relation to the FPL transmission system with different in-service dates, and each plan will have an impact on FPL's transmission system losses. The impact on losses is determined by a comparison of resulting losses among generation plans that serve the same load. Losses were calculated for each plan, at both the peak and the average load levels, for each year in the period 2012 through 2016. The different generation plans are evaluated with respect to losses in terms of the differences in incremental losses among generation plans. Document No. HJS-3, Peak Load Comparison of Transmission Losses for the Fuel Diversity Expansion Plan with Coal versus the Expansion Plan without Coal summarizes the differences in peak load losses and Document No. HJS-4, Average Load Comparison of Transmission Losses for the Fuel Diversity Expansion Plan with Coal versus the Expansion Plan without Coal summarizes the differences in average load losses between plans by year.

Impact of operating existing FPL generation units in Southeast Florida to maintain reliability

The Southeast Florida import limit is the amount of power that can be imported into Southeast Florida in a reliable manner under various conditions. In this context, Southeast Florida is generally defined as the portion of the FPL system located south and east of, and including FPL's Corbett Substation. During those periods when no additional power can be imported into Southeast Florida, there is a reliability need to operate more expensive generation in Southeast Florida out of economic order. Such occurrences result in increased operating costs.

Dr. Sim presents the overall economic results for the two generation expansion plans, including any increase in the production costs for each plan resulting from the Southeast Florida import limit analyses.

FPL'S EXPANSION PLANS' TRANSMISSION EVALUATION TRANSMISSION SYSTEM REQUIREMENTS FOR FPL'S FUEL DIVERSITY EXPANSION PLAN WITH COAL

Q. Please describe FPL's Fuel Diversity Expansion Plan with Coal for the 2012 through 2016 period for which transmission requirements are being evaluated.

A. The Fuel Diversity Expansion Plan with Coal is described below:

FGPP 1 (Coal) = 980 MW net coal unit (1,050 MW gross output) with the potential at this time of being in-service as early as the second half of 2012, as discussed in Mr. Silva's testimony.

FGPP 2 (Coal) = 980 MW net coal unit (1,050 MW gross output) with the potential at this time of being in-service as early as the second half of 2013, as discussed in Mr. Silva's testimony.

South Florida CC unit = 1,219 MW net combined cycle unit (1,243 MW gross output) assumed for analysis purposes to be sited in the vicinity of the West County Energy Center with an in-service date of June, 2015.

Transmission Interconnection

Q. Please describe the transmission interconnection requirements for the new generation in the Fuel Diversity Expansion Plan with Coal.

A. The required transmission interconnection facilities for the Fuel Diversity Expansion Plan with Coal are summarized in Document No. HJS-1, Summary of Required Facilities and Performance for the Fuel Diversity Expansion Plan with Coal.

These facilities include:

For FGPP 1 and 2 (Coal):

- The connection of FGPP 1 and 2 Generator Step Up (GSU) transformers to the FGPP switchyard, and attendant bus equipment;

For South Florida CC unit:

- The connection of South Florida CC unit GSU transformers to the collector yard, including attendant bus equipment, the collector yard, and the string buses from the collector yard to the South Florida 230 kV substation; and
- The circuit breaker and overhead ground wire upgrades required.

Transmission Integration

Q. Please describe the transmission integration evaluation for the new generation in the Fuel Diversity Expansion Plan with Coal.

A. The integration evaluation is comprised of power flow studies. The power flow studies are used to identify any upgrades to existing transmission facilities or new transmission facilities that may be needed to integrate the capacity additions in the Fuel Diversity Expansion Plan with Coal into the transmission system as firm FPL generation resources while meeting reliability criteria. The methodology used to perform these power flow studies is the same as that used in connection with FPL's most recent Need Determination proceedings, and is consistent with the methods used to ensure compliance with the NERC reliability standards. I reviewed and approved the results of the power flow studies, and reviewed the need for new facilities and upgrades required to integrate the capacity additions for the Fuel Diversity Expansion Plan with Coal into the transmission system as firm FPL generation resources used to serve FPL's retail customers. Mr. Coto discusses

the permitting, construction and cost estimates associated with the new transmission facilities and upgrades that were identified as being necessary for the Fuel Diversity Expansion Plan with Coal.

My review determined that to reliably integrate the new generation resources in compliance with NERC reliability standards, new system facilities and upgrades are required for the Fuel Diversity Expansion Plan with Coal. Document No. HJS-1, Summary of Required Facilities and Performance for the Fuel Diversity Expansion Plan with Coal, summarizes the new system facilities and facility upgrades required.

Q. Please describe the power flow analyses performed.

A. As discussed above, the in-service dates for the generation additions included in the Fuel Diversity Expansion Plan with Coal span 2012 through 2016. As Mr. Silva states in his testimony, at this time there is the potential that FGPP 1 and FGPP 2 could be in-service as early as the second half of 2012 and 2013, respectively. Therefore, the transmission assessment performed, including the power flow analysis, to determine the transmission facilities required to interconnect and integrate these units addresses an in-service date consistent with the potential that FGPP 1 and FGPP 2 could be placed in-service as early as the second half of 2012 and 2013, respectively. First contingency, Alternating Current (AC) power flow analyses were performed for the Fuel Diversity Expansion Plan with Coal for each year to assess the need for transmission system upgrades and new facilities. All analyses were

performed using the latest available 2006 FRCC power flow databank cases that were used for the re-study of the Florida Central Coordinated Study (FCCS), updated to reflect FPL's latest load and resource forecast as well as the projects that resulted from the FCCS re-study. Since the FCCS re-study only developed load flow cases through 2014, the 2015 and the 2016 cases were developed by scaling FPL's load in the 2014 case to the latest available load forecast for 2015 and 2016, incorporating FPL's most recent load and resource data and available information on third party systems.

Analyses were performed using power flow simulations to identify the facilities that may become overloaded because of the integration of the generation additions contained in the Fuel Diversity Expansion Plan with Coal, as well as the upgrades and new transmission facilities required to mitigate such overload(s). An AC solution technique was also used to assess the voltage performance of the system against reliability criteria. For all the years of the analysis, the Fuel Diversity Expansion Plan with Coal was subjected to a first contingency screening for loss of transmission elements or generators out of service, one at a time, in accordance with reliability criteria. This resulted in approximately 3,600 power flow calculations being performed for each year assessed. All of the Peninsular Florida interconnected transmission system was monitored to determine whether thermal or voltage reliability criteria violations for system elements at voltages of 69 kV and above occur as a result of the generation resource addition. Reliability

violations on any FPL or other Peninsular Florida system elements directly related to the generation resource addition could indicate the potential need for transmission reinforcements.

Q. What factors associated with FGPP have a major impact on the results of the analysis?

A. The requirement to add major transmission facilities is the result of the need to deliver 1960 MW (two 980 MW units) of new generation from a new site in Glades County, an area where no major transmission infrastructure exists, to Florida's East and West coasts, in order to serve FPL's load. This results in significant transmission facilities being required. Mr. Coto addresses the physical attributes of these major transmission facilities, scheduling and permitting requirements, and attendant estimated costs to construct these facilities.

Q. Please provide a general description of the transmission upgrades and new transmission facilities required for the Fuel Diversity Expansion Plan with Coal.

A. When the first unit is placed in-service, the unit will be connected to the FGPP 500 kV switchyard located at the FGPP site in Glades County. This switchyard will be connected by two 500 kV transmission lines to the 500 kV section of the Hendry 500 kV substation in Hendry County which will be located approximately 25 miles south of the FGPP switchyard. The Orange River to Andytown 500 kV line will be looped into the Hendry substation by constructing two parallel 500 kV lines from the Hendry substation to the

existing 500 kV right-of-way, approximately 24 miles to the south. This effectively creates two 500 kV lines; the Hendry to Orange River line, and the Andytown to Hendry line. Additionally, Hendry substation will also have a 230 kV section. The Hendry 500 and 230 kV sections will be connected via a 500/230 kV auto-transformer. The Alva to Corbett 230 kV line, which is in close proximity to the proposed Hendry substation, will be looped into the Hendry substation.

The FGPP 2 980 MW net output coal unit will also be connected to the FGPP 500 kV switchyard before it enters into service. In order to integrate this additional generation, a 500 kV transmission line from the Hendry substation to the Levee substation will be necessary. This new 500 kV line will be connected at Andytown to an existing Andytown to Levee 500 kV line, forming the Hendry to Levee 500 kV line.

In 2015, the South Florida CC unit is assumed to be added in the vicinity of the West County Energy Center by interconnecting it to the 230 kV section of the South Florida substation. The South Florida 500 kV and South Florida 230 kV sections will be connected via a 500/230 kV autotransformer. Additionally, the Corbett to Green 230 kV and the Corbett to Germantown 230 kV lines will be re-routed from the Corbett 230 kV substation to the South Florida 230 kV substation. The facilities discussed above are summarized as follows:

For FGPP 1 and 2 (Coal):

- The FGPP switchyard;
- Two 500 kV lines from FGPP 500 kV switchyard to Hendry 500 kV substation;
- The Hendry 500/230 kV Substation;
- The looping in of the Andytown to Orange River 500 kV and the Alva to Corbett 230 kV transmission lines into the Hendry substation; and
- The construction of a 500 kV transmission line spanning from the Hendry to Levee substations. This transmission line will be constructed between the Hendry and Andytown substations and connected to an existing Andytown to Levee 500 kV line resulting in a Hendry to Levee 500 kV transmission line.

For the assumed South Florida CC unit:

- The South Florida 230 kV substation; and
- Reroute the Corbett-Green 230 kV and the Corbett-Germantown 230 kV lines into the 230 kV section of the South Florida substation.

These facilities for the Fuel Diversity Expansion Plan with Coal are also summarized in Document No. HJS-1, Summary of Required Facilities and Performance for the Fuel Diversity Expansion Plan with Coal.

Q. Will either FGPP 1 or 2 increase the size of the single largest unit in the FRCC when they enter service?

A. No. Progress Energy Florida has recently filed with the Commission to increase the size of their Crystal River 3 nuclear unit to approximately 1,080 MW gross output by the end of its planned refueling outage in 2011. FGPP 1 and 2 each have a 1,050 MW gross output rating with the first unit potentially going into service as early as the second half of 2012. The 910 MW gross output of FPL's St. Lucie nuclear units are currently the largest sized units in the FRCC.

Q. Will the size of the FGPP coal unit impact the FRCC's import capability from the Southeast Electric Reliability Council (SERC)?

A. No. FPL's assessment indicates that by 2012 the system becomes sufficiently robust to support the sudden loss of 1,050 MW gross output of either FGPP 1 or 2 without reducing the current capability to import 3,600 MW into the FRCC from the SERC.

Q. How was the assessment performed to verify this conclusion?

A. FPL's assessment was performed with the same load flow models used for the 2006 Southern/Florida long term screening evaluations, modified with the addition of the FGPP generation and corresponding transmission facilities, and using the same process that is currently followed every year to assess the import capability of the FRCC from the SERC.

Q. Do you know why the system becomes sufficiently robust in the 2012 and forward time-frame to withstand the loss of a larger size unit?

A. Based on a review of the load flow analyses performed for this Need Filing, it is apparent that FPL's addition of almost 3,600 MW in Southeast Florida (i.e., the Turkey Point 5 unit with 1,144 MW of output in 2007, and the West County 1 and 2 units, each with 1,219 MW of output in 2009 and 2010) reduces the amount of power that is transferred from the north to the south on FPL's 500 kV backbone facilities that span the entire length of the state. Locating the above generation in southeast Florida closer to the load centers has the effect of reducing the loading on the transmission system, resulting in the ability to reliably increase the size of the largest unit in the FRCC while still maintaining the 3,600 MW of import capability into the FRCC from SERC.

Q. Has this assessment, along with the FGPP interconnection and integration requirements discussed above been reviewed by the FRCC?

A. Yes. FPL's interconnection and integration plan for the FGPP and the FRCC-SERC interface capability assessments discussed above was provided to the FRCC to affirm that no reliability issues exist. The FRCC's review affirmed FPL's results associated with the transmission plan, and determined that FPL's interconnection and integration plan will be reliable, adequate and will not adversely impact the reliability of the FRCC transmission system.

Third Party Transmission Service Requirements and Costs

Q. Please describe the third party transmission service requirements and attendant costs incurred by the Fuel Diversity Expansion Plan with Coal.

A. The Fuel Diversity Expansion Plan with Coal involves new generation at the FGPP site and, for purposes of the economic analyses, at the South Florida site. These sites will be directly connected to the FPL transmission system. Therefore, the Fuel Diversity Expansion Plan with Coal does not require or incur third party transmission service costs.

Transmission Losses

Q. Please describe how the effects of transmission losses were included in the economic comparison of the two generation expansion plans and how the loss calculations were performed.

A. The transmission loss impact is a function of the location of generation resources, output capability of each of the resources and system loading conditions. The economic impact of transmission losses is determined by Dr. Sim's economic analyses of the transmission losses that I provide.

Q. Please describe the methodology applied in the determination of transmission losses.

A. The same methodology that was applied in FPL's two most recent Need Determination proceedings was used to determine losses in each year of each Plan. I will summarize that methodology.

Transmission losses are incurred by current (I) flowing through transmission elements that have resistance (R). Losses are calculated as I^2R and occur in each transmission element as the current flows from generator to load. The further the generator is from the load, the larger the value of resistance and the higher the losses. However, the current (I) and voltage (V) are inversely proportional, so as a higher voltage level is used to transport the power (assuming the same R), the same amount of power can be transported with less losses. Therefore, integrating large amounts of generation in areas remote and distant from the concentration of major load centers with major transmission facilities (500 kV) accomplishes not only the requirement of delivering such amounts of power to the various load centers, but also mitigates incurring substantial transmission losses in the process. It is important to note that there are multiple generators, transmission elements and loads distributed throughout the system, and losses will vary as a function of generator dispatch and load level.

Power flows and the losses in the transmission system will be impacted whenever a new generating resource is dispatched. Therefore, the impact on losses of a new generation resource and, more generally, a generation plan of new generation resources, will depend both on where the new generation resources are located and the characteristics of the resources. While base load resources may operate and impact transmission losses most of the time, more

expensive peaking resources tend to operate, and impact losses, only at higher load levels.

The impact of losses can be evaluated by power flow calculations assuming that generation resources will be dispatched economically. This evaluation can be performed with reasonable precision for the years 2012 through 2016. However, for 2017 and beyond, increasing load will require additional generation resources, the location and composition of which are uncertain at this time. The expansion of the transmission system beyond 2017 is also uncertain. Therefore, the impact of a particular generation expansion plan on transmission losses becomes progressively more uncertain with time.

To deal with this uncertainty in a consistent fashion, it was assumed that the transmission loss impacts for the year 2017 and beyond would be identical to the transmission loss impacts calculated for the year 2016. While the accuracy of the losses applied in this analysis can only be ascertained in retrospect after the actual resource and transmission system expansions over the 40 year life of the FGPP 1 and 2 is known, I believe that the methodology developed is a reasonable one, is consistent with the methodologies applied in previous Need Determination proceedings, and produces a fair assessment associated with the impact of transmission losses.

Q. Please describe how the power flow analysis was applied to calculate losses.

A. Transmission losses were calculated for the years 2012 through 2016. Losses were calculated for summer peak load conditions and for average system load conditions. Losses calculated for summer peak load conditions were used by Dr. Sim to estimate the cost of additional capacity required each year to compensate for transmission losses.

Peak load losses for the years 2012 through 2016 were determined using the same power flow representation applied in the transmission integration studies. Also, all FPL resources, other firm resources and the new generation additions in the generation plan were assumed to be dispatched economically. The losses calculated under this methodology reflected the transmission losses only on FPL transmission facilities. Losses for average load conditions used the same system model as for peak load conditions but with resources dispatched economically to meet the lower load level.

Increased Operation of Generating Units in Southeast Florida and Associated Increased Operating Costs

Q. What was the rationale for including the increased operating requirements arising from the uneconomic dispatch of generating units in Southeast Florida as a transmission-related cost?

A. The Southeast Florida import limit is the amount of power that can be imported into Southeast Florida in a reliable manner under high load conditions or during planned or forced outages of generation. In this context, Southeast Florida is generally defined as the portion of the FPL system located south and east of, and including, FPL's Corbett Substation. During those periods where no additional power can be imported into Southeast Florida, there is a reliability need to operate generation in Southeast Florida out of economic order. Such occurrences result in increased operating cost. Dr. Sim's testimony presents the production cost results for the Fuel Diversity Expansion Plan with Coal.

Q. Please describe the methodology and results obtained from the calculation of the Southeast Florida import limits.

A. Document No. HJS-1, Summary of Required Facilities and Performance for the Fuel Diversity Expansion Plan with Coal, shows the Southeast Florida import limit for the Fuel Diversity Expansion Plan with Coal for each year of analysis. The limit is measured as the sum of the flows on the transmission lines connecting the Southeast Florida load center to the rest of the Florida system to the west and north. A power flow analysis was performed by

gradually increasing the interface flows and applying a critical contingency until an acceptable solution could not be obtained. In all cases, the limiting condition was the requirement to avoid voltage collapse in Southeast Florida for the largest single contingency loss, which is a portion of the Turkey Point Unit 5 (i.e., two of the four combustion turbines and the steam unit). These import limits may be reduced as a function of planned operational outages of transmission facilities in Southeast Florida. Conforming to operating experience, this reduction in import limit may also vary with the amount of generation on planned outages and other generation maintenance outages. The table in Document No. HJS-1, Summary of Required Facilities and Performance for the Fuel Diversity Expansion Plan with Coal, shows the Southeast Florida import capability associated with the Fuel Diversity Expansion Plan with Coal for each year, 2012 through 2016.

Q. What are your conclusions based on the analyses involved in performing an economic evaluation of the transmission-related costs?

A. It is my opinion that these analyses provide reasonable estimates of the real transmission-related costs arising from a generation plan and that all such costs should be captured in performing an economic evaluation of different generation plans. These analyses and costs should be relied upon by the Commission.

TRANSMISSION SYSTEM REQUIREMENTS FOR THE EXPANSION PLAN WITHOUT COAL

Q. Please describe the Expansion Plan without Coal for the 2012 through 2016 period for which transmission requirements are being evaluated.

A. The non-coal-based generation expansion plan, the Expansion Plan without Coal, is described below:

The assumed South Florida CC unit = 1,219 MW net combined cycle unit assumed for analysis purposes to be sited in the vicinity of the West County Energy Center with an in-service date of June, 2012;

The assumed FGPP 1 (Gas) = 1,119 MW net sited at FPL's FGPP site in Glades County (the Expansion Plan without Coal) with an in-service date of June, 2014; and

The assumed FGPP 2 (Gas) = 1,119 MW net sited at FPL's FGPP site in Glades County (the Expansion Plan without Coal) with an in-service date of June, 2016.

Transmission Interconnection

Q. Please describe the transmission interconnection for the new generation additions included in the Expansion Plan without Coal.

A. The transmission interconnection facilities are summarized in Document No. HJS-2, Summary of Required Facilities and Performance for the Expansion Plan without Coal.

These facilities include:

South Florida CC unit

- The connection of South Florida CC unit GSU transformers to the collector yard, including attendant bus equipment, the collector yard, and the string buses from the collector yard to the South Florida 230 kV substation;
- Circuit breaker and overhead ground wire upgrades required; and

FGPP 1 and 2 (Gas)

- The connection of FGPP 1 and FGPP 2 CC GSU transformers to the collector yard, including attendant bus equipment, the collector yard, and the string buses from the collector yard to the FGPP switchyard.

The results of the assessment are summarized in Document No. HJS-2, Summary of Required Facilities and Performance for the Expansion Plan without Coal.

Transmission Integration

Q. Please describe FPL's transmission integration assessment results for the Expansion Plan without Coal.

A. My review determined that to reliably integrate the Expansion Plan without Coal in compliance with NERC reliability standards, new system facilities and facility upgrades are required. Document No. HJS-2, Summary of Required

Facilities and Performance for the Expansion Plan without Coal summarizes the new system facilities and upgrades required.

With respect to the Expansion Plan without Coal, the overall transmission requirements are also very similar to those for the Fuel Diversity Expansion Plan with Coal, except that the timing is reversed as to when the new transmission facilities are required, based on the reversal in timing for the new generation. In other words, those facilities in the Fuel Diversity Expansion Plan with Coal that are needed in 2012 and 2013 would instead be postponed from 2012 and 2013 to 2014 and 2016 in the Expansion Plan without Coal due to new generation at the FGPP site in that later time frame.

Third Party Transmission Service Requirements and Costs

Q. Please describe the third party transmission service requirements and attendant costs incurred by the Expansion Plan without Coal.

A. The Expansion Plan without Coal only includes new generation at the FGPP and South Florida sites that will be directly connected to FPL. Therefore, the Expansion Plan without Coal does not require or incur third party transmission service costs.

Transmission Losses

Q. Please indicate in general terms how the Expansion Plan without Coal performs in terms of transmission losses.

A. Document No. HJS-2, Summary of Required Facilities and Performance for the Expansion Plan without Coal, lists the peak load level losses and average load level losses for the Expansion Plan without Coal for the 2012 – 2016 period. The difference in losses between the Fuel Diversity Expansion Plan with Coal and the Expansion Plan without Coal is not significant: only about one-half of one percent (0.5%) of the total transmission losses.

Document No. HJS-3, Peak Load Comparison of Transmission Losses for the Fuel Diversity Expansion Plan with Coal versus the Expansion Plan without Coal, indicates the differences in losses between plans at peak load and Document No. HJS-4, Average Load Comparison of Transmission Losses for the Fuel Diversity Expansion Plan with Coal versus the Expansion Plan without Coal, indicates the differences in losses between plans at average load, and each extrapolates them over a 40 year period. These differences were used by Dr. Sim to calculate the incremental capacity and energy costs due to the differences in losses between plans.

Increased Operation of Generating Units in Southeast Florida and Associated Increased Operating Costs

Q. Please describe the results obtained from the calculation of the Southeast Florida import limits for the Expansion Plan without Coal.

A. The table in Document No. HJS-2, Summary of Required Facilities and Performance for the Expansion Plan without Coal, indicates the Southeast Florida import limits associated with the Expansion Plan without Coal.

Dr. Sim used the Southeast Florida import limits calculated for the Expansion Plan without Coal in the production cost model so that the production cost projections include any incremental operating costs. Dr. Sim's testimony presents the production cost results for this generation expansion plan.

Q. Please summarize your testimony.

A. My testimony provides a description of the evaluation process used to develop the most cost effective plan of transmission-related requirements for FGPP, considering factors associated with planning, construction and operation of the electric system. Additionally, I discuss five aspects of transmission-related requirements that were evaluated for each of the two generation expansion plans:

- The transmission interconnection requirements;
- The new transmission facilities and upgrades of existing transmission facilities required to integrate the generation additions in each plan to the FPL system;

- Third party transmission service requirements;
- Transmission losses during peak load and average load conditions considering the transmission improvements required for the generation additions in each plan based on the attendant operating characteristics (with costs associated for these losses calculated by Dr. Sim); and
- The impact of Southeast Florida import limits (with costs associated with these import limits included in production costs calculated by Dr. Sim).

Each of these transmission-related categories were included in the economic evaluation of the two expansion plans. Their inclusion is necessary and appropriate to capture a reasonable estimate of the transmission-related requirements and attendant costs arising from a generation plan.

Q. Does this conclude your testimony?

A. Yes.

Summary of Required Facilities and Performance for the Fuel Diversity Expansion Plan with Coal

FUEL DIVERSITY EXPANSION PLAN WITH COAL		2012*				2013*				2014*				2015*				2016*			
FPL Transmission Facility	Voltage (kV)	Existing Rating		Required Rating		Existing Rating		Required Rating		Existing Rating		Required Rating		Existing Rating		Required Rating		Existing Rating		Required Rating	
		mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps
TF-1. The connection of FGPP 1 and 2 Generator Step Up ("GSU") transformers to the FGPP switchyard, and attendant bus equipment.	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TF-2. The FGPP switchyard.	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TF-3. The Hendry 500/230 kV Substation.	500/230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TF-4. The two 500 kV transmission lines from the FGPP switchyard to the Hendry Substation.	500	-	-	2598	3000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TF-5a. The looping in of the Andytown to Orange River 500 kV transmission line into the Hendry substation.	500	-	-	2598	3000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TF-5b. The looping in of the Alva to Corbett 230 kV transmission lines into the Hendry substation.	230	-	-	588	1476	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TF-6. The creation of a new 500 kV transmission circuit spanning from the Hendry to Levee substations. This transmission line will be constructed between Hendry and Andytown substations and connected to an existing Andytown to Levee 500 kV line resulting in a Hendry to Levee 500 kV transmission line.	500	-	-	-	-	-	-	2598	3000	-	-	-	-	-	-	-	-	-	-	-	-
TF-7. The connection of South Florida CC unit 1 GSU transformers to the collector yard, including attendant bus equipment, the collector yard, and the string buses from the collector yard to the South Florida 230 kV substation.	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1175	2950	-	-	-	-
TF-8. The South Florida 230 kV substation .	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TF-9a. The re-route of the existing Corbett-Green 230 kV line from Corbett substation to South Florida substation.	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	649	1629	-	-	-	-
TF-9b. The re-route of the Corbett-Germantown 230 kV line from Corbett substation to South Florida substation.	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	729	1830	-	-	-	-
TF-10. The circuit breaker and overhead ground wire upgrades required.	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TRANSMISSION LOSSES	2012*	2013*	2014*	2015*	2016*
	MW	MW	MW	MW	MW
FPL Transmission Losses (MW) @ Peak	532.8	533.8	567.8	573.5	601.9
FPL Transmission Losses (MW) @ 60% Peak Load	291.7	280.5	303.0	324.5	330.1

SE Fla Import					
SE Florida Import Limit (MW)	10023	10815	10729	10606	10313

NON-FPL TRANSMISSION FACILITIES (230kV and above) that ratings are exceeded	2012*			2013*			2014*			2015*			2016*		
	Existing Rating		Overloaded by %	Existing Rating		Overloaded by %	Existing Rating		Overloaded by %	Existing Rating		Overloaded by %	Existing Rating		Overloaded by %
	mva	amps		mva	amps		mva	amps		mva	amps		mva	amps	
NONE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Some facilities may be required to be in-service prior to commercial operation for construction and testing purposes.

Docket No. 07____-EI
H. Sanchez, Exhibit No. __
Document No. HJS-1, Page 1 of 1
Required Facilities and Performance

Summary of Required Facilities and Performance for the Expansion Plan without Coal

EXPANSION PLAN WITHOUT COAL		2012*				2013*				2014*				2015*				2016*			
FPL Transmission Facility	Voltage (kV)	Existing Rating		Required Rating		Existing Rating		Required Rating		Existing Rating		Required Rating		Existing Rating		Required Rating		Existing Rating		Required Rating	
		mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps	mva	amps
TFND-1. The connection of FGPP 1 and FGPP 2 CC GSU transformers to the collector yard, including attendant bus equipment, the collector yard, and the string buses from the collector yard to the FGPP switchyard.	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TFND-2. The FGPP switchyard.	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TFND-3. The Hendry 500/230 kV Substation.	500/230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TFND-4. The two 500 kV transmission lines from the FGPP switchyard to the Hendry Substation.	500	-	-	-	-	-	-	-	-	-	-	2598	3000	-	-	-	-	-	-	-	-
TFND-5a. The looping in of the Andytown to Orange River 500 kV transmission line into the Hendry substation.	500	-	-	-	-	-	-	-	-	-	-	2598	3000	-	-	-	-	-	-	-	-
TFND-5b. The looping in of the Alva to Corbett 230 kV transmission lines into the Hendry substation.	230	-	-	-	-	-	-	-	-	-	-	588	1476	-	-	-	-	-	-	-	-
TFND-6. The creation of a new 500 kV transmission circuit spanning from the Hendry to Levee substations. This transmission line will be constructed between Hendry and Andytown substations and connected to an existing Andytown to Levee 500 kV line resulting in a Hendry to Levee 500 kV transmission line.	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2598	3000
TFND-7. The connection of South Florida CC unit 1 GSU transformers to the collector yard, including attendant bus equipment, the collector yard, and the string buses from the collector yard to the South Florida 230 kV substation.	230	-	-	1175	2950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TFND-8. The South Florida 230 kV substation.	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TFND-9a. The re-route of the Corbett-Green 230 kV line from Corbett substation to South Florida substation.	230	-	-	649	1629	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TFND-9b. The re-route of the Corbett-Germantown 230 kV line from Corbett substation to South Florida substation.	230	-	-	729	1830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TFND-10. The circuit breaker and overhead ground wire upgrades required.	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TRANSMISSION LOSSES	MW	MW	MW	MW	MW
FPL Transmission Losses (MW) @ Peak	547.1	574.1	574.2	595.2	598.6
FPL Transmission Losses (MW) @ 60% Peak Load	285.5	302.0	303.3	313.3	331.6
SE Fla Import					
SE Florida Import Limit (MW)	9210	8841	9519	9342	10400

NON-FPL TRANSMISSION FACILITIES (230kV and above) that ratings are exceeded	2012* Existing Rating mva	2012* Existing Rating amps	2012* Overloaded by %	2013* Existing Rating mva	2013* Existing Rating amps	2013* Overloaded by %	2014* Existing Rating mva	2014* Existing Rating amps	2014* Overloaded by %	2015* Existing Rating mva	2015* Existing Rating amps	2015* Overloaded by %	2016* Existing Rating mva	2016* Existing Rating amps	2016* Overloaded by %
NONE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Some facilities may be required to be in-service prior to commercial operation for construction and testing purposes.

Peak Load Comparison of Transmission Losses for the Fuel Diversity Expansion Plan with Coal versus the Expansion Plan without Coal

Fuel Diversity Expansion Plan with Coal compared to Expansion Plan without Coal (Reference Plan)
Fuel Diversity Expansion Plan with Coal: 2012* FGPP 1-980 MW; 2013* FGPP 2-980 MW; and For 2015 South Florida CC Unit-1219 MW
Expansion Plan without Coal: For 2012 South Florida CC Unit-1219 MW; For 2014 FGPP 1-1119 MW; and For 2016 FGPP 2-1119 MW

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Fuel Diversity Expansion Plan with Coal			Expansion Plan without Coal (Reference Plan)					=(7)*(8)		=(9)+(10)		= (11) - (12)
Year	FGPP 1* (980 MW)	FGPP 2* (980 MW)	South Florida CC Unit (1219 MW)	South Florida CC Unit (1219 MW)	FGPP 1 (GAS) (1119 MW)	FGPP 2 (GAS) (1119 MW)	Filler Capacity Needed to Replace Plan's Expired Components (MW)	Filler Capacity Losses (%)	Filler Capacity Losses (MW)	FPL Transmission System Losses with Plan's Remaining Components (MW)	FPL Transmission System Losses with Plan's Remaining Components + Filler Capacity Losses (MW)	FPL Transmission System Losses with the Reference Plan (MW)	Difference in FPL Transmission System Losses between Plan in question and Reference Plan (MW)
2012	980	0	0	1219	0	0	0	2.19%	0.00	532.8	532.8	547.1	(14.30)
2013	980	980	0	1219	0	0	0	2.19%	0.00	533.8	533.8	574.1	(40.30)
2014	980	980	0	1219	1119	0	0	2.19%	0.00	567.8	567.8	574.2	(6.40)
2015	980	980	1219	1219	1119	0	0	2.19%	0.00	573.5	573.5	595.2	(21.70)
2016	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2017	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2018	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2019	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2020	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2021	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2022	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2023	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2024	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2025	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2026	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2027	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2028	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2029	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2030	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2031	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2032	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2033	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2034	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2035	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2036	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2037	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2038	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2039	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2040	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2041	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2042	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2043	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2044	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2045	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2046	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2047	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2048	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2049	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2050	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2051	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2052	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2053	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30
2054	980	980	1219	1219	1119	1119	0	2.19%	0.00	601.9	601.9	598.6	3.30

* Reflects potential in-service dates (as early as second half of 2012 and 2013 respectively).

Docket No. 07____-EI
H. Sanchez, Exhibit No.___
Document No. HJS-3, Page 1 of 1
Peak Load Transmission Losses

Average Load Comparison of Transmission Losses for the Fuel Diversity Expansion Plan with Coal versus the Expansion Plan without Coal

Fuel Diversity Expansion Plan with Coal compared to Expansion Plan without Coal (Reference Plan)
Fuel Diversity Expansion Plan with Coal: 2012* FGPP 1-980 MW; 2013* FGPP 2-980 MW; and For 2015 South Florida CC Unit-1219 MW
Expansion Plan without Coal: For 2012 South Florida CC Unit-1219 MW; For 2014 FGPP 1-1119 MW; and For 2016 FGPP 2-1119 MW

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Fuel Diversity Expansion Plan with Coal			Expansion Plan without Coal (Reference Plan)					=(7)*(8)		=(9)+(10)		= (11) - (12)
Year	FGPP 1* (980 MW)	FGPP 2* (980 MW)	South Florida CC Unit (1219 MW)	South Florida CC Unit (1219 MW)	FGPP 1 (GAS) (1119 MW)	FGPP 2 (GAS) (1119 MW)	Filler Capacity Needed to Replace Plan's Expired Components (MW)	Filler Capacity Losses (%)	Filler Capacity Losses (MW)	FPL Transmission System Losses with Plan's Remaining Components (MW)	FPL Transmission System Losses with Plan's Remaining Components + Filler Capacity Losses (MW)	FPL Transmission System Losses with the Reference Plan (MW)	Difference in FPL Transmission System Losses between Plan in question and Reference Plan (MW)
2012	980	0	0	1219	0	0	0	2.19%	0.00	291.7	291.7	285.5	6.20
2013	980	980	0	1219	0	0	0	2.19%	0.00	280.5	280.5	302.0	(21.6)
2014	980	980	0	1219	1119	0	0	2.19%	0.00	303.0	303.0	303.3	(0.30)
2015	980	980	1219	1219	1119	0	0	2.19%	0.00	324.5	324.5	313.3	11.3
2016	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2017	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2018	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2019	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2020	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2021	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2022	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2023	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2024	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2025	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2026	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2027	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2028	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2029	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2030	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2031	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2032	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2033	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2034	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2035	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2036	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2037	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2038	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2039	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2040	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2041	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2042	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2043	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2044	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2045	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2046	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2047	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2048	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2049	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2050	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2051	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2052	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2053	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)
2054	980	980	1219	1219	1119	1119	0	2.19%	0.00	330.1	330.1	331.6	(1.50)

* Reflects potential in-service dates (as early as second half of 2012 and 2013 respectively).