

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

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In re: Petition for determination of need  
for Levy Units 1 and 2 nuclear power plants,  
by Progress Energy Florida, Inc.

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Docket No. 080148-EI

Submitted for Filing: June 6, 2008

**PROGRESS ENERGY FLORIDA, INC'S POST-HEARING STATEMENT  
OF ISSUES AND POSITIONS AND BRIEF IN SUPPORT OF ITS  
PETITION FOR DETERMINATION OF NEED FOR LEVY  
UNITS 1 AND 2 NUCLEAR POWER PLANTS**

Pursuant to Section 403.519(4), Fla.Stats., and Rules 25-22.080, 25-22.081, and 28-106.201 F.A.C., Progress Energy Florida, Inc. ("PEF" or the "Company"), petitioned the Florida Public Service Commission ("PSC" or the "Commission"), for an affirmative determination of need for its Levy Units 1 and 2 nuclear power plants, together with the associated facilities, including transmission lines and substation facilities, needed to integrate Levy Units 1 and 2 with PEF's transmission network for delivery of electrical power to PEF's customers. The Commission held a hearing on PEF's petition on May 21-22, 2008. Based on the record in this case, PEF submits that the requirements of Section 403.519(4) have been conclusively established and that the Commission should therefore grant PEF's petition.

Pursuant to the Prehearing Order, PEF submits its Post-Hearing Statement of Issues and Positions and its Brief in Support of its Petition for Determination of Need for Levy Units 1 and 2 Nuclear Power Plants.

**I. PEF'S POST-HEARING STATEMENT OF ISSUES AND POSITIONS**

**PEF's Basic Position.**

\* PEF needs Levy Units 1 & 2 in the 2016 to 2019 time period and beyond, to meet the Company's base load reliability needs and to achieve substantial economic, fuel diversity, fuel

supply reliability, fuel independence, and environmental benefits. These units are PEF's most cost-effective alternative to meet this need. \*

**Issue 1: Is there a need for the proposed generating units, taking into account the need for electric system reliability and integrity, as this criterion is used in Section 403.519(4), Florida Statutes?**

\* Yes, PEF needs Levy Units 1 and 2 to meet its 20 percent Reserve Margin planning criterion for the period 2016 to 2019 and beyond. There is also an economic need for the units, based on the fact that the units provide economic, fuel diversity, fuel independence, and environmental benefits. \*

**Issue 2: Is there a need for the proposed generating units, taking into account the need for fuel diversity, as this criterion is used in Section 403.519(4), Florida Statutes?**

\* Yes, the proposed Levy Units 1 and 2 will increase fuel diversity. With the addition of Levy Units 1 and 2, by 2018, nuclear generation will represent 38 percent of the total energy generation on PEF's system. Without these nuclear units, however, fossil fuel generation will account for 85 percent. \*

**Issue 3: Is there a need for the proposed generating units, taking into account the need for base-load generating capacity, as this criterion is used in Section 403.519(4), Florida Statutes?**

\* Yes, PEF needs new base load generation based on the current and expected load growth. Levy Units 1 and 2 will add the first new base load generation to PEF's system in over thirty years, providing newer vintage generation to complement the older vintage base load units on PEF's system. \*

**Issue 4: Is there a need for the proposed generating units, taking into account the need for adequate electricity at a reasonable cost, as this criterion is used in Section 403.519(4), Florida Statutes?**

\* Yes, Levy Units 1 and 2 will enable PEF to meet its reliability need and continue to provide and increase adequate electrical generation from nuclear fuel at a reasonable cost. Nuclear power uses the lowest cost and least price volatile fuel source available to the Company.\*

**Issue 5: Are there any renewable energy sources and technologies or conservation measures taken by or reasonably available to Progress Energy Florida, Inc. which might mitigate the need for the proposed generating units?**

\* No, there are no additional conservation measures or renewable energy sources reasonably available to PEF which might mitigate the need for the proposed units. PEF's DSM program has captured all cost-effective demand-side potential available. PEF cannot provide DSM options in quantities needed to offset the need for additional generation. \*

**Issue 6: Will the proposed generating units provide the most cost-effective source of power, as this criterion is used in Section 403.519(4), Florida Statutes?**

\* Yes, Levy Units 1 and 2 are the most cost-effective alternative sources of power to meet the Company’s need when fuel diversity and fuel supply reliability, the reduced reliance on fossil fuels, existing and future emission compliance costs, and long-term electric grid reliability factors are considered. \*

**Issue 7: Based on the resolution of the foregoing issues, should the Commission grant Progress Energy Florida, Inc.’s petition to determine the need for the proposed generating units?**

\* Yes, the Commission should grant PEF’s petition. Granting this need determination will provide PEF and Florida the opportunity to move towards a generation supply portfolio that is essential for the future energy needs and economic and environmental well-being of the State.\*

**Issue 8: Should this docket be closed?**

\* Yes, this docket should be closed. \*

**II. BRIEF IN SUPPORT OF PEF’S PETITION**

**A. Introduction.**

PEF demonstrated that it is entitled to a determination by the Commission that Levy Units 1 and 2 are needed within the meaning of Section 403.519(4), Fla.Stats., as amended by the 2006 Florida Renewable Energy Technologies and Energy Efficiency Act (the “Florida Energy Act”), to encourage the development of nuclear generation in Florida. (Hr. Ex. 44, JBC-1, pp. 25-34) Levy Units 1 and 2 are the right choice for PEF, PEF’s customers, and the State.

The Company needs Levy Units 1 and 2 to meet its 20 percent minimum Reserve Margin planning criterion for the period 2016 to 2019 and beyond in the most cost-effective manner for the Company’s customers. (Tr. 89; 488-89). The Company has a base load generation need and Levy Units 1 and 2 meet that need. (Tr. 488; 463-64). Levy Units 1 and 2 will provide PEF’s customers substantial economic, fuel diversity, fuel supply reliability, fuel independence, and environmental benefits.

Levy Units 1 and 2 will be state-of-the-art, advanced passive light water nuclear power plants located in Levy County, Florida. (Tr. 173). Nuclear power generation from Levy Units 1 and 2 will be a clean source of electric power generation. Levy Units 1 and 2 will generate electricity with no SO<sub>2</sub>, NO<sub>x</sub>, mercury, or greenhouse gas (“GHG”) emissions. (Tr. 383). They will also use the lowest cost and least volatile fuel source available to the Company, providing customers adequate electricity at a reasonable cost, indeed generating at least \$930 million in fuel savings for customers each year. (Tr. 465; 506).

As a result, when the financial impacts of potential future carbon abatement regulation currently being considered are accounted for with mid-level to high fossil fuel costs -- the accepted, more likely future scenarios -- Levy Units 1 and 2 are projected to be a more cost-effective alternative to natural gas-fired generation on a cumulative present value revenue requirements (“CPVRR”) basis in seven (7) out of eight (8) CPVRR scenarios, and in some of these scenarios, significantly more so. (Tr. P. 549, L. 1-5; Hrg. Ex. 13, Bates No. 2097). Taking into account all of the factors required to be considered by the Florida Legislature, Levy Units 1 and 2 are, therefore, the most cost-effective generation to meet the Company’s base load need. (Tr. 488-90).

The Company cannot avoid or defer construction of the Levy Units through reasonably available demand-side options or renewable generation options. PEF is first in the nation for demand-side management (“DSM”) and peak load reduction. (Tr. p. 245). PEF is doing all it can do to achieve energy efficiency and reduce peak demand and, even with the additional reductions in peak load expected from PEF’s revised DSM program, there is still a need for 2,000 megawatts (“MW”) of base load generation beginning in 2016 and 2017. Likewise, PEF has aggressively pursued available renewable generation, executing contracts, for example, with the largest proposed bio-mass facility in the nation and the largest proposed wood waste burning

facilities in the nation, and still these generation alternatives cannot offset the need for Levy Units 1 and 2. (Tr. 321-23).

In sum, PEF demonstrated conclusively that it needs Levy Units 1 and 2, that Levy Units 1 and 2 will provide PEF's ratepayers adequate, reasonable-cost electricity, that the Levy Units will contribute to fuel diversity, that they will reduce the Company's (and Florida's) reliance on fossil fuels, and that they are the most cost-effective generation to meet PEF's need. No competent, substantial contrary evidence exists in the record. As such, PEF's petition for determination of need for Levy Units 1 and 2 should be granted.

**B. PEF Met the Applicable Statutory Standard for its Petition.**

Section 403.519(4), as amended by the Florida Energy Act, governs PEF's petition for a determination of need for Levy Units 1 and 2. The determination of need for a proposed electrical power plant using nuclear materials must be based on (1) the need for electric system reliability and integrity including fuel diversity, (2) the need for base-load generating capacity, (3) the need for adequate electricity at a reasonable cost, and (4) whether renewable energy sources and technologies, as well as conservation measures, are utilized to the extent reasonably available. See § 403.519(4), Fla. Stats. Further, the Florida Legislature specifically determined that certain matters were relevant and therefore must be considered in determining the need for a nuclear power plant. These are whether the proposed nuclear power plant will (1) provide needed base-load capacity, (2) enhance the reliability of electric power production within the state by improving the balance of power plant fuel diversity and reducing Florida's dependence on fuel oil and natural gas, and (3) provide the most cost-effective source of power, taking into account the need to improve the balance of fuel diversity, reduce Florida's dependence on fuel oil and natural gas, reduce air emission compliance costs, and contribute to the long-term stability and reliability of the electric grid. §403.519 (4)(b), Fla.Stats.

As we show below, each element of Section 403.519(4) has been affirmatively established by the preponderance of the evidence in this proceeding and, accordingly, PEF's petition should be granted.

**1. Levy Units 1 and 2 are Needed for Electric System Reliability and Integrity, Including Fuel Diversity.**

PEF demonstrated a need for Levy Units 1 and 2 to meet the Company's reliability needs in the 2016 to 2019 time period and beyond. As the evidence shows, PEF needs these units because: (i) without them the Company will not meet its 20 percent minimum Reserve Margin planning requirement in 2016 and beyond, and (ii) there is uncertainty with PEF's expected future generation resources that requires inclusion of the additional, committed generation from the Levy Units in the plan to off-set generation resources that may not materialize or that may retire, or to provide reserves if peak loads are higher than expected or joint ownership off-sets some load. (Tr. 456-59). These fundamental resource planning concerns behind the decision to build Levy Units 1 and 2 are best left to the Company's management judgment when, as was the case here, there was no evidence offered or elicited to show that these concerns were unreasonable under the circumstances justifying the reliability need for Levy Units 1 and 2.

**a. Levy Units 1 and 2 Satisfy the Company's Minimum 20 percent Reserve Margin Planning Criterion beginning in 2016 with the Most Cost-Effective Option.**

Levy Units 1 and 2 are needed to meet PEF's minimum 20 percent Reserve Margin requirement. By the summers of 2016 and 2017, net firm demand is projected to grow to 10,961 MW and 11,150 MW, respectively, followed by a net firm demand of 12,011 MW and 12,242 MW in the winters of 2017 and 2018, respectively. (Tr. 446) This is an expected growth of over twenty (20) percent in the demand for electricity in the Company's service area over the next ten (10) years. (Id.).

PEF's load and energy forecasts include two adjustments to account for slower projected customer load growth due to recent economic conditions, using 2007 Bureau of Economic and Business Research ("BEBR") data, and ultimately reducing PEF's forecasts by approximately 200 MWs. (Tr. 538-39). Even with these adjustments, PEF needs 2,200 MW of base load capacity during the 2016 to 2019 time period. (Tr. 537). The reason is straight-forward: Florida is still growing, albeit at a slower, current pace. (Tr. 446; Comp. Ex. 13, Bates 2350). As shown in the report by the Demographic Estimating Conference introduced by Staff, for every year in the foreseeable future there is still customer load growth, just at lower projected rates than before, and the executive summary of the report concludes that Florida's population will increase by the size of a city the size of Tampa each year. (Comp. Ex. 13, Bates 2349-2385; Tr. 539, L. 22-25). And, as Mr. Crisp explained, when Florida has experienced brief economic downturns in the early 1990's and after 2001, the level of growth bounced back after just one year. (Tr. 540, L. 19-25). For these reasons, PEF did adjust its near-term customer and load forecasts to reflect lower growth, but over the long-term PEF plans for the expected growth trends. (Tr. 539-41). Over time, and applying this method of forecasting to the trend in growth, PEF's load and energy forecasts have proven to be reasonably accurate. (Tr. 445-47). Thus, the evidence demonstrates the Company's customer and load forecasts are reasonable.

Using these customer and load growth forecasts, without Levy Unit 1 in 2016 PEF's Reserve Margin for the summer of 2016 drops below the 20 percent minimum to 15.4 percent. (Tr. 456). This Reserve Margin deficit triggers a resource planning analysis for the most cost-effective generation option to meet that need. (Tr. 443-45). That reliability need is most cost-effectively satisfied by Levy Units 1 and 2 in 2016 and 2017. (Tr. 490). Staff pointed out that the addition of Levy Unit 1 mathematically provided more megawatts than were needed to equal the 20 percent minimum Reserve Margin. (Tr. 521, L. 16-21). But, as Mr. Crisp testified, just

satisfying the minimum Reserve Margin planning criterion is not accepted or prudent resource planning: “if we just went on a year-by-year basis and added a power plant or some means to just satisfy each year’s deficit, it would be considerably more expensive to the ratepayer than by addressing the overall life cycle and by addressing the overall planning horizon.” (Tr. 521, L. 22 to 522, L. 1). The evidence demonstrates that the 20 percent minimum Reserve Margin criterion is the beginning of the integrated resource plan, and just meeting it is not in and of itself a reasonable integrated resource plan. (Tr. 459-60).

The Company’s integrated resource plan calls for Levy Unit 1 in 2016 and Levy Unit 2 in 2017. True, when Levy Unit 2 comes online in 2017, the Company’s Reserve Margin will be 33 percent. (Tr. 526, L. 14-16). But Mr. Crisp explained that the Company will grow into the second nuclear unit quickly. (Tr. 457). Indeed, if Levy Unit 1 is added in the summer of 2016, but Levy Unit 2 is not added the next summer as planned, PEF’s Reserve Margin falls below the 20 percent minimum Reserve Margin criterion by the summer of 2019, just two years later. The Reserve Margin further falls to just 17.2 percent in the summer of 2020, only three years after Levy Unit 2 is planned for commercial operation. (*Id.*). This is demonstrated in the following table. (Hr. Ex. 47, JBC-4).

**Forecast of Summer Demand and Reserves With Levy Unit 1 But Without Levy Unit 2**

<i>Progress Energy Florida - Summer Reserves</i>							
<b>2008 Resource Plan Assessment, Addition of Levy County 1</b>							
	2015	2016	2017	2018	2019	2020	2021
<b>Total Supply Resources</b>	13,252	13,736	13,736	13,736	13,736	13,736	13,736
<b>System Firm Load</b>	10,776	10,961	11,150	11,335	11,530	11,722	11,904
<b>Reserve Margin</b>	23.0%	25.3%	23.2%	21.2%	19.1%	17.2%	15.4%
<b>MW Above/Below 20%</b>	321	583	356	134	(100)	(331)	(549)
<b>2008 Resource Plan Assessment, Addition of Levy County 1&amp;2</b>							
<b>Total Supply Resources</b>	13,252	13,736	14,828	14,828	14,828	14,828	14,828
<b>System Firm Load</b>	10,776	10,961	11,150	11,335	11,530	11,722	11,904
<b>Reserve Margin</b>	23.0%	25.3%	33.0%	30.8%	28.6%	26.5%	24.6%
<b>MW Above/Below 20%</b>	321	583	1,448	1,226	992	761	543



Both nuclear units are needed, therefore, in 2016 and 2017 as planned, especially given the length of time necessary to plan, design, engineer, and construct nuclear generation units. It simply does not make sense to postpone the second nuclear unit when another base load generation unit is needed two to three years after Levy Unit 1. (Tr. 457-59). There will be higher reserve margins with the second nuclear unit but this is not unusual. Mr. Crisp explained that PEF rarely maintains an exact 20 percent Reserve Margin at all times. (Tr. 459). Rather, some additional capacity above the 20 percent minimum Reserve Margin criterion is typical when additional generation resources are added to meet a reliability need. (Tr. 459-60).

The goal of resource planning is to implement the most cost-effective generation alternative to meet the reliability need even if the minimum Reserve Margin criterion is exceeded for several years. (Tr. 460). Levy Units 1 and 2 will provide customers with at least \$930 million in annual fuel savings and even greater annual economic benefits in a future carbon-constrained world. (Tr. 465; 506). Those economic benefits, together with the customer savings from constructing back-to-back nuclear units, overshadow the mere fact that there will be additional reserves for several years after the second unit is added and justify the decision to add Levy Units 1 and 2 in 2016 and 2017.

A similar situation existed the last time large base load generation units were added in Florida. Nuclear and coal base load generation units were added in the mid-70's to mid-80's, a time when continued growth in customers and load in Florida triggered a base load need and rapidly increasing fossil fuel prices justified the addition of these base load units irrespective of the level of reserves. Indeed, in the orders granting the need determinations for these prior base load units little attention was paid to the level of reserves. (See In re Petition for Certification of Need for Orlando Utilities Commission, Curtis H. Stanton Energy Center Unit 1, and Related Facilities, Order No. 10320, 1981 Fla. PUC Lexis 165 (Oct. 2, 1981) (PSC approved 415-

megawatt coal plant that was not needed for reliability purposes by any utility involved in the application until five years after the in-service date of the plant, because the plant would supply an alternative to oil-fired capacity generation (which would lead to fuel savings) and because of the benefits to peninsular Florida in terms of increased reserves); In re JEA/FPL's Application of Need for St. John's River Power Park Units 1 and 2 and Related Facilities, Order No. 10108, 1981 Fla. PUC Lexis 381 (June 26, 1981) (megawatts from base load coal units not needed for several years after in-service date)). Similar conditions support the addition of the Levy base load generation units in 2016 and 2017. (Tr. 456-57).

**b. The Exercise of Reasonable Planning Judgment Supports Both Nuclear Units Under Circumstances where Future Conditions Can Demonstrate a More Immediate Need for the Entire Capacity of Levy Unit 2.**

Mr. Crisp and Mr. Lyash testified to the reasonable, planning judgment supporting the reliability need for Levy Units 1 and 2 in 2016 and 2017. First, PEF's integrated resource plan includes several new, untested renewable energy generation sources exceeding 250 MW. (Tr. 458). These generation facilities rely on unproven technologies or fuel sources and they might not be built, they may be delayed, or they may fail to achieve reliable commercial operation at all, or at the expected capacity when needed, for any number of reasons, such as the inability to obtain financing, to secure reliable fuel sources, or to obtain a site for the project. (Id.; Tr. 328). This renewable energy facility capacity simply may not exist to meet PEF's future load thus reducing PEF's available capacity reserves.

Similarly, there are on-going discussions regarding the continued operation of PEF's two oldest base load coal units, Crystal River Units 1 and 2, in light of pending carbon legislation, that can affect the available base load capacity in the future. (Tr. 527). In addition, Levy Unit 1 will come online eight years from now, with Unit 2 expected to come online in nine years. In

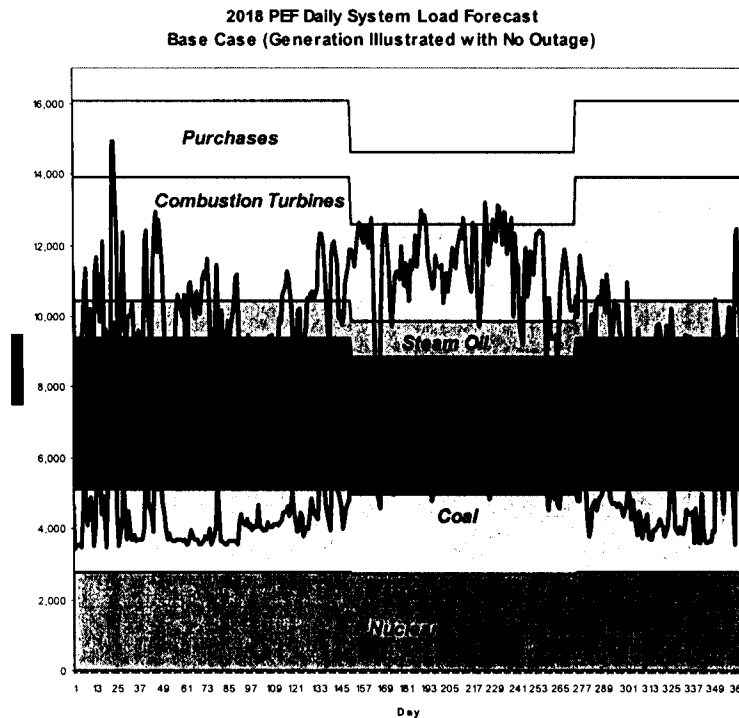
the past, PEF has experienced higher-than-projected load growth, even over shorter periods of time than eight to nine years. (Tr. 458-59). Levy Units 1 and 2 will therefore provide the Company additional capacity to meet customer energy needs in the future if peak loads turn out to be higher than forecasted or if future capacity is less than forecasted due to coal generation retirements. (Id.).

Finally, potential joint ownership will reduce the capacity available to PEF to meet customer load. Mr. Lyash explained that joint ownership discussions with municipal, cooperative, and investor owned utilities are on-going, productive, and, in his opinion, likely to result in co-owners, although the number of co-owners, percentage of co-ownership, and terms of any joint ownership agreement have not been established. (Tr. 122-23). Co-ownership of Levy Units 1 and 2 will reduce the capacity available to PEF to meet PEF's reserves when the Levy Units come on line.

Because all of these circumstances over the planning horizon can reduce PEF's future reserve margins when Levy Unit 2 is added, there is a reliability need in 2017 for Levy Unit 2. (Tr. 527; 122-23; 458-59). This is a matter of PEF's reasonable resource planning judgment. As Mr. Crisp explained, these specific, uncertain circumstances in the planning horizon support the reliability need for Levy Unit 2 because "[t]here are a number of issues that are in play in this time frame that affect our different generating units. ... So to say that 33 percent is an absolute amount in 2017, I think that is the number that we have loaded in based on information that we have today. There is a considerable amount of other impact that could come into play in between now and then that would reduce these reserve margins closer to the 20 percent amount." (Tr. 527, L. 2-4; 12-17). As a result, PEF has established a reasonable resource planning basis for a reliability need for the entire capacity of both Levy Units 1 and 2.

**2. PEF Needs Levy Units 1 and 2 to Meet a Need for Base-Load Generation.<sup>1</sup>**

Levy Units 1 and 2 are needed because the Company needs over 2,000 MW of base load generation capacity beginning in 2016. This point is illustrated by Exhibit 49, included in the following table. (Hr. Ex. 49, JBC-6).



The illustrative chart in Exhibit 49 depicts PEF’s available generation resources (represented by the different blocks stacked on top of each other) and PEF’s daily system load forecast (represented by the two fluctuating lines) with Levy Units 1 and 2 in 2018 (excluding forced or planned outages). (Tr. 465). As demonstrated in Exhibit 49, the nuclear units are expected to run essentially all the time including during off-peak hours to meet load (except when they are off-line for refueling and maintenance or forced outages). (*Id.*). If the 2,200 MW from Levy Units 1 and 2 were removed from the available generation to meet load in Exhibit 49,

<sup>1</sup> This statutory factor appears both in Section 403.519(4) and Section 403.519(4)(b)1. Because of their similarity, they are discussed here and not separately.

all generation blocks depicted would shift down by 2,200 MW, and combined cycle natural gas generation would have to supply part of the base load generation to meet the load signal. The same result occurs if the 2,200 MW of nuclear generation from Levy Units 1 and 2 are replaced with natural gas generation. Levy Units 1 and 2, therefore, are necessary to meet the Company's base load needs. Without them, the Company will have to operate its more expensive natural gas units as base load generation rather than intermediate generation, exposing PEF's customers to higher and much more volatile fuel costs nearly around the clock. (Id.; Tr. 351; 373-74).

Indeed, as Mr. Crisp explained, with the addition of Levy Units 1 and 2 to PEF's system in 2018, PEF is simply maintaining its current, diverse base load fuel mix for energy generation. In 2006, PEF's percentage of energy generation from base load nuclear and coal generation was 57 percent. (Tr. 539, L. 16-18; Hrg. Ex. 50, JBC-7). Adding Levy Units 1 and 2 to the system will in 2018 provide base load (nuclear and coal) generation of 58 percent (38 percent nuclear and 20 percent coal), or roughly the same percentage of base load generation that exists today. (Tr. 539, L. 18-20; Hrg. Ex. 51, JBC-8). Without Levy Units 1 and 2, in 2018 the Company's total base load generation from nuclear and coal drops to a mere 36 percent. (Hr. Ex. 51, JBC-8). Without Levy Units 1 and 2 the Company will be forced to run natural gas combined cycle units longer to meet load, which will have higher costs and higher volatility of natural gas fuel prices. (Tr. 465; 351; 373-74). Mr. Crisp testified that Levy Units 1 and 2 will "balance[] the base load generation to meet [the] exact requirement of base load." (Tr. 540).

Levy Units 1 and 2 will also add additional base load capacity and energy to PEF's generation portfolio with state-of-the-art, nuclear generation technology. (Tr. 463). The Company's other nuclear generating unit, Crystal River 3 ("CR3"), while it has provided and will continue to provide reliable and cost-effective electric service, is thirty years old today. (Id.). Similarly, PEF's other base load generating units, the coal-fired units at Crystal River,

were built decades ago (some before CR3) and therefore represent aging, coal-fired base load generation. (Id.). By the time Levy Units 1 and 2 will be added as planned, the Company's existing base load generation fleet will be nearly forty to over fifty years old. (Tr. 464). This evidence further demonstrates the addition of the Levy nuclear units to PEF's system is important to change the vintage of the Company's existing base load generation for the better by providing PEF's customers with more reliable, efficient, and less costly base load generation to maintain and operate. (Id.).

The Company, therefore, needs 2,200 MW of base load capacity in the 2016 to 2019 time frame. Based on the undisputed evidence, that base load need is best met with Levy Units 1 and 2.

### **3. Levy Units 1 and 2 Provide Adequate Electricity at Reasonable Cost.**

PEF demonstrated that Levy Units 1 and 2 will provide its customers with adequate electricity at a reasonable cost. The fuel for Levy Units 1 and 2, processed uranium, is currently the most stable in price and the lowest cost fuel available to the Company for energy generation. (Tr. 377). This nuclear fuel will be available at a reasonable cost in the future. (Tr. 374-75).

In fact, PEF's nuclear fuel forecast shows that nuclear fuel will continue to be the most stable in price and the lowest cost fuel available to PEF, relative to all fossil fuels, for the life of the Levy nuclear units. (Tr. 377). PEF's fuel forecasts were not disputed. All parties and the Commission Staff stipulated to the entry in evidence of the testimony and exhibits (including the fuel forecasts) of PEF's nuclear and fossil fuel witnesses without challenge. (Tr. 343-344). These witnesses established that the Company's fuel forecasts were prepared using recognized expert utility industry resources and consistent with utility industry and PEF accepted forecasting practices. (Tr. 354-59; 376-77). PEF's fuel forecasts, including its nuclear and natural gas forecasts, therefore, reasonably reflect PEF's expected future fuel costs. (Id.).

Because of the wide variance between natural gas and nuclear fuel prices on a dollar per energy production basis, the operation of Levy Units 1 and 2 will generate substantial fuel savings relative to natural gas-fired generation. (Tr. 465; 359-60; 367). Indeed, the undisputed evidence is that Levy Units 1 and 2 will provide about one billion dollars in fuel savings *each year* to ratepayers, compared to natural gas generation, beginning in 2018 when both nuclear units are on line for a full year. (Tr. 506).

Levy Units 1 and 2 will further be highly efficient, base load nuclear power plants. (Hrg. Ex. 44, JBC-1, p. 21). They will be state-of-the-art, advanced passive light water nuclear power plants, using the Westinghouse Advanced Passive (“AP”) 1000 technology. (Tr. 173). The Westinghouse AP1000 advanced passive reactor design has received Design Certification from the Nuclear Regulatory Commission (“NRC”). (Tr. 167). Westinghouse is the nuclear industry leader with nearly 50 percent of the world’s current nuclear plants based on Westinghouse technology. (Tr. 676). The Levy Units are expected to have low forced and planned outage rates, with the highest expected equivalent availability and capacity factors on PEF’s generation fleet. (Tr. 173). Essentially, these units are expected to and will operate year-round. (Id.) These attributes will provide the Company with a low-cost, highly-reliable source of power. (Tr. 173-74).

PEF further demonstrated that constructing Levy Unit 2 within 12 to 18 months of completion of Levy Unit 1 provides cost savings opportunities for the customers’ benefit. (Tr. 167-68; 461; Hrg. Ex. 44, JBC-1, p. 21). PEF’s witnesses explained that engineering and construction efficiencies and economies of scale -- such as concurrent procurement, engineering and manufacturing of large, key components of the nuclear plant, the continuous mobilization of engineers and construction personnel for the on-site engineering and construction of both nuclear units, and the continuous use of an experienced, efficient work force -- can be achieved by

building successive nuclear units at the Levy site. (Tr. 175; 461-62). As a result, the expected cost of the second nuclear unit is \$3,376/kW, which is significantly less than the cost of Levy Unit 1 at \$5,144/kW, leading to an average \$/kW cost that is cost-effective for PEF and its customers. (Id.). Similarly, there are cost-saving benefits from the average estimated fixed O&M cost for both units. (Id.). These anticipated cost savings are substantial and represent significant economic benefit to PEF's customers, as Mr. Roderick explained in detail in his testimony. (Tr. 167-68). The non-binding cost estimates for Levy Units 1 and 2, which include these substantial cost savings, therefore, represent reasonable costs for advanced, base load nuclear generation in 2016 and 2017. (Tr. 667-68).

No one in fact introduced any evidence to the contrary. There was no evidence at all that the Levy Units did not cost what PEF said they are expected to cost based on the non-binding cost estimate from the Consortium of Westinghouse and Shaw, Stone, and Webster, who will design and build the units, or that the cost efficiencies and economies of scale represented by that non-binding cost estimate cannot be achieved. Rather, intervenors had to admit that the Levy Units might be built for the estimated cost and that the anticipated cost efficiencies and economies of scale might be achieved. (Tr. 581 L. 6-7, 641 L. 20-21). The non-binding cost estimate for Levy Units 1 and 2 is, by the undisputed evidence, the best evidence today of the cost to build and place in operation advanced, base load nuclear generation units. (Tr. 167-68). By definition, then, the Levy Units 1 and 2 cost estimate is a reasonable cost for nuclear generation.

#### **4. PEF Used All Renewable Energy Sources to the Extent Reasonably Available.**

PEF demonstrated by the undisputed evidence that PEF used all reasonably available renewable energy sources and PEF still needs Levy Units 1 and 2. PEF evaluated existing and potential renewable generation resources in accordance with the Commission's rules and entered



into contracts with all available existing and potential renewable generation resources. (Hr. Ex. 44, JBC-1, p. 64; Tr. 317). PEF currently has contracts with five providers for over 173 MW of renewable generation from municipal solid waste facilities and waste wood and tire facilities. (Tr. 314; 320; Hrg. Ex. 23, RDN-1). In addition, PEF has contracts for capacity and energy from three biomass facilities, for a total of 267 MW, including the largest waste wood biomass project in the country. (Tr. 321-24). Biomass is, however, a relatively new technology, and as yet it is untested in Florida. While these projects may be successful, land availability and prices, public acceptance of the projects, and technological feasibility, among other risk factors, may adversely impact the projects. (Id.). Nevertheless, PEF included them in its resource plan to demonstrate its contractual commitment to these renewable generation facility resources. (Hrg. Ex. 44, JBC-1, p. 64).

PEF continues to monitor other forms of renewable resources. PEF issued a Request for Renewables (“RFR”), broadly requesting potential developers to submit projects for PEF to evaluate. (Tr. 326). PEF received 55 responses and, while the vast majority are not viable projects, PEF is actively engaged in discussions with five developers for future, potentially viable renewable generation projects. (Id.). There is no evidence now, however, that these renewable generation projects can in fact be implemented. (Tr. 326-27). PEF has obtained all the renewable generation that can reasonably be obtained. (Tr. 314).

The potential availability of other renewable generation resources in Florida is simply limited by geography, weather, and the current state of technology. (Tr. 315). Traditional renewable resources elsewhere in the country such as hydro power or geothermal sources are essentially unavailable in Florida. (Tr. 325). Other renewable generation resources, like wind, solar, and tidal energy, are ill-suited in PEF’s territory or not sufficiently advanced for Florida to be viable, large-scale generation projects. (320-21; 324-25). Large scale solar energy projects,

for example, are simply not cost-effective given the state of the current technology. (Tr. 324). In fact, recent costs show that solar photovoltaics cost about five times the cost of biomass generation. (Id.).

More importantly, solar energy generation cannot provide the reliable, base load generation that PEF needs. Solar photovoltaic projects can only operate efficiently a few hours per day, given the limited strength of the sun in Florida and the efficiency of current technology to convert that heat to energy, and they cannot operate at all in cloudy conditions. (Comp. Ex. 13, Bates 671). A solar photovoltaic project is also not dispatchable. Because of these operational limitations, the output from a photovoltaic project cannot reliably be counted in PEF's capacity reserves. (Id.). As Mr. Niekum explained, "... to the degree you can align [solar] with the most expensive times you're using electricity any way or running your most inefficient units, it has real value. It just doesn't tend to reduce base load. It tends to reduce these peaking applications and that tends to be where, in my opinion, it fits the best." (Tr. 341, L. 6-11; see also Comp. Ex. 13, Bates 671). Solar photovoltaic projects will not displace the need for base load capacity provided by Levy Units 1 and 2. (Id.).<sup>2</sup>

The undisputed evidence is that, despite PEF's extensive efforts to develop additional renewable generation resources in Florida, no reasonable, additional renewable generation

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<sup>2</sup> Likewise, solar thermal water heaters, which are an element of PEF's load reduction measures in its DSM plan, cannot displace the need for base load generation met by Levy Units 1 and 2. PEF was asked to provide a late-filed Exhibit addressing whether a \$17 billion investment in residential solar thermal hot water heaters might defer some or all of the base load generation need met by Levy Units 1 and 2. As demonstrated by late-filed Exhibit 78, an investment in residential solar thermal hot water heaters would not have a measurable impact on PEF's base load generation need. After investing a maximum of about \$2 billion on all theoretically available, suitable residences, PEF might displace peak load of 46 MW in the winter and 71 MW in the summer at a \$/kW cost that is eight (8) times more expensive than the Levy units. And, PEF would still need the base load generation provided by Levy Units 1 and 2. (Hr. Ex. 78).

resources exist, and Levy Units 1 and 2 are still needed to meet future customer capacity and energy needs.

**5. PEF Used All Conservation Measures to the Extent Reasonably Available.**

No one can seriously challenge PEF's evidence that PEF has used all reasonably available conservation measures to reduce load and off-set the need for additional generation. PEF's Demand Side Management ("DSM") program is ranked first in the nation for demand side management and peak reduction with a reduction of 17 percent of peak load. (Tr. 245, L. 8-11). PEF has met and exceeded its Commission-approved DSM goals every year. For the 2006 reporting period, for example, PEF exceeded its cumulative residential DSM reduction goals as well as all commercial/industrial Commission-established DSM goals by more than 15 percent. (Tr. 260). PEF's DSM programs have saved customers 10 billion kilowatt hours, resulted in a total demand reduction of over 1,500 MW since their inception, offset the need for three new 500 MW generating power plants, and reduced carbon dioxide emissions by more than 7,500,000 tons (the equivalent of removing 1,900,000 cars from Florida roads annually). (Tr. 250).

Yet, despite these accomplishments, PEF recently expanded its DSM offerings in 2006. This expanded program was approved by this Commission in Docket Number 060647. (Hrg. Ex. 44, JBC-1, Appendix C). As a result, PEF currently offers over 100 DSM measures in 16 programs for its customers. (Tr. 251). With its expanded DSM programs PEF included in its resource plan the avoidance of an additional 512 MWs of generation on PEF's system even though these new DSM measures have not been available long enough to determine whether they will actually achieve this level of load reduction. (Id.). As Mr. Masiello put it, "I think your first question was could we do more. And I would tell you – prior to 2004, after our 2004 filing, I would tell you that perhaps we could do more. But with the expansion in 2006 where we

doubled our efforts, I would tell you we are doing the more.” (Tr. 299, L. 4-15). PEF is, therefore, utilizing all conservation and load reduction measures reasonably available to it.

PEF included the additional megawatts from “doing more” with its expanded DSM Program --- the one ranked first in the country --- in its integrated resource plan. (Tr. 509). The undisputed evidence is that all conservation measures reasonably available to PEF have been used and even so there is still a need for Levy Units 1 and 2.<sup>3</sup>

**6. Levy Units 1 and 2 are the Most Cost-Effective Alternative Available to Meet PEF’s Need.**

The Company concluded that Levy Units 1 and 2 are the most cost-effective alternative available to meet its reliability need only after an exhaustive internal review of both demand-side and supply-side options, applying reasonable forecasts and using reasonable resource planning methodologies, consistent with electric utility industry standards and PEF’s integrated resource plan (“IRP”) practices. (Tr. 452-54; Hrg. Ex. 44, JBC-1). In this integrated resource planning process PEF considered, as the Florida Energy Act required, and determined that Levy Units 1 and 2 will improve the balance of fuel diversity, reduce Florida’s dependence on fuel oil and natural gas, reduce air emission compliance costs, and contribute to the long-term stability and reliability of the electric grid. (Tr. 488-91; Hrg. Ex. 44, JBC-1, pp. 35-80). In sum, the evidence of the Company’s IRP planning under the guide of the Florida Energy Act demonstrates that

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<sup>3</sup> Counsel for White Springs questioned Mr. Masiello regarding whether the Company planned to implement smart grid applications. (Tr. 278). The relevance of these questions is unclear, but to the extent White Springs is asserting that smart grid applications could offset the need for Levy Units 1 and 2, this argument is simply incorrect, and White Springs failed to put on any evidence, let alone competent, substantial evidence to support such a claim. Mr. Masiello only testified that at some point over the next 60 years, he expects some smart grid applications might be employed. (Tr. 278, L. 15-17). There is no evidence what these applications might be in the future, when they might be employed, and what load reduction or energy efficiency benefits they might provide. Clearly, the Company cannot rely on conjecture about future, potential load reduction or energy efficiency applications to provide reliable electric service to its customers.

Levy Units 1 and 2 are the most cost effective generation alternative available to meet the Company's need.

**a. PEF's IRP Process Shows that Levy Units 1 and 2 are the Most Cost-Effective Alternative to meet PEF's Need.**

PEF selected Levy Units 1 and 2 as its next-planned units only after carefully evaluating its system needs and planning options through its on-going IRP process. (Tr. 453-54). Through its IRP process, the Company determined that it had a future capacity need by preparing and examining its forecasts for customer growth, energy consumption, and peak demand. (Tr. 446; Hrg. Ex. 44, JBC-1, pp. 42-50). Having identified a capacity need, PEF then conducted a careful screening of the demand-side resources reasonably available to it to determine if its need might be mitigated in whole or in part by DSM resources. (Tr. 131-32; 447-48; Hrg. Ex. 44, JBC-1, pp. 57-60). PEF included all of the existing and expanded DSM programs, at their full potential load reduction, in its resource plan. (Tr. 509; Hrg. Ex. 44, JBC-1, pp. 60, 64). Despite these load reductions, there was still a capacity need in the 2016 to 2019 time frame. (Tr. 448-49).

PEF initially evaluated a wide range of supply-side alternatives (including solar photovoltaic, fuel cells, wind, and wave generation) to meet its capacity need. (Hrg. Ex. 44, JBC-1, pp. 69-71). Initial screening of supply-side options narrowed the field to four viable generation options: natural gas-fired combined cycle generation, pulverized coal or atmospheric fluidized bed combustion ("AFBC") coal generation, coal gasification generation, and advanced light water nuclear generation. (Tr. 451). The Company next initially evaluated each of these alternatives against a resource plan based on natural gas-fired combined cycle and simple cycle generating units. (Hrg. Ex. 44, JBC-1, pp. 71-73). In this initial economic comparison, the advanced light water nuclear generation option was more cost-effective than coal-fired and coal

gasification generation options when compared with the all gas generation reference case. (Hrg. Ex. 44, JBC-1, p. 72).

The Company determined that natural gas-fired generation was the default future generation resource option available to the Company to meet its capacity and energy needs to advanced light water nuclear generation. Natural gas-fired generation has lower capital costs than the other, viable alternative generation options, it is well developed, and the Company has extensive experience with it. (Tr. 480; Hrg. Ex. 44, JBC-1, p. 72). Natural gas-fired generation also is, relative to coal-fired generation, cleaner with lower GHG, SO<sub>2</sub>, NO<sub>x</sub>, and mercury emissions, and it does not have the recent history of adverse regulatory and utility decisions foregoing pulverized coal and coal gasification generation options in Florida. (Hrg. Ex. 44, JBC-1, p. 72-73). Accordingly, the nuclear generation option was reasonably evaluated against an all natural gas generation scenario. (Tr. 452; Hrg. Ex. 44, JBC-1, pp. 72-73).

This evaluation was conducted by the Company with the Strategist computer model. Strategist is a recognized utility industry modeling tool for integrated resource planning that provides an economic evaluation of generation alternatives by making a CPVRR comparison of the viable resource combinations that will satisfy PEF's reliability requirements. (Tr. 475). No one challenged PEF's use of the Strategist model for its integrated resource planning decisions. Rather, the length of the study period in the model was questioned because the Levy nuclear units were evaluated against an all natural gas generation reference case over sixty (60) years. (Tr. 493). As Mr. Crisp explained, however, the sixty-year model period was used because the expected life of the nuclear units was sixty years and, therefore, a longer modeling period was necessary to capture more of the long-term benefits of the nuclear generation option. (Tr. 475). This is consistent with utility industry practice, indeed, Florida Power & Light Company

similarly evaluated the economic benefits of its proposed nuclear generation units over a modeling period in excess of fifty (50) years. (Comp. Ex. 13, Bates 5).

The Company used various fuel forecasts (high, mid and low level natural gas forecasts), as well as various reasonable, carbon cost forecasts in its evaluation of the cost-effectiveness of Levy Units 1 and 2 against an all natural gas generation reference case. (Tr. 476). It bears emphasis that no one questioned the reasonableness of the Company's fuel forecasts used in this analysis. Indeed, all parties including Staff stipulated to the testimony supporting these fuel forecasts. (Tr. 343). Likewise, no one can seriously question the reasonableness of PEF's carbon cost forecasts based on the evidence presented.

Carbon dioxide is a type of GHG. (Tr. 385). Several climate change bills active in Congress would require significant reductions in GHG emissions from electric utilities. (Tr. 391). In addition, in July 2007, Florida Governor Charlie Crist issued executive orders requesting deep reductions in GHG emissions from the State's electric utilities. (Id.). Although there are no current GHG regulations, PEF witnesses testified that it is likely such regulations will be enacted in the future and that those regulations will impose some cost on GHG emissions. (Tr. 395). Indeed, the fact that there will be some form of carbon regulation and resulting GHG emission costs was not disputed by any party during the hearing.

To estimate the cost of potential GHG regulations, the Company first gathered the various federal and state GHG regulations proposed along with other studies that have attempted to estimate what future GHG emission costs may be. (Tr. 395). Counsel for White Springs established with Mr. Kennedy that these studies were based on credible expert sources. (Tr. 399). The cost figures from these studies, on a \$/ton of carbon dioxide emitted, were then determined and plotted on a graph. (Tr. 395-96). Based on this data, a reasonable range of

potential future CO<sub>2</sub> emissions cost projections was developed and incorporated in the Strategist model for the cost-effectiveness determination. (Tr. 396; 476).<sup>4</sup>

The Company used the various fuel and carbon forecasts in the model, including low fuel forecast and no carbon scenarios, and initially produced fifteen (15) different CPVRR scenario results. (Id.; Hrg. Ex. 44, JBC-9). In this evaluation, the nuclear generation option was more cost effective than the all-gas generation reference alternative on a CPVRR basis in ten (10) out of the fifteen (15) potential scenarios. (Id.). PEF concluded, based on this evidence, that the generation resource plan that included Levy Units 1 and 2 was the most cost-effective plan for its customers. (Tr. 477).

Tellingly, all but one of the five scenarios where Levy Units 1 and 2 were not demonstrably the most cost effective generation alternative for customers included the low fuel forecasts, no carbon cost forecasts, or both. When only PEF's mid-level to high fuel forecast and carbon cost forecast scenarios are considered, the resource plan with the Levy Units was the most cost-effective generation resource plan alternative in seven (7) out of eight (8) potential resource plan outcomes. (Tr. P. 549, L. 1-5; Hrg. Ex. 13, Bates No. 2097). Only in the mid-fuel and lowest carbon cost potential scenario was the resource plan with the Levy nuclear units still

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<sup>4</sup> White Springs' counsel apparently questions the Company's analysis of potential carbon regulation costs based on one of several potential scenarios in one updated study of one of the bills (the pending Lieberman-Warner bill) evaluated. (Tr. 401; Hrg. Ex. 42, JMK-3). Since filing Mr. Kennedy's testimony, CRA did update its study to account for additional, subsequent changes made to the Lieberman-Warner bill in legislative committee. (Tr. 403-404; Hrg. Ex. 70). The updated CRA study therefore contains carbon cost figures that were not available when Mr. Kennedy completed his analysis. (Id.). Mr. Kennedy's analysis, however, is consistent with this updated information. Indeed, as Mr. Kennedy testified, the high case scenario in his analysis (\$651/ton) is *less than* the updated CRA scenario with no allowance banking (which in nominal dollars is approximately \$700/ton CO<sub>2</sub>), although more than the alternative scenario where allowance banking is permitted (which, on a nominal dollar basis, is approximately \$100 to \$150 less than the Lieberman-Warner cost figure used as the Company's high case scenario). (Tr. 408-409). The updated carbon cost information, then, still falls within the reasonable range of carbon costs evaluated for the cost-effectiveness of the Levy nuclear units and, therefore, does not change the results of that analysis.



not cost effective. However, the higher the fuel cost, and the higher the carbon costs expected, the more cost-effective the resource plan with the Levy Units becomes. (Tr. 476-77).

As PEF witness Mr. Kennedy testified, there likely will be some future carbon regulation that will impose some cost on the emission of greenhouse gases. (Tr. 395) This testimony was undisputed at the hearing. Further, as PEF witness Mr. Weintraub explained in answer to interrogatories entered in evidence, the advent of GHG regulation will lead to increased demand for relatively cleaner fossil fuel generation such as natural gas generation, and this increase in demand will cause an upward pressure on natural gas prices. (Tr. 544, L. 18-23; Comp. Ex. 13, Bates 518). The existence of low fuel prices in a carbon-constrained future is, therefore, improbable.<sup>5</sup> Mr. Crisp explained further why the low fuel and no carbon cost scenarios were improbable and should be excluded from consideration: “As part of the discussion as a part of what we observed within the Florida Power and Light ruling, they did not include a no carbon scenario. They also did not include a low fuel reference scenario, because what is currently under discussion at federal and state level is that it is more likely that carbon scenarios will be in play in this time frame, and the mid fuel and high fuel scenarios will result from those carbon scenarios. So on the basis of what’s currently going on at the federal and state level legislation, it was more probable to just reference the mid fuel and high fuel as well as the different carbon scenarios.” (Tr. 533, L. 4-14).

Under the more likely scenarios where the low fuel forecast and no carbon cost scenarios are excluded, then, the Company’s CPVRR analysis demonstrates that the nuclear generation resource option is more cost-effective than an all gas generation plan in seven out of the eight

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<sup>5</sup> Indeed, the likelihood of the low fuel price forecast occurring at all in the future is improbable. This point was brought out at the hearing by Commissioner Skop when he questioned Mr. Crisp about PEF’s current natural gas spot market prices. (Tr. 544, L. 5-13). Mr. Crisp agreed that “the current prices of natural gas, both the spot and the futures, are well in excess of the lo[w] forecast . . . and [even exceed] the mid gas forecast.” (Tr. 545, L. 3-11).

more probable scenarios. (Tr. P. 549, L. 1-5; Hrg. Ex. 13, Bates No. 2097). This analysis is depicted in the following chart, which was produced as a late-filed exhibit to Mr. Crisp’s deposition, and entered in evidence. (Comp. Ex. 13, Bates No. 2097).

***Levy 1&2 Nuclear Economic Benefits Assessment  
Mid Reference Fuel and Fuel Sensitivities - Full Ownership  
Comparison of Nuclear Expansion vs All Gas Reference Case  
Base Year Cumulative PV Benefits (\$2007 in Millions)***

<b><i>Base Capital Reference Case</i></b>	<b><i>Mid Fuel Reference</i></b>	<b><i>High Fuel Reference</i></b>
<b><i>Bingaman Specter CO<sub>2</sub> Case</i></b>	<b><i>(\$343)</i></b>	<b><i>\$5,212</i></b>
<b><i>EPA No CCS CO<sub>2</sub> Case</i></b>	<b><i>\$793</i></b>	<b><i>\$6,318</i></b>
<b><i>MIT Mid Range CO<sub>2</sub> Case</i></b>	<b><i>\$3,614</i></b>	<b><i>\$9,077</i></b>
<b><i>Lieberman Warner CO<sub>2</sub> Case</i></b>	<b><i>\$6,380</i></b>	<b><i>\$11,892</i></b>

Mr. Crisp agreed with Staff at the hearing that the above-reference table “more accurately reflects the scenarios that are more likely to occur.” (Tr. 533, L. 15-18). As a result of its evaluation, the Company concluded that, in its judgment after taking into account all of the factors that the Florida Legislature requires the Company to consider in assessing the cost-effectiveness of nuclear generation to meet a future need, the resource plan including Levy Units 1 and 2 was the most cost-effective generation alternative. (Tr. 477).<sup>6</sup>

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<sup>6</sup> Staff asked questions about a summary exhibit that included an estimated net bill impact (per 1,000 kwh(s)) through 2040 using PEF’s mid-level fuel forecast and a mid-level carbon cost forecast scenario, for both units, Levy Unit 1 only, and 80 percent joint ownership of both units. (Tr. 534-37). Staff suggested that the joint ownership or Levy Unit 1-only options in this exhibit offered a way to mitigate the rate impact to customers. Staff is incorrect, as Mr. Crisp pointed out, because Staff failed to take into account the total cost savings to customers. (Tr. 536). When the total, long-term benefits (and, hence, rate impacts) are appropriately accounted for

**b. PEF's Current Non-Binding Cost Estimate for Levy Units 1 and 2 is based upon the Best-Available Information and therefore Reasonable.**

Levy Units 1 and 2 have a high capital cost: \$17 billion (in 2016 dollars, including Allowance for Funds Used During Construction ("AFUDC"), and including transmission facilities). (Tr. 155). Importantly, all of these costs were included in the Company's analysis of the cost-effectiveness of the nuclear generation resource plan with Levy Units 1 and 2 compared to an all natural gas generation resource plan. (Hrg. Ex. 44, JBC-1, pp. 18-23, Tr. 507). The Company still determined that the generation resource plan with Levy Units 1 and 2 was the most cost-effective alternative for its customers. (Tr. 477).

All nuclear generation too, has a high initial capital cost. What is important here is that PEF's non-binding cost estimate is based on the best, currently available pricing information. (Tr. 174, 668). PEF's cost estimates are based on the latest pricing received from the AP 1000<sup>7</sup> vendor, Westinghouse, and its partner, Shaw, Stone, and Webster (together the "Consortium"), during the ongoing negotiations for the engineering, procurement, and construction ("EPC") contract. (Tr. 156). The non-binding cost estimate for Levy Units 1 and 2 is an "all-in" cost estimate. It includes the land cost to purchase the Levy site, (Tr. 162-63),<sup>8</sup> the Combined Construction and Operating License ("COLA") preparation and NRC review, initial core load,

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Levy 1 and 2 full ownership is the most cost-effective option for customers. (Id.). PEF must, of course, take into account the full life-cycle costs and benefits of any generation option to determine what the most cost-effective option for the customer is. (Tr. 475). That is simply prudent utility resource planning.

<sup>7</sup> No one disputed the Company's decision to move forward with the AP1000 technology that was selected. This selection process was described in detail in Mr. Roderick's direct testimony. (Tr. 164-65).

<sup>8</sup> The Company engaged in a lengthy process to select the Levy site as the preferred site. No one disputed the choice of the Levy site at the hearing, which was described in detail in the direct testimony of Mr. Roderick, after Mr. Roderick explained the geotechnical benefits and the higher, inland location benefits of the Levy site compared to the Crystal River site. (Tr. 159-64, 202-206).

site specific structures, land clearing and engineering, owner's costs such as training and staffing, owner construction oversight, permits, fees, insurance, taxes, AFUDC, escalation, and contingencies. (Tr. 167). It is also a detailed cost estimate, containing specific line-item and unit item costs, supported by an actual library of cost data. (Tr. 140, 155-56, 191-192).

In addition, the transmission cost estimates were developed using an industry-accepted evaluation process. This process determined the necessary additional transmission facilities and transmission upgrades to connect the Levy nuclear units with PEF's existing transmission system and the estimated cost of that work. (Tr. 225). No one disputed either the scope of the necessary transmission project or the cost estimates for the project.

The only real challenge to PEF's non-binding cost estimate for Levy Units 1 and 2 at the hearing was that it was in fact a "non-binding" estimate. PEF admitted that delays may occur and that costs may increase for a number of reasons. (Tr. 85; 156). Some of these reasons are specific to nuclear generation projects (e.g., regulatory delays) but many more are not (e.g., inflation, commodity price increases). (*Id.*; Tr. 667-668). Simply put, any large-scale generation project is subject to cost increases. (Tr. 667-668, 683, L. 12-25). Intervenors latched onto this testimony, however, to question the reasonableness of PEF's cost estimate for the Levy project and the cost-effectiveness of Levy Units 1 and 2. (Tr. 101-103; 684-86).<sup>9</sup> They also argued for unspecified "conditions," including unidentified "cost caps," in any need determination order for "consumer protections." (Tr. 638; 644). Intervenors' arguments are misplaced and wrong.

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<sup>9</sup> For example, White Springs' counsel questioned the Company's assumption that the Levy Units would achieve commercial operation as planned in light of the risk of delays in the project. (Tr. 502). As Mr. Crisp explained, however, the Company must plan for the generation units when they are needed and Levy Units 1 and 2 are needed in 2016 and 2017 respectively. (Tr. 502, L. 16-22). In any event, the Company did perform cost sensitivities of as much as a twenty-five percent increase in the cost estimate, for whatever reason – including, potentially, project delays, and still determined that the resource plan with Levy Units 1 and 2 was more cost-effective than the alternative all-gas generation resource plan. (Tr. 549; Hrg. Ex. 44, JBC-1, p. 97).

First, as explained above and in detail by Mr. Lyash and Mr. Roderick, PEF's non-binding cost estimate represents the best commercial information available today on the cost to construct nuclear generation units, and at the specific Levy County site. (Tr. 84-85, 174, 668). This is a highly detailed cost estimate. It reflects substantial engineering and construction estimation work on material and labor unit costs using a NRC certified nuclear design. (Tr. 140, 156, 162-63, 676-677). It reflects all known costs, down to the costs of permits, taxes, and insurance. (Id.). It also reflects the experience and knowledge accumulated over the past forty years operating and maintaining nuclear power plants in the United States and constructing, operating, and maintaining them around the world. (Tr. 105-07, 662, 676-677, 686). It is a real, reliable, and reasonable, though non-binding, cost estimate.

Intervenors did not and cannot challenge this estimate. Their only response was to claim some prior nuclear generation projects in this country and one existing nuclear generation project in another country experienced delays and cost overruns. (Tr. 601). They offered no evidence that any of the cost estimates for these various, other nuclear generation projects they generally referred to, however, were in any way comparable to the detailed Levy project cost estimate.

Mr. Lyash and Mr. Roderick explained (through questions by Intervenors' counsel), based on their own experience in the nuclear industry, that these other nuclear generation projects in fact were not comparable to the Levy project. Rather, the developers of prior nuclear projects that suffered delays and cost overruns did not have, among other distinguishing factors, a standard, certified nuclear design, a combined construction and operating license process, or forty years of experience with nuclear reactor operation and maintenance that PEF has with the Levy project. (Tr. 105-07, 140, 156, 662, 676-677). For example, Mr. Roderick explained that the AREVA nuclear generation project in Finland, which intervenors claimed was delayed and over-budget, did not have the same beneficial legislative and regulatory approval process that

exists in Florida and at the NRC. (Tr. 672, 703-704). There is no evidence, then, that delays or cost overruns experienced on particular, past nuclear generation projects will occur on the Levy project. Indeed, Mr. Bradford, intervenor White Springs' witness, admitted that he cannot say that the history he relied on must repeat itself and that he cannot tell the Commission the cost efficiencies expected from the Levy project cannot be achieved. (Tr. p. 581, L. 6-7; p. 641, L. 17-21).<sup>10</sup> The reasonableness of the non-binding cost estimate is, therefore, clear based on the substantial, competent evidence.

Second, what intervenors really want when they argue for "conditions" to protect consumers is greater certainty about the ultimate cost of Levy Units 1 and 2. Some want additional nuclear generation but only at a cost that even they cannot identify.<sup>11</sup> Mr. Bradford, for example, relies on speculation about ill-defined contract terms and cost management strategies from hearsay statements by an Exelon Generation official which, as Mr. Roderick explained, do not represent real world market conditions involving the construction contracting process for new nuclear power plants. (Tr. 604-05; 672-73). Mr. Bradford must in the end agree and he did. He testified the most important condition was to set cost limits on the Levy project

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<sup>10</sup> Mr. Bradford was in no real position to offer evidence about the Levy project cost estimate anyway. He is not an engineer or a contractor, and he has never been involved in the actual engineering and construction work to develop nuclear power plants. (Tr. 642). Mr. Roderick, however, is a nuclear engineer with more than 30 years experience in the nuclear industry, including operating and maintaining nuclear generators and working on nuclear construction projects, including the current CR3 nuclear uprate project, CR3 steam generator replacement project, and, of course, the Levy project. (Tr. 152-53). His testimony supporting the reasonableness of the Levy project and the non-binding cost estimate was uncontradicted by any competent, substantial evidence.

<sup>11</sup> Indeed, White Spring's witness Mr. Bradford expressed no opinion on the Commission's ultimate decision to grant or deny PEF's need determination. He only opined that, in the event the need determination was granted, it should include consumer protections. (Tr. 636). This is consistent with White Springs' counsel prehearing comments touting the ease with which a nuclear plant met the need criteria because of its base load capacity, no GHG emissions, and relatively low fuel costs. (Prehearing Transcript, p. 19, L. 3-7). White Springs fully recognizes the benefits of nuclear generation.

but he admitted he could not tell the Commission what those costs limits are. (Tr. 644). In sum, no competent evidence supports conditions to protect customers from all risks of cost increases. Such risks are inherent in the project. The Florida Legislature recognized this and directed that the need determination for a nuclear power plant proceed from a non-binding cost estimate. §403.519(4)(b)3, Fla. Stats. Nowhere in Section 403.519 did the Florida Legislature authorize need determination conditions contrary to this express direction. (Id.; Tr. 638-39).

What PEF can do and testified it is doing is manage the costs the best that it can. For example, Mr. Roderick testified that the Company is working to firm up as many of the prices as it can. (Tr. 677). PEF is actively negotiating to allocate risks and tie as many costs to indices as possible. (Id.). The Company is also taking reasonable steps to mitigate other project risks, including obtaining front-of-the-line position for key equipment and labor, creating a separate nuclear construction organization with dedicated, knowledgeable employees, and implementing successful project management tools. (Tr. 175-176, 213). These are just some examples PEF's witnesses provided to demonstrate the Company's efforts now and in the future to reasonably manage the costs of the project. The Company is, of course, responsible for reasonably and prudently managing the construction cost and schedule for any utility generation project to minimize the risk to consumers of cost overruns and project delays. (Tr. 715). The Company intends to fulfill that responsibility with the Levy project, as Mr. Roderick explained, "We absolutely want this project to be successful." (Tr. 716).<sup>12</sup>

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<sup>12</sup> White Springs' counsel questioned Mr. Portuondo regarding the cost recovery mechanism for various levels of cost overruns absent any imprudence by the Company in connection with those cost overruns. Mr. Portuondo correctly pointed out that the nuclear cost recovery statute and rule permitted the recovery of those costs and a return on them under those circumstances. (Tr. 572). If White Springs intends to suggest by these questions that PEF has no interest in controlling costs and no risk associated with cost overruns, White Springs is mistaken. As Mr. Roderick explained, PEF has all the risk of this project, "Progress Energy's name [is] on the bottom of that note, and every year we have to come [to the Commission] to prove that that was prudently spent

Third, the Commission and all interested parties will have an opportunity to review the reasonableness and prudence of PEF's costs for the Levy project in the annual nuclear cost recovery proceeding. This is the appropriate mechanism to address the reasonableness of PEF's risk and cost management efforts under the statutory and regulatory scheme. (Tr. 708-09; §366.93, Fla. Stats.; Rule 25-6.0423, F.A.C.). At that time, the costs actually incurred and the circumstances and conditions under which they were incurred will be before the Commission. As PEF's witnesses explained, it will be a transparent process each year. (Tr. 139, 176-177, 708). That is the time to test the reasonableness of prudence of PEF's costs for Levy Units 1 and 2.

In sum, PEF presented substantial, competent evidence that its cost estimate for Levy Units 1 and 2 is reasonable. There is no competent, contrary evidence and, therefore, Levy Units 1 and 2 are demonstrably the most cost-effective alternative to meet PEF's reliability needs.

**c. Levy Units 1 and 2 will Reduce Air Emission Compliance Costs.**

Nuclear power is a clean source of electric power generation. Levy Units 1 and 2 will therefore emit no air pollutants while generating electricity. (Tr. 387). By comparison, both coal-fired and natural gas-fired generating units will produce air pollutants. In fact, Levy Units 1 & 2 will avoid approximately 5.8 million tons of sulfur dioxide ("SO<sub>2</sub>"), 1.4 million tons of nitrous oxide ("NO<sub>x</sub>"), 28,800 pounds of mercury, and 864 million tons of carbon dioxide ("CO<sub>2</sub>") over a 60-year life time when compared with the potential emissions from a coal-fired plant. Compared to a natural gas-fired, combined-cycle facility, Levy Units 1 and 2 will avoid approximately 1,440 tons of SO<sub>2</sub>, 28,800 tons of NO<sub>x</sub>, and 384 million tons of CO<sub>2</sub>. (Tr. 388). There is a cost to these emissions from coal and natural-gas fired generation too that will be

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money. And, ... that's the risk the Company has. The Company has that debt." (Tr. 709). The statutory and regulatory means of subsequent cost recovery do not change that fact.



avoided with nuclear generation. (Tr. 395). The fact that Levy Units 1 and 2 will provide clean electricity without any SO<sub>2</sub>, NO<sub>x</sub>, mercury, or GHG emissions and their resulting costs is virtually undisputed. (Id.; Tr. 81).

**d. Levy Units 1 and 2 will Contribute to the Long-Term Stability and Reliability of the Electric Grid.**

With Levy Units 1 and 2 on-line PEF will add 2,200 MW of reliable, base load, nuclear generation to PEF's system and the Florida electric grid. This additional base load nuclear generation will contribute to the long-term stability and reliability of the electric grid. (Tr. 481). The Westinghouse AP1000 design that PEF has initially chosen for these units is safer and requires significantly less cable, pumps, valves, and other equipment than existing nuclear power reactors. (Tr. 166). These technological advancements will provide greater operational efficiency and reduced maintenance with lower maintenance costs compared to existing nuclear technology in operation today. (Tr. 481). In addition, because Levy Units 1 and 2 will run essentially year-round, at a very high capacity factor, they will provide needed base load capacity to PEF's system and the electric grid as a whole. (Id.).

White Springs witness Mr. Bradford challenged whether Levy Units 1 and 2 will be able to achieve a high capacity factor, solely on the basis of a comparison to the life-time capacity factors of nuclear plants in the United States, which he failed to introduce in evidence. (Tr. 607). In any event, as Mr. Roderick explained, this comparison is inaccurate. Life-time capacity factors for all existing nuclear power plants naturally include the initial history of the nuclear power plants when the nuclear industry was in its infancy. (Tr. 670). Today, the nuclear industry, including utilities, nuclear vendors, and the NRC, have over forty years experience operating and maintaining nuclear generating units. (Tr. 668). Given this knowledge and experience, and the similarity of the current designs to existing operational nuclear reactors, a

more realistic comparison for future nuclear power plant capacity factors is the capacity factors achieved over the last decade. (Tr. 670). These capacity factors are just as high as expected for Levy Units 1 and 2 (in the 90's) when they achieve commercial operation. (Id.). There is no competent evidence to suggest that Levy Unit 1 and 2 will not achieve these same capacity factors when they come on line.

**7. Levy Units 1 and 2 Enhance the Reliability of Electric Power Production Within the State.**

Pursuant to Section 403.519(4)(b)2, the Commission must consider whether Levy Units 1 and 2 will enhance reliability by improving the balance of power plant fuel diversity and by reducing Florida's dependence on fuel oil and natural gas. PEF has shown that its proposed nuclear power plants will enhance reliability under both criteria.

**i. Levy Units 1 and 2 Improve the Balance of Power Plant Fuel Diversity.<sup>13</sup>**

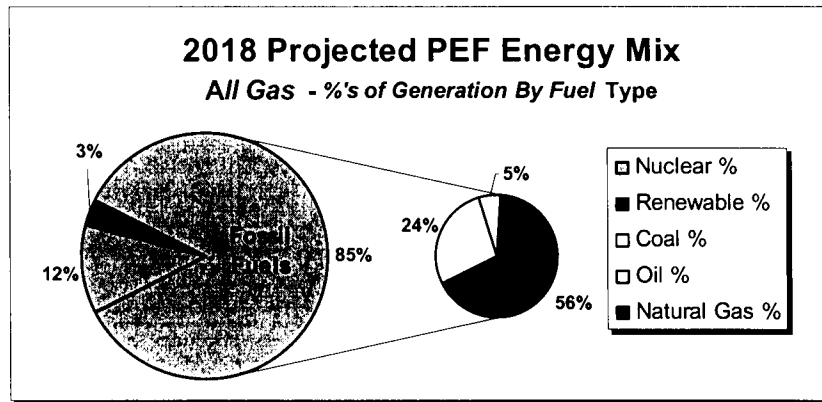
Section 403.519(4)(b)2 requires consideration of whether the nuclear power plant will enhance power production reliability in the State by improving the balance of fuel diversity. Levy Units 1 and 2 will improve the balance of power plant fuel diversity on PEF's system by increasing nuclear fuel base load generation and decreasing fossil fuel generation. No one disputes the value of nuclear generation to fuel diversity. Indeed, all parties stipulated to the evidence presented by Mr. Weintraub regarding the benefits of Levy Units 1 and 2 to PEF's fuel diversity without challenging it. (Tr. 343-44). Adding Levy Units 1 and 2 will diversify PEF's fuel portfolio. This diversity benefits the State too. In 2018, if Levy Units 1 and 2 are *not* added, nuclear generation on PEF's system will only be 12 percent, (Tr. 518, L. 5-12; Hrg. Ex. 51, JBC-

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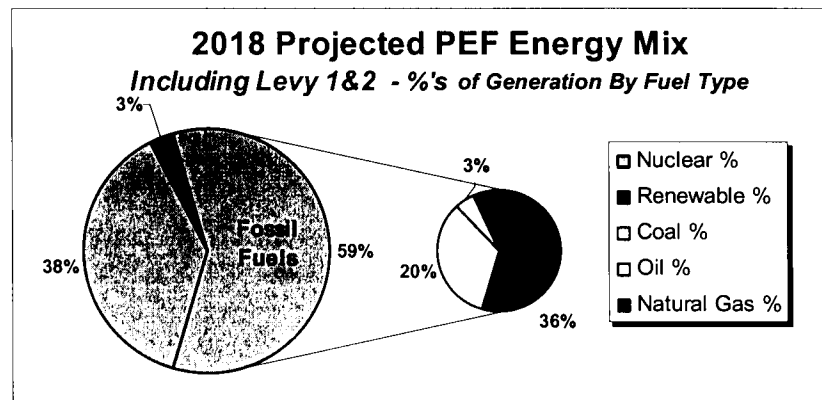
<sup>13</sup> This statutory factor is found in two sections, Section 403.519(4)(a)2 and Section 403.519(4)(b)2.

8), and PEF will rely on fossil fuels for 85 percent of its total energy generation. With these units in 2018, however, nuclear generation improves to 38 percent of PEF's total generation. (Tr. 518, L. 13-18; Hrg. Ex. 51, JBC-8). The impact of nuclear generation on PEF's energy mix is depicted graphically in the following tables in evidence. Id.

**PEF's 2018 Energy Mix Without Levy Units 1 and 2**



**PEF's 2018 Energy Mix With Levy Units 1 and 2**



The addition of this nuclear generation will increase the percentage of total nuclear on PEF's system, which gives PEF's customers a more diversified, price stable fuel portfolio. (Tr. 352-54). Without Levy Units 1 and 2, PEF will rely on more volatile-priced fossil fuels for 85 percent of its energy generation. Indeed, gas and oil will contribute over 60 percent of the total

energy generated – including some around-the-clock base load energy generation. (Tr. 465; Hrg. Ex. 49, JBC-6). These units are therefore needed to improve PEF’s fuel diversity.

**ii. Levy Units 1 and 2 Reduce Florida’s Dependence on Fuel Oil and Natural Gas.<sup>14</sup>**

Levy Units 1 and 2 will also help reduce Florida’s dependence on fuel oil and natural gas. If these nuclear units are not added to PEF’s system, PEF will likely be forced to continue to rely on natural gas-fired combined cycle generation, and rely on natural gas for base load generation. (Tr. 363). This would obviously result in PEF (and correspondingly the State) increasing, not decreasing, its dependence on natural gas.

The substantial, competent evidence shows that PEF’s reliance on fuel oil and natural gas in the future if Levy Units 1 and 2 are not built will have significant repercussions for State energy and PEF customer energy costs. In 2018, fuel oil and natural gas energy generation will account for 61 percent of PEF’s total energy produced. (Hrg. Ex. 51, JBC-8). The fluctuation of natural gas and fuel oil prices in the future is expected to increase beyond even the current volatility of prices. (Tr. 361-62). Additionally, Florida’s geographic limitations make Florida utilities vulnerable to more frequent natural gas supply disruptions, with resulting price increases to the detriment of PEF’s ratepayers. (Tr. 364).

Future natural gas prices are expected to fluctuate even more than current prices. An increase in the number of natural gas-fired generation facilities that were constructed during the 1990’s and that are still being built increases the demand for natural gas and places upward pressure on natural gas prices. (Tr. 361). This will only increase in a future carbon constrained

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<sup>14</sup> This statutory factor is found in two sections, Section 403.519(4)(a)2 and Section 403.519(4)(b)2.

world as utilities move to natural gas as a relatively cleaner fossil fuel for generation resource options. (Comp. Ex. 13, Bates 518).

In addition, while Liquefied Natural Gas (“LNG”) and other potential frontier gas production, like Alaskan production, are expected to help balance the United States’ natural gas supply portfolio, their availability when needed in sufficient supply and at reasonable prices is uncertain. (Tr. 361-62). Seventy percent of the world’s oil and gas is held by national (state-owned) oil and gas companies, such as Russia, Qatar, and Iran, who control a majority of the world’s natural gas reserves. (Tr. 362). As such, PEF (and other United States utilities) have no control over the production and supply of future LNG, much like utilities today have no control over the foreign production and supply of oil. (Comp. Ex. 13, Bates 589-90). Today, LNG and even coal prices are determined by world supply and demand. (Comp. Ex. 13, Bates 588-90). This world energy market is expected to continue in the future. Future fossil fuel prices will, therefore, be driven by world production and supply imbalances with world demand. More, not less, volatility in all fossil fuel prices, in particular, natural gas can therefore be expected. (Id.).

Additionally, Florida’s geographic location creates the potential for supply disruption. Florida is a peninsula that, in effect, operates as a bottle-neck at certain times when it comes to supplying Florida utilities with natural gas. (Tr. 364). Expansions of pipelines will become necessary to meet the demand, and as the costs for that expansion increase, so will the price for natural gas. (Id.). In addition, several natural gas suppliers are located in or near the Gulf of Mexico, and when hurricanes affect this region, these facilities must stop production. (Id.). This again restricts the supply and causes price increases.

Alternative fuel generation, like that offered by Levy Units 1 and 2, will provide greater fuel diversity and fuel supply reliability, thus mitigating the adverse economic impacts from restrictions on natural gas supply when gas production or supply is limited and demand is high.

(Tr. 365). As a result, the evidence demonstrates that nuclear generation is a necessary and attractive long-term economic generation alternative to ensure greater fuel diversity, more fossil fuel independence, and greater fuel supply security. (Tr. 360). This evidence in the record is undisputed. Levy Units 1 and 2, by adding nuclear generation to PEF's system and thus reducing PEF's need for additional natural gas-fired generation, will thus reduce PEF's and Florida's reliance on fuel oil and natural gas.

**C. Benefits of Joint Ownership.**

The Company has been engaging in significant and meaningful negotiations with potential joint owners, including municipal, cooperative, and investor-owned utilities, regarding some level of joint ownership of the Levy nuclear units. (Tr. 93; 122; Hrg. Ex. 65). In initial meetings PEF has explained the technical information as to the nature of the project, the anticipated costs, and schedules. (Id.). Discussions with the potential joint owners have now focused on specific terms and conditions of joint ownership agreements and ongoing operating agreements. (Id.). Mr. Lyash testified that, although it is impossible to say what the results of these negotiations will be, it is "very likely" that PEF will have co-owners in this project. (Tr. 122-23). The Company and the potential joint owners involved have made these negotiations a priority, and discussions are moving forward expeditiously. (Id.). PEF is unable to say with any certainty, however, when final joint ownership agreements may be signed. (Tr. 125).

While PEF has a need for the entire energy output of Levy Units 1 and 2, PEF recognizes that joint ownership has several benefits. If PEF reaches agreement with any joint owners, the generation available for the Company's reserves naturally decreases in proportion to the level of joint ownership. (Tr. 527, L. 4-8). This helps smooth the "lumpiness" of reserves when these large nuclear units come online. (Tr. 86). Also, joint ownership helps spread some of the capital risk and, accordingly, helps mitigate the capital cost to PEF's customers. (Tr. 93). PEF further

may be able to site certain facilities, like transmission facilities, with greater ease if local municipalities are involved in the ownership of the project. (Tr. 123-24). Finally, co-ownership will help alleviate the price impact to customers. (Tr. 124). PEF has demonstrated its commitment to joint ownership for the Levy nuclear units in the event the value of joint ownership under the circumstances will actually produce benefits to PEF and its customers.

**D. Conclusion**

For all of the foregoing reasons, and based on the preponderance of the evidence presented at the hearing, the Commission should grant PEF's Petition for Determination of Need for Levy Units 1 and 2 Nuclear Power Plants.

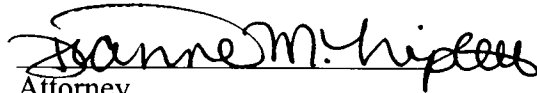
Respectfully submitted this 6<sup>th</sup> day of June, 2008.

R. Alexander Glenn  
Deputy General Counsel  
PROGRESS ENERGY SERVICE  
COMPANY, LLC  
Post Office Box 14042  
St. Petersburg, FL 33733-4042  
Telephone: (727) 820-5587  
Facsimile: (727) 820-5519

  
James Michael Walls  
Florida Bar No. 0706242  
Dianne M. Triplett  
Florida Bar No. 0872431  
CARLTON FIELDS, P.A.  
Post Office Box 3239  
Tampa, FL 33601-3239  
Telephone: (813) 223-7000  
Facsimile: (813) 229-4133

**CERTIFICATE OF SERVICE**

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished via electronic and U.S. Mail this 6<sup>th</sup> day of June, 2008 to all parties of record as indicated below.

  
Attorney

Mr. Paul Lewis, Jr.  
Progress Energy Florida, Inc.  
106 East College Avenue, Ste. 800  
Tallahassee, FL 32301-7740  
Phone: (850) 222-8738  
Facsimile: (850) 222-9768  
Email: paul.lewisjr@pgnmail.com

Katherine Fleming  
Staff Attorney  
Florida Public Service Commission  
2540 Shumard Oak Blvd  
Tallahassee 32399  
Phone: (850) 413-6218  
Email: keflemin@psc.state.fl.us

Stephen C. Burgess  
Associate Counsel  
Office of Public Counsel  
c/o The Florida Legislature  
111 West Madison Street  
Room 812  
Tallahassee, FL 32399-1400  
Phone: (850) 488-9330  
Email: Burgess.steve@leg.state.fl.us

Charles Gauthier  
Division of Community Planning  
2555 Shumard Oak Blvd.  
Tallahassee, FL 32399-2100  
Phone: (850) 487-4545  
Facsimile: (850) 488-3309  
Email: charles.gauthier@dca.state.fl.us

Michael P. Halpin  
Siting Coordination Office  
2600 Blairstone Road, MS 48  
Tallahassee, FL 32301  
Phone: (850) 245-8002  
Facsimile: (850) 245-8003  
Email: Mike.Halpin@dep.state.fl.us

James W. Brew  
Brickfield Burchette Ritts & Stone, PC  
1025 Thomas Jefferson St NW  
8th FL West Tower  
Washington, DC 20007-5201  
Phone: (202) 342-0800  
Fax: (202) 342-0807  
Email: jbrew@bbrslaw.com  
-and-

E. Leon Jacobs, Jr.  
Williams & Jacobs, LLC  
1720 S. Gadsden St. MS 14  
Suite 201  
Tallahassee, FL 32301  
Phone: (850) 222-1246  
Fax: (850) 599-9079  
Email: Ljacobs50@comcast.net

Karin S. Torain  
PCS Administration (USA), Inc.  
Suite 400  
Skokie Blvd.  
Northbrook, IL 60062  
Phone: (847) 849-4291  
Email: KSTorain@potashcorp.com



Dean Edwards  
Inglis Hydropower, LLC  
P.O. Box 1565  
Dover, FL 33527  
Phone: (813) 659-3014  
Email: [inglishydro@hotmail.com](mailto:inglishydro@hotmail.com)