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b. Docket No.: 070098-EI - Petition for determination of need for Glades Power Park Units 1 and 2 electrical power plants in Glades County, by Florida Power & Light Company.

c. Document being filed on behalf of Florida Power & Light Company

d. There are 78 pages.

e. The document attached for electronic filing is FPL's Post-Hearing Brief.

(See attached file: Posthearing Brief 5.7.07.doc)

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BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition for determination of need for Glades Power Park Units 1 and 2 electrical power plants in Glades County, by Florida Power & Light Company	Docket No. 070098-EI Filed: May 7, 2007

FLORIDA POWER & LIGHT COMPANY'S POST-HEARING BRIEF

Florida Power & Light Company ("FPL" or the "Company") files with the Florida Public Service Commission (the "PSC" or the "Commission") its Post-Hearing Brief in the above-referenced docket, and states:

INTRODUCTION

The decision presented in this proceeding, at its essence, is simply whether to continue to rely solely on new natural gas-fired generating resources to meet customers' rapidly expanding need for power in Florida, or to mitigate both price and volatility impacts of natural gas and maintain fuel supply diversity by adding two coal-fired generating units each having summer net capacities of approximately 980 megawatts ("MW") for a combined net capacity of 1,960 MW, to be constructed on a 4,900-acre site property located in unincorporated Glades County. A decision not to pursue FPL Glades Power Park ("FGPP")[1], or even to pursue only a portion of FGPP, is a decision to increase FPL's reliance on natural gas, which is FPL's only alternative through 2017. For the reasons described in FPL's Petition for a Determination of Need and supporting evidence, discussed at length in testimony during the course of five days of hearings

[1] Unless the context clearly indicates otherwise, references to FGPP in FPL's Post-Hearing Brief refer to the Project as defined in FPL's Petition for Determination of Need for FPL Glades Power Park Units 1 and 2 Electrical Power Plant.

in this matter, and as summarized in this brief, FPL believes that customers' interests are best served through the addition of FGPP.

If constructed, FGPP will be one of the cleanest, most efficient coal plants in the world, providing for the environmentally responsible use of coal and petroleum coke to produce electricity to serve the needs of FPL's customers, keeping pace with the substantial infrastructural and energy demands of Florida's rapidly growing population and economy, and maintaining much-needed fuel diversity for the benefit of customers, beginning in about 2013. Tr. 219 (Olivera); 348-49 (Silva); 751-51 (Hicks). Simply stated, FGPP is the best resource addition for FPL's customers at this time.

FGPP satisfies all of the requirements contained in Section 403.519, Florida Statutes, and applicable Florida Public Service Commission ("FPSC" or "Commission") rules. FPL has appropriately considered all available alternatives to meet the resource needs of FPL's customers and maintain fuel diversity in the future. FPL has performed an effective, complete evaluation that addressed all issues relevant in the determination of the best resource to add to FPL's generating portfolio in 2013 and 2014. FGPP will be the most cost-effective means by which to maintain coal-fired generation as a significant element of the generating portfolio serving FPL's customers beginning in the 2013-2014 time period, to meet large amounts of additional capacity needs of its customers, while maintaining system fuel diversity, reducing Florida's dependence on fuel oil and natural gas, and contributing to the long-term stability and reliability of Florida's electric grid. The record in this proceeding supports each of the relevant findings in this regard.

As shown by FPL's witnesses and testimony in this proceeding, FPL based its solid-fuel generating technology choice on extensive analyses of all available options, including sub-critical pulverized coal ("PC") units, circulating fluidized bed ("CFB") units, integrated

gasification combined cycle ("IGCC") units, and ultra-supercritical pulverized coal ("USCPC" or "advanced technology coal") units. Tr. 751-57 (Hicks); 1106-11 (Sim). After a careful and thorough analysis of available technology options and fuel supply issues, and after conducting a comprehensive siting study, FPL concluded that the addition of an USCPC plant, augmented with a suite of state-of-the-art emissions control equipment, and plant design that will allow for the recycling of combustion and pollution control by-products into useful commercial products, will provide FPL's customers reliable, cost-effective, fuel diverse electricity. Tr. 751-52 (Hicks). One of the Sierra Club's witnesses questioned whether FPL had made the right technology choice as between USCPC and IGCC, another technology that FPL evaluated.[2] The record clearly supports FPL's choice of USCPC based on all of the relevant decision-making criteria: technological maturity, availability, construction risk, life-cycle costs, generation efficiency, environmental performance, and CO2 emissions.

USCPC is a proven technology well-established in commercial operation, has extremely high availability factors, and produces energy in an extremely clean manner, particularly with the state-of-the-art emissions control equipment included in its design. Indeed, the record clearly demonstrates that USCPC materially outperforms all other existing or proposed coal-to-electricity plants, including IGCC, on the combination of efficiency and emissions. Tr. 315-17 (Silva); 756-57 (Hicks); 1106-11 (Sim); 1022-26 (Yeager); 925-34 (Jenkins). There was no credible evidence to the contrary on any of these fundamental points.

Likewise, there is no disagreement that Florida continues to experience one of the highest population growth rates in the country. In FPL's service territory alone, the need for new generating capacity has grown and is projected to continue to grow by roughly the equivalent of

[2] Several Intervenors appeared together and were represented as a group by Earth Justice. For purposes of this brief, FPL refers to them collectively as "Sierra Club."

a new power plant every year. Tr. 434-36, 443 (Green). Again, there is no credible evidence to the contrary. But what is extremely important about this rate of growth is that it already reflects the major reductions in demand resulting from FPL's industry-leading conservation efforts, ranked number one nationally by the U.S. Department of Energy. Tr. 437 (Green); 2004 (Sim); 662-63 (Brandt). So extensive are FPL's demand side management ("DSM") efforts that, considering DSM programs to date and additional DSM being pursued, FPL will have avoided approximately 5,800 megawatts of generating capacity by 2015, or roughly three plants the size of FGPP. Tr. 681-82 (Brandt). There is no dispute regarding these facts. What is contended, without credible foundation, is that FPL could defer or avoid FGPP simply by increasing the scope of its DSM programs and/or renewable energy purchases.

The evidence shows, however, that despite FPL's industry-leading accomplishments, there simply is not enough cost-effective DSM available to eliminate or defer the need for all baseload capacity additions, including FGPP. Tr. 1104-06 (Sim). The Sierra Club's contentions to the contrary were not based on Florida-specific analyses, failed to account for significant differences in electric rates, and did not consider the unique characteristics of the FPL service area, FPL's current and planned DSM programs, or how DSM potential is determined based on FPSC guidelines. Tr. 699 (Brandt). Indeed, the record reflects that even if DSM measures were screened using another test that ignores the impact on customer rates, only a modest incremental amount of DSM would be added – nowhere near sufficient to defer or avoid the need for new baseload capacity in the relevant time frame. Tr. 1878-79 (Sim).

Similarly, despite FPL's strong support for renewable sources of energy, they also are not the answer to the need for a baseload generating plant in the relevant time period. Tr. 1952-53 (Silva). No credible testimony or analysis whatsoever was offered in support of the Sierra

Club's generic statements regarding the potential for renewables in Florida. FPL Group, Inc. as a whole has the cleanest generating fleet in the United States, has the largest portfolio of renewables, and is the largest producer of energy from wind and solar in the country. Tr. 234 (Olivera). These facts were not contested. But, as FPL witnesses testified, even the entire coast line of Florida is not sufficient to accommodate the 8,000 turbines that would be needed just to replace the energy, not even the capacity, produced by FGPP. Tr. 1891-92 (Silva); 843-46 (Hicks). As testimony made clear, renewable systems such as wind and solar that are intermittent in nature cannot be used to provide the much-needed capacity – so that when Florida residents and businesses turn on their lights and their air conditioners and their computers and their security systems and their file servers, the needed power is there to serve them. Tr. 1892 (Silva). These facts also are not controverted in the record.

The point is that not all new baseload additions can be avoided, a fact acknowledged even by one of Sierra Club's witnesses who testified that "[t]here are clearly places in this country that need new baseload facilities. . . . certainly areas that are in large – that have high growth and demand and energy sales that's [sic] don't have the potential for energy efficiency and that don't have the potential for renewables have a need for new baseload capacity. . . ." Ex. 193, p. 57-58 (Schlissel). As shown by the record in this case, the region served by FPL is precisely such an area: (i) FPL serves an area with continued high growth in customers, demand and energy sales, Tr. 432-43 (Green); (ii) the potential for energy efficiency has been and will continue to be realized to the fullest extent that is possible and cost-effective, Tr. 681-82 (Brandt); and (iii) not much incremental new renewable energy is or will be available in Florida, and there is certainly not enough to delay or avoid the need for the capacity represented by FGPP, Tr. 1891-92 (Silva). These facts considered together show that the need for new baseload capacity additions to serve

FPL's customers, which FPL submits is best met through FGPP, is inescapable. The choice in this case is whether to serve that need with solid fuel that maintains fuel diversity or additional natural gas fired generation. Tr. 355 (Silva).

At the heart of FPL's proposal to construct FGPP is the need to maintain fuel diversity, a goal consistent with the intent of the Florida Legislature in recently amending the Florida Power Plant Siting Act to require utilities and the Florida Public Service Commission to explicitly take fuel diversity into consideration as a criterion of approval in need determination cases. The Commission likewise has acknowledged the importance of fuel diversity. Tr. 220-21 (Olivera). Indeed, on August 29, 2006, the Commission moved to facilitate FPL's fuel diversity efforts when it granted the Company an exemption from Rule 25-22.082, Florida Administrative Code (the "Bid Rule") with respect to FPL's proposal to construct a USCPC generating plant, finding:

> ... the exemption will serve the public welfare and will likely result in reliability and cost benefits to the utility's general body of ratepayers. FPL should move forward with construction of the generating units as expeditiously as possible and has stated that a need determination filing could be made, for both units, no later than May 1, 2007.

Order No. PSC-06-0779-PAA-EI, issued September 19, 2006, pp. 5-6. Tr. 220-21 (Olivera), 1204 (Sim).

The evidence clearly shows that while today FPL relies upon natural gas for approximately half of its generating needs, by 2016 that dependence will increase to more than 70 percent, in the absence of FGPP. Tr. 223 (Olivera); 311 (Silva); 1135-37 (Sim). Such a large dependence on natural gas would expose FPL's customers to an unreasonable risk of natural gas price increases and volatility such as have been experienced over the past several years, an unwelcome market result vis-à-vis FPL's customers, and underscoring the fact that there is no fuel choice that does not have any detractors or drawbacks. Tr. 221-27 (Olivera).

Adding coal at this time, a fuel that has many advantages in terms of supply and price, will mitigate the supply and price drawbacks of natural gas – drawbacks that become much more pronounced the greater proportion that natural gas comprises of a utility's fuel mix. If, on the other hand, natural gas markets soften and prices decrease, FPL's customers would still benefit because of FPL's relatively large natural gas-fired generation portfolio. Tr. 318-23, 341 (Silva) This is fundamentally the objective and advantage of diversification, which should be the major factor underlying the Commission's decision in this matter. Tr. 300-01 (Silva).

The prospect of CO2 regulation was raised and addressed in this proceeding. In many respects, the potential for the regulation of CO2 emissions underscores the need for diversity, particularly given that one of the few predictions that one can confidently make regarding carbon regulation is that a high cost carbon regime will drive up the price of natural gas. Tr. 1565, 1582 (Rose); 1922 (Silva). But the important point is that FPL included in its economic analyses a reasonable range of potential CO2 compliance costs, the result of which show FGPP under most scenarios to be more cost-effective than adding solely natural gas-fired units. Tr. 328 (Silva); 1062-65 (Kosky); 1578-81 (Rose). Indeed, a decision to add FGPP should be predicated on the need to maintain fuel diversity, and a finding that the economics of the project have been reasonably and properly modeled, having included an appropriate range of fuel and CO_2 compliance cost scenarios – not on a particular, expected fuel and compliance cost scenario. Tr. 300-01 (Silva). The record is clear that FPL has indeed appropriately considered a reasonable range of fuel and compliance cost outcomes and that under most scenarios FGPP is expected to be the lowest cost resource addition. Tr. 328, 1893-94, Ex. 7 (Silva).

While the Sierra Club would suggest that FGPP should be delayed because of unknown elements, it is important to emphasize that FPL is requesting approval of FGPP not just on the

basis of what is known and certain, but precisely because of the uncertainties in the fuel markets and in environmental compliance costs. Factors that are known (most of which are completely uncontested in this matter) strongly indicate that FGPP is the appropriate resource addition at this time. These factors include the following: energy costs are rising; world demand for energy is increasing, not decreasing; relative to natural gas, the domestic reserves of coal are immense; all projections are that coal prices will remain below the price of natural gas; without the addition of these state-of-the-art coal units, FPL's reliance on natural gas will increase to more than 70 percent by the year 2016; CO2 regulation will increase the cost of energy, including natural gas; USCPC is a proven state-of-the-art technology; IGCC, in contrast, is still in the emergent phase of development; USCPC is 15 percent more fuel efficient than IGCC and at least 5 percent more fuel efficient than any proposed future IGCC plants; USCPC is commercially available in the right scale; IGCC is not; USCPC is less expensive to build than IGCC; USCPC is more reliable (because of its high availability) than any current operating IGCC unit; high availability translates into lower operating and electric costs and lower emissions; as Florida continues to grow, we will need more, not fewer, baseload units; as Florida continues to grow, it will become more difficult, not easier, to site baseload generating units; and, adding coal to FPL's system will help diversify FPL's system. Based on everything that is known, FGPP is the right decision at this time.

On the other hand, some of the things we do not know include the following: when CO2 regulation will be imposed and what form it will take, including what kind of allowances or offsets might be granted and whether such a regime will penalize or reward an already clean system such as FPL's, and to what extent it will encourage clean coal units such as FGPP, as

defined under Federal law; how much CO2 regulation will increase the cost of natural gas; and how much CO2 regulation will decrease the cost of coal as a fuel.

Clearly, much more is known than is unknown with regard to the key factors that will underlie a decision regarding FGPP. But, even factors that are not known at this time, or are less certain than others, strongly suggest that FGPP is the right plant to build at this time. FGPP will best meet the power generation needs of FPL's customers beginning in 2013 and beyond, and provide FPL's customers reliable, cost-effective, and environmentally-sensitive fuel diversity.

As the record demonstrates, FGPP is a well-conceived project. FPL has implemented well-designed contracting strategies to obtain market pricing and to mitigate cost uncertainties. FPL is employing state-of-the-art technology and design and the very best in environmental controls. FPL has a good site and support from local government and the community. FPL also has a sound fuel procurement strategy that will maintain needed fuel diversity for the benefit of customers, a new and key criterion under Section 403.519, Florida Statutes. Specifically, FGPP will help FPL manage and mitigate such risks on behalf of customers as part of a well-balanced and diversified FPL resource portfolio. In short, FGPP has all the elements of a good project that should be approved. It is the right solution for meeting FPL's customers' needs. For the reasons discussed more fully below under each of the issues identified for Commission disposition in this matter, FPL's petition for a determination of need for FGPP Units 1 and 2 should be granted.

ISSUES AND POSITIONS

<u>Issue 1:</u> 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, Florida Statutes?

*Yes. Significant annual load growth in FPL's service territory, along with FPL's need to maintain an adequate reserve margin support a finding of need for additional baseload capacity

beginning in approximately 2013. Without FGPP, FPL's reserve margin would be inadequate to ensure service reliability. Further, in order to ensure service reliability, FGPP is needed to maintain fuel diversity on FPL's system and reduce FPL's reliance on one type of generation technology. *

It is undisputed that customer growth and electricity usage are growing at a rapid pace. FPL will need the additional baseload capacity FGPP will supply beginning in approximately 2013 in order to continue to provide reliable service to its customers. Sierra Club was unable to show that FPL's system would be reliable with a 15% reserve margin planning criterion. Instead, the record demonstrates that a move to defer or avoid FGPP by lowering FPL's reserve margin planning criterion from 20% to 15% would leave customers with a far less reliable system to meet FPL's customers' needs due to much lower generation reserves and increased reliance on DSM to meet customer load. Further, without FGPP, system reliability will suffer due to increased reliance on a single fuel (natural gas) and a single generation technology (combined cycle). The supply and technology diversity that FGPP would bring to FPL's system will help ensure continued system reliability and integrity.

Load Growth

Florida, one of the most populous states in the nation, also continues to be one of the fastest growing. In FPL's service territory alone, an average of 85,000 new customer accounts have been added each year over the last ten years. FPL is projecting an average increase of more than 88,000 new customers per year for each of the next ten years.[3] In addition, electric usage per FPL customer has increased by approximately 30% over the past 20 years.[4] FPL also

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[3] The 2007 University of Florida's Bureau of Economic Business Research ("BEBR") report was issued since the time direct testimony was filed in the proceeding. As Dr. Green testified, for the period relevant to this case, the population projections for Florida represented in that report actually increased compared to the projections produced in 2006 and used in Dr. Green's testimony. Indeed, for the first three months of 2007, FPL is showing stronger customer growth than it did for the same time period last year. Tr. 447-50 (Green).

[4] Despite FPL's substantial DSM efforts, the amount of energy used in homes is almost 16% higher than it was just four years ago. This is, in part, because the size of homes in FPL's service territory has increased by almost 16%. Also, there is a substantial increase in wealth, which increases electricity consumption. Tr. 448-51 (Green).

projects significant continued growth in energy usage per customer over the next decade and for energy sales to increase by 2.5% in 2006, 3.1% in 2007 and 3.8% in 2008. Tr. 221 (Olivera), 432-34, 442, 449-53, Ex. 18 (Green). Over the longer-term, 2009 to 2015, the annual average growth rate in sales is estimated to be about 3.0%. Tr. 442, Ex. 18 (Green). Peak demand will continue to show strong growth in both the summer and the winter. Tr. 435-36 (Green).

As a result, the need for new generating capacity in FPL's service area has grown and is projected to continue to grow by roughly the equivalent of a power plant each and every year. Tr. 221 (Olivera), 313, 390 (Silva), 1101-04, Ex. 46 (Sim). FPL's load forecast demonstrates the need for additional capacity beginning in about 2013. Tr. 310-11 (Silva), 435-36, 438-39, 442-43 (Green), 1101-04 (Sim).

Reserve Margin

Without FGPP, or an alternative arrangement to continue to meet the reliability planning criterion of a 20% reserve margin, FPL's summer reserve margins would decrease to 14.8% in 2013 and 13.0% in 2014. Tr. 313-315 (Silva); 1102-04, Ex. 46 (Sim). Furthermore, if FGPP is not added, FPL's capacity need would exceed 2,280 MW by 2015, and continue to grow thereafter.[5] Tr. 313-15 (Silva); 1102-05, Ex. 46 (Sim). Without FGPP, the levels of reserve margin are inadequate to provide service reliability not only during peak months, but also during off-peak months when significant generation capacity must be taken out of service in order to perform planned maintenance. Tr. 1239-41, Ex. 198 (Sim); 1908-12 (Silva). In addition, these lower levels of reserve margin would mean that FPL's total reserves would consist primarily of

[5] As Dr. Sim indicated on examination by Staff regarding Exhibit 155, p. 2, and SRS-1, FPL was unable to extend its purchased power contracts with Progress Energy Ventures and Williams beyond the current expiration dates, and other purchased power contracts are fairly inefficient, very low capacity and non-fuel diverse options that would not be cost-effective on FPL's system in the long-term. Therefore, without the Progress Energy Ventures and Williams projects, FPL would be unable to satisfy the required 20% Reserve Margin planning criterion. Tr. 1206-10 (Sim).

DSM.[6] Specifically, approximately 76% of the reserves in 2013 would be supplied by DSM, and approximately 88% of the reserves in 2014 would be supplied by DSM. This means that load control would be exercised frequently, potentially resulting in cancellations and increased dropout rates in DSM programs. Tr. 1255-56 (Sim); 1905-07 (Silva). Without the FGPP units and without exercising the DSM, FPL's reserve margins would be only 3.5% in 2013 and 1.5% in 2014. These projections also assume, contrary to historical precedent, that there is no uncertainty in regard to the forecasted load – i.e., that FPL's peak load in those years will be no greater than is projected and that the peak loads will occur in August as projected.[7] FGPP is therefore needed to maintain the electric system reliability and integrity of FPL and Peninsular Florida.[8] Tr. 1239-41; Ex. 46, 187 (Sim); 1903-14 (Silva).

Contrary to the suggestion of one Sierra Club witness, Mr. David Schlissel, the record in this proceeding demonstrates that a 15% planning reserve margin is not adequate to ensure reliable service on FPL's system because it would provide a level of generation reserves that would be too low to offset the consequences of commonly occurring differences between the load forecast used in FPL's long term plan and actual loads, especially if those differences occur

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[6] Presently, FPL's summer reserve margin without DSM is 12.8% and 43% of FPL's reserve margin is supplied by DSM. Tr. 1243-46; Ex. 46, 49, 188 (Sim).

[7] If the exact same load projected for August 2013 were to occur in June 2013 instead, FPL would have essentially 0% generation reserves on its system because certain units would be out of service for scheduled maintenance. Further, if the peak load were significantly higher than projected, which happened in 2005, there would be a deficit of generation available to serve the load of 2,676 megawatts. Even applying all of FPL's 2,500 MW of DSM, FPL's total reserves would be a negative 176 megawatts. Therefore, without even assuming forced outages or breakages of units, without considering fuel supply or transmission interruptions, or providing any assistance to another utility experiencing a high load on that date, a 15% reserve margin simply does not protect FPL from variances in both the timing and the magnitude of the load forecast. Tr. 1239-41; Ex. 187 (Sim).

[8] Dr. Sim was asked whether the projected reserves for the Florida Reliability Coordinating Council ("FRCC") were at or above 20% for the period 2010-2013 based on page 1 of Exhibit 155. Dr. Sim agreed, but pointed out that it did not reflect units the utilities were committed to, but rather, reflected projections of the utilities when the utilities did their planning and reported to the FRCC about a year ago, which included a number of units that had not yet received need determination approval. Tr. 1212-14 (Sim). Also, a number of the FRCC non-IOU member utilities, which are required by the FRCC to operate at a 15% reserve margin, believe that a 15% reserve margin is not sufficient for them. They are, therefore, projecting reserve margins significantly higher than 15% in order to get Peninsular Florida reserve margins in the 22% to 25% range. Tr. 1253-54 (Sim).

at times when FPL has scheduled planned maintenance outages for one or more generating units, let alone those of forced outages, fuel supply interruptions and assisting other utilities.[9] A 20% planning reserve margin is necessary for FPL to provide reliable service. A lower planning reserve margin would result in excessive use of older, less-efficient generation, which would increase forced outages and fuel costs. Tr. 1236-38, 1786-88 (Sim); 1904-11 (Silva). Further, the effect of setting FPL's reserve margin reliability criterion at 15%, in and of itself, would not eliminate the need for new capacity. Rather it would defer that need for only one year. Nor would changing the reserve margin criterion to 15% eliminate the need to maintain fuel diversity, so it would not eliminate the present need for FGPP. Tr. 1913-14 (Silva).

Prior to 1999, FPL used a reserve margin criterion of 15%. At the time, FPL's reserves consisted more heavily of generation reserves, with load management contributing less than half of what it will provide in 2013. However, the Commission initiated in the late 1990s a proceeding to determine what the appropriate reserve margin planning criterion should be to ensure reliability of electric service in the future, recognizing rapid increases in electric loads, the introduction and expansion of new technologies, and recognition that fuel supply interruptions could occur. After audits were performed by the Commission Staff, and after several stakeholders, including peninsular Florida's investor-owned utilities, presented their analyses and conclusions, all parties agreed that a 20% reserve margin planning criterion for the investor-owned utilities was the appropriate level that would ensure reliability of service in the utilities' systems, as well as in peninsular Florida. These investor-owned utilities stipulated that they

[9] FPL's system has changed substantially since a 15% reserve margin planning criterion was in effect. FPL has many more units on its system than it had 10 years ago, including more than 5 times the number of advanced combustion turbines. It is more difficult to schedule maintenance for advanced combustion turbines because there are well-defined times for taking such units out of service. A 20% reserve margin has assisted FPL in finding time to perform scheduled maintenance on these and other units and has enabled FPL to add more fuel efficient capacity on the system, which has allowed FPL to reduce its use of some of its less efficient, conventional units, thus resulting in fuel savings. Tr. 1235-36 (Sim).

would agree to use a 20% reserve margin reliability criterion for resource planning beginning in the summer of 2004. This stipulation was approved by the Commission in Order No. PSC-99-2507-S-EU, issued December 22, 1999, in Docket No. 981890-EU. Tr. 1786-88 (Sim), 1903-04 (Silva).

Any question regarding the proper level of reserve margin for future resource planning purposes would need to be addressed in an independent proceeding and the implementation date of any change should be far enough into the future to allow utilities to incorporate it into their strategic and operational planning processes. This view is consistent with the Commission's own views, expressed in Order No. PSC-03-0175-PCO-FOF-EI issued February 4, 2003 in Docket No. 020953-EI regarding Progress Energy Florida's Hines Unit 3 need determination, in which the Commission stated that it was inappropriate to consider a change to the reserve margin planning criterion in a particular utility's need determination proceeding.[10] Tr. 1207-08, 1787-88 (Sim).

Mr. Schlissel suggests that the reserve margin planning criterion is not needed because one could lower the reserve margin to 15% and still meet a reliability criterion of not exceeding a

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[10] Regarding reserve margin, the Commission in the Progress Hines 3 need determination order also said as follows:

> To provide reliable service, utilities are required to maintain a margin of generating capacity above the firm demand of their customers (planned reserves). At any given time of the year, some generating plants will be out of service and unavailable due to forced outages, periodic maintenance, refueling of nuclear plants, etc. Therefore, adequate reserves must be available to provide for this unavailable capacity and for higher than projected peak demand due to forecast uncertainty and abnormal weather. ...
>
> FPC has relied heavily in the past on demand side management (DSM) to meet its reserve requirements. FPC cannot use DSM as often or with the same duration as physical generation without eventually affecting customer participation levels, as was demonstrated by FPC's customer attrition from its DSM programs in 1998 and 1999. The record indicates FPC's DSM programs are becoming less cost-effective compared to the cost of generation. For these reasons, FPC is attempting to build up its physical reserve percentage.

Order No. PSC-03-0175-FOF-EI, issued February 4, 2003, Docket No. 020953-EI, Tr. 1207-08, 1252-53 (Sim).

Loss of Load Probability ("LOLP") of 0.1 days per year that FPL also uses. Ex. 162 p. 14. However, if the reserve margin criterion were to be set at whatever level is necessary in each year in the plan to meet the LOLP criterion, then this would mean that the reserve margin criterion would be eliminated and only the LOLP criterion would be used. Using LOLP as the single reliability criterion would not be sufficient to ensure continuing reliable electric service to FPL's customers. FPL's customers would find themselves with a less reliable system (due to smaller reserves from the deferral of new capacity additions) and with an increasing reliance on natural gas and its price volatility (due to not adding these advanced technology coal units). Tr. 1786-88 (Sim); 1903 (Silva).

System Reliability from Fuel and Technology Diversity

Like the other utilities in Florida, FPL's reliance on coal-based generation is less than the national average.[11] In 2005, FPL's ownership interests in Plant Scherer Unit 4 and St. Johns River Power Park contributed only 5.2% to FPL's power sales. Tr. 477-79 (Schwartz). As discussed in greater detail in Issue 3 below, the addition of FGPP is the best option available to continue to achieve system reliability by helping FPL preserve fuel diversity. Tr. 300-01, 312-17, 364-65 (Silva).

An electric system that relies on a single fuel and a single technology to generate all the electricity needed to meet its customers' demand, all else equal, is less reliable than a system that uses a more balanced, fuel-diverse generation portfolio. Further, the existing natural gas pipeline infrastructure into peninsular Florida is comprised of just two pipelines from the Gulf Coast region. While this infrastructure has provided a high level of reliability over the years, the demands on both pipelines have continued to grow. In fact, by mid-2009, these pipelines will be

[11] Indeed, FPL's fuel mix is more heavily dependent on natural gas than either Progress Energy or TECO. Tr. 1229 (Sim).

fully subscribed. Therefore, in order to maintain a minimum level of natural gas supply reliability, the addition of incremental natural gas-fired generation will require a very costly investment in natural gas inventory capability because of the overdependence on natural gas. If FGPP is not approved, gas pipeline companies will be less flexible and more demanding regarding the firm level of commitment they will require of FPL to build the needed new gas transportation facilities because they will know that FPL really has no choice. Tr. 224-25, 268 69 (Olivera); 312-17 (Silva); 808-09 (Hicks); 1370-71 (Yupp).

Still, expansion of the existing pipelines to meet additional demand will not help reduce the vulnerability to production curtailments due to natural disasters such as hurricanes. Without FGPP, FPL may not be able to mitigate the effect of an interruption in the supply of natural gas to Florida. Tr. 225 (Olivera); 348-49 (Silva); 1369-70 (Yupp).

Moreover, diversity, not just in fuel type but in generation technology, also improves reliability. FGPP enhances diversity in power generation technology, which improves system reliability. Occasionally, equipment design or manufacturing problems manifest themselves in the form of systematic failure of the same part in a number of generating plants that utilize the same part design, or those plants that use parts produced in the same production batch. Having diversity in generation technology is also important because if a generic equipment problem occurs, it would affect a smaller portion of a utility's generation portfolio, making it easier for the utility to mitigate the effect of that problem without adversely affecting service to its customers. Because generating units that use different fuels usually also use different technologies, a fuel diverse system also helps mitigate the effect of equipment problems that affect one specific type of generation technology, such as for example, gas turbines. Tr. 321 (Silva).

Inability of Renewables or DSM to Meet Need

It is important to recognize that FPL's generation capacity need projections already reflect all of the cost-effective DSM currently known to FPL, including not only FPL's current Commission-approved DSM Goals, but also significant amounts of additional DSM that FPL has identified since the DSM Goals were approved. Tr. 266 (Olivera); 315 (Silva); 668-72 (Brandt); 1105-07 (Sim). In addition, FPL's need projections take into account increased conservation expected due to the effects of the 2005 Energy Policy Act on FPL's summer peak demand forecast. Tr. 437, 454-55, Ex. 21 (Green); 679 (Brandt). Even with these large DSM and other conservation savings, FPL still has a 2,283 MW need through 2015. Tr. 1102-04, Ex. 46 (Sim). Therefore, cost-effective DSM cannot meet FPL's resource needs.

Also, despite FPL's commitment to renewable energy, which is discussed in greater detail in Issue 3 below, renewables are not the answer to the need for a baseload generating unit. Tr. 318-19, 1892-93 (Silva). Both wind and solar energy systems are intermittent in nature and can provide intermittent energy, but do not provide needed capacity that is required to be reliably available at FPL's peak load hours. Tr. 1892-93 (Silva). There are not sufficient renewable resources to avoid or defer the need for the baseload capacity and energy that the FGPP units will provide. Tr. 266 (Olivera); 1892-93 (Silva).

Issue 2: 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, Florida Statutes?

Yes. FGPP is the most cost-effective alternative to provide electricity at a reasonable cost that will maintain system reliability and contribute to fuel diversity. FGPP will employ state-of-the-art advanced coal-based generation technology to provide cost-effective, reliable power, while meeting and in many cases exceeding all environmental requirements and will be among the most efficient coal-fired electric generating facilities in the United States.

As addressed below, FPL's thorough and effective process for selecting the best technology for adding reliable and efficient fuel-diverse generation to FPL's system resulted in the selection of ultra-supercritical pulverized coal technology. The Sierra Club was unsuccessful in its repeated attempts to show that integrated gasification combined cycle technology was preferable to USCPC. There is no credible evidence that IGCC is preferable to USCPC based on any of the relevant metrics. It would clearly be a mistake for FPL to reject proven reliable USCPC technology for investment in an IGCC plant of a size and configuration that has never been constructed anywhere in the world and which, even if built, would have much lower efficiency and availability than FPL's proposed plant.

FPL's Selection of Advanced Technology Coal

Among other objectives, FPL's integrated resource planning work focused on maintaining system fuel diversity. In the 2012-2015 time frame, coal options are the primary fuel diversity capacity options. Tr. 312-15, 364-66 (Silva); 1101-02 (Sim).

Beginning in 2003, FPL conducted a thorough and extensive investigation into the potential for adding solid fuel generation to its resource mix, and concluded that significant improvements had been made in solid fuel technology, emissions control technologies, and plant design such that FPL had a number of technology options, all of which would provide fuel diversity to FPL's system. Tr. 752-53 (Hicks). The alternatives evaluated included sub-critical pulverized coal units, circulating fluidized bed units, IGCC units, and advanced technology coal (USCPC) units. Tr. 753-54 (Hicks). The record in this proceeding shows that based on FPL's careful and thorough analysis of available technology options and fuel supply considerations, the addition of a USCPC plant, augmented with a complete suite of state-of-the-art emissions control equipment, with a plant design that will allow for the recycling of combustion and emission

control system byproducts into useful commercial products, will provide FPL's customers reliable, cost-effective fuel diversity. Tr. 753 (Hicks); 1024-25, 1029-38 (Yeager).

FPL conducted three separate evaluations of the four coal-based technology alternatives in order to determine the best choice that could be put into service as part of FPL's system to meet a significant capacity need and maintain system fuel diversity starting at the earliest possible date.

As part of the first evaluation, conducted during 2004 and early 2005, basic configurations were developed for the potential technologies for a target level of 1,200 to 1,700 MW of new solid fuel fossil generation. Each of the technologies was reviewed and the configurations developed in a scaled-up size consistent with the commercial availability of that type of unit. Estimates were developed for unit output, heat rate, availability, capital cost, fixed and variable O&M costs, capital replacement costs and emissions rates for each of the coal-based technologies. This technical information was provided to FPL's Resource Assessment and Planning Group, which conducted a long-term economic evaluation of the technology options. The results of that evaluation, combined with the engineering evaluation of the technologies, showed that USCPC technology would provide the greatest benefit to FPL's customers. Tr. 324-25 (Silva); 754-55 (Hicks); 912, 943 (Jenkins); 1022-25 (Yeager); 1107 (Sim).

As its second technology choice evaluation, FPL worked to test and to verify that its analysis of alternative solid fuel technologies was reasonable and accurate. To this end, FPL retained the Black & Veatch engineering firm in 2006 to work with the Company to prepare a joint Clean Coal Technology Selection Study. The purpose of the study was to build upon FPL's first analysis by ensuring thorough and systematic consideration of the most current information available in the industry concerning each technology. The study compared SPC, USCPC, CFB

and IGCC technology alternatives for meeting FPL's generation needs in the 2012 to 2014 time frame, and confirmed that USCPC is by a significant margin the best alternative to maintain fuel diversity in FPL's system beginning in 2013.[12] Tr. 324-25 (Silva); 755-57; Ex. 168 (Hicks); 1108 (Sim).

FPL's third evaluation consists of an economic analysis performed by FPL in December, 2006 after the cost estimates and operating characteristics of FGPP were fully developed. FPL used a screening curve evaluation, which is commonly used to compare competing generating unit or technology options that are expected to be dispatched in a similar fashion on a utility system (i.e., to be dispatched as baseload units, or as peaking units, etc.). The results of this analysis show that the USCPC technology selected by FPL for FGPP is less costly than the other three coal-fueled technologies for all capacity factor levels. Tr. 324-325 (Silva); 1108-10, Ex. 48 (Sim).

Based on the results of its evaluation of technology alternatives, FPL concluded that employing USCPC generating technology coal at FGPP is by far the best choice to preserve fuel diversity and meet FPL's generation capacity needs beginning in about 2013. As discussed in greater detail in Issues 3 and 7 below, FPL also evaluated the impact of adding two USCPC units to FPL's system versus the non-coal options, natural gas-fueled combined cycle units.

USCPC vs. IGCC

Stephen D. Jenkins, who serves as Vice President, Gasification Services for CH2M Hill, Inc., an engineering services firm, provided detailed testimony supporting FPL's selection of

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[12] For example, the busbar cost of the USCPC case was nearly 10% less than SPC, which is the second lowest busbar cost case. USCPC will have good environmental performance because of its high efficiency. Emissions of NOx and PM will be very similar across all technologies. Sulfur emissions would be slightly lower for IGCC than the PC and CFB options, although startup and shutdown flaring will reduce the potential benefit of IGCC. The lower expected availability of IGCC on coal, particularly in the first years of operation, could compromise FPL's ability to meet baseload generation requirements and require FPL to run its existing units at higher capacity factors. Tr. 756, Ex. 168 (Hicks).

USCPC technology. Tr. 911-43, 1640-73 (Jenkins). Based upon extensive personal experience designing, constructing, operating and helping develop IGCC coal-based generating technology, Mr. Jenkins recommended to the Commission FPL's proposed use of USCPC technology because "it meets the requirement for a power generation technology that can provide 1,960 MW net in the 2012-2014 time period, high efficiency, low cost, high cost certainty, high reliability and low emissions." Tr. 943 (Jenkins).

While Mr. Jenkins is an experienced IGCC industry executive whose career revolves around designing and constructing IGCC plants, and whose service has included working as Tampa Electric Company's Deputy Project Manager for that utility's IGCC electric generating plant, Mr. Jenkins recommended the use of USCPC technology for FGPP because "USCPC technology is more technologically mature, more efficient, and higher in availability than IGCC technology. It also provides for a similar environmental emission profile as IGCC technology, and more cost certainty than IGCC." He therefore concluded that "the selection of USCPC technology for FGPP would be a prudent decision by FPL." (Id.)

In contrast to FPL's selection of USCPC technology based upon extensive economic engineering studies and evaluations of coal-based technologies, discussed above, which was supported by IGCC electric generation industry expert Mr. Jenkins, one Sierra Club witness, Richard Furman, disagreed with FPL's choice of USCPC technology and claimed that IGCC technology is preferable to advanced technology coal.[13] Tr. 1456, Ex. 97 (Furman).

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[13] However, the record shows that Mr. Furman lacks any actual experience designing, constructing, operating or helping develop IGCC coal-based generating technology, or coal plants of any kind. Tr. 1509-10 (Furman). Similarly, as to environmental matters, Mr. Furman has never been responsible for obtaining environmental permits for any electric generating plant of any type, and has never signed and sealed as a professional engineer any application for environmental permits for any electric generating plant in Florida, or anywhere else. Id. Accordingly, the Commission should not give weight to Mr. Furman's assertions that FPL should have selected IGCC technology instead of USCPC technology.

Moreover, the record shows that FPL's selection of USCPC technology is supported by the overwhelming weight of actual electric generating industry experience. This industry experience, detailed below, shows USCPC technology to be the clear first-place choice over IGCC and other available coal technologies with respect to the key decision factors of technological maturity, availability, construction risk, life cycle costs, generation efficiency, environmental performance and CO2 emissions. Tr. 316-18 (Silva); 784-98 (Hicks); 912, 926-43 (Jenkins); 1022-25 (Yeager).

BENEFITS OF USCPC vs. IGCC

		USCPC		IGCC
Technological Maturity	✓	•Commercial operation •>1000 MW units operating Tr. 916 (Jenkins); 1024 (Yeager)		•Demonstration projects •<300 MW units operating Tr. 759(Hicks); 917, 942 (Jenkins)
Reliability	✓	•>90% availability in industry •92% projected for FGPP Tr. 759 (Hicks); 942 (Jenkins)		•About 80% availability without additional gasifiers and/or backup fuel, after several years in operation Tr. 759 (Hicks); 920, 926 (Jenkins)
Construction Risk	✓	•Has been constructed on large scale •Supplier guarantees available Tr. 759 (Hicks)		•Never constructed on large scale •Commercially acceptable supplier guarantees not available Tr. 759 (Hicks); 924, 942 (Jenkins)
Life-Cycle Costs	✓	•Lower Tr. 761 (Hicks)		•Significantly higher Tr. 761 (Hicks)
Generation Efficiency	✓	•8800 Btu/kWh •Up to 15% better than existing IGCC Tr. 760, 768 (Hicks); 1053 (Kosky)		•Next generation" plants expected to be ≥5% less efficient Tr. 760 (Hicks); 1053 (Kosky)
Environmental Performance	✓	•Low, fully compliant emissions •Better than existing IGCC units Tr. 760 (Hicks); 941 (Jenkins); 1053 (Kosky)	✓	•Potentially higher emissions due to lower reliability •"Next generation" plant emissions similar to USCPC Tr. 760 (Hicks); 931, 933 (Jenkins)
CO2 Emissions	✓	•Less fuel usage produces less CO2 Tr. 760 (Hicks); 1053 (Kosky)		•More fuel usage produces more CO2 Tr. 760 (Hicks); 1053 (Kosky)

In terms of technological maturity, based on the United States Department of Energy ("DOE") current definition of USCPC, there are more than 30 advanced technology coal units in

commercial operation, many of which are in the approximate 1000 MW size needed by FPL.[14] Tr. 784-98, 878-84 (Hicks); 916 (Jenkins); Ex. 176, 177. By contrast, there are only four small coal-to-electricity IGCC demonstration plants in operation, each delivering less than 300 MW, which all required large government subsidies, without which they would not have been built.[15] Tr. 822, 824-26, 887-88 (Hicks); 917-19, 926-29 (Jenkins); 1022-25 (Yeager).

Mr. Furman attempts to portray IGCC as a favored technology in the industry, asserting that there are 32 IGCC plants under development, and pointing to a National Energy Technology Laboratory ("NETL") report. Tr. 1469 (Furman). Mr. Furman neglected, however, to point to NETL's own qualifying statements which states that "[p]roposals to build new power plants are often speculative and typically operate on 'boom & bust' cycles, based upon the ever changing economic climate of power generation markets. As such, **it should be noted that many of the proposed plants will not likely be built.**"[16] (emphasis added). In fact, several of the proposed

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[14] Mr. Hicks repeatedly rebutted the Sierra Club's suggestions upon cross-examination, using documents concerning possible future technology, that FGPP did not meet the definition of USCPC based on the DOE definition on which the industry relies. Tr. 784-98. For example, the following exchange occurred:

> Q. "With ultra-supercritical steam conditions of 4,500 psi and 1,100 to 1,100° F double reheat," is the description of ultra-supercritical.
> A. Yes. And that is consistent, once again, with the U.S. Department of Energy definition .... This plant would be an ultra-supercritical under that definition.
> Q. Okay. So but you're 800 psi short and you're not anywhere close to the 45% efficiency that you'd get for ultra-supercritical.
> A. No. This ... plant represents a ... combination of temperature and pressure that is unique ... for the United States. It represents the cutting edge of ultra-supercritical technology in the world. It is state of the art and meets the definition of ultra-supercritical technology.

Tr. 791 (Hicks).

[15] Regarding Exhibits 172, 173 and 174, introduced by Sierra Club and related to IGCC facilities, Mr. Hicks pointed out that all of the projects listed on these exhibits are relatively small, would not improve fuel diversity in FPL's system in any noticeable way, and the costs of the facilities were not adjusted to show the plant costs in 2014 dollars, which is the relevant metric for comparing the costs of these plants to FGPP. As Mr. Hicks indicated, "each one of those plants [on the exhibits] is significantly more expensive than [FGPP] in 2014 dollars." Tr. 887-88, Ex. 178 (Hicks).

[16] In addition, Mr. Furman does not provide a balanced outlook with respect to new coal generating capacity. For example, Mr. Furman speaks to American Electric Power's ("AEP's") commitment to IGCC in Ohio and West Virginia but does not mention AEP's commitment to a USCPC plant in Arkansas and possibly Oklahoma. With AEP's recent announcement that it is delaying its planned IGCC plants until 2015, its commitment to USCPC technology has become even more critical to satisfying new baseload capacity needs. Similarly, Duke Energy is

plants on the list referenced by Mr. Furman have already been delayed or cancelled. Mr. Furman also fails to mention, for example, that one of the 32 proposed IGCC plants he relies on is an FPL IGCC plant listed in the NETL report as under study for St. Lucie County. However, no such plant is planned by FPL, nor has it ever been planned. Tr. 520 (Schwartz), 825-29 (Hicks). Further, nowhere in its proofs did Sierra Club point to even a single proposed, much less operating, IGCC electric generating plant approaching the approximately 1000 MW size units selected by FPL to serve its customers.

In terms of reliability and availability, FPL's proposed advanced coal technology is expected to provide 92% average annual availability, based upon engineering analyses including consideration of performance from similar large USCPC units already in service around the world. Tr. 925, 941 (Jenkins). In contrast, three of the four IGCC coal-to-electricity plants have never achieved an 80% availability level when operating on coal, and the fourth has barely met that lower level of performance. In fact, first-year availability of the four coal IGCC plants has ranged between 16% for Elcogas in Spain to 35% for TECO's Polk County plant. Ex. 26, p. 78. Similarly, second-year availability of the four coal IGCC plants ranged from 29% for the Nuon plant in the Netherlands to 67% for TECO's Polk Power Station IGCC. Id.

As explained by FPL's witnesses, it would be a mistake for FPL to reject proven reliable USCPC technology for investment in an IGCC plant of a size and configuration that has never been constructed anywhere in the world and which, even if built, would have much lower

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proceeding with the development of a new supercritical pulverized coal plant in North Carolina at the same time it is pursuing the development of an IGCC in Indiana. Another example is Mr. Furman's Exhibit No. 102, where he lists emission limits for three permitted IGCC plants and fails to mention that none of these have been built. We Energies is building Elm Road as a supercritical pulverized coal plant. Kentucky Pioneer has been cancelled with the withdrawal of Department of Energy support. Global Energy's Lima plant is only notionally under construction and it has no financing or off-take agreements. Tr. 487-88 (Schwartz).

efficiency and availability than FPL's proposed advanced coal technology plant. Tr. 317-18 (Silva); 919-20, 928, 932-33, 937-43 (Jenkins); 1771-73 (Sim).

With respect to construction risk, in large part due to the technological maturity and proven performance of USCPC technology, FPL has been able for FGPP to negotiate a turn-key Engineer, Procure and Construct ("EPC") contract and major equipment supplier contracts with guarantees on performance, schedule and cost. In contrast, IGCC developers have yet to secure a viable EPC contract.[17] Tr. (Hicks), 981-82 (Jenkins).

Of critical importance to FPL and its customers, life cycle costs for advanced technology coal plants are clearly and significantly lower than IGCC, due to much lower capital costs, lower operations and maintenance costs, and higher efficiency and availability. Tr. 928-29, 936-37, 942-43 (Jenkins).

The generation efficiency of the USCPC technology to be used at FGPP will exceed both current IGCC performance and the projected, but as yet unrealized generation efficiency for next generation IGCC plants planned to begin operation at the same time as FGPP. Tr. 940-42, 994-96 (Jenkins). Indeed, this point was reinforced during the Sierra Club's cross-examination of Mr. Hicks. For example, Sierra Club's counsel referred Mr. Hicks to Tampa Electric Company's ("TECO's") Ten-Year Site Plan dated April 1, 2006 (Exhibit 169), and questioned Mr. Hicks about the capacity and equivalent availability factors of TECO's planned IGCC unit. In response, Mr. Hicks referred to the Exhibit (page 2, under number 12) and pointed out that:

> [T]he average net operating heat rate is [9,306, which is] 506 Btus higher than the ultra-supercritical plant proposed for Glades Power Park. ... And footnote number 1 says, "Based on in-service year." So that's the average annual heat rate for the first year of the plant, not the average annual heat rate over the life of the

[17] Regarding Exhibit 180, introduced by the Sierra Club, Mr. Jenkins pointed out that securing guarantees from EPC contractors could be important to IGCC developers, but none of the IGCC developers to date have been able to do so. Tr. 981-82 (Jenkins).

plant. Due to degradation in the performance and the equipment one would expect a higher average heat rate over the life of the plant.

In fact, our own internal analysis and the analysis of Black & Veatch has demonstrated that an IGCC plant would incur average degradation over the life of the plant of about 2.5%.

... [I]f you take this number, 9,306, and multiply it by 1.025, which is the average degradation rate, you get an average annual heat rate over the life of the plant of 9,538. What's interesting about it is AEP, American Electric Power, filed air permit applications for two IGCC plants, 600-megawatt demonstration plants or 600 megawatt plants, one in Ohio and one in West Virginia. In those air permit filings the calculated heat rate using the same technology that TECO is proposing for this plant is 9,538, exactly the same number as taking this number and multiplying it by 1.025. That leads be to believe that the average annual heat rate over the life of this TECO plant will be 9,538, 738 Btus higher than the average annual heat rate for the FPL Glades Power Park, approximately 10% less efficient. **That means 10% more coal burned to produce the same amount of electricity and more CO2 emissions**.

Tr. 799-01 (Hicks) (emphasis added). Mr. Hicks rejected further attempts by the Sierra Club's attempts to establish that the efficiency of IGCC plants would be superior to that of FGPP. Mr. Hicks pointed out that counsel for the Sierra Club was confusing the concept of capacity factors with efficiency, and was making an "apples-to-oranges comparison" relying on documents which were not peer reviewed and reflected one gentlemen's opinion. Tr. 802-05 (Hicks).

Further, economic analyses conducted by FPL, as well as a major study conducted by FPL together with Black & Veatch, showed FPL's USCPC technology to be clearly more cost-effective than IGCC.[18] The capital cost of an IGCC unit similar in size to FGPP would be 36.8% higher. Tr. 817, 820-21 (Hicks), 923-24 (Jenkins). Indeed, IGCC technology ranks last behind USCPC, CFB technology and PC technology in comparative economics.[19] Tr. 817, Ex. 168

[18] A USCPC unit is more cost effective than IGCC through all capacity factors shown on the graph in Appendix M of the Need Study, page 1-13. Tr. 1232-34 (Sim).

[19] Referring to Exhibit 169, the Sierra Club failed in its attempt to establish that the installed cost of an IGCC plant would be less than that of FGPP on a cost per KW basis. Tr. 814-821. Mr. Hicks pointed out: 1) Exhibit 169 appeared to reflect the winter and not the summer capacity of TECO's planned IGCC unit; 2) the Sierra Club failed to account for the difference in costs of the necessary transmission upgrades; 3) Exhibit 169 represented an estimated cost for the TECO IGCC unit before feasibility and front end engineering and design studies were done,

(Hicks). As discussed in greater detail in Issue 5 below, this is the case even including the potential cost of adding carbon capture in the relevant time frame. Tr. 865-66 (Hicks).

As discussed in greater detail in Issue 7 below, regarding cost-effectiveness, FGPP's initial bill impact for the average residential customer is estimated at $3.63 per 1,000 kilowatt-hours ("kWh"), then diminishing over time. As a result of fuel savings associated with FGPP, bill reductions would be realized in as little as three years after the units are placed in service. Tr. 415-17, Ex. 156, pp. 14-15, 22-23. If FPL replaced FGPP with an IGCC unit instead, it would result in a higher initial rate impact to FPL's customer and a longer period of time before net benefits to customers began to accrue. This is the case under all fuel and carbon cost scenarios analyzed by FPL. Indeed, all four variations of an IGCC screening analyses conducted by FPL at every capacity factor showed a substantially higher cost to customers than FGPP. Tr. 417-20, Ex. 161, pp. 5, 11 (Silva).

FGPP, employing USCPC and a complete suite of state-of-the art emissions control equipment, and incorporating a plant design that will allow for the recycling of the byproducts from the combustion and emissions control processes, sets a new standard of excellence for coal-fired electric generation stations in the United States and is far superior to IGCC technology. Tr. 775-76 (Hicks). Mr. Stephen D. Jenkins, Vice President, Gasification Services, with CH2M Hill, Inc. independently reached the same conclusion. Tr. 940-43 (Jenkins); see also 324-25 (Silva); 1112 (Sim). Among other statements concerning IGCC, Mr. Jenkins points out that IGCC units that will incorporate design enhancements intended to improve the availability of IGCC technology will not be placed into service until the 2011-2013 timeframe, so that it will be six to eight years from now (allowing for start-up and initial operation) before it is known whether

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noting that "what we're seeing over and over again is when the front end engineering design study is completed, the costs rise dramatically." Tr. 816-21 (Hicks).

IGCC availability can be improved to levels greater than 85% when operating on coal. This means that if a utility chooses to wait until the higher level of availability for IGCC is proven, by 2013 at the earliest, before it initiates its process to install IGCC technology, it could not place an IGCC unit in commercial operation until after 2017. Tr. 324-25 (Silva); 850-51 (Hicks); 921-25, 1014 (Jenkins).

Mr. Furman's claims that IGCC would be a less expensive choice when fueled 100% with petroleum coke as compared to an USCPC unit fueled 100% with coal were shown to be entitled to no weight for a host of reasons. First, Mr. Furman admitted that he did not even prepare his Exhibit RCF-5 which contains his economic analysis, including fuel costs, for use in this proceeding. Ex. 192, p. 11. For example, Mr. Furman's cost comparison was not based at all upon FGPP's capital costs, operating and maintenance costs, FPL's fuel cost projections, or FGPP's heat rate. Id., pp. 11-12, 47, 60.

Moreover, Mr. Furman's flawed "cost comparison" is invalid because it was not even made with respect to FPL's proposed fuel mix of 40% domestic coal, 40% foreign coal and 20% petroleum coke. Tr. 513 (Schwartz). Rather, Mr. Furman's claim was based solely upon a cost comparison using a generic power plant located in the Midwest using 100% Eastern bituminous coal, and even his petroleum coke cost assumptions were based not on any reasonable projections but solely upon two years of historical data for fuel. Ex. 192, pp. 10, 47, 60. Similarly, Mr. Furman admitted that he is not an expert in projecting petroleum coke prices, and that he has not performed any projections of petroleum coke prices or availability over the expected 40-plus year life of FGPP. Id. at pp. 60-61. See also, Tr. 508-13 (Schwartz), 806-08 (Hicks). Finally, Mr. Furman failed to account for the fact that a plant the size of FGPP would use over 15% of the total potential available market supply of petroleum coke. FPL's witness

Mr. Schwartz explained that this would "leave FGPP far too dependent upon a very limited source of fuel, and would not be as reliable as relying upon a blend of coals from multiple supply regions, in addition to petroleum coke" as proposed by FPL. Tr. 513, 519 (Schwartz).

While it is theoretically possible to fuel a power plant 100% with petroleum coke, it is extremely unlikely that any utility would plan to meet significant capacity and energy needs such as FPL's over an extended time frame solely with petroleum coke. To imply that FPL should plan on fueling this very large amount of capacity over 40 years solely with petroleum coke strains credulity. Tr. 519 (Schwartz); 1773-74 (Sim).

The Sierra Club's testimony hinges on the assumption of a substantial differential between the delivered price of petroleum coke and the delivered price of coal. Mr. Furman represents that the prices used in his analysis were derived from historical data published by the Department of Energy. However, Mr. Furman incorrectly applied historical data, and conducted no independent evaluation of the supply/demand balance for petroleum coke. Tr. 508-19 (Schwartz).

Mr. Furman represents that the fuel costs in his testimony are the average 2004 and 2005 delivered prices of coal and petroleum coke to Florida power plants as reported by the Energy Information Administration ("EIA"), which is part of the U.S. Department of Energy. However, FPL's expert Mr. Schwartz and his firm Energy Ventures Analysis, Inc. ("EVA") reviewed the relevant EIA reports referenced by Mr. Furman and could not verify Mr. Furman's numbers. Tr. 508-513 (Schwartz), Exs. 135-40 (Schwartz). In any event, EVA reviewed the basis for the EIA numbers and determined that the reported petroleum coke costs do not actually represent fully delivered costs to inland Florida plants. Mr. Furman therefore understates the delivered price of

petroleum coke and overstates the delivered price of coal. Tr. 508-11, Ex. 141, 142, 143 (Schwartz).

Further, the average petroleum coke costs delivered to Florida power plants do not reflect fuel economics at FGPP because FGPP is an inland plant and has different delivery characteristics than a coastal plant. Therefore, the price of petroleum coke delivered to a coastal utility such as Jacksonville Electric Authority is not comparable to FGPP. The reported delivered price to inland utilities like the City of Lakeland is about $0.50 per MMBtu higher than the price to the coastal utilities, reflecting the increased transportation costs, which were not addressed in Mr. Furman's analysis. Tr. 511-12 (Schwartz).

Most significantly, Mr. Furman used historical price data rather than forecasted prices to determine the fuel cost differential. The market for petroleum coke is changing as a result of both increased supply and demand. The price for petroleum coke generally tracks petroleum prices subject to supply and demand but is capped by the price of its alternative, which is coal. With increased demand, the price for petroleum coke will balance at the avoided coal price for the marginal plants, essentially eliminating the price differential Mr. Furman uses to justify an IGCC plant. Tr. 515-19, 528-32, Ex. 90, 144, 145, 146 (Schwartz), 811-812 (Hicks). As Mr. Schwartz indicated on examination by the Sierra Club, "[p]etroleum coke is typically less expensive than coal, but not all the time and not right now." Tr. 532 (Schwartz). Therefore, it would not be reasonable to make the assumption, as Mr. Furman does, that petroleum coke would be the least cost fuel over the entire life of the FGPP units. Also, as Mr. Hicks pointed out, "over the last year or so FPL and Jacksonville Electric Authority have actually cut back on petroleum coke [at St. Johns River Power Park] because the price has either met or exceeded the

price of coal.[20] Tr. 811-12 (Hicks). Having a flexible fuel supply strategy like the one FPL developed for FGPP is one way utilities can minimize fuel costs over a long period of time. Tr. 528-32 (Schwartz), 805 (Hicks).

Moreover, a fuel strategy which relies exclusively on over four million tons per year of petroleum coke would not be a prudent fuel supply decision. On questioning by the Sierra Club, Mr. Schwartz soundly and firmly rejected repeated questions attempting to suggest that an IGCC unit fueled 100% with petroleum coke was preferable to FGPP and its fuel supply plan.[21] Tr. 539-546 (Schwartz). The petroleum coke use by a plant the size of FGPP would equal more than 15% of the total available supply of petroleum coke.[22] This would leave FGPP far too dependent upon a very limited source of fuel, and would not be as reliable as relying upon a blend of coals from multiple supply regions, in addition to petroleum coke.[23] Tr. 519, 532 (Schwartz).

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[20] During the Sierra Club's cross examination of Dr. Sim, the Sierra Club failed to demonstrate that the TECO document concerning the demonstration unit, which was labeled as Exhibit 183,and the TECO presentation labeled as Exhibit 184 had any relevance to FGPP or FPL's situation, and Dr. Sim pointed out, again, that the price of petroleum coke at times exceeds that of coal. Tr. 1165-66 (Sim).

[21] The Sierra Club suggested to Mr. Schwartz that Florida has a "unique opportunity" to use petroleum coke to fuel IGCC plants that "will significantly reduce the present environmental emissions created by the export of pet coke." Tr. 546. Mr. Schwartz strongly disagreed. While the larger share of U.S. pet coke production is in the Gulf Coast, "there's also a lot of demand for it." Tr. 546 (Schwartz). The available exports of pet coke today are 16 million tons per year. "Nobody is going out and building a 2,000 megawatt plant to use petroleum coke like the size of FGPP just depending on market supplies of petroleum coke. ... [A]nd nobody is building a project anywhere close to FGPP on petcoke, but even the 300 megawatt projects are trying to be designed next to or within a refinery in order to assure a committed supply." Tr. 546 (Schwartz).

[22] The Sierra Club asked Mr. Schwartz whether the 4 million tons per year needed by FGPP would represent 3% of total petroleum coke production in 2010 and 2% of total production in 2025. Mr. Schwartz clarified that the Sierra Club was correct with respect to total world production, but that would not necessarily be accessible to the U.S. markets. Comparing FGPP's requirements to world coal production, world coal production is about 5 billion tons per year, of which FGPP would then be 0.1%. This is a large difference, especially when considering what would be available in the U.S. Tr. 544 (Schwartz).

[23] The Sierra Club also failed to establish that IGCC plants run on a diverse array of fuels. Tr. 805-11 (Hicks). As Mr. Hicks pointed out on examination by the Sierra Club:

> Q. Well, IGCC plants run on a diverse array of fuels, do they not?
>
> A. I would disagree with that. IGCC plants, just like pulverized coal plants, [are designed] for a specific ... fuel type. If you deviate from that fuel type, that can cause considerable problems. It's called design point. So, for example, there [are] two design points for the pulverized coal plant at the FPL Glades Power Park. One design point is bituminous coal. The second design point is bituminous coal with 20% petroleum coke. That gives us great fuel

FPL's Installed Cost Estimate is Reasonable

The expected installed cost for FGPP is $3,456 million (2013 dollars) for FGPP 1 and $2,244 million (2014 dollars) for FGPP 2, resulting in a total estimated cost of $5,700 million.[24] For FGPP 1, this cost includes $2,521 million for the power plant, including land acquisition for the power plant, $274 million for the transmission interconnection and integration, including land acquisition for the off-site transmission system, and $661 million in allowance for funds used during construction ("AFUDC") to an in-service date of June, 2013. For FGPP 2, this cost includes $1,668 million for the power plant, $195 million for the transmission interconnection and integration, and $381 million in AFUDC to an in-service date of June, 2014. Tr. 1029-38, Ex. 61 (Yeager).

FPL's transmission plan, which was not challenged in this proceeding, is the most cost-effective for interconnecting and integrating FGPP into FPL's system. Tr. 1029-38 (Yeager); 1301 (Sanchez). The requirement to add major transmission facilities is the result of the need to deliver a substantial amount of new generation from an area where no major transmission infrastructure exists to Florida's east and west coasts in order to serve FPL's load. Tr. 1310 (Sanchez). The cost estimates and schedules associated with the transmission facilities are

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> flexibility in sourcing bituminous coals and petroleum cokes throughout the United States and also throughout the world.
>
> Now, we can run that plant on other types of fuel, such as subbituminous coals. We would take a slight derate in capacity or a slight derate on efficiency, but we can run on other fuels. But we have designed that plant for certain types of fuel. It's the same thing with IGCC. You design it for a specific type of fuel. If you deviate from that fuel, it can cause considerable problems.

Tr. 804-05 (Hicks). Mr. Jenkins also pointed out that an IGCC unit itself is not necessarily designed for a wide variety of fuels. Tr. 955 (Jenkins).

[24] FGPP meets the requirements to be considered clean coal technology under the Energy Policy Act of 2005, and FPL will be applying for clean coal tax credits this year. While FPL's cost estimate for FGPP did not include the value of these potential tax credits because approval of FPL's request is not within FPL's control, if FPL does obtain these tax credits they would be used to reduce the final cost of the coal project for the benefit of FPL's customers. Tr. 870-72 (Hicks).

reasonable and representative of what would be expected to interconnect and integrate the Glades Power Park units. Tr. 1349-50 (Coto).

The FGPP installed-cost estimate is reasonable and competitive. FPL has secured firm pricing for a majority of the power plant costs, which would include the EPC agreement, boiler, steam turbine and pollution control equipment, with a portion of those costs subject to market indices.[25] Tr. 1034-35 (Yeager). By doing this, FPL has significantly reduced the risk of the types of cost increases currently being experienced by similar projects throughout the country. Tr. 1039-41 (Yeager).

FPL also has confirmed the reasonableness of the estimate through an independent consultant who performed a detailed review of the installed cost estimate for FGPP. Mr. William Damon of Cummins & Barnard discussed the scope and results of his review which concludes that the estimated installed costs for FGPP are reasonable and competitive. Tr. 1035 (Yeager); 1291-92 (Damon).

Issue 3: Is there a need for the proposed generating units, taking into account the need for fuel diversity and supply reliability, as this criterion is used in Section 403.519, Florida Statutes?

*Yes. The addition of FGPP is needed to maintain fuel diversity in FPL's system, which will reduce fuel price volatility experienced by customers and mitigate the effects of delivery disruptions caused by an overdependence on natural gas. Domestic coal reserves are plentiful, and the flexibility of the FGPP fuel plan to utilize domestic and international coal and petroleum coke further enhances FGPP's fuel supply reliability. While FPL will continue to pursue cost-

[25] Only two components of the total estimated capital costs for the power plant are based on indices: escalation for labor costs in the EPC agreement, and escalation for the costs of high allow steels used in the emission control equipment. These indices address market risks over which neither the supplier nor FPL will have control. The portion of the total estimated cost representing the projected escalation for labor costs, including AFUDC, in the EPC scope is nominally $594 million, or about 10% of the total capital cost of FGPP. This component will be indexed to a rate derived from the United States Department of Labor Bureau of Labor Statistics County Employment and Wages Bulletin, which is outlined in Exhibit 62. The portion of the total cost estimate representing the alloy material component of the pollution control equipment is nominally $151 million, including AFUDC, or about 3% of the total capital cost of FGPP. High alloy steels and metal costs will be indexed to published market indices for high alloy steels and metals used in producing the equipment. Tr. 269-270 (Olivera), 1031-1034, Ex. 62 (Yeager).

effective renewable resources, there are not sufficient renewable resources to avoid or defer the need for FGPP or contribute in any meaningful way to fuel diversity.*

Coal-fired generation is FPL's only alternative to bring any meaningful amount of fuel-diversity to FPL's system before 2017. There is no credible evidence to the contrary. Despite FPL's demonstrated commitment to renewable technologies, the record is clear that wind and solar technology will not supply FPL with the needed baseload capacity that FGPP will bring and would only supply intermittent energy. Further, there is not adequate potential incremental capacity from biomass, waste-to-energy and other renewable resources in Florida to avoid or defer the need for FGPP. FGPP is needed to reduce price volatility and minimize the risk of delivery interruptions on FPL's system and achieve the important public policy objective of maintaining fuel diversity for FPL's customers.

Public Policy of Fuel Diversity

Fuel diversity is an important public policy objective, as evidenced by Florida's Energy Plan, issued on January 17, 2006, which addressed the importance of fuel diversity and the need to avoid excessive reliance on any one fuel type such as natural gas. The Legislature also has reinforced the need for fuel diverse generating resources, with the recent amendment of Section 403.519, Florida Statutes, which now requires that the Commission expressly consider "the need for fuel diversity and supply reliability" when making its determination of need for new electric generating capacity. Tr. 220 (Olivera); 300-01, 340-41 (Silva).

Consistent with this objective, the Commission on August 29, 2006 moved to facilitate FPL's fuel diversity efforts when it granted the Company an exemption from Rule 25-22.082, Florida Administrative Code (the "Bid Rule") with respect to FPL's proposal to construct a USCPC generating plant, finding:

> ... the exemption will serve the public welfare and will likely result in reliability and cost benefits to the utility's general body of ratepayers. FPL should move forward with construction of the

> generating units as expeditiously as possible and has stated that a need determination filing could be made, for both units, no later than May 1, 2007.

Order No. PSC-06-0779-PAA-EI, issued September 19, 2006, pp. 5-6. Tr. 220-21 (Olivera), 1204 (Sim).

Reduction in Price Volatility

In order to evaluate the impact of the addition of two advanced technology coal units to FPL's system, FPL developed two resource plans. One resource plan, the Plan with Coal, included the two coal-based units at the FGPP site. The other resource plan, the Plan without Coal, assumed no coal-based capacity additions. FPL then conducted economic and fuel diversity analyses of these two resource plans. Tr. 326-33, 357-59 (Silva). The economic analyses are discussed in Issue 7 below.

The effects of the two resource plans on FPL's system fuel diversity were evaluated by projecting the annual percentage of system energy that is supplied by each fuel type – coal/petroleum coke (sometimes referred to as "solid fuel"), natural gas, oil, nuclear, and other (primarily purchases such as from waste-to-energy facilities) – for both resource plans for the 2012 – 2016 time period; i.e., a system fuel mix projection. FPL's fuel diversity analyses demonstrated that the Plan with Coal holds a significant advantage in regard to fuel diversity compared to the Plan without Coal. With FGPP, the solid fuel percentage will be 18% in 2016, the same as in 2005, thus helping maintain the solid fuel contribution percentage in FPL's fuel mix with the associated benefits for customers. In contrast, without FGPP, the solid fuel percentage in 2016 will drop to 7%. Therefore, the Plan with Coal is projected to have a significant fuel diversity advantage over the Plan without Coal, resulting in the FPL system

being 10-11% more reliant on solid fuel, and 10-11% less dependent on natural gas. Tr. 222-23 (Olivera); 312-14, 326-33, Ex. 4, 5 (Silva); 1141-43, Ex. 60 (Sim).

Moreover, during the first twenty full years of operation of both FGPP units, FPL will reduce the use of natural gas by about 2 billion million British Thermal Units ("MMBtu") compared to the amount of natural gas it would use without FGPP. This decrease in natural gas use, which is a measure of the reduction in FPL's reliance on natural gas achieved by FGPP, is equivalent to the total quantity of natural gas that FPL used in its entire system during the last 6 years. On the other hand, if natural gas-fired combined cycle plants were to be constructed instead of FGPP, which is the only option FPL has through 2017, FPL's dependence on natural gas for supplying annual energy to its customers would increase from 42% in 2005 to 71% in 2016, resulting in commensurate increases in the amount of natural gas burned on FPL's system, and increased bill impacts due to price volatility. Tr. 224 (Olivera); 313-14 (Silva); 1141-43 (Sim).

This result is driven in part by the fact that by 2016 the quantity of firm power FPL will purchase from coal-fueled plants under existing contracts will decrease by 1,312 MW as a result of the terms of those contracts. Thus, the net effect of adding 1,960 MW of advanced technology coal generation at FGPP by 2013 and 2014, less the anticipated reduction in power delivered under expiring existing power purchase contracts served by coal-fueled generation between now and 2016, will be a net increase of only 648 MW of coal-fueled generation to FPL's system by 2016 when compared to the current level.[26] Tr. 312-13, 410-14, 1890-91 (Silva); Ex. 50 (Sim); Ex. 155 p. 2.

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[26] Mr. Silva was asked about the potential to renew or extend the purchase power contracts that are expiring. Regarding FPL's purchase of 30% of the output of St. Johns River Power Park, which equals 381 MW of coal-fired generation, FPL will have to replace that with other generation in order to comply with Internal Revenue Service regulations applicable to the original financing of the plant. In regard to the Unit Power Sales ("UPS") contract with

Fuel diversity helps mitigate the effects of price volatility in one or two fuels on the price of electricity. For example, if a utility relies solely on natural gas to produce all the electricity needed by its customers, any increase in the market price of natural gas would translate into a direct and comparable increase in the cost of electricity. Because natural gas prices are projected to be volatile in the future, electricity customers would be subject to significant volatility in the future cost of electricity. Recent history has demonstrated just how volatile natural gas prices can be. Because the prices of coal and nuclear fuel are relatively stable, and because changes in these fuels are not directly linked to changes in the prices of natural gas and fuel oil, having a fuel diverse portfolio that includes significant contributions from coal (as would be the case with the addition of FGPP) and nuclear fuel helps dampen the effect of volatility in natural gas prices. Tr. 225-26, 268-69 (Olivera); 312-15, 326-33, 335-44 (Silva); 1144 (Sim); 1372 (Yupp).

FPL's customers have already seen how significant the impact of price volatility can be. FPL purchases the fuel used to produce electricity and bills customers for the fuel directly at cost – with no profit added. FPL customers saw the latest spike in natural gas prices reflected in their bills beginning in January 2006. At that time, a residential 1,000 kWh bill increased by approximately $17 or 18.5% over the 2005 bill, an increase of $204 per year, primarily due to an increase in fuel costs.[27] Based on FPL's 2007 projected gas consumption as filed in the Fuel Cost Recovery Docket No. 060001-EI, each one dollar per MMBtu increase in the cost of natural

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Southern Company, when it expires in 2015, there will only be 160 MW of coal-fired generation from that contract. The remaining 770 MW of the 980 MW UPS contract is combined cycle generation because Southern Company's subsidiary, Alabama Power Company, elected to retain the 770 MW of coal-fired generation to serve its native load. FPL will continue to try to renew the contract to provide FPL at least 160 MW of coal-fired generation. FPL is also exploring other possibilities for purchasing coal generation from plants that are being built or have been built. However, Seminole Electric, for example, said there will be no coal-fired generation available for sale to FPL when its Unit #3 is constructed. There is a great deal of competition for coal generation, which is one of the reasons it is necessary that FGPP be constructed to add fuel diversity to FPL's portfolio. Tr. 410-14 (Silva).

[27] Residential rates have increased substantially due to greater reliance in terms of the percentage of energy supplied by natural gas as well as a significant run-up in the cost of natural gas during the same time period. Tr. 1230-31 (Sim).

gas translates to an increase in FPL's fuel costs of approximately $430 million, which is directly reflected on customers' bills. Tr. 226-27, 268-69 (Olivera); 312-15, 326-33, 335-44 (Silva).

The projected price differential between natural gas and solid fuel is a major driver in the economic evaluation of FGPP and FPL's Plan without Coal. The inherent uncertainty and unpredictability in the factors that affect oil and natural gas prices today and in the future clearly underscored the need for FPL to develop several fuel price forecasts to ensure that the economic analysis considered a wide range of reasonable future fuel price outcomes. Accordingly, the economic evaluation of FGPP and the Plan without Coal provides a range of potential cost outcomes given several potential gas-coal price differential scenarios. It is important to note that although periods of lower natural gas prices will reduce the fuel cost benefits to FPL's customers specifically from the addition of FGPP, periods of lower gas prices will at the same time benefit FPL's customers due to the significant level of natural gas generation in the FPL system, so that there would still be an overall fuel cost benefit to FPL's customers in that scenario. Tr. 226-27 (Olivera); 335-44, 357-59 (Silva); 1378 (Yupp). It is also important to note that, if CO2 reduction regulations are implemented, this will ultimately increase the demand, and thus the price, of natural gas because it produces less CO2 than coal when combusted. Tr. 269 (Olivera); 421-22 (Silva). This is also discussed in Issues 5 through 8 below.

Minimizes Risk of Delivery Interruptions

As discussed in Issue 1 above, FGPP will maintain and improve the reliability of service for FPL's customers. As a matter of electric system reliability, relying exclusively on one fuel makes the system more susceptible to events that cause delays or interruptions in the supply of that fuel because there would not be any generation facilities that could use other fuels to make up for reductions in the constrained fuel. As events related to recent hurricanes have shown,

natural gas supplies to Florida, which originate in the Gulf of Mexico region, are vulnerable to interruptions. Tr. 225-28 (Olivera); 319-20, 348-49, 425 (Silva); 1370 (Yupp).

Conversely, because a fuel-diverse system with adequate generation reserve margin is capable of producing electricity using a number of different fuels and has sufficient generation capacity, it can offset the reduced availability of one constrained fuel by generating sufficient electricity using other fuels. FGPP can play an important role in reducing FPL's customers' exposure to potential interruptions in the availability of natural gas supply, which might otherwise lead to temporary power curtailments. Tr. 225-27 (Olivera); 320, 348-49, 425 (Silva); 504-05 (Schwartz); 1369-70 (Yupp).

Further, the ability of a generating system that relies on only one fuel transportation and delivery method and route to serve its customers can be severely impaired by delays or interruptions in the transportation and delivery of that single fuel to the generating plants. Diversity in transportation and delivery methods and routes enables a utility to mitigate the effects of such interruptions and delays by fully utilizing other transportation channels that remain unaffected until transportation problems are resolved. Tr. 320, 348-49, 425 (Silva); 479-83, 488-93 (Schwartz).

FPL's base fuel plan for FGPP calls for a blend of 40% Central Appalachia coal, 40% international coal and 20% petroleum coke. This plan will provide sourcing flexibility and allow FPL to realize a low fuel cost with reliable supplies. Tr. 481-83 (Schwartz), 805-07, 813 (Hicks). However, FGPP could use coal from almost all domestic U.S. sources as well as almost all foreign sources.

Central Appalachia is the second largest coal supply region in the U.S. and is the closest coal supply region to Florida.[28] Two Class I railroads provide service between Central Appalachia and Florida and FPL's transportation strategy provides for the use of both railroads in order to promote competition. As Mr. Schwartz indicated on questioning from the Sierra Club, FGPP could also use any of the bituminous coals available in the western United States, but it is not expected to have a lower delivered cost compared to the least cost fuels, which would be Central Appalachian or international coals, with a blend of petroleum coke.[29] Tr. 539-40 (Schwartz). International coals would most likely originate in South America, although other sources are possible. Columbia, for example, exports large volumes of high quality steam coal. Tr. 497-99 (Schwartz).

Throughout its operation, the St. Johns River Power Park has relied on South American coal. Petroleum coke is a refinery by-product which often is a lower cost source that many utilities have successfully incorporated into fuel supply as a means of controlling costs. Other plants in Florida, including St. Johns River Power Park, Seminole Electric's Seminole Generating Station and Jacksonville Electric Authority's ("JEA's") Northside plant rely on petroleum coke for a portion of their fuel supply. The petroleum coke most likely to supply FGPP would originate from refineries in the Gulf of Mexico or the Caribbean. The international

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[28] FPL's fuel plan and its forecasted prices take into account the long-term effects regarding on-going regional surface mining issues such as those recently heard in the West Virginia federal court case Ohio Environmental Coalition v. U.S. Army Corps of Engineers, official notice of which was requested by the Krasowskis. While this is a recent decision, this is a long-running dispute and FPL's forecast of coal supply and prices from this region has taken into account the impacts of this dispute over the impacts of surface mining. However, underground mining is still the primary mining technique in the Central Appalachian region, so that the impacts of this decision are expected to be minimal to the production and cost of coal from this region. Tr. 386-87 (Silva), 523, 538-39 (Schwartz).

[29] FGPP is limited in its ability to use Illinois Basin coal to the extent that the coals have a higher chlorine content, but there are lower chlorine coals in the Illinois Basin. However, the Central Appalachian region is closer to FPL than the Illinois Basin and it is not expected that the Illinois Basin would be the most economic source of coal for FGPP. Tr. 482, 534-40 (Schwartz).

coal and petroleum coke would move through existing or new import terminals. Tr. 498-03 (Schwartz).

FPL's plan to maintain access to both domestic and international supplies of coal will provide additional fuel diversity benefits. Because different fuels usually originate from different geographical areas and are transported and delivered via different methods and routes, having a fuel diverse generation system helps mitigate the effect of problems related to transportation and delivery, as well as production. Tr. 320 (Silva); 481-83 (Schwartz).

Adding 1,960 MW of advanced technology coal generation to FPL's system will reduce reliance on natural gas and will enable FPL to more effectively offset decreases in natural gas supply because factors that could affect gas production and transportation would not affect coal. For example, the coal to be used in FGPP will largely be produced in Central Appalachia or other U.S. production areas, South America, and other coal sourcing areas of the world that are well removed from the Gulf of Mexico, where most of the natural gas delivered to FPL is currently produced. In addition, coal will be transported via ship and rail, instead of by pipeline, so most events that would affect gas transportation are unlikely to affect coal transportation. Also, the technology to be used in FGPP will be different from that used in most of FPL's gas-fired units, so technical problems that may affect the gas-fired units are much less likely to affect FGPP. Tr. 321-22, 425 (Silva); 534, 539-41 (Schwartz).

FGPP provides additional reliability and diversity benefits because, unlike natural gas, coal and petroleum coke can be economically stored in significant quantities at the plant site. The addition of FGPP will enable FPL to maintain up to a 60-day on-site inventory of coal and petroleum coke to mitigate the effect of solid fuel transportation delays or interruptions. Additional coal and petroleum coke would be stored at the import terminal. In comparison, the

natural gas-fired combined cycle unit additions in 2012 – 2016 in the Plan without Coal contain on-site backup fuel (i.e., fuel oil) capability of only several days. Consequently, the Plan with Coal, due to the inclusion of the two advanced technology coal units at FGPP, has a significant advantage in regard to system reliability in the event of a significant fuel supply disruption.[30] Tr. 322, 348-349, 425, Ex. 7 (Silva); 1138 (Sim); 1379-81 (Yupp).

If FPL were to add the capability to maintain a similar (60-day supply for 1,960 MW of generation) inventory of natural gas in the form of liquefied natural gas ("LNG") at the plant site, the cost to build, operate and maintain this LNG storage facility, including working capital, would be in excess of $1.4 billion on a cumulative net present value of revenue requirements ("CPVRR") basis.[31] Tr. 322, 356-57, 396-99, Ex. 7 (Silva). Similarly, if instead of natural gas inventory capability FPL were to add comparably sized fuel oil inventory capability, the cost to build, operate and maintain this fuel oil storage facility, including working capital, would be about $1.4 billion (CPVRR). Tr. 322, 396-99, Ex. 7 (Silva); 1379-80 (Yupp).

Because the reserves of bituminous coal in the U.S. are so large, a coal supply that meets the specifications required by FGPP from secure, domestic sources is assured for the entire operating life of the plant. Tr. 323 (Silva); 481-83, 492-93 (Schwartz). There are approximately 230 years of estimated domestic coal reserves based on current demand. Domestic coal,

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[30] FPL did not attempt to quantify all of the fuel diversity advantages of the Plan with Coal in its economic analyses because the quantification would be dependent upon a number of subjective assumptions including: the likelihood of such a fuel supply disruption occurring, the duration of the disruption, the year(s) in which the disruption might occur, etc. Therefore, this real advantage of the FGPP advanced technology coal units is not fully reflected in the economic analysis. Tr. 1138 (Sim). However, Mr. Silva's Ex. 7 does incorporate the impact to the Plan without Coal of adding a comparable amount of on-site gas storage. Considering only the quantitative effects of that aspect of reliability, FGPP is cost-effective in 10 of the 16 scenarios modeled. Tr. 329, Ex 7 (Silva).

[31] This $1.4 billion estimate would be associated with developing the capability to import gas through one of the existing natural gas pipelines and store it onsite by compressing it into LNG. As it relates to bringing LNG to Florida, FPL has pursued associations with three different entities that could bring regasified LNG into Florida or construct an offshore LNG facility. Of those, only one is known to FPL to be potentially viable and, contrary to the suggestion of one of the public witnesses, none of the entities has discussed with FPL the possibility of locating an LNG facility in Fort Lauderdale. Because this is not a viable alternative at this time, the cost of importing regasified LNG into Florida was not analyzed in this proceeding. Tr. 395-98 (Silva).

therefore, is an important component of any plan to move toward greater energy independence from foreign sources of fossil fuels, which is imperative for the Unites States' energy future.[32] Tr. 228 (Olivera); 483-93 (Schwartz).

Lack of Sufficient Renewables

One witness asserts that FPL did not give adequate consideration to renewable energy alternatives to FGPP. Tr. 585 (Schlissel); 1891-92 (Silva). While FPL is a strong supporter of cost-effective renewable resources, there are not sufficient renewable energy resources to avoid or defer the need for the baseload capacity and energy that the FGPP units will provide. Tr. 318-319, 1891-92 (Silva); 843-46 (Hicks). Moreover, the cost of photovoltaic (PV) energy, without back up capacity, is $250 per MWh, more than 2.5 times the cost of FGPP, a unit that will provide both energy and capacity. Tr. 1933 (Silva). In 2005, FPL purchased about 1.5 million megawatt hours ("MWh") of electricity under contracts with nine suppliers that own and operate renewable energy generation resources. FPL continues to encourage existing and potential renewable energy generators by facilitating dialogue with these entities and offering to negotiate contract terms that favor development of renewable resources. Indeed, FPL recently issued a request for proposals for renewable generation sources that would be placed in service by 2015, and expressed interest in knowing about possible renewable resource additions that might be

[32] As more natural gas-fired generation is added, the need to consider alternatives to maintain reliability will become imperative. These alternatives could include the addition of a new interstate pipeline, additional underground natural gas storage, on-site LNG storage facilities, and identifying alternate supply sources, including access to new producing regions as well as the addition of regasified LNG. Currently, LNG deliveries accounts for approximately 2.7% of the total U.S. natural gas supply. By 2020, as demand for natural gas grows, it is projected that LNG will account for approximately 20% of the total U.S. natural gas supply. However, to the extent LNG supply imported from the oil producing regions of the Middle East becomes a greater percentage of total U.S. natural gas supply in the future, the risks associated with foreign natural gas supply sources will become more prevalent. Tr. 225, 232-33 (Olivera), 1371 (Yupp).

offered beyond 2015, and gave respondents until July 1, 2007 to respond.[33] However, there are not sufficient renewable resources to avoid or defer the need for the baseload capacity and energy that the FGPP units will provide. Tr. 228-29 (Olivera); 1950-53 (Silva).

Both wind and solar energy systems are intermittent in nature and can be used to provide energy, but not needed baseload capacity. FPL has done a preliminary examination to determine what would be required to replace the energy (only) from FGPP with wind turbines. FPL's studies indicate the best technical potential for wind generation in Florida is on the coast, with a clear site line to the Atlantic Ocean or Gulf of Mexico. Because even at these locations the winds are light, the capacity factor for the wind turbines is estimated at 8% to 12%. Generously assuming a 15% capacity factor and assuming 1.5 MW wind turbines are used (some of the largest commercially available), it would require over 8,000 wind turbines (or about 69% of the total installed wind generation capacity in the U.S. as of the end of 2006) to produce the same amount of energy that FGPP would generate. The wind turbines would have to be located on the coast, and, even if they were appropriately spaced along the entire coast of Florida (from Alabama in the West, around the Keys and back up the east coast to Georgia) there still would not be enough coast line to accommodate the needed number of turbines. Tr. 389-91, 1891-92 (Silva); 843-46 (Hicks).

Using solar energy as another example of renewable potential, based on insolation (sunshine) data from the Florida Solar Energy Center ("FSEC") and National Renewable Energy Laboratory ("NREL"), approximately 5.5 watt-hours per day of energy will be produced for each watt of PV cells installed. Therefore, to replace the energy output of FGPP would require 7,868 MW of PV cells, almost 100 times more than the total installations of PV cells throughout the

[33] Even if the renewable generation is not available until after 2015, FPL indicated that it would like to be aware of the potential. Tr. 389-91 (Silva); Ex. 214.

U.S. in 2005. Using typical commercial PV cells, these panels would cover over 20 square miles, and like wind could not be relied upon to provide firm capacity to meet customers' needs during FPL's peak load hours. Tr. 1892 (Silva); 846 (Hicks).

Renewable sources that, unlike wind and solar, can provide both energy and capacity include biomass, waste-to-energy and landfill gas facilities. However, there is limited achievable potential for incremental capacity from these sources in Florida, and certainly not enough to avoid or defer the need for FGPP.[34] Tr. 389-91, 1892 (Silva).

Issue 4: Are there any conservation measures taken by or reasonably available to FPL which might mitigate the need for the proposed generating units?

FPL: *No. FPL is an industry leader in cost-effective load management and conservation programs, and will continue to pursue such programs. However, FPL has already accounted for all DSM in its planning process, and determined that there is not enough additional cost-effective DSM that could mitigate the need for capacity that will be provided by FGPP. Altering the cost-effectiveness test for DSM programs would not affect this result and would do nothing toward the objective of maintaining system fuel diversity.*

There is no credible evidence that incremental DSM savings can avoid or defer the need for FGPP. Indeed, the Sierra Club only presented what it termed a "rough idea" of incremental savings that it thought may be achieved over what it called the "long term," but presented absolutely no Florida-specific analysis to support its recommendations. Even if the cost-effectiveness test for DSM were to change, the record is clear that there still would not be incremental capacity and energy savings to mitigate the need for FGPP. FPL's resource needs must be met by capacity additions.

FPL's DSM efforts

[34] FPL has done a significant analysis to establish the technical capability of several types of renewable resources that could provide capacity toward reserve margin, including hydro, landfill, biomass and waste-to-energy. FPL's estimate is that the maximum technical potential, without regard to cost-effectiveness for FPL's customers, would not be greater than 300 MW for FPL's share of statewide potential over the next ten years. This does not take into consideration whether the renewable resources will actually be developed, at what cost they will be developed and whether FPL would be able to contract the capacity. Certainly, 300 MW of renewable generation over a ten-year period is not sufficient to meet the need of a system that is growing at the rate of 600 MW per year. Tr. 389-91 (Silva).

FPL is an industry leader in DSM and cost-effective conservation programs. Indeed, FPL is ranked number one nationally for cumulative conservation achievement and number four in load management based on the most current U.S. Department of Energy data available. Tr. 662-63, 691 (Brandt); 1794-95 (Sim). Through 2005, FPL's DSM programs, including demand-side renewable resource efforts, have enabled FPL to avoid the need for more than 4,200 MW of generation capacity, equivalent to about 20% of the 2006 peak load.[35] Tr. 315, 392 (Silva); 662, 666, 675-79; Ex. 23 (Brandt). FPL now projects implementing approximately 564 MW of additional summer demand reduction capability from 2006 through 2015 beyond FPL's current DSM Goals of 802 MW at the generator, for a total of 1,366 MW of additional cost-effective DSM through this time period. Tr. 668-72 (Brandt); 1105-06, Ex. 47 (Sim). By 2015, FPL projects that DSM will have avoided an additional 1,639 MW of equivalent generation, for a total capacity avoidance of more than 5,800 MW, or about 21% of the 2016 projected peak load. Tr. 315 (Silva); 669, 679-81 (Brandt); 1105-06 (Sim). This avoided capacity is almost three times the size of FGPP.[36] Tr. 315, 420 (Silva); 682 (Brandt).

Incremental DSM Savings Could Not Mitigate the Need for FGPP

These DSM savings are already reflected in FPL's resource planning process and there is not sufficient additional cost-effective DSM to eliminate or defer the need for FGPP to meet Florida's growing need for electrical power. Tr. 315 (Silva); 679-81 (Brandt); 1105-07, 1796-99, Ex. 46, 47 (Sim). If the resource needs for just the years 2012 through 2014 were to be met solely by additional new DSM resources, FPL would need to find an additional 1,371 MW of cost-effective DSM to meet these resource needs. Tr. 680 (Brandt). There is no reasonable basis

[35] The contribution of DSM to FPL's portfolio is a larger contribution than coal-fired generation makes now and would make with the addition of FGPP. Tr. 392 (Silva).

[36] As referenced in Issue 1 above, FPL's capacity needs are net of the 1,256 MW of projected savings expected from implementation of the 2005 Energy Policy Act. Tr. 437, 454-55, Ex. 21 (Green); 679 (Brandt).

for concluding that FPL could first identify, and then implement, an additional 1,371 MW of cost-effective, incremental DSM in the next 7½ years (2007 through mid-2014) to meet these needs, especially considering that this amount of DSM is virtually identical to the maximum amount (1,366 MW) of cost-effective DSM known to FPL for the 2006-2015 time period, and that is already included in the projection of capacity needs. Tr. 679-81, 726 (Brandt); 1184-87, 1796-01 (Sim); 1801-02 (Silva).

Consequently, cost-effective DSM cannot meet FPL's incremental resource needs for this time period. Tr. 679-81, 726 (Brandt); 1106, 1796-01 (Sim). These resource needs must be met by capacity additions. The majority or all of the capacity associated with the proposed plant would have to be replaced with a natural gas-fired alternative, resulting in more volatility and higher fuel costs for FPL's customers. Tr. 266-68 (Olivera); 312-14, 364-65 (Silva); 1106-07 (Sim). Of course, FPL will continue to investigate cost-effective DSM opportunities beyond those already identified in this filing, and will come to the Commission to request approval of new programs as appropriate. Tr. 266, 274-75 (Olivera); 681-82, 698 (Brandt).[37]

Even if the cost-effectiveness test for DSM were to change, there is not enough additional cost-effective DSM that could delay or mitigate the need for capacity that will be provided by FGPP. Tr. 726, 732 (Brandt). There were questions posed to FPL about its use of the Rate Impact Measure ("RIM") test for cost-effectiveness. As FPL indicated, the goal of the RIM test is to ensure that all customers benefit appropriately from DSM initiatives by comparing DSM options on a level playing field to supply options and by minimizing rate impacts to all customers, participants in DSM programs and non-participants alike. Tr. 707, 727, 733 (Brandt),

[37] Several witnesses were questioned about a Lakeland Electric solar water heaters program. Tr. 274-275 (Olivera); 721-722, 729-730 (Brandt), 1874-75 (Sim). As FPL pointed out, the Lakeland Electric program has been in effect since 1997 and only 60 Lakeland Electric customers have participated with far less than 1 MW of total savings. Tr. 729-730 (Brandt), 1874 (Sim). FPL is configuring a pilot program for solar water heaters on rooftops, but implementation of this pilot would not affect or alter the need for FGPP. Tr. 274-275 (Olivera), 722 (Brandt).

1799-1800 (Sim). FPL also utilizes the Participant test, which ensures that participants in conservation programs benefit by their participation in the program through FPL-supplied incentives, tax credits, and through reducing consumption as part of the program, and non-participants benefit through having as low a rate as possible. Tr. 707-08 (Brandt), 1798-1800 (Sim). These two cost-effectiveness tests were approved by the Commission following a vigorously contested month-long hearing in 1994 and have been utilized by FPL and the other investor-owned utilities in Florida since that time.[38] Tr. 1798-1800, 1816-19 (Sim). If the Commission were to consider changing the test for cost-effectiveness, which FPL would not recommend, it would be inappropriate to do so in the context of this need determination proceeding because such a consideration could potentially impact resource planning activities by many Florida utilities, not just FPL. Tr. 1796 (Sim).

Mr. Brandt also disagreed with Mr. Krasowski's suggestion that implementation of the FSEC standards for housing would mitigate the need for FGPP.[39] Tr. 728-29 (Brandt). As Mr. Brandt indicated, he does not believe the FSEC recommendations would be cost-effective for FPL's customers. Tr. 728-29 (Brandt). Even if cost-effectiveness is not considered, FPL is not aware of any FSEC-proposed policies or standards the implementation of which would enable FPL to avoid or defer the need for FGPP.[40] Tr. 736 (Brandt).

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[38] As the Sierra Club addressed with Dr. Sim, the 1994 DSM Goals Order, Order No. PSC-94-1313-FOF-EG, issued October 25, 1994 in Docket Nos. 930548-EG, 930549-EG, 930550-EG and 930551-EG, provided that "[s]ince the record reflects that the benefits of adopting a [total resource cost ("TRC")] goal are minimal, we do not believe that increasing rates even slightly is justified." And also provided that "[u]pon petition from a utility, lost revenue recovery and stockholder incentives shall be considered on a case-by-case basis for such TRC measures that result in large savings and small rate impacts." Tr. 1824-25 (Sim). However, as Dr. Sim indicated, FPL has never encountered a circumstance in which it is found that use of the TRC test for cost-effectiveness of DSM measures would result in large savings and small rate impacts, and FPL has looked. Tr. 1879 (Sim).

[39] Dr. Sim pointed out that Mr. Krasowski's FSEC data was outdated and Mr. Krasowski agreed. Tr. 1190-91 (Sim).

[40] Nor is FPL aware of any legislative changes being considered by the Florida Energy Commission the implementation of which would enable FPL to avoid or defer the need for FGPP. Tr. 736 (Brandt).

One Sierra Club witness, Mr. John Plunkett, suggested that FPL could defer the need for FGPP by at least five years if it increases the amount it spends on DSM, but he relied on no Florida or FPL-specific data to support his recommendation.[41] Tr. 695-96 (Brandt). As Mr. Plunkett concedes in his testimony, he is unsure of whether FPL can find enough cost-effective DSM potential to defer the need for FGPP – he just presents a "rough idea" of how much DSM he thinks FPL might be able to accomplish. Tr. 699 (Brandt), 1408 (Plunkett); Ex. 190, p. 25. On questioning from FPL at his deposition, Mr. Plunkett admitted that he did not even read either Mr. Brandt's or Dr. Sim's testimony prior to making his recommendations to the Commission in this proceeding, nor did he familiarize himself with FPL's DSM Plan or the extensive amendments to FPL's Plan that were recently approved by this Commission. Ex. 190, pp. 57-58.

Moreover, even Mr. Plunkett's testimony supports that FPL has done a more than credible job of identifying the potential for cost-effective DSM for the relevant time period. Tr. 685 (Brandt). Mr. Plunkett presents a high-level benchmarking analysis comparing FPL to utilities in Massachusetts and Pacific Gas and Electric ("PG&E") in terms of DSM spending per kilowatt hour ("kWh").[42] Tr. 1410 (Plunkett). Of the Northeastern states Mr. Plunkett identifies, Massachusetts is the least effective in terms of annual kWh savings per dollar spent. Tr. 693-94 (Brandt). However, it is the peak hour kilowatt ("kW") reduction value of DSM options, not annual kWh reductions, that enables utilities to defer the need for new generation additions. Tr.

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[41] Mr. Plunkett made a passing reference to the American Council for an Energy Efficiency Economy ("ACEEE") report for Florida, Tr. 1404 (Plunkett), but only to say that FPL's planned DSM savings add up to more than its share of statewide efficiency potential estimated by ACEEE in the report. However, Mr. Brandt presents numerous problems with the ACEEE report and underlying assumptions. Tr. 685-690 (Brandt). Given the concerns about the accuracy of the ACEEE report and Mr. Plunkett's observations about FPL's planned savings relative to the report, it is reasonable to conclude that FPL is doing substantially more than its share of statewide potential as projected by ACEEE. Tr. 690 (Brandt).

[42] Mr. Plunkett has previously submitted substantially the same high-level benchmarking values in prior testimony in other jurisdictions and simply repeating those values in this docket did not require additional work or analysis on his part. Tr. 695 (Brandt), Ex. 190, pp. 53-54.

691-691 (Brandt), 1836-37 (Sim). Moreover, FPL achieves its DSM-induced kW reductions in a highly efficient manner. Despite being the national leader in conservation achievement, the amount FPL spends per kW of achieved savings is as much as one-third less than the amount PG&E spends per kW of achieved savings.[43] Tr. 694-95 (Brandt), 1838-39 (Sim). There is no credible evidence that shows FPL can cost-effectively triple its DSM potential over the undefined time period Mr. Plunkett refers to as the "long term," or that the need for FGPP can in any way be deferred or avoided. Tr. 699 (Brandt).

Issue 5: Has FPL appropriately evaluated the cost of CO2 emission mitigation costs in its economic analysis?

FPL: *Yes. CO2 likely will be regulated during the life of FGPP. Based on expert environmental compliance forecasts, FPL considered a reasonable range of CO2 compliance costs in its economic analysis. With FPL's clean emissions profile and allocations similar to existing emissions regulations, a zero or low-cost CO2 compliance outcome for FGPP is possible. A high CO2 cost, low gas cost outcome is unlikely given the expected impact of CO2 regulation on gas prices. If CO2 capture and sequestration becomes commercially available, it can be included in FGPP's design at a lower total cost than constructing IGCC without capture and sequestration.*

Although there are no current laws regulating emissions of CO2, FPL appropriately considered the potential future regulation of CO2 and a range of costs associated with such regulation in its economic analysis of FGPP. Because CO2 is emitted by combustion of all fossil fuels, including natural gas, it is necessary to consider the possible future costs of compliance when evaluating both the Plan with Coal and the Plan without Coal. This consideration, along with FPL's selection of USCPC technology, is consistent with FPL's demonstrated support of a

[43] Further, PG&E is not an appropriate benchmark for FPL because, among other reasons detailed in Mr. Brandt's testimony, the price of electricity in PG&E's service territory is almost double the price of electricity in FPL's service area. All else equal, a customer is far more likely to implement a DSM measure where the price of electricity is much higher because their payback on investment is far sooner. Tr. 694-95 (Brandt).

national, economy-wide program aimed at reducing greenhouse gas emissions. Tr. 235 (Olivera).[44]

The recent Supreme Court decision issued in Massachusetts v. Environmental Protection Agency, to the extent it authorizes the EPA to regulate CO2 emissions, would only confirm that which FPL already has accounted for – the potential future regulation of CO2 emissions and associated costs.[45] In addition, because it is possible that CO2 regulations may have a very small, or even zero cost effect on FPL's portfolio, the Office of the Public Counsel's suggestion that only CO2 scenarios equal to or higher than the moderate case should be considered should be rejected. Rather, the full range of possible CO2 compliance costs should be considered, including the small or even zero cost case.

CO2 Cost Projections

All parties agree that it is appropriate to take plausible allowance prices into account when planning for future generation additions. FPL used projections developed by ICF International (ICF). ICF has been the principal electric power consultant to the U.S. EPA continuously for over 25 years, and is expert in environmental compliance cost projections. ICF's CO2 environmental compliance cost projections were based on federal legislative initiatives and the basic framework of the cap-and-trade system. Tr. 1062 (Kosky); 1578 (Rose). ICF explicitly takes into account up-to-date policy, market and technical information and

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[44] FPL's parent company, FPL Group, is a signatory to USCAP, "A Call to Action" which reflects support for a U.S. policy to reduce CO2 emissions. FPL as a company is concerned with the environmental impact of CO2 emissions and is also participating in the relevant dialogue to advance a policy that will recognize the costs already incurred by FPL and its customers in building and operating a generating fleet that is among the cleanest in the country. Tr. 256-57, 271-72 (Olivera). Although promoting a reduction in CO2, USCAP does not oppose the construction of new, highly efficient coal-fired generating sources to meet baseload capacity requirements. Ex. 210.

[45] The Massachusetts case has no direct application to this proceeding, as it is directed specifically at EPA's rulemaking decision with respect to greenhouse gas emissions from motor vehicles, not power plants. But whether costs are ultimately imposed by a future EPA regulation or a future statute does not change the fact that although CO2 emission regulation is likely to occur, the future timing and structure of such regulation and the ultimate impact on either FGPP or FPL is unknown, and that FPL has appropriately considered a reasonable range of potential future costs.

integrates those factors into its sophisticated modeling framework, the Integrated Planning Model, which has been used by multiple utilities as well as by the EPA and others. Tr. 1577 (Rose).

Four allowance cost scenarios were used including mild, moderate, and high CO2 emissions allowance costs. The range of CO2 allowances that were used are consistent with current legislative proposals being considered by Congress, and reflect the appropriate range of potential future allowance costs. Tr. 1063 (Kosky). Further, Mr. Rose confirmed that ICF's forecasts accurately reflect the current bills before Congress. FPL also assumed, conservatively, that allowances would need to be purchased for every ton of CO2 emitted. Tr. 1063 (Kosky). However, FPL has one of the cleanest generating systems in the country and allowances may be afforded FPL on a system-wide basis, reducing or perhaps even eliminating entirely the CO2 compliance costs that FPL would ultimately have to pay.

Indeed, it is possible that future CO2 regulations will have a very small, or even zero, differential effect on FPL's portfolio relative to the type of generation technology that will be added. Tr. 1900 (Silva). Dr. Sim explained that FPL is allocated more allowances than it needs for SO_2 and NO_x emissions, and in fact receives credits for the allowances it does not use. Given FPL's clean system, the fact the FGPP constitutes clean-coal technology, and the potential role for offsets, allowances may be granted for CO2 that exceed FPL's emissions as well.[46] If that occurs, the economic scenarios that represent a zero CO2 compliance cost will be realized as the cost of compliance will have a zero net effect for FPL. Tr. 1813 (Sim). The four environmental compliance cost scenarios that represent the four CO2 compliance cost forecasts are discussed further in Issue 7, below. Because it is possible that CO2 regulations may have a very small, or

[46] Mr. Rose noted that the Feinstein-Carper Bill in particular would reward clean coal technology such as FGPP with allowances. Tr. 1604 (Rose).

even zero cost effect on FPL's portfolio, the Office of the Public Counsel's suggestion that only CO2 scenarios equal to or higher than the moderate case should be considered should be rejected. Rather, the full range of possible CO2 compliance costs should be considered, including the small or even zero cost case.

The allowance forecasts FPL used were developed using integrated modeling of the electric, fuel, and environmental markets in the U.S. The forecasts were based on ICF's extensive experience in evaluating these markets for allowance costs of SO_2 and NO_x. Tr. 1740 (Kosky). In contrast, the allowance costs advanced by Sierra Club did not take into consideration the interrelationship of these markets. Tr. 1740 (Kosky). Further, ICF has extensive experience in modeling and projecting environmental compliance costs. Tr. 1560-61 (Rose). Mr. Schlissel, on the other hand, does not have any similar relevant experience, a fact clearly manifest in the many flaws, both methodological and factual, contained in his analysis. As a result, Mr. Schlissel's analysis of potential CO2 costs should be given no weight.

First, the analysis presented by Mr. Schlissel consists of nothing more than connecting three points, derived by the collective "judgment" of his firm and not based on any type of model or even a mathematical regression analysis. Tr. 606-608; Ex. 193, 88-89 (Schlissel). As support for the placement of the three lines connecting the dots, Mr. Schlissel points only to a series of data points plotted on Figure 1 contained in his direct testimony (Ex. 163), presumably as spatial context for the location of those lines. However, cross examination of Mr. Schlissel regarding his Figure 1 disclosed several flaws. First, he selectively and without explanation or justification includes only some of the data points from the referenced studies. Tr. 610-12, 615 (Schlissel). He also fails to accurately plot other data points by not having reflected the net cost of compliance after taking into account offsets. Tr. 632-34 (Schlissel). Further, in some cases the

data points he has plotted reflect the safety valve (or upper limit) costs of compliance, not the anticipated actual costs. Tr. 630-31 (Schlissel). And perhaps most significant, for the highest data points on Figure 1, he relies on purported data from studies of bills dating all the way back to 2003. Tr. 616-18 (Schlissel). Indeed, even if the Commission were willing to ignore all other deficiencies associated with the representation of data points on Figure 1, and chose only to eliminate data from 2003 bills, Figure 1 and the spatial context of Mr. Schlissel's three lines representing his high, mid, and low forecasts relative to the data points would be dramatically different, suggesting in fact a high forecast more closely aligned with his mid forecast, and a commensurate downward shift in his mid and low case scenarios. Tr. 620-21 (Schlissel); Ex. 164. But in fact, in addition to the problems noted above, there are several flaws in some of the studies relied on by Sierra Club that should have caused those studies to be given significantly less weight. Tr. 1572-73 (Rose).

These deficiencies, including the lack of any independent modeling and the use of outdated data, in addition to Mr. Schlissel's failure to consider the effects of alternative emission allowance programs and the potential use of offsets, international allowance trading, and CO2 capture and sequestration to reduce the cost of regulation compliance in the future, Tr. 1563, 1575 (Rose), clearly support a conclusion that the CO2 compliance cost forecasts presented by Sierra Club cannot be relied upon, but if given any credence whatsoever, are unreasonably high. Tr. 1563-64, 1571 (Rose). Indeed, even Mr. Schlissel indicated that the most likely cost scenario is closer to his low case than their high case, Tr. 573-74 (Schlissel), and concedes that range is consistent with FPL's moderate CO2 cost estimate. Tr. 604 (Schlissel).[47]

[47] Moreover, given that the midpoint in each of the three sets of three reference points that Mr. Schlissel's firm arrived at by "judgment" are equidistant between the high and low points for that year, his statement that the most likely scenario is closer to the low case than the high necessarily means his expected case is below, not equal to, the mid-case scenario. Ex. 128 p. 52 of 63 (Schlissel).

Interestingly, Mr. Rose also confirmed that had Mr. Schlissel taken a simple average of the data points (instead of just "picking" numbers) for years 2010, 2020, and 2030 reflected on Figure 1 (Ex. 163), the average of those points would reflect a compliance cost below Mr. Schlissel's mid case. Removing the data points that reflect studies conducted on 2003 bills (Ex. 164) and re-calculating the simple average would adjust this average compliance cost downward even further. In fact, that average cost would be lower than the moderate or medium CO2 compliance cost forecasted by ICF and used by FPL. Tr. 1609-12 (Rose). This analysis further demonstrates that Sierra Club's CO2 compliance cost forecasts are unreasonably high in addition to being devoid of analytical integrity or support. Finally, Sierra Club failed even to mention or account for the possibility that FPL might have no net CO2 compliance costs at all, or even a credit for CO2 compliance costs as is the case for FPL's SO_2 and NOx compliance costs, as was explained by Dr. Sim.

CO2 Capture and Sequestration

CO2 emissions are not presently subject to regulation, as discussed above. Looking beyond the likely future economic regulation of CO2 emissions, it is also possible that in the future CO2 capture and sequestration may be required for power plants and other sources of carbon emissions, or that CO2 capture and sequestration may itself become an economic method of compliance with possible future CO2 regulations.

Because there is not a clear technology choice winner in this rapidly developing area, it is important to understand that FGPP will be well positioned with respect to any future CO2 capture and sequestration regime because (i) the plant will be highly efficient and produce comparatively less CO2 than other solid fuel technologies; and (ii) space is being accommodated

in FGPP's design to permit installation of CO2 capture and sequestration equipment. Tr. 1715 (Hicks).

There is a large effort underway, both in the private and public sectors, to evaluate the technologies and resources necessary for the technical viability of CO2 capture and sequestration (CCS). Tr. 1568 (Rose). If and when CCS technology becomes commercially available in the future, FGPP will be able to take advantage of that technology to further reduce its relatively low CO2 emissions. The addition of such technology would also reduce any future cost of compliance with CO2 emission regulations. Tr. 1568 (Rose).

With regard to sequestration, there are a variety of potential sites that could be determined to be appropriate for such use. One potential site is within deep saline aquifers. Virtually all of FPL's service territory, about 27,650 square miles, is characterized geologically by deep saline aquifers. In addition, there is a depleted oil well about 75 miles from FGPP which might be able to be used for sequestration. There is also on-going research into using the lower portion of the ocean to store captured CO2. FPL would have all of these sequestration options available to it when the technology to capture and store CO2 becomes commercially available. Tr. 848-49 (Hicks).

In terms of future CO2 capture technology potential, there is no clear preference for IGCC versus other new coal-based plants.[48] Tr. 1569 (Rose); 1710, 1714 (Hicks). The USCPC technology employed by FGPP will be just as capable of utilizing CO2 capture as other coal-based generation technologies. An IGCC plant is not capable of capturing CO2 unless it has

[48] Exhibit 18 was introduced by Sierra Club, purportedly demonstrating greater unit output derating and adverse effects on efficiency when CO2 capture is utilized by PC units as compared to IGCC units. However, the basis for that exhibit has been widely discredited. As. Mr. Jenkins notes, "the EPA has found that nobody is using these numbers because they were not done on a credible basis...and has determined that it is outdated and inaccurate and needs to be completely revised." Tr. 1006 (Jenkins).

been designed from the beginning to allow the significant modifications that would be required. As a result, IGCC by itself is not "carbon capture ready." Tr. 934 (Jenkins).

The costs associated with the installation and operation of CO2 capture technology on an USCPC plant will likely be lower than originally anticipated by those in the industry. Tr. 838-840 (Hicks). There are so many research and development projects currently in place for pulverized coal technology that the cost of CO2 capture technology for USCPC plants is expected to decrease significantly over time. The Sierra Club failed in its attempt to show that the cost of CCS would favor IGCC technology over USCPC because there were many questions raised as to the assumptions and basis for comparing the unit referred to in the exhibit it offered, Exhibit 175, and FGPP. Tr. 830-42 (Hicks). As Mr. Hicks stated:

> ... Many of these studies, and this is an example of it, were done on older types of carbon capture systems. ...
>
> So these type of statements based upon older obsolete technologies may or may not be true, particularly when you look at the differences between a 600-megawatt IGCC plant updated for [Front End Engineering Design] costs, those more robust costs that come from going through the feasibility and front end engineering design analysis versus a 980-megawatt or 2000-megawatt plant at the FGPP site.
>
> It is fairly widely recognized by many that the costs for carbon capture for both IGCC and PC will converge over time. ... There is a recent EPRI study done for CPS in Texas looking at the comparison between an ultra-supercritical plant and an IGCC plant. The conclusion is both with and without capture, the cost of electricity from the ultra-supercritical plant is less.

Tr. 839-40 (Hicks). Mr. Hicks also pointed out that a recently released Massachusetts Institute of Technology ("MIT") study supports the view that the cost for carbon capture on the two types of technologies will converge. Tr. 840, 849-50, (Hicks); Ex. 196. As Mr. Hicks noted:

> ... The first and primary recommendation of the MIT study is that entities such as utilities that are designing and building coal-fired power plants today [should] design those plants to be as efficient as economically justifiable. And by doing so **you reduce the amount of CO2 that has to be dealt with no matter what regime or what control mechanism is employed.**

With [FGPP], that is exactly what FPL is doing.

Tr. 840 (Hicks) (emphasis added). In the time frame that is relevant to this case, it would be more expensive to add CO2 capture to an IGCC plant than to a PC plant. Tr. 865-66 (Hicks). Without CO2 capture technology, and without considering the higher efficiency of FGPP, FGPP and an IGCC plant would produce about the same amount of CO2 emissions. Tr. 233 (Olivera).

FGPP's CO2 Emissions

According to the U.S. Department of Energy, USCPC is clean coal technology. But CO2 is emitted by all fossil fuels, including natural gas. A gas plant of a size comparable to FGPP would emit 8.5 million tons of CO2 per year as compared with 14 million tons per year from FGPP. Tr. 1699 (Jenkins). On a pounds per MMBtu basis, FGPP would emit about the same pounds per MMBtu of CO2 as an IGCC plant. Of course, because FGPP will have a lower (more efficient) heat rate than IGCC plants, it will emit less CO2 per kWh than an IGCC plant. These points aside, however, it is important to recall Mr. Kosky's testimony that there is no meaningful environmental aspect whatsoever to the tons per year of CO2 from a single power plant. Rather, a better evaluation of CO2 emissions includes the efficiency of the plant and the utility's system and how system emission rates are trending. Tr. 1057, 1741-42 (Kosky).

FGPP will be a highly efficient coal-fired power plant, which means that less coal is needed to generate the same amount of electricity as compared to other coal-fired plants, and less coal translates to less CO2 for each MWh generated. Tr. 231 (Olivera); 1742 (Kosky); 946 (Jenkins); 801 (Hicks). FGPP will also be on average about 23% more efficient than all other coal units in the U.S. Tr. 1759 (Kosky). Because FGPP is so efficient, it will actually emit two million tons per year less CO2 than other coal-fired Florida power plants for the same amount of generation. In fact, if all other major coal-fired power plants in Florida were as efficient as

FGPP, the CO2 emissions generated in the state would be about 15% lower. Tr. 1742 (Kosky). FGPP's high efficiency will also result in lower emissions for other pollutants, as discussed in Issue 6, below.

FPL's System-Wide CO2 Emissions

FPL's CO2 emission rate with the addition of FGPP will be trending downwards in 2015. With FGPP in full operation, FPL's average CO2 emission rate for the period 2015 through 2020 is expected to be 17.4% lower than the period 2000 through 2005. Tr. 1057 (Kosky). This trend in lower CO2 emission rates for FPL's system with FGPP included is beneficial from an overall environmental standpoint. Tr. 1743 (Kosky). With FGPP, FPL will continue to be among the very cleanest generating utilities in the nation and will continue to have the lowest CO2 emission rate of any major utility in Florida. Tr. 231 (Olivera). Consistent with FPL's longstanding commitment to environmental stewardship, the technology selected by FPL for FGPP together with FPL's environmental compliance plan constitute the best available environmental choice to maintain fuel source diversity for electric supply to FPL's customers.

Issue 6: Do the proposed FGPP generating units include the costs for the environmental controls necessary to meet current state and federal environmental requirements, including mercury, NOx, SO2, and particulate emissions?

FPL: *Yes. FPL appropriately included the cost of compliance with current state and federal environmental regulations, as well as a reasonable range of possible future regulations and the investment in and operation of state-of-the-art emission control systems. FGPP will not only meet but exceed the standards imposed by environmental regulations. From an environmental perspective, FGPP is the best choice that is consistent with maintaining fuel diversity. Moreover, FGPP results in overall savings to customers in the majority of likely fuel price and environmental compliance cost scenarios analyzed.*

FGPP, utilizing highly efficient USCPC technology and a suite of state-of-the-art emission control equipment, is the best alternative that will contribute to diversity from an environmental perspective. Kennard Kosky, an independent engineer with over 30 years

experience working on over 50,000 MW of new and existing generation, who is responsible for managing and optimizing the environmental compliance aspects of the project, testified that "I thought it might be of benefit to the Commission to know that taken together, the efficiency of the ultra-supercritical technology, the state-of-the-art environmental controls, proposed emission levels, and the environmental impacts, FGPP will be the cleanest solid fuel fired power plant that I've seen in my career and that I'm aware of in the electric utility industry." Tr. 1069 (Kosky).

FGPP is required to obtain federal, state and regional environmental approvals and permits. The principal environmental approval is Site Certification under Florida's Power Plant Siting Act, and this comprehensive review is currently underway. Although other federal and state agencies will fully review the environmental compliance of FGPP, FPL has included in this proceeding information with respect to environmental compliance in order to provide assurance to the Commission that these requirements will be fully satisfied through FPL's construction of FGPP, and to inform the Commission regarding the expected costs of such environmental compliance.[49]

Environmental Compliance Costs

FPL included in its economic analysis the current costs of complying with environmental regulations as well as the potential costs of complying with future environmental regulations. The Florida Department of Environmental Protection (FDEP) adopted with minor changes two EPA regulations that will be applicable to new generating plants beginning in 2009 and 2010. Those regulations are the Clean Air Interstate Rule and the Clean Air Mercury Rule. Tr. 1060

[49] As Mr. Kosky indicated, the review process is an ongoing process. Mr. Kosky was asked about the National Park Service letter to FDEP dated April 4, 2007 (Ex. 154, p. 2). As Mr. Kosky pointed out, the National Park Service has provided two comment letters to FDEP regarding FGPP. FPL supplied information to FDEP addressing concerns raised in the National Park Service's first letter and the National Park Service had additional questions, which it supplied in the April 4 letter. FPL is currently meeting with the National Park Service to address its technical concerns. Tr. 1072-73 (Kosky).

(Kosky). FPL utilized reasonable cost projections for compliance with these regulations that were developed through a comprehensive analysis of multiple factors involving emission control costs, fuel utilization, and market factors. Tr. 1061 (Kosky). These projections, while somewhat uncertain, are based on experience from the existing Acid Rain Program. In addition, the relevant emission control technologies are well established and their cost can be estimated with reasonable accuracy. Tr. 1061 (Kosky).

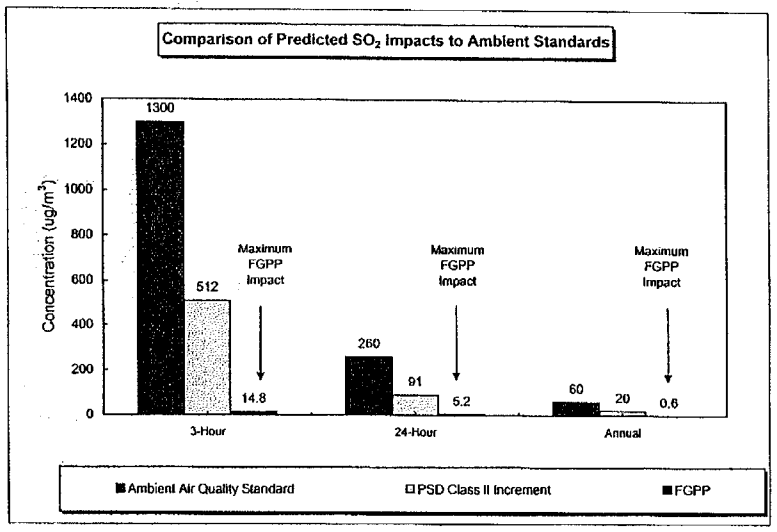
FGPP will be installed with proven, state-of-the-art emission control technology that will result in emissions that are among the lowest in the U.S. for similar new facilities. Tr. 1053 (Kosky); 775 (Hicks). The cost of this technology has been included in FPL's economic analysis which supports the cost-effectiveness of FGPP. The technology will include combustion controls to minimize formation of nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOCs); Selective Catalytic Reduction for further minimizing NOx emissions; a Fabric Filter to minimize particulate matter (PM); a wet-limestone Flue Gas Desulfurization to minimize emissions of acid gases such as sulfur dioxide (SO_2); and a wet Electrostatic Precipitator (ESP) to minimize small particulate matter and aerosols. These emission controls also minimize emissions of trace metals including mercury. Sorbent injection will also be used to further enhance the removal of mercury. Tr. 1054 (Kosky).

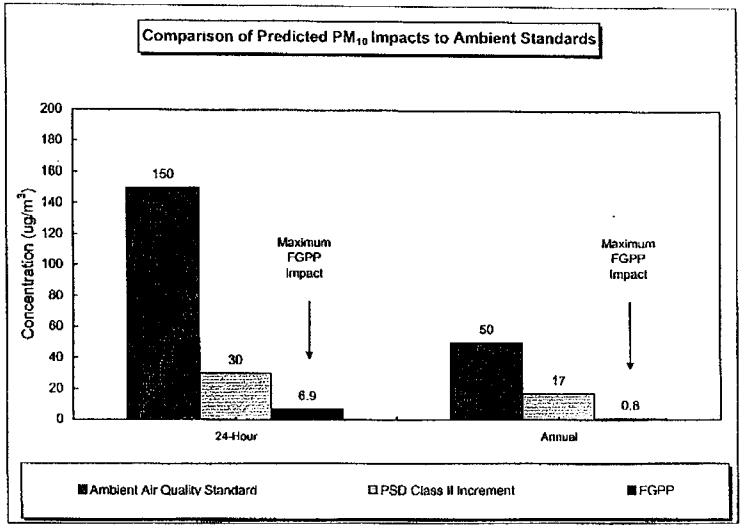
Water will be recycled as much as possible, and FGPP will not have industrial water discharges to surface waters or groundwater that can impact the environment. Tr. 1053 (Kosky). Water use effects will be minimized by using excess storm water from South Florida Water Management District canals and lower-quality water from the Upper Floridan Aquifer. Tr. 1052 (Kosky). The costs associated with treating the water from the Upper Floridan Aquifer for use in the plant have been included in the budget and economic analysis of FGPP. Tr. 852 (Hicks).

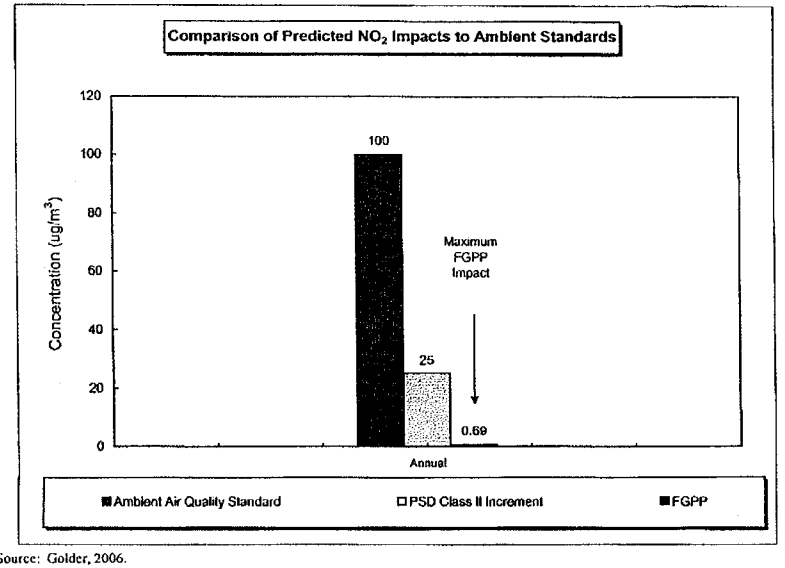
FGPP's Emissions

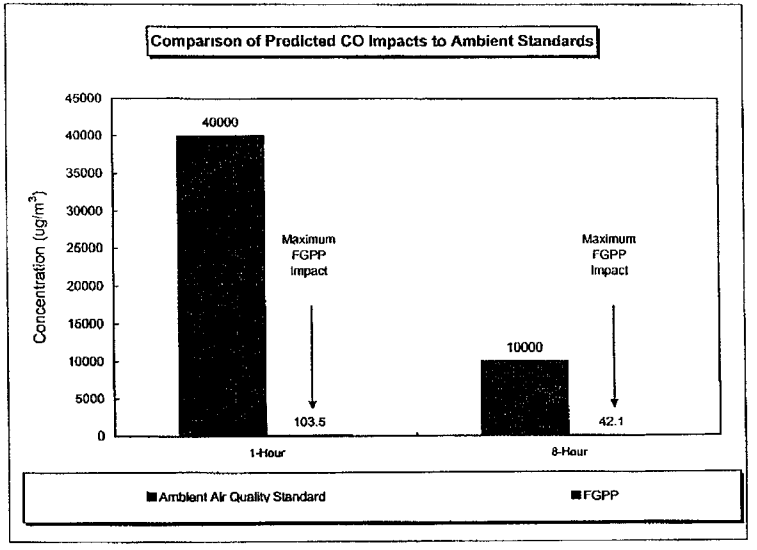
FGPP is the best solid-fuel alternative from an environmental perspective. The EPA recently promulgated New Source Performance Standards for new generating units and established a performance based mercury emission rate. FGPP's emission control equipment, along with the use of powdered activated carbon, will achieve 95% mercury removal. Tr. 1677 (Jenkins). The maximum mercury emission rate for FGPP will be less than one-half of the new, more stringent standard. Tr. 1734 (Kosky). FGPP will add such minute amounts of mercury to Florida's environment that it will be immeasurable. Tr. 1736 (Kosky). With respect to SO_2, NO_x, PM, and CO, FGPP will not only meet all applicable requirements, but the maximum impacts of FGPP will be well below the ambient air quality standards designed to protect the public health and welfare, with an adequate margin of safety. Tr. 1056, 1068, Ex. 41 (Kosky). The maximum air quality impacts of FGPP are depicted in Exhibit No. 41 below.

FPL Document No. KFK-3
Maximum Air Quality Impact Predicted for the FGPP Compared to Ambient Air Quality Standards and PSD Class II Increments









Source: Golder, 2006.

Docket No. 07-____-EI
K. Kosky, Exhibit No. ____
Document No. KFK-3 Page 1 of 1
Maximum Air Quality Impact Predicted for the FGPP Compared to Ambient Air Quality Standards and PSC Class II Increments

IGCC does not have significantly lower emissions as compared to USCPC technology as claimed by Sierra Club. Tr. 1730 (Kosky). There are only four coal-based IGCC plants in operation with which to compare the emissions of FGPP. When compared to Tampa Electric's Polk Power Station IGCC unit, the annual average emission rates of SO_2, NO_x, and mercury are all higher than the emissions for FGPP. Tr. 1731 (Kosky). Based on reports submitted to FDEP, the Polk Power Station IGCC unit, if scaled up to the size of FGPP, would emit about 800 pounds of mercury annually, compared to FGPP's maximum emission of 183.8 pounds annually. Tr. 1731 (Kosky). Ultimately, an IGCC unit does not have a significantly lower impact on air quality compared to the USCPC technology selected for FGPP. Rather, FGPP compares very favorably to an IGCC plant of comparable size. Tr. 1739, Ex. 133 (Kosky). IGCC could also produce more solid wastes than FGPP. Tr. 1738-39 (Kosky). Finally, IGCC is no more "carbon capture ready" than USCPC. The potential addition of CCS to FGPP is addressed directly in Issue 5 above, and the additional reasons for selecting USCPC technology over IGCC, aside from environmental concerns, are addressed in more detail in Issue 2.

The start-up profiles of an USCPC unit and an IGCC unit could also affect the plant's emissions. During the start-up of an USCPC unit, some coal is burned without producing electricity, but USCPC units have a fairly short start-up time period. Start-up for an IGCC plant could take several days, and when combined with its lower availability, an IGCC plant could produce more emissions on an annual basis than a PC unit. Tr. 933 (Jenkins). For FGPP, the emissions from start-up and shutdowns would increase the overall emission rates by no more than 5%. Emission rates for IGCC, however, could be increased by an average of 38% if all potential start-up and shutdown emissions are accounted for. Tr. 933 (Jenkins).

The site for FGPP was selected at a location that minimizes environmental impacts. Additionally, air emissions from FGPP will be reduced to the greatest extent practicable, resulting in minimal environmental impacts. Tr. 1054 (Kosky). FGPP's emissions will be the lowest of any PC plant in the state of Florida, and one of the lowest in the country. Tr. 1067 (Kosky). If all coal plants in the U.S. were as clean as FGPP, the reduction in emissions nationally would be considerable. As Mr. Kosky testified, there would be "hundreds of thousands of tons" in reduced emissions for a variety of pollutants. Tr. 1759 (Kosky). That would include about a 90% reduction in SO_2 emissions and approximately an 80% reduction in NO_x nationally. Those reductions are estimated as a factor of FGPP's high efficiency. The reductions would be even greater if FGPP's pollution control equipment was included on other plants. Tr. 1759 (Kosky). As a result, highly efficient USCPC technology coupled with the emission controls planned for FGPP is the best alternative from an environmental perspective that still contributes to fuel diversity.

Issue 7: Are the proposed generating units the most cost-effective alternative available, as this criterion is used in Section 403.519, Florida Statutes?

FPL: *Yes. FGPP is the most cost-effective alternative that will maintain fuel diversity in FPL's system. All alternatives were evaluated, and FGPP proved to be the best choice. The economic advantages diminish, however, if both proposed units cannot be built at the same time. FGPP was the most cost-effective choice under a majority of likely fuel cost and environmental compliance cost scenarios. When the cost of developing a reasonable fuel inventory is considered, the relative economics favor FGPP even further. Given these significant variables, one cost outcome cannot be predicted with any certainty, emphasizing the importance of fuel diversification.*

FGPP is needed to preserve a balanced, fuel-diverse generation portfolio and to maintain an adequate level of reserve margin by 2013 and through 2014. Tr. 312 (Silva). In reaching this conclusion, FPL thoroughly considered every alternative, including supply-side resources and demand-side management, in determining how to best meet its capacity need beginning in 2013.

It also performed a variety of economic sensitivity analyses in reaching the conclusion that FGPP would be the most cost-effective alternative available. Given the uncertainties associated with projecting future fuel prices and CO2 regulation compliance costs, no single cost outcome can be predicted with any certainty. However, this fact underscores the importance and advantages of maintaining fuel diversity within FPL's system. When all relevant factors are considered, including the effect of CO2 regulation compliance costs on the price of natural gas and the cost of LNG fuel storage comparable to the inventory storage planned for FGPP, FGPP is the most cost-effective choice under a majority of economic scenarios.

Technology Choice

Generation from renewable resources and use of DSM, regardless of the test utilized to determine cost-effectiveness, unfortunately cannot displace the need for new, baseload generation and do not contribute significantly to maintaining system fuel diversification. Renewables and DSM are discussed in greater detail in Issues 3 and 4 above, respectively. Likewise, additional gas-fired generation would only intensify the risks of supply disruption and fuel price volatility from over-reliance on natural gas. It may also not be cost-effective or appropriate to build a gas-fired combined cycle plant at the site selected for FGPP in Glades County. There are existing sites with gas-fired units already in operation, and it would likely be more cost-effective to expand the generation capacity of those existing sites before building a gas-fired combined cycle plant at a new site. Tr. 402-03, 409-10 (Silva); 886-87 (Hicks). The site chosen for FGPP is particularly suited for an USCPC technology plant. Therefore, it would be highly unlikely that a gas-fired combined cycle facility would be built at the site selected for FGPP.

As a result of the above initial analyses, FPL evaluated four solid fuel technologies on a quantitative and qualitative basis to determine whether they could reliably contribute to the fuel diversity and generating capacity needs of FPL's system in this time period. As discussed in Issue 2, the four technologies were sub-critical pulverized coal, circulating fluidized bed, IGCC, and USCPC technology. Tr. 316 (Silva). The technological and cost advantages of USCPC technology over IGCC were addressed above in Issue 2, and the environmental advantages of FGPP over IGCC were addressed in Issue 6. The results of FPL's evaluation clearly established that USCPC is the best alternative. Specifically, USCPC is the most cost-effective of the four, will provide availability that has been established to be as good as or better than the other three options, is the most fuel-efficient, and can be readily constructed in the large size required by FPL's rapidly increasing demand. Tr. 317 (Silva). No reliable evidence to the contrary was produced by any Intervenors.

While the capital and operation and maintenance ("O&M") costs of FGPP are higher relative to comparably sized gas-fired generating units, they are offset to a large extent by fuel cost savings. For example, the estimated net effect on a residential 1,000 kWh monthly bill for both FGPP units for the first full year of these plants' operation, declining thereafter, is $3.63 under a relatively conservative scenario using projections from the lower half of the range of fuel forecasts analyzed by FPL. The estimated increase in the 1,000 kWh residential bill for the first year revenue requirements for both FGPP units is $9.41, and the corresponding projected fuel savings for both units as described above, compared to not adding FGPP or any new generation, is $5.78, for a net effect of $3.63. Tr. 346, Ex. 158 (Silva). This $3.63 per month or $43.56 per year for FGPP compares very favorably to the bill increases experienced by FPL's customers in 2006 due to spikes in natural gas prices. These savings are in addition to the system reliability

benefits associated with a diverse fuel source -- benefits that, depending on the scenario that impacts the flow or availability of natural gas, may be enormous, but which are not capable of being fully quantified on a projected basis. Tr. 243-44 (Olivera). The benefits associated with fuel diversity are more fully addressed above in Issue 3.

It would not be a cost-effective choice to build only one unit at FGPP. The total cost on a dollars per kilowatt basis will be significantly higher if only one unit is approved due to a loss of economies of scale. Tr. 818-19 (Hicks). In addition to the loss of economies of scale, FPL would be required to re-negotiate its EPC, generating equipment and emission control system contracts in very unfavorable competitive conditions that are due to the increased world-wide demand for efficient USCPC technology. One unit would also fail to provide any significant amount of fuel diversity and generation technology diversity to FPL's system.

Economic Analyses

For its economic and fuel diversity analyses, FPL developed two resource plans: The Resource Plan with Coal ("Plan with Coal"), which includes FGPP, and the Resource Plan without Coal ("Plan without Coal"), which does not include any coal-fueled generation capacity additions. FPL calculated the estimated cost, on a cumulative net present value revenue requirements ("CPVRR") basis, associated with the Plan with Coal, and compared that cost to the Plan without Coal. The economic and fuel diversity analyses were based on multi-year resource plans to adequately capture and fairly compare all of the economic and fuel diversity impacts of the various capacity options on FPL's system. In this way, factors such as capacity deferral, heat rate, and production cost savings were effectively compared. Tr. 1113 (Sim).

FPL considered sixteen different scenarios that utilized four different fuel price forecasts developed by FPL and four different environmental cost projections developed by ICF

International. Tr. 326-33 (Silva); 1115 (Sim). FPL conducted the cost comparison under different scenarios because the relative cost of the Plan with Coal compared to that of the Plan without Coal is primarily determined by the future cost differential between coal and natural gas and the difference in the cost of complying with future environmental requirements, both of which are highly uncertain. FPL performed the scenario analysis in order to identify under what circumstances implementing the Plan with Coal could be more or less economic than the Plan without Coal. Tr. 326-27 (Silva).[50]

FPL performed an economic analysis using four different fuel price forecasts because there is significant uncertainty regarding the future cost of natural gas, and because the differential between the future cost of coal and petroleum coke, which would be used in FGPP, and that of natural gas is a key variable in determining the relative cost of adding coal-fired generation compared to adding only natural gas-fired generation. FPL utilized several forecasts of the future price differential between coal and natural gas to ensure that the economic analysis considered a wide range of reasonable future fuel price outcomes. Tr. 327 (Silva). Those price forecasts identify a reasonable set of potential outcomes. Tr. 1377 (Yupp).

FPL also performed an economic analysis using four different environmental compliance cost forecasts because there is significant uncertainty regarding the environmental regulations that may be enacted and applied to generating facilities in the future, and uncertainty regarding the compliance costs that those regulations could impose on FGPP, compared to a natural gas-fired plant. Tr. 328 (Silva). While CO2 regulation is likely during the life of the FGPP units, it

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[50] FPL has not performed similar scenario analyses in prior need determination filings because it was not necessary. Previous need determination filings reported the results of comparative cost analyses between alternative resource plans constructed from FPL-proposed additions and proposals submitted in response to FPL's requests for proposals that included only natural gas-fired generation additions. In these analyses the differentials between the various alternative resource plans were not significantly affected by changes in future fuel costs or in future environmental compliance costs because all plans would be affected equally. Tr. 327 (Silva).

is not improbable that FPL will experience a net CO2 compliance cost of zero dollars as a result of its clean system and use of clean coal USCPC technology at FGPP. Tr. 1813 (Sim). The cost differentials related to environmental compliance cost forecast "A" in Exhibits 48 and 49 should therefore not be disregarded. CO2 compliance costs and environmental compliance costs are addressed in greater detail in Issues 5 and 6 above, respectively.

In seven scenarios that generally reflect a wider fuel price differential between natural gas and coal and/or moderate environmental compliance costs, the Plan with Coal, which reflects the addition of FGPP, results in lower costs (CPVRR) than would the Plan without Coal. Tr. 1135 (Sim). Conversely, in the nine scenarios that generally reflect a narrower fuel price differential between natural gas and coal and/or higher environmental compliance costs, the Plan with Coal results in higher costs than the Plan without Coal. Tr. 328, Ex. 6 (Silva).

Several of the scenarios in which FGPP would not result in overall savings to customers are comparatively less likely to occur; for example, scenarios where environmental compliance costs are very high while natural gas prices remain very low. It is simply not reasonable to assume that high CO2 compliance costs would not have a substantial and adverse impact on the demand for and price of natural gas. Tr. 328-29 (Silva). As environmental costs for coal-fired plants increase relative to those for gas-fired plants, the demand for and price of natural gas would increase and coal prices would decrease, broadening the cost differential between gas and coal. Therefore, the fuel cost forecasts with lower differentials between gas and solid fuel are unlikely to occur under the Mid and High Environmental Cost Forecasts. Tr. 1582 (Rose).

Moreover, when one takes into account the costs associated with developing a level of LNG inventory comparable to the coal inventory at FGPP, FPL's economic analysis shows that FGPP will result in overall savings to customers in the majority of the fuel price and

environmental compliance cost scenarios analyzed. Only the cost associated with developing and maintaining a 60-day coal inventory capability for FGPP is reflected in the results presented in Exhibit No. 6. As Dr. Sim explained:

> ...these set of costs for the Resource Plan without Coal do not account for the approximately $1.4 billion CPVRR cost of comparable gas storage which would allow these two plans to be truly comparable both in terms of reliability for reserve margin as well as reliability of fuel supply.

Tr. 1221 (Sim). As presented in Exhibit No. 7, when the LNG inventory cost estimate of $1.4 billion (CPVRR) is applied, the cost of the Plan with Coal is lower in 10 out of the 16 scenarios. And as stated above, several of the remaining six scenarios that reflect a lower fuel price differential and/or higher environmental compliance costs are less likely to occur. Therefore, on a truly comparable basis, the Plan with Coal is the most cost-effective choice in a majority of fuel and environmental compliance cost scenarios.

Given the significant variables at issue with regard to FGPP, there is no one cost outcome that can be projected with any reasonable degree of certainty. Indeed, FPL is not recommending approval of FGPP based on any specific projected outcome. Rather, FPL's projected range of cost scenarios for FGPP indicate a reasonable range of potential outcomes based on fuel and environmental compliance costs over an extended period of time. It is this range of potential outcomes that illustrates and underscores one of the principal reasons to maintain fuel diversity.

Nevertheless, focusing solely on FPL's economic analysis, it is clear that adding FGPP to FPL's electric generating portfolio provides a substantial hedge or insurance for customers against high fuel prices, especially high natural gas prices, at a reasonable cost. In future periods when natural gas prices are high, all other things being equal, the lower cost of the solid fuel used by FGPP will clearly benefit FPL's customers. If natural gas prices in the future are low, the comparative cost benefit of FGPP diminishes but customers still enjoy significant benefits

from the low cost of natural gas used by FPL in natural gas-fired generating units. Factors such as lower or higher CO2 compliance costs, which may be established by future laws and regulations, will also affect the economic advantage or disadvantage of FGPP compared with other generation sources, but by how much is entirely unclear. Such uncertainties arise for reasons outside of FPL's and the Commission's control. But, it is precisely because of such uncertainties that FGPP should be constructed. Tr. 330-31 (Silva).

The fact is that neither FGPP, nor a natural gas-fired combined-cycle facility that would have to be added to maintain system reliability if FGPP is delayed or rejected, can be shown to have been the best choice under all reasonable possible future scenarios. The continuing debate on the form, extent, and ultimate cost of CO2 emission regulations, including its impact on the demand for and cost of natural gas, should not impede efforts to create a more fuel-diverse portfolio of highly efficient generating assets. The best course, faced with the almost certain prospect of higher energy prices, but not knowing how the relative costs of various fuel and generation types will actually play out either in the near or the long term, is to pursue more diversity in FPL's generating portfolio by adding the highly fuel efficient FGPP units at this time.

Thus, FPL is requesting approval of FGPP to meet projected load on the basis of an interest in and need for fuel diversity, consistent with Section 403.519, Florida Statutes. Specifically, FGPP will help FPL manage and mitigate such risks on behalf of customers as part of a well-balanced and diversified FPL generating resource portfolio. For these reasons, in considering the factors set forth under the Florida Power Plant Siting Act ("PPSA"), the Commission should place particular emphasis and weight on the need for fuel diversity, an important addition to the statutory standard of review added to the PPSA in the most recent legislative session.

Issue 8: Based on the resolution of the foregoing issues, should the Commission grant FPL's petition to determine the need for the proposed generating units?

FPL: *Yes. FPL considered all available alternatives and determined that the addition of FGPP would be the most cost-effective capacity addition that will also maintain fuel diversity in FPL's system. Any delay in the decision would expose FPL's customers to the risks associated with continued and greater reliance on natural gas, would provide limited (if any) additional information on CO2 compliance costs, and may eliminate the potential to add coal-fired generation to FPL's system in the future. As a result, the Commission should grant FPL's petition at this time.*

FPL submits that FGPP satisfies all of the requirements contained in Section 403.519 and applicable Commission rules. FPL has appropriately considered all available alternatives to meet the resource needs of FPL's customers and maintain fuel diversity in the future. FPL has performed an effective, complete evaluation that addressed all issues relevant in the determination of the best resources to add to FPL's portfolio in 2013 and 2014. FGPP will be the most cost-effective way to maintain solid fuel generation as a major element of the generating portfolio serving FPL's customers beginning in the 2013-2014 time period in which customers need large amounts of additional capacity, maintaining the balance of fuel diversity, reducing Florida's dependence on fuel oil and natural gas, and contributing to the long-term stability and reliability of the electric grid.

Delaying the decision to add FGPP would not be in the best interests of FPL's customers because such a delay would, in effect, be a decision to reject FGPP and consequently not maintain fuel diversity, making FPL's customers even more vulnerable to the very uncertainties that a delay would purport to mitigate. Tr. 1891 (Silva). Any delay in adding FGPP would certainly result in the deterioration of FPL's system reliability. As Dr. Sim pointed out,

> [Intervenors] fail[] to recognize that [their] desired outcome, delaying or avoiding the FGPP units, would leave FPL's customers with two undesirable outcomes. Number one, a less reliable system due to smaller reserves and/or number two, an increasing reliance on natural gas and its price volatility.

Tr. 1808-09 (Sim). In addition, there are no advantages to such a delay.

First, no one knows when new information that might be relevant in a re-evaluation of FGPP would be available. For example, it is not clear when CO2 emission regulations would be finalized and implemented, how it would affect FPL's system, nor what form such regulation would take. Tr. 1918 (Silva). If such a delay occurred, the site selected for FGPP may not be available, the cost of materials and services will have changed (and likely increased substantially), the equipment and service providers selected for FGPP would no longer be bound by contract, and development of a fuel delivery infrastructure will be more challenging than it is today. In short, such a delay will in effect be a rejection of the proposed FGPP, and if FPL were to present a plan for new coal-fueled generation to the Commission for approval it would not be before 2011 when such a submittal could occur. Tr. 1918-19 (Silva).

Furthermore, there is no assurance that FPL could, in the future, propose a coal-fueled generating plant. The opportunity to site a large coal-fueled plant will diminish with time because of rapid residential and commercial growth in Florida. Therefore, additional costs for transmission facilities would be required. Also, FPL may not be able to obtain the same contract terms from equipment suppliers and construction services providers because there would be little confidence among such suppliers and providers that a future FPL coal-fueled addition would in fact be approved and constructed. Therefore, the delay posed in this question could well result in the elimination of any coal-fueled generation technology as an alternative for FPL's portfolio. Tr. 1919 (Silva).

Second, waiting until new information regarding a particular area of uncertainty, such as CO2 emission legislation, becomes available would not eliminate the other key uncertainties that affect these decisions. It is realistic to expect that environmental legislation and regulation will

continue to change. Recent requirements imposed by the CAIR rule, which affects all the generation facilities in FPL's system regardless of when they were placed in service, provides evidence that waiting until the next round of decisions does not reduce uncertainty. Tr. 1920 (Silva). The same is true regarding another key area of uncertainty related to generation capacity decisions – the future price differential between natural gas and coal. If FPL could again petition for a determination of need for coal-fueled generation, the future 40-year forecasted price differential between natural gas and coal would not be clearer than it is today. Tr. 1920 (Silva).

Third, even if coal-fueled generation could be added in later years, delaying the addition of FGPP will result in FPL's reliance on natural gas and fuel oil to grow significantly in the interim. Any spike in the price of gas of the type that has occurred several times in the recent past would cause a significant increase in the price of electricity. And because without FGPP FPL would use significantly more natural gas, the effect on the future price of electricity for FPL's customers would be significant. Of even greater concern is the fact that if there is an interruption in the supply of natural gas, FPL's ability to serve its customers would be severely impaired. Tr. 1921 (Silva). The risks associated with over-reliance on natural gas, including price spikes in the cost of fuel and delivery interruptions are addressed in more detail in Issue 3 above.

FPL's system requires the addition of new baseload capacity in order to maintain system reliability consistent with an appropriate 20% reserve margin. Sierra Club, through the deposition of David Schlissel, concedes that there are areas of the country that are in need of new baseload capacity, and describe such areas as those with high growth and demand that do not have the potential for additional DSM and do not have the potential for "renewables". Ex. 193 p. 57-58 (Schlissel). This description identifies FPL's service area and the planning environment

that FPL is presently encountering. Without FGPP, the only alternative available to FPL would be to add gas-fired generation through 2017. Therefore, FGPP is needed to maintain electric system reliability and integrity, provide adequate power at a reasonable cost, and maintain diversity in FPL's system.

FPL and its customers are faced with the almost certain prospect of higher energy prices, but it is not possible to know how the relative costs of various fuel and generation types will actually play out. Therefore, the best course is to pursue more diversity in FPL's generating portfolio at this time to mitigate against the effects of over-reliance on natural gas. USCPC technology is proven worldwide as a reliable technology for power generation and it is the most cost-effective alternative that will provide this much needed diversity in FPL's system. For all the above reasons, FPL's petition for a determination of need for FGPP Units 1 and 2 should be granted.

Issue 9: Should this docket be closed?

FPL: *Yes, provided a separate docket is established for purposes of addressing cost recovery should FPL's petition for determination of need be granted. [51]*

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[51] In light of the magnitude of the financial commitment that FPL and its customers will need to make to construct FGPP, and the significant public policy issues associated with the choice of fuel for this generating unit, prior to undertaking this project and in connection with this request for a determination of need for FGPP, FPL requested in its petition that the Commission establish an annual review process through which the prudence of actual costs incurred and the continued feasibility of the plant would be determined FPL further requested that the Commission affirm certain principles relative to cost recovery: for example, that (i) costs that are imposed pursuant to current or future environmental legislation or regulatory requirements will be deemed prudent and will be recovered on an incremental basis through the Environmental Cost Recovery Clause, or similar means; and (ii) prudently incurred costs of the project would be recovered, including in the event the project is not completed. These issues are to be addressed in a separate proceeding and therefore are not addressed in FPL's Posthearing Brief.

Respectfully submitted this 7th day of May, 2007.

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished electronically and by United States Mail this 7th day of May, 2007, to the following:

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