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COMMISSION CLERK

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October 4, 2011

**VIA HAND DELIVERY**

Ms. Ann Cole  
Division of the Commission Clerk and  
Administrative Services  
Florida Public Service Commission  
Betty Easley Conference Center  
2540 Shumard Oak Boulevard, Room 110  
Tallahassee, FL 32399-0850

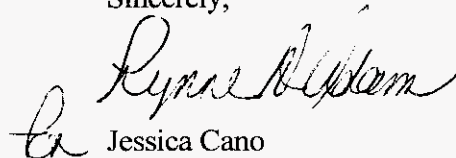
RE: Docket No. 110000-OT; Florida Power & Light Company's 2011 Ten Year Power Plant Site Plan – Data Request Regarding Planned Solar Power Plants

Dear Ms. Cole:

Enclosed for filing on behalf of Florida Power & Light Company ("FPL") are an original and 5 copies of FPL's response to Staff's Fifth Data Request dated September 19, 2011.

Please contact me if there are any questions regarding this filing.

Sincerely,

  
Jessica Cano

- COM \_\_\_\_\_
- APA \_\_\_\_\_
- ECR 4
- GCL 1
- RAD \_\_\_\_\_
- SRC \_\_\_\_\_
- ADM \_\_\_\_\_
- OPC \_\_\_\_\_
- CLK \_\_\_\_\_

Enclosure  
cc: Charles Murphy (w/ enc)

DOCUMENT NUMBER-DATE

07214 OCT-4 =

FPSC-COMMISSION CLERK

**Q.**

At the September 7, 2011, Ten Year Site Plan Workshop, Dr. Sim indicated that there have been significant improvements in the cost and efficiency of photo-voltaics. On Slide 8 of Dr. Sim's Presentation he indicates that FPL has done extensive planning and performed initial permitting and due diligence for a number of additional large-scale PV projects totaling approximately 500 MW.

Please list the potential sites of the potential additional projects referenced on Slide 8.

**A.**

The additional large-scale PV projects mentioned on slide 8 of Dr. Sim's presentation are the same potential projects discussed in FPL's March 4, 2011 data request responses to Staff "Regarding Planned Solar Power Plants." These potential projects would be in addition to FPL's three operating PV facilities at the Martin Next Generation Solar Energy Center, the DeSoto Next Generation Solar Energy Center, and the Space Coast Next Generation Solar Energy Center. The potential sites for future large-scale FPL projects are provided on pages 153-163 of FPL's 2011 Ten Year Power Plant Site Plan.

As described in FPL's March 4th responses, FPL has not fully developed any specific solar projects at specific power plant sites because no legislation supporting utility development of new solar power generation facilities has been passed at this time. For that reason, FPL provided information for a "typical" 100 megawatt PV facility. It is important to note that cost assumptions should be expected to change between the time of FPL's data request responses and the development of an actual solar power project. Similarly, the performance characteristics of various technologies are likely to continue to change over time.

For these responses, FPL has used the same approach and provided information for the same PV technology that was used for its March 4th responses, but with updated PV cost information. Dr. Sim's comments at the Ten Year Site Plan Workshop conveyed the fact that PV cost and performance has improved since FPL developed its three operating solar facilities. The March 4th responses already reflected significant cost and performance improvements over the existing PV facilities. These current responses indicate even lower costs than assumed in FPL's March 4th responses, while maintaining the same performance improvements.

DOCUMENT NUMBER-DATE

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FPSC-COMMISSION CLEAR

**Q.**

Please complete the table below describing the costs of the potential additional projects referenced on Slide 8.

Solar Project	Projected Total Capital Cost (\$Millions)	Overnight Construction Costs (\$/kw)	Total Installed Costs (\$/kw)	Variable O&M (\$/MWH)

**A.**

FPL is assuming a typical 100 MW Greenfield solar photovoltaic plant in-service January of 2014 for its responses. Cost and performance assumptions are expected to vary over time and vary by site.

Solar Project	Projected Total Capital Cost (\$Millions)	Overnight Construction Costs (\$/kw)	Total Installed Costs (\$/kw)	Variable O&M (\$/MWH)
100 MW PV	350	3,500	3,668	0

The total capital cost includes land and transmission interconnection costs. These costs are based on an average of the current land prices and expected interconnection requirements for projects that FPL is currently assessing for potential future development. Other projects that may be developed further into the future could have land and/or transmission costs that are higher or lower than the costs assumed for this response based on the specific project location (e.g., proximity to transmission and transmission capacity, land values, etc.).

Total Installed Costs for this solar case include overnight construction costs plus an assumed cost for capital charges during the construction period. It should be noted that since solar costs are typically recovered during the construction phase, AFUDC is usually not part of the installation cost.

Please note that, in general, photovoltaic projects do not have variable O&M costs, as O&M costs are not a function of the output of the solar PV installation. All O&M costs for solar projects are therefore considered as Fixed O&M. Fixed O&M costs are included in the responses to subsequent data requests.

**Q.**

Please complete the table below describing the expected performance characteristics of the potential additional projects referenced on Slide 8.

Solar Project	MWH/Year	Summer Capacity Factor (% on-peak)	Winter Capacity Factor (% on-peak)	Average Capacity Factor

**A.**

FPL is assuming a typical 100 MW Greenfield solar photovoltaic plant in-service January of 2014 for its responses. Cost and performance assumptions are expected to vary over time and vary by site.

Solar Project	MWH/Year	Summer Capacity Factor (% on-peak)	Winter Capacity Factor (% on-peak)	Average Capacity Factor
<b>100 MW generic</b>	<b>199,500</b>	<b>32.9%</b>	<b>15.9%</b>	<b>22.8%</b>

1. Summer capacity % on peak is April through October, weekdays 1PM – 9PM.
2. Winter capacity % on peak is January through March, November and December, weekdays 7AM to 10AM and 7PM to 10 PM.
3. Capacity factors assume 100 % availability.
4. This information is based on projected DeSoto Next Generation Solar Energy Center generation, scaled to 100 MW, and presented as a 30 year average. The values are based on SunPower tracker used at this location. FPL expects that the generic facility assumed for this response would perform similarly at this location. Actual results will vary depending upon location, technology and weather conditions.

**Q.**

Based on the "significant cost and efficiency improvements" described by Dr. Sim, please provide an estimated levelized cost (in \$/kwh) for various capacity factors for a typical solar project. Please provide the raw data and a chart depicting this information. Please include all assumptions used to develop values.

**A.**

FPL is assuming a typical 100 MW Greenfield solar photovoltaic plant in-service January of 2014 for its responses.

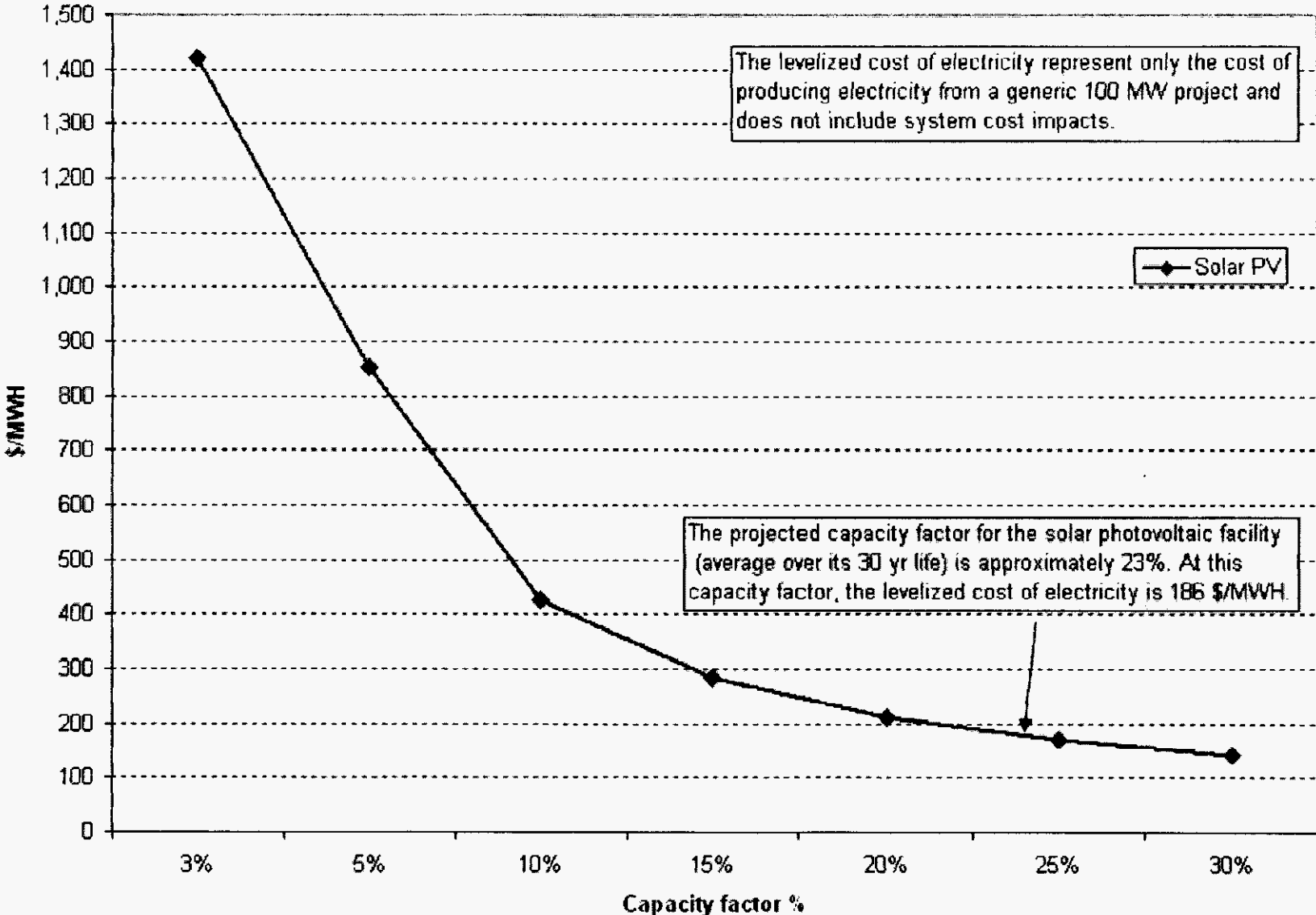
As requested, FPL is providing the estimated levelized cost of electricity (\$/mwh) for this typical photovoltaic plant (see chart and tables that follow). Please note that FPL does not believe that the information requested by Staff in this question provides meaningful information if used for the purpose of comparing a solar photovoltaic facility to any other generation technology.

The comparison of dissimilar resource options such as solar (PV) vs a fossil fuel facility (for example, a combined cycle or combustion turbine), using a levelized cost of electricity approach, cannot provide meaningful information about the relative economics of these resource options. A levelized cost of electricity approach is useful as a preliminary economic screening tool only if the resource options in question are identical, or virtually identical, in regard to at least the following four attributes: (i) size (MW), (ii) firmness of capacity, (iii) capacity factor, and (iv) operating life. If the resource options in question differ in even one of these attributes, then a levelized cost of electricity approach cannot provide meaningful results even for preliminary analyses. This is because dissimilar resource options will impact the FPL system in very different ways. These significant system impacts are simply not captured in a levelized cost of electricity approach. PV and fossil fuel facilities are typically dissimilar in regard to all four of these attributes.

For example, different resource options can be completely different in regard to the firmness of their capacity. PV would be a non-firm energy (MWh) source which results in reduction of system fossil fuel use and air emissions. On the other hand, combined cycle or combustion turbine options would represent a firm capacity (MW) source that relies upon fossil fuel. There are also typically differences in regard to size (MW), capacity factor, and operating life as well between these dissimilar resource options.

Consequently, the levelized cost of electricity approach for analyzing different options does not, and cannot, provide meaningful results. If a comparison of the cost of electricity associated with adding resource alternatives to FPL's system is to provide meaningful information, the comparison must reflect all system impacts caused by the addition of each alternative, such as effects to system fuel costs and system environmental costs, as well as capacity deferral effects from resource options that provide firm capacity. In addition, the analysis of the FPL resource portfolio with each of the alternatives must be based on a system simulation that provides a reasonable projection of the generation to be provided by each of the alternative resources, not a pre-determined, unsupported range of assumed capacity factors.

### Levelized Costs of Electricity - Solar PV Interrogatory 4



	Levelized Costs of Production \$/MWH
Capacity Factor	Solar PV
3%	1,421
5%	852
10%	426
15%	284
20%	213
25%	170
30%	142

**Notes:**

These levelized costs of electricity include only the costs associated with the PV facility as stand alone unit. They do not include the costs associated with operating this unit as part of the FPL system (i.e. system impacts).



Annual revenue requirements \$millions			
	Capital	FOM +Capital Replacement	total
2011	0.0	0.0	0
2012	0.0	0.0	0
2013	16.8	0.0	17
2014	53.4	1.5	55
2015	48.7	1.5	50
2016	44.1	1.6	46
2017	40.9	1.7	43
2018	38.2	1.9	40
2019	35.8	2.0	38
2020	34.3	2.2	37
2021	33.2	2.3	35
2022	32.0	2.4	34
2023	30.9	2.5	33
2024	29.7	2.6	32
2025	28.6	2.7	31
2026	27.4	2.8	30
2027	26.3	2.9	29
2028	25.1	3.0	28
2029	24.0	3.0	27
2030	22.8	3.2	26
2031	21.7	3.2	25
2032	20.5	3.3	24
2033	19.4	3.4	23
2034	18.2	3.6	22
2035	17.1	3.8	21
2036	15.9	4.0	20
2037	14.8	4.2	19
2038	13.6	4.4	18
2039	12.7	2.8	15
2040	11.8	2.1	14
2041	10.8	1.5	12
2042	9.9	1.2	11
2043	9.0	0.9	10

**Q.**

Please complete the table below describing the typical monthly performance characteristics of the potential additional projects referenced on Slide 8 .

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Gross Capacity (MW)</b>												
<b>Net Capacity (MW)</b>												
<b>Equivalent Availability Factor</b>												
<b>Net Generation (MWH)</b>												
<b>Resulting Capacity Factor</b>												

**A.**

FPL is assuming a typical 100 MW Greenfield solar photovoltaic plant in-service January of 2014 for its responses. Cost and performance assumptions are expected to vary over time and vary by site.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Gross Capacity (MW)</b>	100	100	100	100	100	100	100	100	100	100	100	100
<b>Net Capacity (MW)</b>	100	100	100	100	100	100	100	100	100	100	100	100
<b>Equivalent Availability Factor</b>	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
<b>Net Generation (MWH)</b>	11,550	13,179	18,017	20,129	21,492	18,827	18,640	17,722	15,762	15,213	13,097	11,895
<b>Resulting Capacity Factor</b>	16%	20%	24%	28%	29%	26%	25%	24%	22%	20%	18%	16%

1. The equivalent availability factor represents the solar facility equipment, not generation availability due to solar resource availability.
2. The performance information provided is based on projected DeSoto Next Generation Solar Energy Center generation, scaled to 100 MW, and presented as a 30 year average. The values are based on SunPower tracker used at this location. FPL expects that the generic facility assumed for this response would perform similarly at this location. Actual results will vary depending upon location and weather conditions.
3. Net generation is averaged over a 30 year asset life with equivalent availability factor applied.

**Q.**

For each additional solar project referenced on Slide 8, please complete the table below describing the CPVRR.

**A.**

FPL is assuming a typical 100 MW Greenfield solar photovoltaic plant in-service January of 2014 for its responses. The table below summarizes the CPVRR. Cost and performance assumptions are expected to vary over time and vary by site.

**System Annual Revenue Requirements - with and without Solar Project**  
**(Includes all Projects Costs and System Impacts)**

	[1]	[2]	[3]	[4]	[5]
Year	Annual System Total Revenue Requirements with Solar Project \$ Millions	Annual System Total Revenue Requirements without Solar Project \$ Millions	Differential in Annual System Total Revenue Requirements [1] - [2] \$ Millions	Differential in Customer Bill \$/ 1000 kWh	Differential in Customer Bill \$/ 1200 kWh
2011	0	0	0	0	0
2012	0	0	0	0	0
2013	3,470	3,453	17	0.161	0.194
2014	3,755	3,710	45	0.420	0.504
2015	4,082	4,043	38	0.352	0.423
2016	4,978	4,945	34	0.307	0.368
2017	5,559	5,533	27	0.239	0.287
2018	7,250	7,227	23	0.206	0.247
2019	7,838	7,817	20	0.180	0.216
2020	8,496	8,479	17	0.146	0.175
2021	9,361	9,346	15	0.129	0.155
2022	9,904	9,889	15	0.123	0.147
2023	9,916	9,904	12	0.100	0.120
2024	10,575	10,565	10	0.082	0.098
2025	11,593	11,586	6	0.048	0.058
2026	12,357	12,353	4	0.030	0.037
2027	13,401	13,400	1	0.005	0.007
2028	14,265	14,263	2	0.018	0.021
2029	15,283	15,284	-1	-0.005	-0.006
2030	16,544	16,541	2	0.017	0.021
2031	17,245	17,248	-3	-0.018	-0.022
2032	18,844	18,847	-3	-0.020	-0.023
2033	20,977	20,983	-6	-0.039	-0.047
2034	22,104	22,108	-5	-0.031	-0.038
2035	23,177	23,186	-9	-0.058	-0.069
2036	25,491	25,499	-8	-0.054	-0.065
2037	26,605	26,614	-9	-0.060	-0.072
2038	27,561	27,572	-12	-0.074	-0.089
2039	28,921	28,933	-12	-0.072	-0.087
2040	30,053	30,069	-16	-0.095	-0.114
2041	31,392	31,408	-16	-0.097	-0.116
2042	32,588	32,605	-17	-0.100	-0.120
2043	33,831	33,849	-18	-0.104	-0.124

**Notes:**

Negative indicates a reduction in the customer bill for the 100 MW solar project.

The annual revenue requirements include system capital costs, O&M costs, emission costs and fuel costs as well as the solar project costs in the "with solar" case.

The bill impact computation is based on dividing the differential in revenue requirements between the two cases and dividing by the system retail sales. As such it represents a system average rate impact, not specific to any one rate class.

**Q.**  
 For all potential additional projects referenced on Slide 8, please complete the table below describing the CPVRR.

Year	Annual Total Revenue Requirements (\$millions, Nominal \$) with All Solar Project	Annual Total Revenue Requirements (\$millions, Nominal \$) without Solar Project	Differential in Annual Total Revenue Requirements (\$millions, Nominal \$)	Differential in Customer Bill of 1,000 kwh (\$)	Differential in Customer Bill of 1,200 kwh (\$)
2011					
2012					
2013					
2014					
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2017					
2018					
2019					
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2021					
2022					
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**A.**

Please see FPL's response to Staff's 5th Data Request, Question No. 6.