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JEA

June 1, 2012

Ann Cole
Office of Commission Clerk
Capital Circle Office Center
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

120000-OT

RE: Review of 2012 Ten-Year Site Plans – Staff's Data Request #2

Pursuant to the Commission's authority under section 366.05(7), Florida Statues, attached is JEA's response to Data Request #2 for supplemental information of JEA's 2012 Ten-Year Site Plan filing.

Enclosed is a hardcopy of JEA's response to this data request. Also enclosed is an electronic version of these files on disk. If you have any questions regarding this submittal, please contact me at (904) 665-6216 or guytml@jea.com.

Thank You,

Mary Guyton Baker, PE
Electric System Planning, JEA

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ADM _____
OPC _____
CLK _____

REVIEW OF THE 2012 TEN-YEAR SITE PLANS: DATA REQUEST #2

Please provide an electronic copy of all responses in Adobe PDF format, with tables to be provided in an Excel (.xls file format) document, unless otherwise specified in the question.

1. **Please discuss whether the company included plug-in electric vehicle loads in its demand and energy forecasts for the 2012 Ten-Year Site Plan. If yes, please discuss the methodology used to estimate the number of vehicles operating in the company's service territory and their cumulative impact on system demand and energy consumption, and include the following information if available: an estimate of the number of electric vehicles, by year, and the estimated demand and energy impacts, by year.**

   JEA developed PEV vehicle, demand, and energy forecasts for Duval County using information from Electric Power Research Institute (EPRI), Duke Energy through an Edison Electric Institute (EEI) webinar, the U.S. Census Bureau, and the Bureau of Economic and Business Research (BEBR).

   The forecasted total number of all vehicles in Duval County is a prorata share of the 2010 U.S. Census Bureau's estimate based on BEBR's forecasted population growth for Duval County. With this total, EPRI's forecasted low scenario PEVs penetration rate was used to extrapolate a forecasted number of PEVs for Duval County.

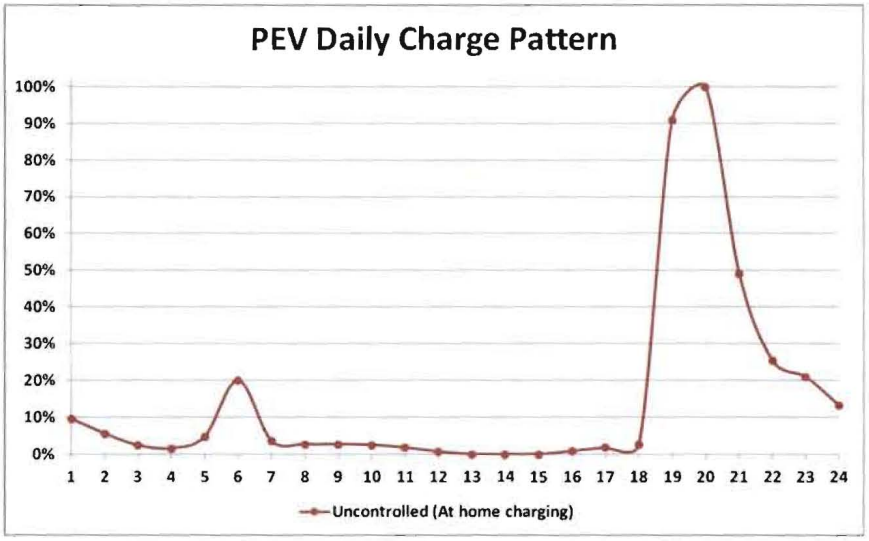
   The table that follows summarizes customer vehicle brand preferences based on a study done by Duke Energy.

Manufacturer	Preference
Toyota Motor Corporation	22%
General Motors (GM) Company	19%
Honda Motor Company	15%
Ford Motor Company	13%
Volkswagen Group	9%
BMW AG	7%
Nissan Motor Company Ltd.	5%
Hyundai Kia Automotive Group	4%
Daimler AG	2%
Tesla Motors Inc.	2%
All Other Automotive Companies	3%

   Using the upcoming PEV line-up from each manufacturer and assuming the size of the battery capacity would be the same for all division brands, the average usable battery

capacity per PEV is estimated to be 19.5 kWh. The forecasted size of the battery capacity is estimated to grow at 1 kWh per year.

In the Duke Energy study, traffic patterns and typical parking locations coupled with the charge shape of an electric vehicle battery were used to produce an uncontrolled PEV charging pattern at home, as shown in the graph below.



To forecast the PEV peak demand energy forecasts, JEA used the PEV average usable battery capacity, the peak demand, and the daily charging pattern. The table below shows the forecasted PEV peak and energy for JEA.

Year	Number of Electric Vehicles	Cumulative Impact		
		Summer Demand (MW)	Winter Demand (MW)	Annual Energy (GWh)
2012	431	0	0	5
2013	651	0	0	8
2014	876	0	0	11
2015	1104	0	0	14
2016	2006	0	1	27
2017	2924	1	1	41
2018	3860	1	1	56
2019	4813	1	1	73
2020	5783	1	2	91
2021	7583	85	3	123

Note: Summer and Winter demand are **coincident** at time of JEA's system peak demand.

2. **Does the company anticipate developing load management programs relating to plug-in electric vehicles within the ten-year period? If yes, is this reflected in the company's forecasted impact of electric vehicles on the company's system demand?**
In this ten-year period, JEA's demand response (DR) programs have not considered load management specific to plug-in vehicles. JEA's DR estimates were based on HVAC & water heating loads.

3. **Explain the process used to identify, evaluate and select supply–side conservation and efficiency measures, including but not limited to heat rate improvements of individual generating facilities, improvements to system fuel efficiency, and improvements in transmissions losses.**

As economically feasible, JEA evaluates additional internal efficiency improvements at JEA facilities. Listed below are procedures to identify potential system efficiency and loss reduction opportunities.

Unit Heat Rate and Auxiliary Load Reduction

For all plants, unit heat rates are monitored day-to-day to track actual versus target heat rates; response occurs by plant staff as needed, based on observed data. Monitoring also occurs from System Operations Control Center (real-time) and Fuels Management Services (monthly QC work and variance reports).

Transmission and Distribution Losses Reduction

Substation Transformers

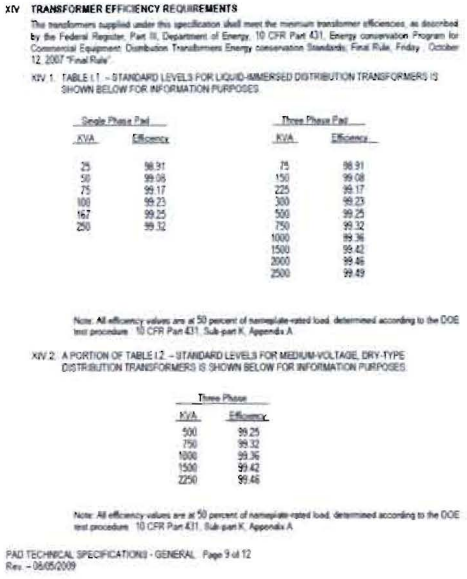
- All new or rebuilt transformers have an evaluated cost that favors transformers with lower losses.
- JEA specifies the target efficiency. The core losses, no-load losses, and power losses have a formula that deducts from the purchase price. Effectively, JEA buys the lowest cost transformer with consideration of the transformer cost for electrical losses for the life cycle.

Distribution Lines & Transformers

- JEA continues to pursue of all 4KV to 26/13KV voltage level conversions which reduce distribution system losses.
- JEA uses capacitor banks on the distribution grid to help with the power factor. The capacitors are "manually" switched in during the summer periods or, when a low voltage problem exists in the system. JEA does not use a coordinated system to control the losses per line. With a coordinated system, the power factor is measured at the line (circuit) in the substation and remotely controlled capacitor banks on that circuit are automatically switched in and out to control the line losses. The distribution line losses are between 2-4% depending upon the source of the research.
- Any distribution transformers that JEA receives must meet the DOE's efficiency standards which are mandatory and effective on all transformers built on or after 1/1/10. These standards are detailed in two Federal Register documents: Energy Conservation Standards (72FR58190, 10/12/07) and Test Procedures (71FR24972, 4/27/06). The Energy Conservation Standards document lists the represented efficiency (DOE Specified Efficiency) of each size transformer, as

shown below. These efficiency values are at 50% of nameplate-rated load, as specified in the Test Procedure document, which also details the tolerances for efficiency.

Single-Phase	
kVA	DOE Specified Level
10	98.62%
15	98.76%
25	98.91%
50	99.08%
75	99.17%
100	99.23%
167	99.25%



XIV TRANSFORMER EFFICIENCY REQUIREMENTS

The transformers supplied under this specification shall meet the minimum transformer efficiencies, as described by the Federal Register, Part III, Department of Energy, 10 CFR Part 431, Energy conservation Program for Commercial Equipment: Distribution Transformers Energy conservation Standards; Final Rule, Friday , October 12, 2007 "Final Rule".

XIV.1 TABLE I.1 – STANDARD LEVELS FOR LIQUID-IMMERSED DISTRIBUTION TRANSFORMERS IS SHOWN BELOW FOR INFORMATION PURPOSES

Single Phase Pad		Three Phase Pad	
KVA	Efficiency	KVA	Efficiency
25	98.91	75	98.91
50	99.08	150	99.08
75	99.17	225	99.17
100	99.23	300	99.23
167	99.25	500	99.25
250	99.32	750	99.32
		1000	99.36
		1500	99.42
		2000	99.46
		2500	99.49

Note: All efficiency values are at 50 percent of nameplate-rated load, determined according to the DOE test procedure 10 CFR Part 431, Sub-part K, Appendix A

XIV.2 A PORTION OF TABLE I.2 – STANDARD LEVELS FOR MEDIUM-VOLTAGE, DRY-TYPE DISTRIBUTION TRANSFORMERS IS SHOWN BELOW FOR INFORMATION PURPOSES

Three Phase	
KVA	Efficiency
500	99.25
750	99.32
1000	99.36
1500	99.42
2250	99.46

Note: All efficiency values are at 50 percent of nameplate-rated load, determined according to the DOE test procedure 10 CFR Part 431, Sub-part K, Appendix A

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Northside

Northside Generating Station evaluates any modification or investment in the plant using basic cost benefit analysis. This is done as a routine review of cost and efficiencies or as part of a life cycle cost analysis for equipment at the end of its life and in need of replacement. Efficiency improvements would be one of the factors considered in the analysis.

SJRPP

The process SJRPP uses to identify, evaluate, and select supply-side conservation measures is to identify which large motors consumed significant station service power in the power generation process, and evaluate what equipment could be taken out of service at full or reduced loads without jeopardizing unit reliability. Motors and their driven equipment are prioritized and evaluated from the largest to smallest power consumption.

4. **Describe each of the supply–side conservation and efficiency measures implemented during the period 2002-2011 and provide the annual capital and O&M cost savings from each measure in dollars, Btus and/or other appropriate unit of measurement (ie - therms, barrels of oil, etc.).**

Northside

Through the period 2002 – 2011, JEA has done five (5) major turbine upgrade projects at Northside Generating Station which increased the efficiency of the turbines and thus improved the heat rate of the units. The upgrades are listed below.

Year	Turbine Upgrade	Efficiency Improvement
2002	NGS Unit 1 HP/IP	109 BTU/KWH
2002	NGS Unit 2 HP/IP	109 BTU/KWH
2005	NGS Unit 3 HP/IP	195 BTU/KWH
2006	NGS Unit 1 LP	170 BTU/KWH
2006	NGS Unit 2 LP	170 BTU/KWH

SJRPP

- In the period 2002-2011, SJRPP began to remove 1 Induced Draft Fan (out of 4 installed on both units) from service at all loads, beginning in 2010, about a year after the SCR installations. This results in a saving of approximately 1 MW per unit, or 2 MW for the station. These 2 MWs, at an in-house power cost of $40/MWHR for 90% of the year, would be an annual plant savings of approximately $630,000 per year.

Brandy Branch Combined Cycle

- Brush Seals. In the steam turbine, brush seals provides better sealing between the turbine sections and less leakage around the blade sections with an approximate 0.15% efficiency improvement.
- Ceramic Seals. In BBCT 1 ceramic seals were installed by GE at no cost to JEA for beta testing. Plans are to remove the test seals at the next HGP inspection, and replace with the latest versions of the ceramic seals. This is an approximate 0.20% efficiency improvement.
- House load control and reduction. BBCC plant has limited opportunities for reductions. JEA has implemented a procedure to limit the use of large pumps and fans to a minimum of what's needed, based on real-time/current conditions. The same has been done on the circulating water pumps (run 2 only when both are needed) as well as the cooling tower basin fans (cycled only as water temperature necessitates).

Scherer Unit 4

Plant Turbine Improvements

- In service date: July 12, 2011.
- High pressure turbine efficiency improvement: 3.6% (87.4% actual, guarantee was 89.3%)
- MW increase from efficiency: 8 MW. The other 27 MW is additional steam flow.
- Expected plant net heat rate improvement: 145 BTU/KWH

Distribution Transformer Efficiency Improvements

Prior to 2010, JEA purchased transformers per the NEMA TP1 efficiency standard. Today all transformers manufactured after December 31, 2009 meet the Department of Energy efficiency requirements set forth in the DOE Final Rule. On page 3 of the Rule, the chart shows the efficiency requirements for liquid-immersed distribution transformers at 50% of nameplate-rated load. This is required by the DOE and is listed in JEA's specifications.

5. **Describe each of the supply–side conservation and efficiency measures planned during the period 2012-2021 and provide the projected annual capital and O&M cost savings from each measure in dollars, Btus and/or other appropriate unit of measurement (ie- therms, barrels of oil, etc.).**

Northside

There are currently no major projects planned for the horizon of 2012-2021 that improve plant heat rate and efficiency. As part of our ongoing enterprise asset management system JEA regularly reviews heat rate and efficiency. New projects may be generated from that review effort.

SJRPP

In the period 2012-2021, SJRPP will remove an additional pulverizer from service on both units at lower loads (approximately 12 hours per day), resulting of a savings of about 375 kw per unit, or 750 kw for the station. The plant had always removed 1 of the 6 in-service pulverizers at low load; the plant will now remove 2. This 750 kw, at an in-house power cost of $40/MWHR for 90% of the year, 12 hours per day, will result in an annual savings of approximately $118,000 per year.

Scherer Unit 4

Georgia Power Company has presented potential improvements for efficiency but none are in the approved 5-year Capital Plan.