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Jacksonville, Florida 32202-3139

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: Electric Vehicle Charging Station Study – Staff's Data Request #1

Pursuant to the Commission's authority under section 366.94(4), Florida Statues, and Chapter 2012-117, Laws of Florida, attached is JEA's response to the above mentioned data request.

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

COM _____
APA _____
ECR _____
GCL _____
RAD CD forwarded
SRC _____
ADM _____
OPC _____
CLK _____

Note: PHEV Charging Station Energy Specifications:

Level 1	1.1 kW, 15 amp, 110 V (< 15 amps delivered) Restricted to at home only, overnight full charge 9 pm to 9 am, randomized start, full plug-in PHEV charge
Level 2	3.3 kW, 15 amp, 220 V Restricted to home and work Charging anytime, charge until full
Level 2+	6.6 kW, 30 amp, 220 V Unrestricted location; wherever parked Charging anytime, charge until full
Level 3	50 kW, 100 amp, 400 V Refueling station concept for PHEVs Charging anytime, charge until full
Level 4	Up to hundreds of charges per day Not currently defined Will use DC Technology

3. **Please describe the impact PHEV charging stations had on the utility's load in 2011. Please include contribution to peak demand, a typical hourly profile for load from PHEV charging stations, and a typical hourly profile for the electric system as a whole for comparison purposes, for each month of 2011.**

   There was no noticeable impact to JEA's load in 2011 for PHEV charging stations.

   Please provide this information for:

   a. **In-home charging stations.**

   b. **Other private chagrining stations**

   c. **Public charging stations**

   Data Not Available for a - c.

4. **Has the utility estimated the number of PHEVs in Florida at present, both in its service territory and statewide?**

   JEA does not have record of the total number of PHEVs that reside in the service territory or the State. However, the following is data reported for January – April 2012 by Nissan and General Motors dealers in Jacksonville. For the Nissan Leaf, there are 1,426 interested customers, 25 of which have paid $99 to reserve a place in line to order, 5 have ordered, 4 have been delivered in

or around JEA's service territory. For General Motors, 13 Chevy Volts have been delivered in or around JEA's service territory.

5. **Has the utility estimated the number of PHEVs that are expected to be in use in Florida through 2021?**

   If yes, please provide and include source of estimates and how derived.

   JEA has not estimated of the number of PHEVs in the State of Florida through 2021.

6. **Has the utility estimated the number of PHEVs that are expected to be in use in its service territory through 2021?**

   If yes, please provide and include source of estimates and how derived.

   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 Census Bureau's estimate for the U.S. 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.

   If yes, please complete the table below describing the projected number of PHEVs in utility's service territory through 2021.

Year	Number of PHEVs
2012	431
2013	651
2014	876
2015	1104
2016	2006
2017	2924
2018	3860
2019	4813
2020	5783
2021	7583

7. **Explain how load management or rate design tools may mitigate the demand impacts of PHEV charging on peak demand.**

   No analysis or study has been performed at this time.

8. **Does utility currently plan to offer to its customers programs designed specifically for PHEVs?**

   If yes, please describe these programs including participation and peak reduction.

   If no, does utility have plans to offer any programs designed for PHEVs?

   No analysis or study has been performed at this time.

9. **What type of additional policies and processes does the utility currently have in place to manage the additional of chagrining facilities to the system?**

   JEA has had discussions with the City of Jacksonville Inspections Department and have asked to be informed of all permits issued for charging stations. It is JEA's intent to track these installations using GIS. It is not part of JEA's business plan to provide charging stations; however, JEA is willing to support those doing so.

10. **Based on the utility's experiences, what challenges do PHEVs present to utility and grid operations.**

    At this time, JEA does not see a significant impact on the system based on JEA's current PHEV projections. JEA's existing facilities are capable of handling the PHEVs demand within the TYSP period.

<u>Generation and Transmission</u>

11. **What additional generation or transmission assets will the utility require if 1 percent of vehicles in the utility's service area are replaced with PHEVs for each year through 2021?**

    a. **What if the figure reaches 5 percent, 10 percent, 25 percent, or 50 percent?**

Year	Total Number of Vehicles	Number of Vehicles replaced with PHEVs				
		1%	5%	10%	25%	50%
2012	538,400	5,384	26,920	53,840	134,600	269,200
2013	542,901	5,429	27,145	54,290	135,725	271,451
2014	547,440	5,474	27,372	54,744	136,860	273,720
2015	552,017	5,520	27,601	55,202	138,004	276,008
2016	557,176	5,572	27,859	55,718	139,294	278,588
2017	562,384	5,624	28,119	56,238	140,596	281,192
2018	567,640	5,676	28,382	56,764	141,910	283,820
2019	572,945	5,729	28,647	57,295	143,236	286,473
2020	578,300	5,783	28,915	57,830	144,575	289,150
2021	583,310	5,833	29,166	58,331	145,828	291,655

Year	Average Battery kW	Peak Demand (MW) per PHEV Scenario				
		1%	5%	10%	25%	50%
2012	8.4	45	226	452	1,129	2,259
2013	8.8	48	239	479	1,197	2,394
2014	9.3	51	253	506	1,266	2,532
2015	9.7	53	267	534	1,336	2,672
2016	10.1	56	282	563	1,408	2,817
2017	10.5	59	296	593	1,482	2,964
2018	11.0	62	311	623	1,557	3,114
2019	11.4	65	327	653	1,633	3,266
2020	11.8	68	342	684	1,710	3,421
2021	12.3	72	358	715	1,788	3,576

Year	Average Battery kWh	Total Energy (MWh) per PHEV Scenario				
		1%	5%	10%	25%	50%
2012	19.5	105	525	1,051	2,627	5,255
2013	20.5	111	557	1,114	2,785	5,570
2014	21.5	118	589	1,178	2,945	5,890
2015	22.5	124	622	1,243	3,108	6,216
2016	23.5	131	655	1,310	3,276	6,552
2017	24.5	138	689	1,379	3,447	6,895
2018	25.5	145	724	1,449	3,622	7,243
2019	26.5	152	760	1,519	3,799	7,597
2020	27.5	159	796	1,591	3,979	7,957
2021	28.5	166	832	1,664	4,159	8,318

b. What are the costs of these additional generation assets expected to be?

The cost associated with additional generation assets is determined by the capacity need and optimum mix of assets to meet that need. Table 1 below lists the projected capacity need based on the 1% - 50% PHEV replacement scenarios using data projections from part a, given JEA's current and proposed capacity additions as provided in the 2012 TYSP.

This additional capacity need can be met in multiple ways, but is best determined through Integrated Resource Planning analysis of the various levels. JEA has not performed such analysis which would properly assess the cost of generating assets to meet these PHEV additions. However, listed in Table 2 below is the expected, cost of several supply side options that could be used to meet such needs. This only is an indicator or possible capital outlay, but a true analysis would also be needed to

determine the additional operating costs associated with the added PHEV load at the assumed pattern of use.

Table 1: Capacity Need with PHEV Scenarios

Year	Capacity Needed for Peak + 15% Reserves - Cumulative				
	1%	5%	10%	25%	50%
2012	0	0	176	955	2,254
2013	0	0	229	1,055	2,432
2014	0	38	329	1,203	2,659
2015	0	108	415	1,338	2,874
2016	0	183	506	1,478	3,098
2017	0	161	502	1,525	3,229
2018	0	136	495	1,569	3,359
2019	0	211	586	1,713	3,591
2020	0	0	343	1,523	3,490
2021	0	16	427	1,661	3,717

Table 2: Potential Supply-Side Additions and Cost

Category	Unit Type	Winter Capacity	Capital Cost[1]
		MW	$/kW
Renewable	Biomass	50	4,300
Pulverized Coal	Supercritical PC	760	3,000
	Supercritical PC with CCS	542	5,890
Natural Gas	LMS100 Simple Cycle	95	1,150
	7FA Simple Cycle	198	792
	2x1 CC	600	1,275
Nuclear	Nuclear AP1000	110	6,854

c. What effect will these additional costs have on the general body of ratepayers?

No analysis done at this time.

12. Has the utility adjusted its load forecast to account for additional load from PHEVs?

If yes, describe the basis for the projected load adjustment and provide resources relied upon for this adjustment.

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).

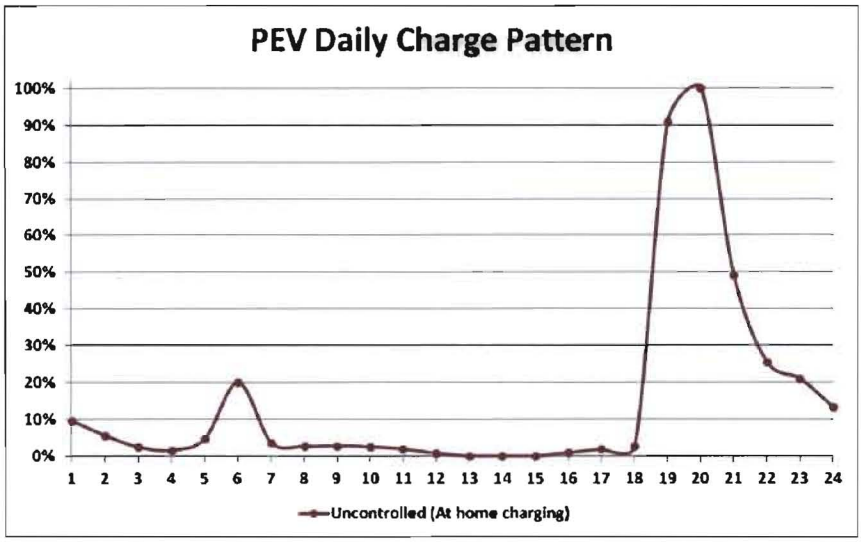
The forecasted total number of all vehicles in Duval County is a prorata share of the 2010 U.S. Census Bureau's estimate based on BEBR's forecasted population growth for Duval County. With this total, EPRI's forecasted low scenario PEVs penetration rate was used to extrapolate a forecasted number of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

If yes, please complete the table below summarizing the incremental projected load from PHEVs?

Year	Summer MW	Winter MW	GWH
2012	0	0	5
2013	0	0	8
2014	0	0	11
2015	0	0	14
2016	0	1	27
2017	1	1	41
2018	1	1	56
2019	1	1	73
2020	1	2	91
2021	85	3	123

13. Is the utility's existing electric generation system adequate to accommodate the PHEV demand based on the estimated number of PHEVs expected to be in use through 2021?
Please Explain.

JEA's existing and committed capacity over the TYSP period is sufficient to meet the demands of JEA's 2012 PEV forecasted demand and energy. By 2021, JEA's current PEV demand forecast is approximately 3% of JEA's firm winter peak demand and less than 0.1% for summer. Likewise, JEA's forecasted PEV energy requirement is less than 1% of JEA's forecasted net energy for load.

14. **Is the utility's existing electric transmission system adequate to accommodate the PHEV demand based on the estimated number of PHEVs expected to be in use through 2021?**

    Please Explain.

    No analysis has been done to accurately assess the effect of PHEVs on JEA's transmission system. However, JEA's 2012 Demand and Energy Forecast, which includes consideration for PHEV, are lower than the 2011 Demand and Energy Forecast. The 2011 electric transmission system was shown to be adequate based on studies done during that year with the higher forecast. Therefore, JEA's existing electric transmission system is adequate to accommodate the demand based on the estimated number of PHEV's expected to be in use through 2021.

15. **Has the utility performed any analysis or prepared any studies examining the magnitude and nature of PHEV charging, especially regarding whether different levels (as delineated in question 2) of charging are more or less likely to occur at specific times of day?**

    If yes, please provide the analysis or study and describe the results.

    No analysis or study has been performed.

16. **Has the utility performed any analysis or prepared any studies related to the potential impacts of PHEV charging on its transmission system?**

    If yes, please provide the analysis or study and describe the results.

    No analysis or study has been performed.

17. **Has the utility performed an analysis or prepared any studies related to the potential impacts of PHEV charging on its generation system?**

    If yes, please provide the analysis or study and describe the results.

    No analysis or study has been performed.

<u>Distribution</u>

18. **What improvements will be required for the utility's distribution network if 1 percent of existing vehicles are replaced with PHEVs for each year through 2021?**

    JEA does not currently foresee a need for distribution improvements for the 1 percent of existing vehicles through 2021.

    a. **What if the figure reaches 5 percent, 10 percent, 25 percent, or 50 percent?**

       At the 5 and 10% levels, without study, JEA is not expecting the need for additional distribution improvements. At the 25% level, an analysis would be needed and

improvements would most likely be required. The 50% level would also require an analysis and improvements would be needed.

b. What is the costs of these distribution improvements?

Costs of distribution improvements would be considered and estimated after the analysis defining necessary improvements is complete.

c. Does the utility believe that a contribution in aid of construction would be appropriate?

Do not know at this time

19. To what extent will "clusters" of PHEVs in the same geographic area cause localized distribution problems, especially in residential areas?

a. Explain how many PHEVs on a single residential transformer will necessitate upgrades to the utility's distribution network.

It has not been analyzed yet to know how many PHEVs on a single residential transformer will necessitate an upgrade. However, JEA will be able to monitor the transformer loading through Distribution System Loading (DSL) data received through the NMR system

b. Describe the methods to minimize any additional costs for distribution upgrades.

Costs associated with distribution upgrades would be minimized if quick charging is guided to "off-peak" hours. Otherwise, more significant upgrades to capacity will be required.

20. What effect will quick-charge stations (level 3 or above) have on the utility's distribution network?

Costs associated with distribution upgrades would be minimized if quick charging is guided to "off-peak" hours. Otherwise, more significant upgrades to capacity will be required.

a. Will this effect vary in urban, suburban, or rural areas? If so, how?

This effect will probably not vary.

21. Has the utility performed any analysis or prepared any studies related to the potential impacts of PHEV charging on its distribution system?

If yes, please provide the analysis or study and describe the results.

No studies have been performed at this time to determine the potential impact of PHEV charging on JEA's distribution system.

22. Is the utility's existing electric distribution system adequate to accommodate the PHEV demand based on the estimated number of PHEVs expected to be in use through 2021?

Please explain.

JEA's current estimate of PHEV in JEA's service area does not effects through 2021

Off-Grid Solar Charging

23. Provide the location and describe the utility and non-utility off-grid solar PHEV charging stations in operation in the utility's service area.

JEA has no off-grid Solar Charging Stations and does not have information of any non-utility stations.

24. How many utility and non-utility off-grid solar photovoltaic PHEV charging stations are planned to be installed in the utility's service area?

None known.

25. How does the production cycle of solar photovoltaic align with the load profile of PHEV charging demand?

N/A

26. Explain the extent to which solar photovoltaic can meet the energy requirements of PHEVs?

N/A

27. Please estimate the load and number of solar photovoltaic panels needed for Level 1, Level 2, Level 2+, and Level 3 charging stations.

N/A