Progress Energy Florida, Inc.'s Response To The FPSC's Post Plug-In Electric Vehicle Workshop Request For Additional Information

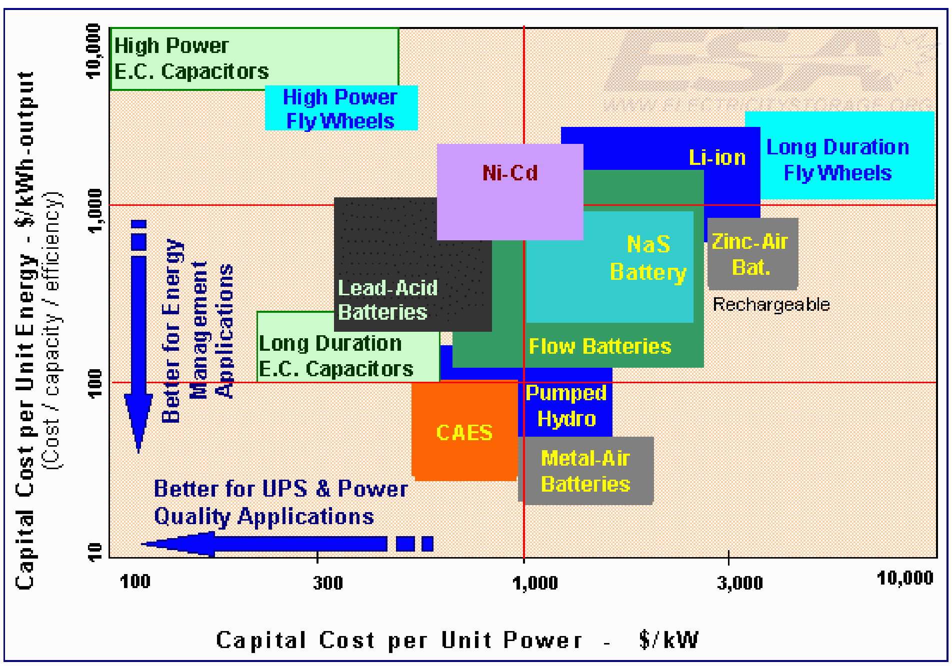
September 27, 2012

Staff Request For Additional Information:

1. "Cost data on energy storage"

Response: The following chart by the Electricity Storage Association provides a cost comparison for various energy storage technologies. The cost of each available technology changes as it evolves toward maturity. In the case of lead-acid batteries, the range of capital costs represent more mature values than those for technologies that are still under development, such as metal-air batteries. Capital costs reflected should only be used as a guide for discussion and for illustrative purposes and not as a source of detailed information.

When considering various applications of available energy storage technologies, it is important to understand that off-grid solar photovoltaic (PV) applications require higher kW capacity and therefore higher associated total cost.



Source: Electricity Storage Association

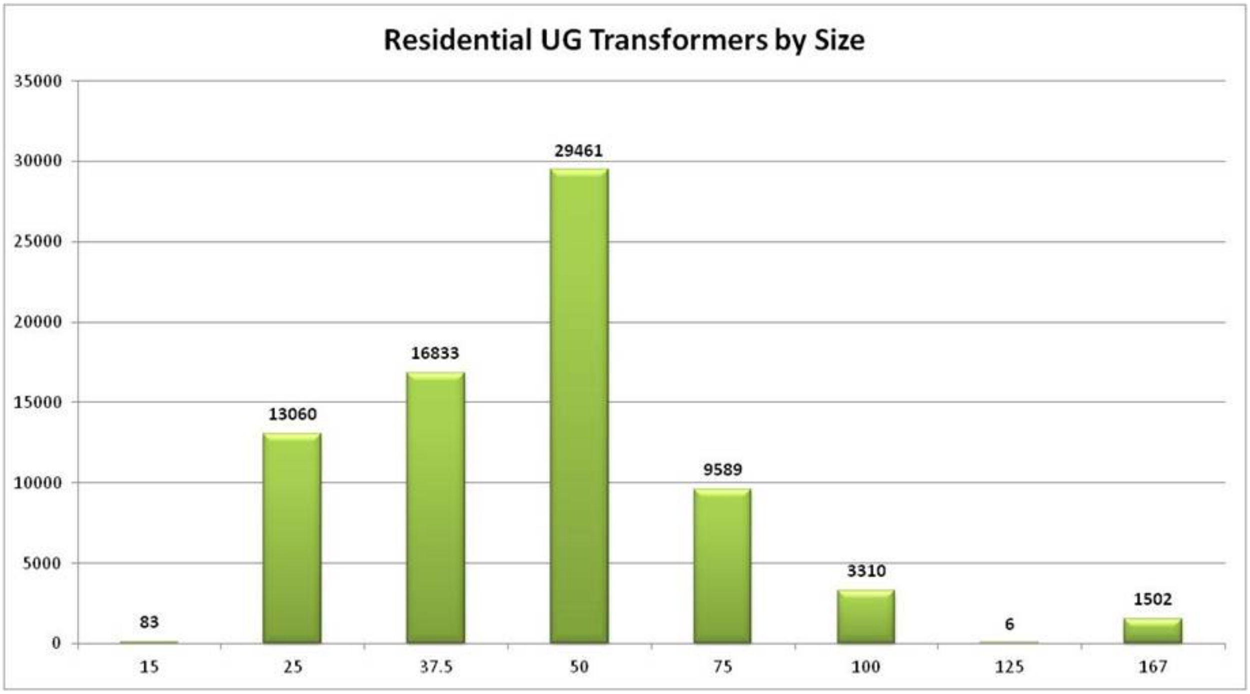
2. “Additional data on distribution risks, especially related to “quick-charge” stations”

Response: Generally speaking, the faster the rate of charge, the higher the potential impact on the distribution system. Risks to the local transformer and service drop that are evaluated in any new load case include such factors as overcapacity, low voltages, and cold load pickup. However, every transformer is unique, and depending on the rate of charge, a more detailed examination may be required with some customer requests in order to determine what service upgrades are needed, if any, to handle the additional load. Previous distribution studies indicate that very few residential transformers will require an upgrade given the estimated level of charging and vehicle adoption over the next 5-10 years.

DC “quick charge” stations represent a higher power requirement, up to 50 kW, compared to typical residential or even public charging levels. Due to the relative newness of the technology and lack of any installations in the PEF territory, additional time and real world data are required to better understand the potential grid impacts. Due to the required load, it is expected that utilities will be notified and therefore have the opportunity to ensure service is adequate for such charging stations. Near term, it is expected that penetration and utilization will continue to be low. Geographically dispersed charge stations with site information, utilization rates, charge times vs. peak coincidence, accurate loading numbers, and additional factors such as user costs, are just a few of the metrics needed to better understand distribution risks pertaining to fast charging.

3. “What size transformers are most common in residential neighborhoods?”

Response: The most common residential transformer found in Progress Energy Florida’s service area is the 50 KVA pad mounted, single phase transformer located in Underground Residential Distribution (URD) subdivisions. The chart below groups transformers by KVA and was constructed from a population of 73,844 residential underground (UG) transformers with a service voltage of 120/240 volts.



Source: Progress Energy Florida

Since 50 KVA pad-mounted UG transformers are the most common transformer in residential neighborhoods, PEF did not include overhead (OH) data in the chart above. However, for information purposes, the most common size of residential OH transformers is 25kVa.

<u>Clarification Regarding FPSC's Slide #15 "Clustering of Electric Vehicles"</u>:

<u>Response</u>: The source of information that was used to construct Slide #15, "Table 6: Plug-In Vehicle Capacity Estimate by Transformer Class and Charging Level," was provided as part of the response to Question 19 within "Progress Energy Florida, Inc.'s Responses To Staff's Data Request #1." As mentioned in the response, Table 6 is for "illustrative purposes," based on theoretical information, and designed to indicate one potential impact associated with clustered electric vehicles and coincident peak loading. Table 6 is not based on real world data from an actual research project, and therefore should only be used for discussion purposes.

When assessing real world transformer impact, it is important to first realize that every transformer is unique, and many factors must be considered in order to determine the number of plug-in electric vehicles that a transformer can handle before requiring an upgrade. Transformer load profile, age, peak coincidence, use of smart charging technologies, and heat shedding are just a few of the variables that will determine whether an upgrade is needed. Due to the variability of all of these factors, actual data is necessary to understand the potential effects that clustering of electric vehicles may have on the distribution system.

As previously mentioned in the earlier response to Question 19, an EPRI distribution circuit analysis and early feedback from utilities in high adoption regions both indicate very low near-term impacts to the distribution system from charging clustered vehicles. However, continued monitoring and additional research are needed to further understand the potential for future impacts.