August 11, 2017

VCharge (a Rhode Island-based subsidiary of OVO Energy, a $1 billion competitive energy supplier in the UK), offers the following comments based on the *Request for Responses to Stakeholder Comments Regarding a Utility's Role in Deploying Beneficial Electrification* of July 21, 2017.

Our work focuses on using behind-the-meter controlled electric loads (thermal storage heating, hot water heaters, EVs, and batteries) to benefit electricity consumers and distribution/transmission network operators. By enhancing appliances and EVs with hardware and software features, we tap latent value in these assets by providing grid balancing services on several time scales ranging from milliseconds (simulated inertia), to seconds (primary frequency regulation), to hours (time shifting consumption to arbitrage energy prices).

Enhancing electric loads to provide these services requires additional capital equipment (e.g., energy storage, Internet-of-Things controls, power electronics) that make them more expensive (at least before scale-up) than conventional counterparts. For example, a high-temperature, air-to-water heat pump coupled with sufficient phase-change thermal storage to shift home heating loads by a few hours would roughly double the cost of a home heating system versus a convention fossil-fueled boiler—yet it offers the promise of both decarbonizing home heating and providing beneficial grid balancing services that increase hosting capacity for renewables.

Several of the commenters cite the benefits of *time-varying* or *time-of-use rates* (Acadia Center, People's Power & Light, NECEC). While these types of rates are a step forward, we believe they alone are not sufficient, especially if implemented strictly as regimented "by-the-clock" tariffs.

Truly modern "smart tariffs" to go along with our smart grid would add the ability for competitive energy suppliers to develop different products for consumers that cut costs while minimizing the supplier's trading risks. From our perspective, several developments are required:

- **Open economic and load control signals at the distribution network level.** Analogous to the frequency regulation structure at the transmission level in systems like ISO-NE and PJM, we would like to see localized distribution network price and load signals that would enables demand response providers like VCharge open up additional revenue streams to offset higher equipment costs and open revenue-sharing arrangements with customers. The "non-wires alternatives" efforts in Tiverton/Little Compton offer an example of a problem that could be solved through these types of market solutions.

- **Regulatory support for "type-of-use" and sub-metered-load tariffs.** As an energy supplier, we can do a far better job trading on the wholesale markets to procure power for a load that we control; this controllability is a characteristic of the *type* of load, not just the *times* it is used. *Type-of-use* tariffs offer intriguing possibilities for migrating consumers off delivered fossil fuels in home heating. A typical New England home uses 25 to 30 MWh of energy (as oil or gas) for heating. Enabling a competitive electricity supplier to tailor a renewable electric heating-only tariff would enable the supplier to reduce trading risk through load control, NEST-like comfort control, and highly accurate weather-based demand forecasting. These capabilities then support the ability to subsidize more expensive capital equipment in the form of energy storage (electrochemical or thermal) and alternative heating systems like high-temperature air-to-water heat pumps capable of replacing oil-fired boilers.

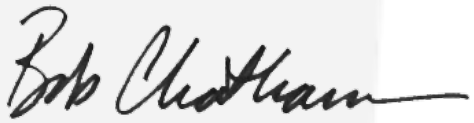
In the UK we offer free electricity for your EV (https://www.ovoenergy.com/ev-everywhere) based on a similar strategy of a understanding consumer behavior, engaging user interfaces, and control of charging and vehicle equipment.

- **System-wide optimization and energy storage.** Heat pumps are great, cutting the cost of delivering a BTU of heat electrically in half versus resistive electric heat. But imaging what happens to New England's winter-time grid load if we massively scale heat pumps for home heating (97% of New England homes are heated with oil or gas) that all want to run 19 hours on the design day? Actually, we have a model for what this looks like: air conditioning in Florida. However, New England's grid congestion problem will be far worse—the temperature delta in air conditioning requires that we drop the temperature from say 85 degrees to 70—a mere 15 degrees, compared with bringing the temperature up from 20 degrees to 68 – three times the temperature difference. A/C in Florida is typically only 6 MWh/year, while heat in New England is more like 25 MWh.

If we want to avoid overbuilding a grid for this new peak, we must orchestrate this load. Our belief is that this orchestration should happen through open competition and market-based solutions. This will require systems with storage capable of buffering several hours of demand, grid-responsive appliances and EVs, and load optimization software that balances grid conditions and customer comfort. Funding these enhancements requires that we extract all the latent value these smart loads can deliver, and that we support a tariff structure open to new ways of metering and settling customer energy supply.

We hope the PUC and other stakeholders will support these new tariff options and the supporting market and grid signals to enable true competitiveness in electricity supply and open up new options for home heating and vehicle charging.

Thank you for your consideration of these comments.



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