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Filer:	Megan Myers
Organization:	California Efficiency + Demand Management Council, Leapfrog Power, Inc., and Renew Home
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California Efficiency + Demand Management Council, Leap, and Renew Home Comments on May 16, 2024 California Energy Commission Scoping Workshop on Identifying Research Gaps to Improve Predictability of Behind-the-Meter Distributed Energy Resources

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I. Introduction

The California Efficiency + Demand Management Council ("Council"), Leapfrog Power, Inc. ("Leap"), and Renew Home (collectively, the "Virtual Power Plant Coalition" or "VPP Coalition") appreciate this opportunity to provide written comments on the California Energy Commission's ("CEC") May 16, 2024 Scoping Workshop ("Workshop") on Identifying Research Gaps to Improve Predictability of Behind-the-Meter ("BTM") Distributed Energy Resources ("DER").

The overview that was provided by John Rudolph, Lead Forecast Modeler on the California Independent System Operator's ("CAISO") Short-Term Forecasting team explaining how the CAISO forecasts BTM DER performance was very helpful in illustrating the challenges the CAISO faces in accurately accounting for these resources on an operational level. The Workshop primarily consisted of Mr. Rudolph providing an overview of how the CAISO develops its operational forecasts of BTM DER performance, with the conclusion being that better short-term forecasting is needed for CAISO operators to maintain a well-functioning grid. Mr. Rudolph's presentation concluded with the statement that the CAISO needs real-time visibility data for BTM DERs which could be conceivably facilitated by a common data sharing platform that the CAISO could access.

To a growing extent, DR-related load curtailment is being driven by devices, including smart devices, that are controlled or programmed by the customer or the demand response ("DR") provider (which can be a utility or other load-serving entity (LSE), or a third party such as a DR aggregator).

Under the current supply side and load modifying DR, the quantities and types of devices responding to dispatch signals are obscured behind the meter. The VPP Coalition believes that this challenge could potentially be addressed by providing visibility into the specific underlying technologies that participate in DR events.

II. VPP Coalition Comments

Mr. Rudolph's presentation serves as an excellent backdrop to State policies that will drive substantial growth in BTM DERs over the next several years and further complicate the CAISO's efforts to forecast their performance. These include State policies to adopt 6 million heat pumps by 2030, a 52 GW energy storage procurement target, eight million electric vehicles ("EV") by 2030, and the CEC's 7 GW by 2030 load shift goal that estimated an incremental need of 3,400-3,900 MW in flexible loads by 2030. From an estimated 5 GW of existing smart device potential today, we expect that these policies could potentially lead to 20 GW of BTM DER potential by 2030, if California meets its EV and home electrification goals.

In light of this veritable mountain of impending BTM DER growth, through its Electric Program Investment Charge ("EPIC") program, the CEC is in a unique position to sponsor research to improve the granularity and availability of the data used in BTM DER forecasting through device-level measurement ("DLM"). Devices that either indirectly (e.g., smart thermostats) or directly (e.g., energy storage, electric vehicle supply equipment, smart water heaters) measure energy usage, can be used to develop models to more accurately forecast BTM device responses to market dispatch signals.

Heating and cooling loads controlled by smart thermostats are a significant source of load reduction for both supply-side and load-modifying DR programs, and the energy savings these devices offer are weather sensitive. Rather than using a blunt estimated capacity monthly value based on average monthly weather, forecasting the estimated impacts of these resources based on daily temperatures is possible utilizing machine learning models. Thermostat device data, weather, and home characteristics could be used in conjunction with meter data to generate temperature-sensitive performance predictions.

Similarly, models could be developed based on DLM of energy storage, EV supply equipment, and smart water heaters. Device-level data would undergo the validation, editing, and estimation

process to arrive at a clean data set suitable for machine learning. This type of modeling would provide CAISO with better operational forecasting of the resources participating in the market.

Successful modeling would not only significantly improve CAISO awareness of BTM DER performance, it would also prove the value of DLM, potentially unlocking a pathway to address some major barriers to expanding customer participation in market-integrated programs at scale. Enabling the development of third-party programs that do not rely on individual customer authorization of smart meter data sharing would unlock significant load flexibility resources that do not participate in a program today. The barriers of relying on individual smart meter data include:

- Low (25-50%) completion rate of the click-through authorization process for sharing utility meter data; and
- Current smart meter-based rules that limit multi-device participation to a single DR provider.

In contrast, DLM can provide the following important benefits:

- More targeted and accurate measurement of load curtailment;
- Increased situational awareness with visibility into the quantity and types of devices responding to market signals;
- Dual participation in conflicting programs can be determined and resolved at the device level;
- Reduced reliance on meter data for participation or settlement; and
- Greater customer choice by allowing customers to select different DR providers for individual devices.

III. Conclusion

The VPP Coalition appreciates this opportunity to provide feedback on this topic and respectfully urges the CEC to consider this proposal to sponsor research to improve the data used in BTM DER forecasting through DLM. We are available to respond to any subsequent questions by CEC Staff.