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Re: Docket 23-ERDD-01 Electric Program Investment Charge (EPIC) DER Orchestration Research - Request for Information (RFI)

Derapi, Inc. is pleased to submit the following response to the Commission's Request for Information regarding DER Orchestration Research.

About Derapi

Derapi (www.derapi.com) is a California-headquartered startup that provides software data infrastructure services to the Distributed Energy industry, including solar and battery storage installers, demand flexibility providers and energy management firms. Our software application programming interface (API) streamlines communication with behind-the-meter (BTM) distributed energy resources (DER) such as solar inverters, battery storage systems, and other smart energy devices. Our goal is to accelerate electrification and decarbonization by enabling energy consumers to unlock the full value of their investments through the use of data and communication technologies.

Responses to RFI questions

Use Cases that Require Validation through Demonstration:

2. What performance metrics should a research demonstration achieve to assure confidence in resource dispatchability?

Key metrics for a successful demonstration are:

- Customer enrollment and disenrollment rates
    - What fraction of eligible customers were contacted? How many took further action in response to being contacted? How many enrolled in the program?
    - Of those who enrolled, how many continued through the conclusion of the program? Why did customers disenroll from the program?
- Performance relative to customer commitment:

    - How well did individual systems, as well as the overall aggregation of systems perform?
    - How often, and for what reasons, did equipment fail to perform as intended?
    - How often, and for what reasons, did individual customers "opt out" of dispatch-based events?
- Cost and complexity involved in certification, design, procurement, and operation of necessary equipment or software.

Research demonstrations should also consider additional topics:

- Characterizing the performance of DERs on an aggregated basis in addition to an individual basis. The goal of this is to develop techniques and models for managing DER aggregations as a distinct system resource on a portfolio basis, as opposed to a group of individual resources each attempting to mimic existing centralized resources.
- Understanding the impact of multiple, concurrent use cases for DERs, including utility and non-utility use cases, and how they influence customer behavior with respect to grid services.
- Differences in equipment capability between different source technologies (solar, wind, battery storage, fuel cells, etc.)
- Differences in equipment capability and system architecture between different customer segments (residential, commercial, industrial, government/municipal, etc.)
- The ability of controllable loads to contribute to grid services independently or in coordination with inverter-based generation
- The impact of differences in program design, business processes, and procedural requirements related to DER orchestration across different utilities, municipal jurisdictions, and DER aggregators

3. What role would Investor-Owned Utilities (IOUs) play in potential field demonstrations?

- *Would IOUs need to develop new programs for grant recipients to bid into, or could projects use existing agreement structures?*
- *What role could dynamic hosting capacity have in expanding the depth of services that inverter-based DERs could provide to the grid?*
- *Should a Letter of Support from an IOU be a minimum requirement?*
- *Could utilities be potential technical reviewers during the application scoring phase as a means of providing insightful input to Evaluation Committee scorers?*
- *Are there additional considerations for utility's role in project demonstrations?*

The nature of IOU involvement in demonstration projects would depend on the research questions to be addressed by a particular demonstration and the level of customer participation required. At the very least, technical expertise from IOUs and other utilities would be needed to provide input on project scope and evaluation. It will be critical to the success of these demonstrations that a wide range of stakeholders be involved in their design, operation, and evaluation.

Gateway Conformance Testing for Dispatchable DERs:

4. What is the industry need for dedicated testing and certification of DER gateway functionalities and conformance independent of the inverter or DER they are paired with? Would there be interest in a unified, open testing procedure that verifies DER gateways' functionality and adherence to utility-mandated communication requirements?

Industry-accepted testing protocols and criteria are necessary to ensure that systems are capable of performing as required. However, there is already a robust system of standards development, test tools, and test procedures within the industry. We do not believe that it is necessary at this time to create an additional effort in this area.

Our recommendation is that the Commission focus on work that helps establish an understanding of the capabilities and performance requirements needed for DERs and aggregations of DERs to provide grid services, as this is a subject of ongoing discussion within the industry.

We also encourage the Commission to consider system architectures other than traditional on-premises gateways, such as cloud-based services, that can serve as coordination points for DER grid services.

6. What should be the baseline performance requirements of DER gateways for the following functions?

- *Performance in DER communication*
- *Interoperability of communication between DER devices from various manufacturers*
- *Responsiveness in DER dispatch*

The performance requirements will depend upon the types of services being delivered, the electric system challenges being addressed, and the design of the utility or market program.

7. Should this research scope (gateway conformance testing) be under a separate funding group to be conducted independent of the VPP demonstrations, or should this scope be incorporated as a phase of a larger VPP field deployment demonstration?

Gateway conformance testing should be a separate funding group from VPP demonstrations. The demonstrations are a necessary step to determining capability and performance requirements, which will in turn inform test criteria and procedures.

Valuation of Aggregated DER Services:

8. How could technology demonstrations be designed to increase confidence in the efficacy of market signals?

Technology demonstrations should be designed to test various hypotheses on the types of market signals and program structures that are most effective. Techniques such as Control Groups and A/B Testing may be helpful for this purpose.

These demonstrations should also consider how differences between customer segments may affect responsiveness to various types of market signals or participation mechanisms.

9. Identify existing market mechanisms that enable DER aggregators and VPP platforms to provide each of the grid services identified in Question 3. How effective are these market mechanisms in facilitating that service, and what barriers must be overcome for these market mechanisms to be more effective than they are now?

We are aware of market mechanisms in CAISO, PJM, Australia and Japan that allow DER aggregators to participate in some of the grid services mentioned in this RFI. However, we do not have direct experience with these markets and are unable to comment on details regarding their effectiveness or barriers to participation.

11. What consumer protections measures must be put in place for DER aggregation? This is especially important for projects to be designed with an equitable focus. For example, solicitation requirements could require including protections that ensure DER enrollees are fairly compensated by aggregators for the value they provide to the DER portfolio being dispatched. What are some examples of best practices?

There are number of consumer protection measures that need to be in place for effective DER aggregation, including but not limited to:

- A secure mechanism for the consumer to enroll their device(s) that ensures such devices are only enrolled with their knowledge and permission. One example of this is use of the OAuth authentication protocol to obtain customer permission.
- Privacy protections to ensure that data from their devices is only used for intended purposes. While this is already codified in California Law, it may be helpful for the Commission to develop a set of principles and best practices for applying these protections to DER aggregation.
- Provisions to allow consumers to disenroll from programs and opt-out of events. This is a feature of many existing Demand Response and VPP programs.

- Provisions to ensure that consumers may use their DERs for purposes other than grid services (e.g. backup power, load shifting, or time-of-use arbitrage), and are not prevented from or unduly penalized for fulfilling those other purposes while also making their resources available for grid services. One example of such a provision is the use of proportional or performance-based compensation for grid services that allow the consumer to determine the degree to which they provide these services.