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Tesla, Inc.'s Response to CEC DER Orchestration Research – Request for Information

Tesla appreciates the opportunity to provide this brief response to the questions posed by the CEC in the recently issued DER Orchestration Research Request for Information. In this response we specifically address the topic area covered by question 4, namely whether there is a need for a testing and certification pathway to address DER gateway functionalities, independent of the DER or inverter with which that gateway is paired. We additionally address, at a high level, the topics raised in questions 1-3 and 8-10 regarding the types of ancillary services that VPPs can provide, the role of technology demonstrations and market mechanism to motivate VPP participation in the provision of those services.

Response to Question 4 re- industry interest/support for the development of a dedicated testing and certification pathway to validate the functionality and conformance of DER gateways, independent of the inverter or DER they are paired with.

While Tesla does not oppose the creation of a gateway-specific certification pathway per se, we do have concerns to the degree the intent is to require all DER gateways to be certified to this independent certification standard, irrespective of whether a DER system, inclusive of the inverter and gateway, has been (or could be) certified to all relevant and applicable standards. In the case of the Tesla storage ecosystem, the Tesla Powerwall and Tesla Gateway have been certified as a system to UL 1741 Multimode, which has tests specific to grid forming/grid following functionality to ensure inadvertent backfeeding to the grid doesn't happen. This systems level approach has proven effective to ensure systems operate in a safe and reliable manner. The CEC has not adequately explained what problem certifying the Tesla Gateway independent of the inverter would solve, given the ability to certify a DER system, inclusive of its constituent parts, to meet all relevant and applicable standards. We further note that there are potentially significant downsides to requiring DER gateways to certify on a standalone basis. Currently, under the systems-based approach, Tesla is able to maintain a proprietary communications protocol between the Tesla Gateway and the Powerwall, that was selected and optimized based on our specific system architecture. Under an independent or standalone certification approach, Tesla has serious concerns that OEMs would be forced to implement an administratively prescribed communication protocol, which may be suboptimal for their systems and hardware. A systems level approach does not require the standards and certification process to prescribe how the gateway communicates with the battery system, rather it can instead evaluate how the overall system functions, regardless of the communication protocol or architecture that contributes to that functionality. As noted above, we aren't opposed to the creation of a standard to which gateways can certify on a standalone basis, but it should not become the required or exclusive pathway for certification. If such an effort is pursued, it should exist alongside the existing system level standards and certification pathway(s).

Notwithstanding the concerns above, Tesla also questions the reasonableness of the CEC assuming the responsibility to develop the suggested standard and certification pathway. Dedicated and established standards-making bodies, like UL and IEEE, are better-positioned to develop new standards. Importantly these bodies have existing stakeholder engagement forums and working groups, in which entities like the CEC could participate. For this particular proposal, Tesla submits that the CEC consider participation in

UL's 1741 working group. This provides a reasonable forum where this proposal and its implications can be further considered.

Response to Questions 1-3 and 8-10 regarding the types of grid services that virtual powerplants (VPPs) can provide, the role of technology demonstrations, and market mechanisms to motivate the provision of ancillary services.

VPPs provide ancillary services today and have done so for several years. Additional technical demonstrations are not necessary. As framed in the RFI, using VPPs to provide a host of ancillary grid services is an untapped and impliedly unproven opportunity. While the RFI appears bullish on the potential, the questions suggest that the ability to utilize VPPs to provide various ancillary services is an area in need of additional research and demonstration. From Tesla's perspective, this framing doesn't adequately recognize that VPPs are already providing MWs of ancillary services through existing and pilot market mechanisms alongside conventional generators and front-of-meter batteries.

For example, in October of 2018, the Electric Reliability Council of Texas (ERCOT) Board of Directors established a pilot project to evaluate the participation of Aggregate Distributed Energy Resources (ADERs) in the ERCOT wholesale market.¹ Pursuant to this program, an ADER is a resource consisting of multiple premises or devices connected at the distribution system level that has the ability in aggregate to respond to the same dispatch instructions required of conventional generators; i.e. an ADER is ERCOT's terminology for a VPP. Through this program, currently in its second "Phase", VPPs are providing non-spinning reserves and Emergency Contingency Reserve Services. Tesla has a significant number of systems, representing 16 MW of reserve capacity, that are actively participating in this program (and the capacity totals would be significantly higher if not limited by program caps that we hope will be raised soon). Notably, the scope of ancillary services that participating systems may be eligible to provide and be compensated for may expand further to include frequency regulation products when the program transitions to Phase 3.

In addition to the ADER pilot program in ERCOT, Green Mountain Power is using a network of Tesla Powerwalls aggregated into a VPP and registered and qualified by ISO-NE to provide frequency regulation services. This is the utility's Frequency Regulation Pilot program, which has been in operation since 2021.² And in South Australia, a large VPP, designed and developed by Tesla is also providing frequency support to help stabilize the grid there as part of AEMO's Frequency Contingency Ancillary Service, further underscoring the practical experience that now exists in implementing VPP programs to effectively access their capacity to provide ancillary services.³

Based on these real-world programs, Tesla does not feel there is a need for technology demonstrations. The experiences in ERCOT, ISO-New England and South Australia have already proven the ability of existing technologies to access various ancillary services. Tesla submits that scaled pilots, building off the learnings already gleaned from existing programs would be more appropriate given the market's current state of play. In developing such pilot programs the CEC should consider three essential

¹ <https://www.ercot.com/mktrules/pilots/ader>

² [https://greenmountainpower.com/news/network-of-powerwall-batteries-delivers-first-in-new-england-benefit-for-customers/#:~:text=GMP's%20pioneering%20new%20Frequency%20Regulation%20Pilot%20program,regional%20system%20safety%20and%20reliability%20for%20customers.&text=Customers%20sharing%20energy%20through%20the%20program%20are,\\$13.50%20per%20month%20on%20their%20energy%20statements.](https://greenmountainpower.com/news/network-of-powerwall-batteries-delivers-first-in-new-england-benefit-for-customers/#:~:text=GMP's%20pioneering%20new%20Frequency%20Regulation%20Pilot%20program,regional%20system%20safety%20and%20reliability%20for%20customers.&text=Customers%20sharing%20energy%20through%20the%20program%20are,$13.50%20per%20month%20on%20their%20energy%20statements.)

³ <https://www.energymining.sa.gov.au/consumers/solar-and-batteries/south-australias-virtual-power-plant>

elements that need to be in place: an effective enrollment pathway (i.e. a low-friction means by which resources can enroll in the program), an effective qualification pathway (i.e. a clear and readily applied set of eligibility criteria), and an appropriate market access resource/monetization pathway (i.e. a way to register a VPP as a resource in the wholesale market such that it gets value for full flexibility, including exports, and can be metered and settled at the device).

Tesla reiterates its appreciation for the opportunity to submit this brief response to the CEC's RFI and we look forward to additional discussions with the CEC on this matter.

Respectfully submitted,

Andy Schwartz
Senior Managing Policy Advisor
Tesla, Inc.
anschwartz@tesla.com