Via Electronic Mail

November 30, 2022

Mr. Edison Avilés-Deliz, Chairman
Puerto Rico Energy Bureau
268 Muñoz Rivera Ave,
San Juan, PR 00918

RE: Docket No. NEPR-MI-2021-0006 – Reply Comments on Proposed EE/DR Transition Period Plan

Dear Mr. Avilés-Deliz:

Tesla, Inc. ("Tesla") thanks the Puerto Rico Energy Bureau ("Bureau") for the opportunity to provide reply comments regarding LUMA Energy's ("LUMA") Proposed Energy Efficiency (EE) and Demand Response (DR) Transition Period Plan. Tesla's mission is to accelerate the world's transition to sustainable energy through the deployment of hardware and software solutions that support rapid electrification and create affordability and access to energy resiliency. We are pleased to submit reply comments and look forward to participating in the near future in an Emergency Virtual Power Plant (VPP) Program that can unlock the energy capacity of thousands of Tesla Powerwalls to help the Puerto Rico grid.

On November 9, 2022, Tesla filed initial comments in response to the Bureau's Request for Information regarding changes being considered to LUMA's proposed Battery Demand Response Program.[1] Tesla respectfully notes that it is imperative that the Bureau enable LUMA to expeditiously implement an Emergency VPP Program capable of achieving urgently needed near-term grid stability, and make findings appropriate to the emergency nature of the needed program design. Therefore, in these comments, Tesla requests that the Bureau open a sub-docket in this proceeding to issue a draft Resolution and Order (i) directing LUMA to create and implement an Emergency VPP Program by May 2023, and (ii) directing LUMA to identify and mobilize sufficient funding from all available federal and non-federal

[1] *See Comments of Tesla Inc.*, Docket No. NEPR-MI-2022-0001 (Nov. 9, 2022), at pp. 2-3 (discussing that to launch a successful virtual power plant (VPP) program, LUMA should contract with aggregators to sign up customers and manage their behind the meter (BTM) Battery Energy Storage Systems (BESS); compensate for emergency load reduction via a performance payment; allow both residential and commercial customers to participate; and implement a pay-for-performance program design instead of a long-term commitment requirement for participating customers), available at https://energia.pr.gov/wp-content/uploads/sites/7/2022/11/Tesla-Comments-on-Proposed-EEDR-Transition-Period-Plan-corrected-NEPR-MI-2022-0001.pdf.

sources. Tesla recommends the Bureau issue the requested draft Resolution and Order with a 45-day comment period to collect further information from stakeholders and from LUMA, and publish a final Resolution and Order within 60 days. Further, Tesla proposes that LUMA be directed to implement the final Resolution and Order within 45 days of its issuance so that the Emergency VPP Program can be created and made available for potential aggregation service providers to execute service agreements with LUMA well in advance of the additional heat-induced grid stress conditions anticipated in summer 2023. To the extent that LUMA may require additional guidance or clarifications, Tesla respectfully requests that the Bureau enable those requests through action on urgent motions without causing substantial delay to the overall program implementation process.

To facilitate the issuance of a Draft Resolution and Order, Tesla proposes guiding principles which can be fashioned into proposed directives to LUMA for creation of an Emergency VPP Program. These principles are directly tied to Tesla's learnings and practical experience managing successful VPP programs in other markets and working with other aggregators and utilities to deliver these programs. Tesla sincerely hopes that this proven blueprint to mobilize emergency megawatts to other stressed electric grids can be quickly replicated in Puerto Rico.

I. Summary of Guiding Principles for Emergency Virtual Power Plant Program

The following is a summary of Tesla's proposed guiding principles for an Emergency VPP Program.

1. Utility enrollment criteria should enable broad participation and allow aggregation service providers to lead program enrollment and engagement with customers.
2. Customer performance should be measured and compensated by the aggregator, based on inverter-level (device-level) telemetry, allowing customers to be settled based on their selected participation level.
3. The program design should include a targeted dispatch strategy with dispatch event windows called for a maximum duration of 3 hours, a minimum of 21 dispatch hours per calendar year, and should allow the aggregator to select highest need intervals for performance in the dispatch event window.
4. Customer compensation is based on energy contribution during event hours, and aggregators would directly pay customers for contributions with a participation rate of $2/kilowatt-hour.

Please find below a detailed explanation of both Tesla's requested actions of the Bureau to facilitate an Emergency VPP Program and proposed guiding principles for such an Emergency VPP Program design.

Additionally, Tesla has included an Appendix explaining how customers engage with Tesla's active emergency VPP program in California – a model Tesla hopes can be replicated in relevant parts to bring a compelling participation experience to Puerto Rico Tesla Powerwall owners.

II. Comments

Tesla respectfully requests that the Bureau open a new sub-docket to issue a draft Resolution and Order proposing high-level guiding principles for an Emergency VPP Program, accept public comments on the draft issuance, and thereafter direct LUMA to create such a program and identify all available federal and non-federal funding sources to support its administration and implementation. As suggested above, these actions should be taken on an expedited schedule to allow for such a program to be available no later than May 2023. Tesla's comments below explain the need for the program to be designed as an emergency resource and provide insights on potential funding sources for the program. We also propose guiding principles that we recommend the Bureau use to shape a draft Resolution and Order directing LUMA to create an Emergency VPP Program.

A. An Emergency Virtual Power Plant Program Designed and Compensated as Additive Emergency Capacity is Essential to Meet Puerto Rico's Grid Stability Needs.

Tesla appreciates LUMA's initiative to propose a Battery Demand Response ("DR") Program in this docket; it is important that such a program be designed to address the emergency needs currently faced by the grid in Puerto Rico. However, a typical battery DR program is designed to avoid the purchase of costly energy from thermal power plants or to delay the need for grid upgrades. In contrast, Tesla urges LUMA and the Bureau to work together to enable an Emergency VPP Program which serves a different, more urgently targeted need: the need for fully dispatchable, <u>supplemental</u> emergency energy capacity required by the electric system during critical grid stress conditions that pose the highest risk for involuntary load shed. While the economics of a DR program are supported by fundamentals of energy and capacity costs and are typically compensated at an equivalent replacement rate for the avoided cost of running peaker plants or avoided grid upgrades, the economics of an Emergency VPP Program are driven by shortage pricing – namely the incremental scarcity value of supplemental dispatchability necessary to keep the lights on when existing grid capacity is insufficient to do so. Due to the frequent blackouts and load shed events currently experienced in Puerto Rico, an Emergency VPP program compensated as additive emergency capacity is a more appropriate program design compared to a standard DR offering.

By comparison, in California, the California Public Utility Commission ordered the creation of an Emergency Load Reduction Program ("ELRP") to avoid load shed events during summer peak demand.[2] In that instance, a temporary funding source was identified to pay participants $2 per kilowatt-hour for energy provided during ELRP events. Additional funds were paid directly to aggregators, such as Tesla, to assist in program administration, which included the following services: (i) identifying eligible customers, (ii) enrolling customers, (iii) notifying customers of upcoming events, (iv) providing customer support, (v) collecting meter data for settlement purposes, and (vi) facilitating payments to customers. Between Aug. 17 and Sept. 9, Tesla's VPP was called on 10 times as part of the California ELRP program; a total of 4,687 homes participated, providing a peak output of 33 MW, which helped to fully avoid the need for any load shed. It is important to note that the program value is a monetized representation of the value of lost load, *i.e.*, the economic benefit of averting the costs to consumers of involuntarily losing their supply of electricity.[3] This is not equivalent to, and is a higher value than, the value of simply replacing alternative available sources of generation capacity. Emergency capacity should earn higher prices when reserve shortages increase, which in turn increases the probability of losing load. Battery energy storage capacity is a duration-limited, fully dispatchable emergency resource that fits this use case perfectly – providing a surge of additive megawatts to the electric system at the most critical junctures where capacity shortfall would drive immediate blackouts but for the availability of that emergency capacity.

Due to the emergency nature of the needs faced by the grid in Puerto Rico, it is appropriate for the Bureau to open a sub-docket to determine the scope and funding source for an Emergency VPP Program. In these reply comments, we propose guiding principles of our recommended Emergency VPP Program structure that we believe, based on our experience, would best encourage aggregators and customers to participate. Tesla recognizes that our recommended design is only one vision of how this program could operate, and that other stakeholders would need to provide feedback in a sub-docketed proceeding. However, one of the advantages of our recommended design and implanting our proposed guiding principles, much of the administrative burden of a program could be shifted from LUMA to aggregators,

[2] California Public Utilities Commission. "Emergency Load Reduction Program." https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-costs/demand-response-dr/emergency-load-reduction-program

[3] *See. e.g.*, Sinclair, Robert, *What is Shortage Pricing and Why is it Essential in Competitive Electricity Markets?* (Potomac Economics, April 2, 2012), at Para. 2 (stating, "[t]he marginal reliability value of reserve capacity is: VOLL * p(s), where VOLL is the value of lost load, estimated based on the cost to consumers of involuntarily losing their supply of electricity, and p(s) is the probability of losing load at a reserve shortage of s MW."). Note: Potomac Economics serves as the Independent Market Monitor for the Midcontinent ISO, New York ISO, ISO New England, and ERCOT (Texas).

allowing the program to be operationalized quickly after the conclusion of a sub-docket while limiting the need for LUMA to allocate new personnel or technology resources to the program.

To meet the operational aims of an Emergency VPP Program, it also will be necessary for LUMA to identify a funding design that serves the purpose of adequately compensating the additive emergency capacity value of the valuable energy resource.

B. The Bureau should Direct LUMA to Identify and Mobilize Funding to Support an Emergency VPP Program.

Unlike a typical DR program, an Emergency VPP Program is a short-duration mechanism that should be compensated as a last-resort resource until a grid emergency otherwise compelling load shed is mitigated. In Puerto Rico, it similarly makes sense to treat an Emergency VPP as a marginal peaker resource, but given the lack of a competitive market design to appropriately compensate the emergency resource, LUMA would need to identify additional funding to support the economics of such a program. For those reasons, we recommend that the Bureau direct LUMA to identify and mobilize funding to support an Emergency VPP Program.

We believe LUMA is in the best position to ascertain which is the appropriate source(s) of funding and should provide insight in the sub-docket as to what the most expedient and appropriate funding sources are for addressing this emergency resource program. Importantly, since this program would be construed as an emergency resource, we believe there is fresh ground to reconsider a wider pool of potential internal and external funding resources to support the program. We encourage the Bureau and LUMA to cast a broad net over potential available emergency, contingency, and resiliency funding sources which may not fit a traditional demand response program design but will be appropriate for an emergency program. Tesla further notes that if LUMA is unable to use its existing authorities to reallocate emergency funding to stand up this program, the Bureau should use its plenary authorities to direct allocation of funds to address this critical need.

One potential funding source LUMA might consider to support an Emergency VPP is a small portion of the roughly $12 billion in federal funding allocated to the Federal Emergency Management Agency (FEMA) and the United States Department of Housing and Urban Development (HUD) to aid Puerto Rico in rebuilding and strengthening its electrical infrastructure.[4] An Emergency VPP program will

[4]FACT SHEET: The Biden-Harris Administration Supports Puerto Rico's Recovery and Renewal in its First Year in Office". *The White House*, 20 Jan. 2022, https://www.whitehouse.gov/briefing-room/statements-

in the short-term produce the same operational and policy goals that this funding was intended to achieve – increased grid stability and reliability – by using a decentralized solution to quickly address the emergency caused by frequent grid outages. Recently, President Biden also asked Congress to allocate an additional $3 billion to help Puerto Rico increase installations of distributed solar energy and battery systems as part of an omnibus spending package to fund the federal government after Dec. 16, 2022.[5]

LUMA might also consider blending internal and external funding sources to support an Emergency VPP Program. In LUMA's "Transition Period Program Plan for Energy Efficiency and Demand Response" filed June 21, 2022, in Docket No. NEPR-MI-2021-0006, the utility identified $4.57 million in existing funds to support its proposed EE and DR program.[6] While LUMA preliminarily earmarked that funding to support the entire EE/DR Program, a portion of it or other existing funds could be used to help support the quick startup of Emergency VPP Program.

C. Proposed Guiding Principles should be Included in a Draft Order Directing Creation of an Emergency Virtual Power Plant Program.

Tesla recommends an Emergency VPP structure that allows LUMA to partner with aggregators that are capable of enrolling customers into an aggregation, providing certain program administration services, dispatching the batteries within their aggregations to provide energy capacity to the grid during events as called by LUMA, tracking customer contributions, and compensating customers for the energy they provide. As described in our initial comments, we recommend such a program compensate customers based on their battery's volumetric performance and allow for voluntary participation for all customers within an aggregation. Based on our experience with California's ELRP, we believe that this design will allow for rapid implementation, broad customer participation, and will encourage aggregators to do much of the heavy lifting associated with program implementation. More than 44,000 customers in Puerto Rico have installed a Tesla Powerwall home battery storage system for their own energy security, equaling more than 275 megawatts in nameplate capacity. Providing a fairly compensated, user-friendly VPP program for these customers could encourage significant program enrollment that brings rapid relief to Puerto Rico's

releases/2022/01/20/fact-sheet-the-biden-harris-administration-supports-puerto-ricos-recovery-and-renewal-in-its-first-year-in-office/

[5] "Biden requests $3B for residential solar, battery systems in Puerto Rico." *Utility Dive*, 23 Nov. 2022, https://www.utilitydive.com/news/biden-requests-3b-for-residential-solar-battery-systems-in-puerto-rico/637330/

[6] *See LUMA's Motion Submitting Proposed EE/DR Transition Period Plan,* Docket No. NEPR-MI-2022-0006 (June. 21, 2022), at p. 80, available at https://energia.pr.gov/wp-content/uploads/sites/7/2022/06/Motion-Submitting-Proposed-EE-DR-Transition-Period-Plan-NEPR-MI-2021-0006.pdf

grid. We provide a more detailed program scope below in the form of guiding principles which can shape the essential structure of an Emergency VPP Program.

1. Utility Enrollment Criteria Should Enable Broad Participation and Allow Aggregation Service Providers to Lead Program Enrollment and Engagement with Customers.

- Utility and Regulator Responsibilities: Emergency VPP enrollment criteria should be established by enabling Orders from the Bureau, allowing LUMA to shape a program design with the goal of allowing as many customers as possible to participate.
- Aggregation Service Provider (Aggregator) Responsibilities: Aggregators should be the primary mode of program engagement with the customer as they are in a favorable position to identify customers who are potentially eligible for enrollment in the program. Aggregators can create outreach plans to sign up customers for the program. Aggregators should be responsible for customer education relevant to the program; collection of enrollment information; review and acceptance of terms and condition; and communication of enrollment status.
- Customer Role and Responsibilities: Customers should be able to enroll and unenroll freely by notifying the aggregator.
- Utility-Aggregator Program Communication Process: Aggregator will share new enrollment information with the utility on a daily basis in the form of a machine-readable text file uploaded to a secure location. Within a specified timeframe as agreed to between Utility and aggregator in a services agreement, the utility would respond with an update for each set of Enrollment Information in the form of a machine-readable text file uploaded to a secure location. The file will provide an update on status, whether the customer (i) cannot be identified with a utility account, (ii) is confirmed to be eligible and is enrolled, or (iii) is confirmed to be ineligible. Aggregator will similarly share with the utility information regarding unenrollment.

2. Customer Performance should be Measured and Compensated by the Aggregator, based on Inverter-Level (Device-Level) Telemetry, Allowing Customers to be Settled based on their Selected Participation Level.

- Customer Participation Methodology: Customers participating in the Emergency VPP Program should be permitted to select their participation level and therefore be compensated based on device inverter telemetry which indicates the individual participation contributions of each customer, by reducing their own consumption and/or exporting energy to the grid.

- Aggregator Responsibilities for Device-Level Telemetry and Data-Sharing: The aggregator will be responsible for collecting telemetry on the power output of the battery system for the purposes of calculating energy contribution and customer payments. Settlement should be based on inverter data. Battery output data will be collected from the inverter system and sent back to the aggregator via a secured connection over the public internet.
- Shared Settlements Calculation Responsibilities between Aggregator and Utility: Aggregators will work with LUMA to define a definition of settlement calculation procedures including telemetry data validation and the definition of the settlement calculations. Data will be collected on a five-minute frequency or more frequently as required by the selected calculation approach. For each event in the season, the aggregator will provide the utility with information about each site's kilowatt-hour contribution during the event and time series telemetry data supporting the calculation.

3. The Program Design should Include a Targeted Dispatch Strategy with Dispatch Event Windows Called for a Maximum Duration of 3 Hours, a Minimum of 21 Dispatch Hours per Calendar Year, and should Allow the Aggregator to Select Highest Need Intervals for Performance in the Dispatch Event Window.

- Utility-Administered Targeted Dispatch Approach: To obtain the greatest capacity shortage value of the energy-limited, highly dispatchable storage fleet in a VPP, LUMA should target program dispatch events during periods where the probability of inadequate reserve margins on the system is the most likely to result in grid stress conditions that would immediately trigger involuntary load shed.
- Dispatch Duration and Frequency: Event duration should be three (3) hours or less, allowing duration-limited batteries in the VPP fleet to reserve energy capacity for dispatch at the most critical moments during the operating day. At least 24-hours' notice should be provided whenever possible, but dispatch can happen with as little as 1-hour's notice. There should be a minimum of 21 hours of dispatch each calendar year to demonstrate performance and ensure customer value proposition.
- Dispatch Communication and Aggregator Response Obligations: Aggregators would receive event notices from LUMA and will send event and dispatch information to their aggregated customers. Aggregators would be responsible for ensuring that the available energy is delivered during the event to the degree possible. As the party responsible for dispatch, the aggregator has the freedom to choose when energy is delivered during the event with the understanding that all parties are aligned that 1) as much available energy as possible should be delivered, and 2) load reduction is most valuable during the periods

of greatest capacity need. Aggregators will provide a forecast of available program energy and an estimated capacity delivery during the event. The forecast of capability will be updated periodically based on the enrollment fleet.

4. Customer Compensation is Based on Energy Contribution during Event Hours, and Aggregators would Directly Pay Customers for Contributions with a Participation Rate of $2/kilowatt-hour.

- Aggregator Responsibilities to Deliver Direct Compensation: Under the VPP Program design, participating customers would be enabled to receive compensation directly from the aggregator based on their energy contributions during event hours, and aggregators will in-turn seek payment from LUMA based on cumulative customer performance within their aggregation. Settlement will occur on a regular basis as agreed to between the aggregator and LUMA to ensure that customers and aggregators are paid in a timely manner for the services that they provide. When settlement calculations are complete and accepted by LUMA and the aggregator, the aggregator will invoice LUMA for the cumulative amount of the customer payments paid by the aggregator to participating customers.
- Compensation Rate for Customers: Tesla recommends an incentive rate of $2 per kilowatt-hour based on the broad program enrollment and ELRP VPP success in California in the summer of 2022. While ELRP customer compensation was initially set at $1 per kilowatt-hour during 2021, the California Public Utilities Commission ordered a higher volumetric rate for 2022, finding that it could incent greater program enrollment, stating that $2 per kilowatt-hour was "appropriate because this program is triggered during times of the grid being the most stressed," and stating that the higher compensation "could avert unexpected outages during time of extreme weather."[7]
- Compensation for Aggregators: LUMA should have the authority to negotiate fees directly with aggregators to compensate for administration and/or performance.

III. Conclusion

Tesla acknowledges that our proposal is novel in that LUMA has been considering the Battery Demand Response Program design purely from the lens of a conventional DR program. However, based on the successful blueprint for emergency program design we have executed along with other aggregators

[7] *See California Public Utilites Commission Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Reliable Electric Service in California in the Event of an Extreme Weather Event in 2021*, Rulemaking 20-11-003 (Dec. 2, 2021), at p. 44 and 149, available at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M428/K821/428821475.PDF

in California and elsewhere, we believe the emergency program design is the best solution available to quickly address Puerto Rico's urgent grid resiliency needs. Tesla hopes to actively participate in a future program design and support the grid through the summer 2023 peak season.

Thank you for the opportunity to provide reply comments. Please contact the undersigned if you have any questions.

Sincerely,

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CC:

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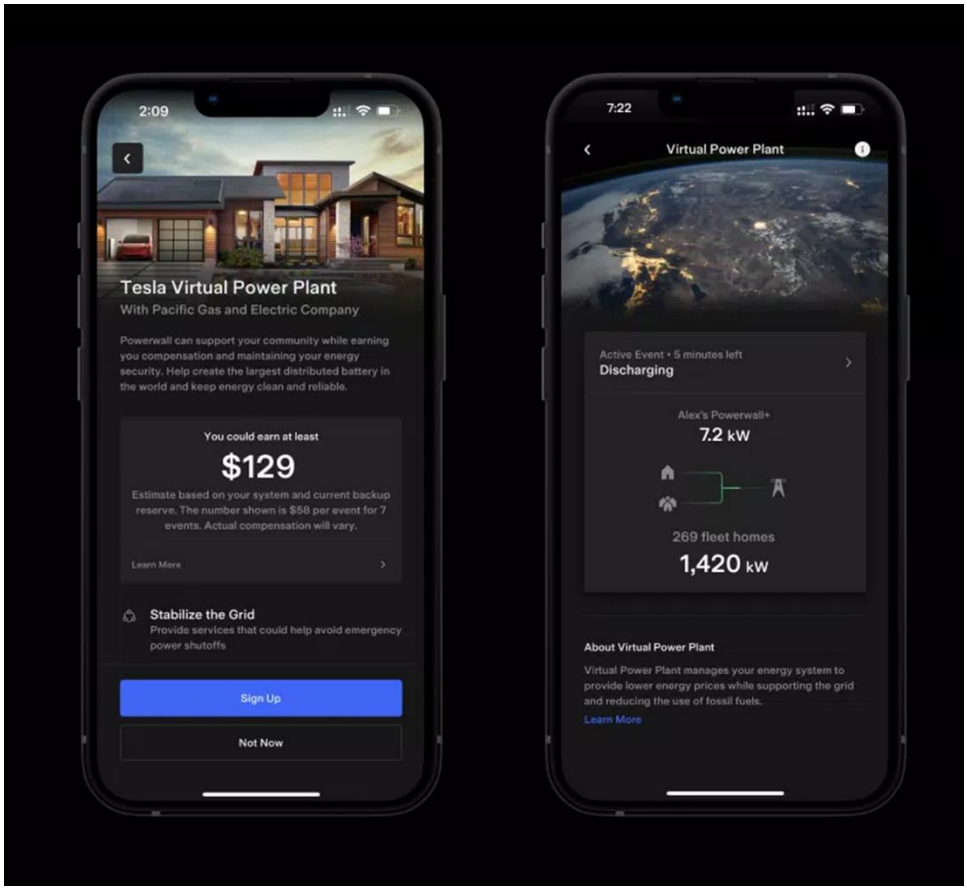
Appendix A

Tesla VPP Participation Experience – California ELRP



The Tesla Virtual Power Plant for California's Emergency Load Reduction Program is an example of a program that centers around customer experience with the intention of maximizing participation. It also reduces the administrative complexity of customer programs. Coordination of enrollment operations and settlement all happen between the utility or market and Tesla systems.

Enrollment – Program promotion and enrollment is handled through the Tesla Powerwall app.

- Customers can see program description, including customized estimate of value.
- Collection of all necessary application information (e.g., utility account number).
- Customers agrees to program terms and conditions.

Participation – Customers have visibility into and control of their participation and contribution.

- Customers set preferences for participation level (e.g., reserve energy for backup or opt out of events).
- Customers see the Tesla VPP fleet's performance and their own contribution.

Payment – Tesla collects system telemetry and can calculate customer contribution and value earned.

- Customer participation information, including telemetry, is seamlessly shared with the utility or market subject to program terms, privacy policies and restrictions.
- Program payments are shared with the customer through their Tesla experience.