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Battery Emergency Demand Response (DR) Program – Cost Structure

NEPR-MI-2022-0001
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1.0 Introduction

As operator of the electric transmission and distribution system, LUMA is responsible for helping to implement Puerto Rico's public energy policy, including important customer initiatives such as Energy Efficiency (EE) and Demand Response (DR) programs that are required by law and mandated by the Puerto Rico Energy Bureau (Energy Bureau).

LUMA is committed to working with the Energy Bureau to build a more reliable, more resilient, more customer-focused, and cleaner energy system that benefits everyone in Puerto Rico. To move toward this goal and to make it feasible for energy service customers to become prosumers as envisioned in Law 17¹, reliability solutions are being implemented to benefit all customers. Among these solutions is incorporation of important energy-saving resources like DR programs that help reduce electricity usage during peak periods or when generation capacity is insufficient to support customer demand.

The Battery Emergency Demand Response Program ("BEDRP")² will be an important tool to help increase the energy available to all customers during emergency conditions and reduce the need for load shedding. When there is insufficient generation supply to meet customer energy demand, the System Operator may interrupt service to some customers, "shedding load," in order to maintain system security and reduce the risk of an overall system failure. The System Operator follows specific procedures for load shedding that typically include rotating the customers who have service interrupted when possible. This reduces the duration of the service interruption to specific customers.

The BEDRP will contract with third-party Emergency Demand Response ("EDR") Aggregators who will incentivize eligible customers to use their Behind the Meter ("BTM") batteries for personal generation and export excess energy to the grid during emergency conditions. An EDR Aggregator refers to a qualified entity that has a portfolio of customers with Distributed Energy Resources (DERs) that can be managed collectively to provide energy, capacity, or ancillary services and has executed a standard master aggregation agreement with PREPA, with LUMA acting as agent of PREPA, to participate in the BEDRP. A BEDRP Event occurs when all available generation resources are in use and LUMA acting as System Operator determines that the system will be unable to meet forecasted energy requirements. When there is a BEDRP Event, LUMA can request energy from DR Aggregators to help support electric service stability during emergency conditions.

¹ See: Law 17 - 2019, Puerto Rico Public Policy Act

² Pursuant to the Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement among LUMA Energy Servco, LLC ("LUMA"), LUMA Energy, LLC, the Puerto Rico Electric Power Authority ("PREPA") and the Puerto Rico Public Private Partnerships Authority dated as of June 22, 2020, as supplemented and as may be amended from time to time in accordance with its terms ("T&D OMA"), LUMA provides operations and maintenance of the Puerto Rico transmission and distribution system owned by PREPA and related assets ("T&D System") on behalf of or as agent for PREPA. Therefore, the BEDRP program was created and is managed by LUMA on behalf of PREPA and any actions taken by LUMA in connection with the Program are taken on behalf of or as agent for PREPA as owner of the T&D System; all references to any approval, communication, notification or other action issued or taken by LUMA in relation to the Program prior to the expiration or early termination of the T&D OMA shall be deemed an approval, communication, notification or other action issued or taken by PREPA as owner of the T&D System.

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In compliance with the Energy Bureau's Resolution and Order issued August 11, 2023,³ LUMA is providing an overview of the BEDRP, estimated costs including the incentive compensation offered to EDR Aggregators and an explanation the identified BEDRP costs. As determined by the Energy Bureau in its July 31, 2023 Resolution and Order,⁴ the costs related to the DR programs shall be recovered through the Purchase Power Charge Adjustment (PPCA, or generation power supply costs) because emergency demand response financial incentives are considered energy purchases. Secure, long-term funding is essential for the success of DR programs. If approved by the Energy Bureau, FY2024 BEDRP costs will be part of the PPCA calculations presented to the PREB as part of the Permanent Rate docket filings. LUMA is solely responsible for calculating the cost of purchased power adjustments based on the information provided by generators and does not financially benefit from purchased power charge adjustments to customer bills.

LUMA is supportive of Demand Response programs designed to mitigate rotational load shedding, which will benefit all customers in Puerto Rico. The BEDRP is one of many activities that LUMA is carrying out in order to continue to work toward a more reliable, more resilient, cleaner, and more affordable energy future for all Puerto Ricans.

³ See: [Resolution and Order](#) Subject: Addressing Requests for Funding Clarity and Adjusted Milestone Deadlines for Emergency Demand Response Program in Case No/ NEPR-MI-2022-0001, In Re: Energy Efficiency and Demand Response Transition Period Plan.

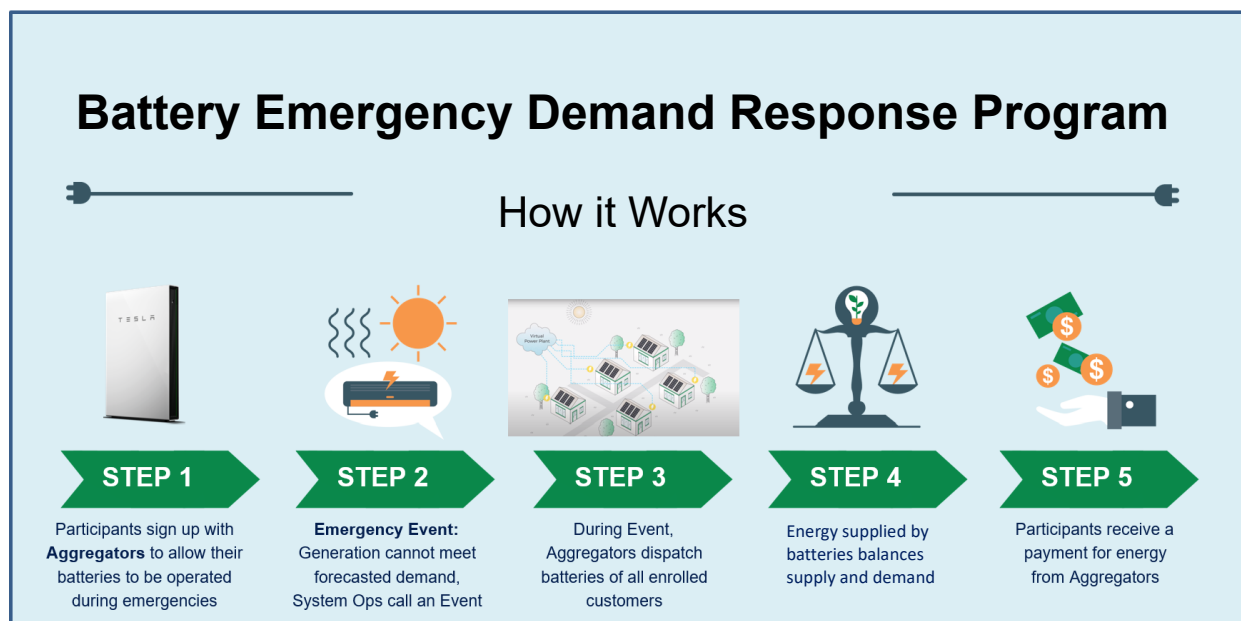
⁴ See: [Resolution and Order](#) Subject: Addressing Requests for Funding Clarity and Adjusted Milestone Deadlines for Emergency Demand Response Program in Case No/ NEPR-MI-2022-0001, In Re: Energy Efficiency and Demand Response Transition Period Plan.

2.0 Program Cost Structure

2.1 Overview

BEDRP targets PREPA residential and commercial customers with BTM batteries that are registered in the LUMA Net Energy Metering (NEM) Program. The Program provides compensation to participating customers for operating their BTM batteries during BEDRP Events. Customer Participation in the Program is voluntary, and participating customers may opt out of the Program at any time. BEDRP Events will be triggered by generation emergencies and will help improve system reliability.

The BEDRP is delivered by DR Aggregators who, as mentioned, must be qualified, and have executed a standard Master Aggregation Agreement with LUMA (acting as PREPA agent). DR Aggregators will be responsible for enrolling and signing agreements with customers in the Program, dispatching battery resources of participating customers during BEDRP Events called by LUMA and compensating these customers for the energy provided. Customers participate in the BEDRP by signing up with a DR Aggregator. LUMA will provide a standard non-negotiable performance payment of \$1.25/kWh to DR Aggregators for their aggregation services, who, in turn, must provide compensation to participating customers for operating their batteries during BEDRP Events according to the DR Aggregators' unique business model and customer value proposition, as per their agreement. The image below illustrates how the Battery Emergency Demand Response Program works.



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2.2 Costs

Table 1 below provides a breakdown of estimated costs for the first year of the BEDRP (which would be FY24), along with the inputs and assumptions behind this cost estimate. The total cost for the BEDRP in FY24 is estimated to be \$5.1 million (as shown in row L), which represents the total amount to be recovered through the PPCA as ordered by the Energy Bureau in its July 31, 2023 Resolution and Order.⁵ This total cost includes approximately \$3.9 million for energy payments to DR Aggregators (row J) and approximately \$1.1 million for Program Administration (row K). An additional supporting narrative explaining the basis for this cost estimate is provided below.

Table 1. BEDRP Cost Estimate

	Inputs and Assumptions	Value	Calculations
A	Enrolled Customers (#)	6,500	
B	Average Battery Capacity (kWh/battery)	13	
C	Average Battery Reserve (%)	50%	
D	Total Available Energy per Event (kWh)	42,250	A x B x C
E	Total Available Capacity per Event (kW)	21,125	D / F
F	Average Event Duration (Hours)	2	
G	Estimated Annual Events (#)	75	
H	Aggregator Energy Payment (\$/kWh)	\$1.25	
	FY24 Program Totals		
I	Total Annual Energy Delivered (kWh/yr)	3,168,750	D x G
J	Total Annual Aggregator Payments (\$/yr)	\$3,960,938	H x I
K	LUMA Administrative Costs (\$/yr)	\$1,100,000	
L	Total Annual Program Costs	\$5,060,938	J + K

⁵ See: [Resolución y Orden](#) Subject: Determinación sobre los Factores de las Cláusulas de Ajuste Trimestral para el periodo de agosto a septiembre de 2023 in Case No. NEPR-MI-2020-0001, In Re: Permanent Rate of the Puerto Rico Electric Power Authority. Supra

2.3 Explanation of Estimated Program Costs

The Total Annual Aggregator Payment (row J) is based on the estimated Total Annual Energy Delivered (row I) multiplied by the Aggregator Energy Payment (row H) of \$1.25/kWh. This payment is a standard non-negotiable rate to be offered to all eligible DR Aggregators for the aggregation services. This amount was determined by LUMA based on a review of similar incentives from other jurisdictions and collected input from potential DR Aggregators. The amount was estimated to be the minimum amount required to generate sufficient customer interest and participation in the Program, within current budget limits. DR Aggregators will be required to pass on a portion of the payment to customers, though they have the flexibility to determine the specific terms and conditions of customer payments. Customers may opt out of any BEDRP Events with no penalties, though they would not receive any compensation for events they opt out of. The payment (\$/kWh) should not be compared to the cost of other generation because the BEDRP payment takes into account the value of energy procured during “grid emergencies” when other all other generators are unavailable.

The Total Annual Energy Delivered (row I) is based on the Total Available Energy per Event (row D) multiplied by the Estimated Annual Events (row G). The Total Available Energy per Event assumes that an average of 50% of each customer’s battery energy will be held in reserve for customer backup use and 50% will be used during the Event. The battery reserve is a setting that is determined by each customer and thus is subject to change based on customer preferences.

The current budget is sufficient for starting the program at a small scale to allow time for refining program operations, conducting program evaluation, and any necessary engineering analysis before considering when the program could be scaled up to a larger size. The PPCA mechanism allows an opportunity to revisit program costs on a quarterly basis to adjust and reconcile as necessary. The number of Enrolled Customers (row A) and the Estimated Annual Events (row G) are both determined by the available budget. If the program meets the stated objectives and more budget is made available (including through federal funding), the program could be expanded. A larger program would enable DR Aggregators to enroll more customers and allow LUMA to dispatch more events based on the forecasted system needs.

The Administrative Cost (row L) is based on estimates of LUMA’s annual costs to deliver the program, which includes all program management, system operations, customer service, professional services, and program evaluation expenses that can be directly attributed and allocated to the BEDRP.

At this time additional funding for BEDRP has not been identified. There has been discussion with state and federal agencies on providing additional funding for DR initiatives. To the extent alternative funding sources are identified, obligated, and disbursed to LUMA by the relevant state or federal government entities for purposes of funding the BEDR Program, LUMA will promptly communicate with the Energy Bureau. Those monies could be used in the calculation of the PPCA to reduce the applicable factors or in order to expand the scope of the program.

2.4 Anticipated Timeline

In the August 11 Order, the Energy Bureau ordered LUMA to file, “within two weeks of the Energy Bureau’s approval of the compensation to the participants, proof it has published Emergency DR program terms, established agreements with DR aggregators, and enrolled customers in the program”. The Energy Bureau also ordered LUMA to file “within two weeks of its filing proof of customer enrollment, documentation showing that LUMA has the capacity to call Emergency DR events. LUMA’s ability to meet certain milestones as set forth by the Energy Bureau, is contingent on additional factors outside LUMA’s control.

In this regard, once the Energy Bureau has approved the BEDRP cost provided above, LUMA will publish the BEDR Program Terms as part of the procurement process that will be issued on Power Advocate (see Table 2). LUMA will issue a Request for Acquisition, notify potential DR Aggregators about the opportunity, and gather qualifications to identify eligible DR Aggregators. All DR Aggregators determined to be eligible through this process will then be invited to execute a Master Aggregator Agreement, which should be complete by mid-September. It should be noted that DR Aggregators will be able to enroll in the program on a rolling basis, even after the process has closed. Once the Agreement is executed, DR Aggregators may begin recruiting and enrolling customers. Shortly after customer enrollment begins, LUMA expects that DR Aggregators will be able to conduct a test event dispatch to confirm their ability to respond to LUMA’s request for additional energy.

Taking into account the steps described above, in Table 2. below, LUMA proposes a timeline to meeting the milestones as established in the August 11 Order.

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Table 2. BEDRP Timeline

Task	Description	Aug	Sept	Oct
1	LUMA PPCA Cost Filing			
2	Energy Bureau Approval of PPCA Costs			
3	LUMA Publication of BEDR Program Terms and Request for Acquisition			
4	LUMA Determination on Qualified DR Aggregators			
6	LUMA and Aggregators Execute Master Aggregation Agreements			
7	DR Aggregators Begin Recruiting and Enrolling Customers			
8	DR Aggregators Dispatch Test Event to Provide Proof for Energy Bureau			
9	LUMA Files Proof DR Aggregators Have Enrolled Customers and Conducted Test Event			

The time estimates made by LUMA are based on the assumptions discussed above. Some of the milestones in the August 11 Order may not be reached by the timeframes established by the Energy Bureau and are contingent on additional factors outside LUMA's control. LUMA will timely inform the Energy Bureau of any potential delays LUMA becomes aware of.