

**GOVERNMENT OF PUERTO RICO
PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU**

IN RE: IMPLEMENTATION OF THE PUERTO RICO ELECTRIC POWER AUTHORITY INTEGRATED RESOURCE PLAN AND MODIFIED ACTION PLAN

CASE NO.: NEPR-MI-2020-0012

SUBJECT: Renewable Energy Generation and Energy Storage Resource Procurement Plan – First Tranche Projects for Phase III Contract Negotiation and Final Interconnection Plan Approvals

RESOLUTION AND ORDER

I. SUMMARY

This Resolution and Order puts forth the approval by the Energy Bureau of the Puerto Rico Public Service Regulatory Board (“Energy Bureau”) for nine (9) 4-hour duration utility-scale Battery Energy Storage System (“BESS”) projects totaling 490 MW and one (1) 17 MW Virtual Power Plant (“VPP”) project.

On April 28, 2022 the Puerto Rico Electric Power Authority (“PREPA”) submitted to the Energy Bureau a document titled *Memorandum of Law in Support of Request for Confidential Treatment of Attachment A* and as Attachment A (under seal) to that a document titled *Informative Motion and Responses to Resolution and Order Issued on April 11, 2022* (“April 28 Informative Motion”).¹ The April 28 Informative Motion contained a recommendation by PREPA for approval of four (4) utility-scale BESS projects totaling 240 MW of capacity with a 4-hour duration, and a 17 MW VPP project. The April 28 Informative Motion also contained information on six (6) additional utility-scale BESS resource proposals totaling 275 MW and a 150 MW VPP proposal. The April 28 Informative Motion contained PREPA’s rationale for recommending the four utility-scale BESS projects and one of the two proposed VPPs, and its rationale for not recommending the remaining six utility-scale BESS projects and the other VPP.

As described herein, the Energy Bureau **AUTHORIZES** PREPA’s request to finalize its negotiations with the proponents with their recommended four utility-scale battery storage resource project proponents (240 MW total), and one VPP provider (17 MW total), as set out in PREPA’s April 28 Motion.²

The Energy Bureau also, critically, **AUTHORIZES** PREPA to finalize its negotiations with the proponents for contract for additional five (5) utility-scale BESS projects (250 MW, total) in furtherance of Puerto Rico’s urgent needs to:

- i) Reliably integrate increasing amounts of renewable energy resources onto its system and avoid potential curtailment of renewable resource output (solar PV or wind),
- ii) Support the reliability and resiliency of the electric power grid with flexible, dispatchable capacity resources that provide energy, operating reserve, and transmission grid security attributes, and
- iii) Reduce local air pollution by not delaying the planned retirement of the oldest and most polluting of PREPA’s existing fossil-fueled power plants.

Puerto Rico continues to be threatened with short and longer-term outages due in part to the lack of sufficient, reliable capacity resources to meet load requirements, and this authorization seeks to assist in remedying that concern without further delay while

¹ Attachment A to the Memorandum of Law.

² Informative Motion at page 1 and page 15.



simultaneously supporting clean air needs for Puerto Rico and aiming to meet the 2025 requirements of the Puerto Rico Renewable Portfolio Standard (RPS).³

The Energy Bureau authorizes PREPA to finalize its negotiations with the proponents of these projects as being in alignment with Puerto Rico's needs as reflected in the Modified Action Plan set out in the IRP.⁴ ⁵ The rationale for these battery storage resource project authorizations and the VPP authorization are contained herein.

II. INTRODUCTION

On August 24, 2020, the Energy Bureau issued the IRP Order, with respect to the Integrated Resource Plan ("IRP") of PREPA. The IRP Order approved a Modified Preferred Resource Plan that included a plan for six (6) tranches of procurement of renewable energy and battery storage resources.⁶

On December 16, 2021, PREPA submitted a document titled *Motion Submitting 733 MW of PV Renewable Energy Draft Power Purchase and Operating Agreements Offered in Tranche 1 of PREPA's Renewable Generation and Energy Storage Resources RFP for Energy Bureau Evaluation and Approval* ("December 16 Motion"). In that December 16 Motion PREPA identified fifteen (15) solar PV projects totaling 732.7 MW and submitted draft bespoke power purchase and operating agreements ("PPOAs") contracts for those projects, for evaluation and approval by the Energy Bureau. In the December 16 Motion PREPA also identified three (3) battery energy storage resource projects (4-hour duration) totaling 220 MW, for which PREPA indicated planned submission of bespoke energy storage services agreements (ESSAs) was intended by or before December 23, 2021. PREPA included in its December 16 Motion submission of Attachment A, a memorandum from PREPA's Tranche 1 Evaluation Committee describing the detailed evaluation approach taken to arrive at its selection of project offerings for approval.

On December 23, 2021, PREPA submitted a document titled *Supplemental Motion Submitting PV Renewable Energy Draft Power Purchase and Operating Agreements (PPOAs) As Well As Energy Storage Service Agreements (ESSAs) As Part of PREPA's Tranche 1 Renewable Generation and Energy Storage Resources RFP For Energy Bureau Evaluation and Approval* ("December 23 Motion"). PREPA submitted three bespoke ESSA contracts totaling 220 MW reflecting the projects indicated in the December 16 Motion and also submitted three solar PV bespoke contracts totaling 112.1 MW, additional to the 732.72 MW of solar PV projects submitted for authorization in the December 16 Motion. In total, the combined solar PV resource procurements for which authorization was sought by PREPA was 844.82 MW.

On December 28, 2021, the Energy Bureau issued a Resolution and Order seeking additional information concerning the December 16 Motion ("December 28 Order"). The December 28 Order included a set of questions as Attachment A, to which PREPA was ordered to respond by January 7, 2022.

The December 28 Order requested submission by PREPA of four project offerings totaling 130 MW of solar PV, in addition to the 732.72 MW for which authorization was requested in the December 16 Motion, based on the full set of solar PV projects identified in PREPA's Attachment A to its December 16 Motion. These "Four Additional PV" projects were initially assessed by the Energy Bureau as in alignment with the intentions of the IRP Modified Action Plan and as meeting a \$105/MWh threshold when their LCOE (IEA metric) is estimated in

³ RPS of 40% by 2025.

⁴ Final Resolution and Order on the Puerto Rico Electric Power Authority's Integrated Resource Plan, *In re: Review of the Integrated Resource Plan of the Puerto Rico Electric Power Authority*, Case No. CEPR-AP-2018-0001, August 24, 2020 ("IRP Order").

⁵ IRP Order, Section IV, Action Plan.

⁶ IRP Order, pp. 266-268, ¶ 860.



real currency terms. The December 28 Order further requested submission by PREPA of “Six Additional Storage” projects in addition to the 220 MW of 4-hour duration project offerings contained in the December 16 Motion.

On January 6, 2022, PREPA submitted a *Request for Clarification, Partial Reconsideration of the December 28 Order, Confidential Meeting, and for Extension of Time* (“January 6 Request”). In its January 6 Request PREPA noted that its December 23 Motion submission included a PREPA Tranche 1 Committee recommendation that, based on meeting levelized cost of energy (“LCOE”) thresholds, additional solar PV procurement totaling 112.1 MW should be approved, for a total solar PV Tranche 1 capacity of 844 MW. PREPA further requested a confidential meeting to discuss energy storage proposal selection processes, extend the deadline for submitting responses to the December 28 Order questions, and be relieved from providing FOMB approvals for projects because until the Energy Bureau authorizes those projects FOMB⁷ would not be in position to review the PPOAs and ESSAs. PREPA requests clarification or reconsideration of the December 28 Order, and to set aside the Energy Bureau’s request to submit additional solar PV offerings.

On January 12, 2022, PREPA submitted a document titled *Motion in Compliance with the December 28 Order Submitting 167 MW of VPP Resources and Reiterating Request for Confidential Meeting and Extension of Time* (“January 12 Motion”). In this January 12 Motion in part, PREPA reiterated its request for an extension of time to answer questions from the December 28 Order, in addition to providing information on the status of Virtual Power Plant Grid Service Agreements (“GSAs”) and pending issues and reiterating a request for a confidential meeting on energy storage resources information.

In the January 12 Motion PREPA reiterates the request for a confidential meeting and filed drafts of Bespoke Contracts for VPP Resources (“Draft GSAs”) with two VPP Proponents.

On January 26, 2022, PREPA filed a document titled *Motion Reiterating Request for Meeting to Discuss Responses to Attachment A of the December 28 Order and Energy Storage Resources* (“January 26 Request”). In the January 26 Request, PREPA reiterates its request for a confidential meeting to discuss the energy storage information as well as the questions in Attachment A to the December 28 Order and to grant ten (10) business days after the requested meeting to submit the information required.

On January 28, 2022, the Energy Bureau issued a Resolution and Order in this matter addressing PREPA’s requests for extensions to respond to questions from the December 28 Order, granting certain PREPA requests concerning refiling of information, and clarifying aspects of the December 28 Order.

On February 2, 2022, the Energy Bureau issued a Resolution and Order in this matter authorizing eighteen (18) solar PV PPOA’s resource projects for PREPA to finalize its negotiations with those proponents.

On February 2, 2022, PREPA filed a document titled *Motion in Compliance with the January 28 Order Submitting Energy Storage Resources Information, the Next Two Projects Totaling 50MW of Solar PV Resources and Memorandum of Law Requesting Confidential Treatment* (“February 2 Motion”). PREPA filed information regarding the six additional BESS projects and the two projects totaling 50 MW of solar PV resources.⁸

On March 1, 2022, PREPA filed a document titled *Memorandum of Law in Support of Request for Confidential Treatment of Attachment A* (“March 1 Memorandum”). The March 1 Memorandum included as Attachment A, filed under seal, a document titled *Informative Motion Regarding Status of VPP Contract Negotiations and Delays in Finalizing Form of Interconnection Agreement* (“March 1 Motion”). Through the March 1 Motion, PREPA

⁷ Federal Oversight and Management Board for Puerto Rico.

⁸ February 2 Motion, p. 5.



provides an update on the status of PREPA's discussion regarding the VPP Proponents and with representatives of LUMA regarding a potential significant delay regarding the Interconnection Agreement. The March 1 Motion includes as Exhibit A, on a confidential basis, a Bespoke GSA as it stands with one of the VPP Proponents.⁹

On March 17, PREPA filed a document titled *Memorandum of Law in Support of Request for Confidential Treatment of Attachment A* ("March 17 Memorandum"). The March 17 Memorandum included as Attachment A, filed under seal, a document titled *Informative Motion Identifying Concerns Regarding Pricing and Certain Commercial Terms Offered by Tranche 1 VPP Project Proponents and Request for Confidential Meeting to Discuss Selection of Tranche 1 VPP Proposals* ("March 17 Motion"). The March 17 Motion provides an update on the status of the two VPP Proponents and the finalization of the GSA's.¹⁰

On April 11, 2022, the Energy Bureau issued a Resolution and Order ("April 11 Resolution") to obtain additional information from PREPA and LUMA concerning the status of Tranche 1 resource offerings and interconnection cost considerations. In the April 11 Resolution, the Energy Bureau issued questions 1-5 for PREPA to respond and issued questions 6-7 for LUMA to respond. Both PREPA and LUMA were to respond on or before April 19, 2022.

On April 19, 2022, LUMA presented a document titled *Motion Submitting Partial Response and Requesting Brief Extension to Submit LUMA's Full Answers to Questions 6 and 7 in the Energy Bureau's Resolution and Order of April 11, 2022* ("April 19 Motion"). In the April 19 Motion, LUMA addressed the lack of access to certain information that PREPA provided to LUMA on April 18, 2022. Due to the short period to respond, LUMA prepared partial responses to Questions 6 and 7 and requested an extension until April 29, 2022, to submit its complete answers to Question 6 and 7.¹¹

On the same day, PREPA filed a document titled *Motion for Extension of Time Until April 25, 2022, to Comply with Responses Required by the April 11, 2022, Resolution and Order* ("April 19 Request"), where PREPA requested an extension until April 25, 2022, to file its responses to the April 11 Resolution.

On April 22, 2022, the Energy Bureau issued a Resolution and Order granting both PREPA and LUMA to file their complete responses to the April 11 Resolution on or before April 28, 2022.

On April 27, 2022, the Energy Bureau issued a Resolution and Order ("April 27 Resolution") through which it ordered LUMA to file the results of the final Tranche 1 technical studies by May 30, 2022 and ordered PREPA to file the execution copies of the 18 authorized PPOAs by June 30, 2022.

On April 28, 2022, PREPA submitted a document titled *Memorandum of Law in Support of Request for Confidential Treatment of Attachment A* ("April 28 Memorandum"). Attachment A of the April 28 Memorandum includes a document titled *Informative Motion and Response to Resolution and Order Issued on April 11, 2022* ("April 28 Informative Motion"). The April 28 Informative Motion included responses to the Energy Bureau questions from the April 11 Resolution and requested approval of four (4) utility-scale BESS projects totaling 240 MW and one (1) VPP resource totaling 17 MW. In the April 28 Memorandum, PREPA states that the April 28 Informative Motion and its attached responses included in Attachment A contains detailed information related to ongoing negotiations, strategies to prepare documents to be negotiated and proposals in the Tranche 1 RFP process, which, pursuant to

⁹ March 1 Motion, pp. 2-3, ¶ 2.

¹⁰ March 17 Motion, p. 3, ¶ 5,

¹¹ April 19, Motion, p. 3, ¶¶ 6-7.



applicable law and regulation are confidential until the adjudication and award process is final.¹²

On the same day, LUMA filed a document titled *Motion Submitting Complete Responses to Questions 6 and 7 in the Energy Bureau's Resolution and Order of April 11, 2022 and Requesting Confidential Treatment* ("April 28 Motion"). In the April 28 Motion, LUMA attached Exhibit A which includes a complete response to questions 6 and 7 of the April 11 Resolution.¹³ In the April 28 Motion, LUMA argues that the responses in Exhibit A were prepared based on and Informative Motion which PREPA filed under seal of confidentiality since it is regarding the RFP process which is still under a deliberative process. Therefore, LUMA request the Energy Bureau to receive and maintain Exhibit A under seal of confidentiality, since the responses are part of the deliberative process.¹⁴

III. DISCUSSION AND FINDINGS

The table identified as Confidential Appendix A of this Resolution and Order ("Confidential Appendix A") contains a list of the ten battery energy storage proposals submitted by PREPA in Table 2 of its April 28 Informative Motion ("PREPA Table 2") in response to the Energy Bureau's questions from the April 11 Resolution. Confidential Appendix A contains information provided in PREPA Table 2 and indicates the per unit first-year price for each of the ten BESS proposals. PREPA Table 2 contained only the first-year total cost, even though it was labeled as a first-year price. Confidential Appendix A includes a ranking of the proposals using the first-year price, which results in a different rank order than that resulting from using the proponent-provided levelized cost of storage ("LCOS") metric. Confidential Appendix A also contains a "weighted portfolio" LCOS metric based on the MW-size-weighted LCOS for a portfolio comprised of a group of proposals considered for selection based on the ranking seen in Confidential Appendix A.

Confidential Appendix A also contains additional identifying information for the proposals. Seven of the proposals would interconnect at 115 kV, and three proposals would interconnect at 38 kV. Four proposals are listed as "ITC", indicating that the proponents intend to utilize the federal investment tax credit, available to BESS resources if they are limited to charging with renewable energy resources during at least the first five years of their operation, with incentive amounts varying depending on specific charging circumstances.¹⁵ Six proposals are listed as "Standalone" indicating that battery charging would be from resources connected to PREPA's grid. PREPA does not describe in its responses the potential increased operational flexibility associated with standalone systems, which could be available to absorb grid energy when required and could be less constrained in total as a capacity resource available to LUMA for operational flexibility.

The Confidential Appendix A also contains information for the two VPP proposals. PREPA did not provide any proponent-computed LCOS for these projects, nor did PREPA themselves compute an LCOS for these projects or evaluate these projects on the basis of their ability to support resiliency aims for Puerto Rico critical load.¹⁶ PREPA provides comparative data

¹² April 28 Informative Motion, p. 3.

¹³ April 28 Motion, p. 4, ¶ 8.

¹⁴ *Id.*, p. 4, ¶¶ 9-10

¹⁵ See, e.g., NREL, *Federal Tax Incentives for Energy Storage Systems*, available at: <https://www.nrel.gov/docs/fy18osti/70384.pdf>. Last verified on May 24, 2022.

¹⁶ Tranche 1 RFP, Page 42: "The evaluation team will consider and evaluate the additional benefits that distributed resources procured as part of a VPP may provide, including (i) the potential to avoid transmission and distribution system costs (including T&D system losses), (ii) the possible enhancement of local resiliency by serving critical or priority loads, and (iii) the potential for completion of any required installation in shorter periods, or more immediate availability as a capacity resource based on an existing installation, than would be true of a new-build project."



indicating that one of the two VPP proposals, for 17 MW, has considerably increased availability as a demand-building or demand-reducing resource compared to the other VPP proposal, for 150 MW.¹⁷

Confidential Appendix A lists these BESS projects in the order of a lowest-to-highest-cost ranking provided by PREPA Table 2 based on the “Proponent’s Calculated LCOS (\$/MWh)”. The projects range from 20 MW to 100 MW in size. There are three (3) 100 MW proposals, two (2) 50 MW proposals, three (3) 25 MW proposals and two (2) 20 MW proposals. In total, the ten projects comprise 515 MW of 4-hour duration utility-scale battery energy resource proposals distributed across the island, though concentrated in the south. Confidential Appendix A identifies six (6) proposed projects (395 MW total) that are located across the southern half of Puerto Rico.

PREPA recommends contract authorization for the first four proposals listed in Confidential Appendix A, totaling 240 MW (two 100 MW and two 20 MW proposals). PREPA also recommends contract authorization for a 17 MW VPP.¹⁸

Section III and Section IV of PREPA’s April 28 Informative Motion contain its rationale for recommending four projects and one VPP. PREPA states that it has used the PREPA’s 2022 Certified Fiscal Plan as a budgetary guide to selecting battery energy storage proposals.¹⁹ PREPA states that deviations from the PREPA’s 2022 Certified Fiscal Plan “ultimately imply upward pressure on rates”.²⁰ PREPA further states that it computed its original threshold of \$120/MWh (for LCOS) based on the Certified Fiscal Plan budgetary data and application of a differential analogous to the rationale used to determine a \$105/MWh levelized cost of energy threshold for renewable energy projects.²¹ While PREPA states that it “did not revisit the originally identified \$120/MWh energy storage pricing threshold to establish a new specific threshold...”²² it did determine that a \$182/MWh value represents the mid-point of a range of LCOS (\$131/MWh - \$232/MWh) identified based on an industry standard analysis²³ of utility scale battery energy storage costs for 4-hour duration resources, the Lazard Cost of Energy Storage publication.²⁴

PREPA based its recommendation for four utility scale battery energy storage projects by using the mid-point of the Lazard analysis. PREPA did not provide any further explanation for why the \$182/MWh value represents a reasonable cutoff point for Tranche 1 BESS resource selection. While PREPA states that “energy storage projects offering prices that yield a LCOS of around \$182/MWh are not contrary to ratepayers’ long-term interests”, PREPA does not further explore the extent to which additional projects above the level of \$182/MWh (LCOS) may also be beneficial to ratepayers, especially considering PREPA’s earlier comments concerning the need for PREPA’s system to have battery energy storage resources to support Puerto Rico’s Energy Public Policy Act.²⁵

¹⁷ April 28 Informative Motion; Informative Motion Identifying Concerns Regarding Pricing and Certain Commercial Terms Offered by Tranche 1 VPP Project Proponents and Request for Confidential Meeting to Discuss Selection of Tranche 1 VPP Proposals, *In Re. The Implementation of the Puerto Rico Electric Power Authority Integrated Resource Plan and Modified Action Plan*, Case. No. NEPR-MI-2020-0012, March 17, 2022.

¹⁸ April 28 Informative Motion, p. 1.

¹⁹ April 28 Informative Motion, p. 10, ¶ 18.

²⁰ *Id.*

²¹ April 28 Informative Motion, pp. 11-12, ¶ 20.

²² April 28 Informative Motion, footnote 22 at page 10.

²³ Lazard Levelized Cost of Storage Analysis, version 7.0, October 28, 2021, available at: [Lazard.com \(Levelized Cost Of Energy, Levelized Cost Of Storage, and Levelized Cost Of Hydrogen\)](https://www.lazard.com/media/437921/levelized-cost-of-storage-analysis-version-7-0-october-2021.pdf). Last verified May 25, 2022.

²⁴ April 28 Informative Motion, pp 14-15, ¶ 25.

²⁵ April 28 Informative Motion, po. 6-7, ¶ 12.



PREPA does not provide any detailed information on the way in which battery storage resource costs would specifically affect rates, nor does it provide any information on the extent to which other system costs could be avoided as a result of proceeding with battery energy resource installations. PREPA does not directly address the extent to which any alternative funding sources may be available for resources that directly support the resiliency of the Puerto Rico electric power system and how such funding could potentially mitigate rate effects.

PREPA does not offer extensive insights into the extent to which battery energy storage resource installations beyond the 240 MW level at this time could help to alleviate reliability or resiliency concerns associated with insufficient flexible capacity across its system. However, PREPA notes that “The T&D System needs energy storage capacity. Procuring storage capacity not only would permit the integration of the approximately 1,000 MW of new renewable energy generation that PREPA has already identified for procurement (i.e., 844.8 MW from Tranche 1 plus the expansions of operating renewable projects approved in 2020 and the 150 MW that survived the “shovel-ready” renewable project contract renegotiation process), but also would support the broader reliability and resiliency of the T&D System through the ancillary and other services that such storage can provide. PREPA recognizes this and views the proposed energy storage projects as helping it achieve important objectives of Puerto Rico’s energy public policy, as articulated in Act 17-2019 (the “Energy Public Policy Act”).”²⁶

PREPA acknowledges “that the Energy Bureau may view the maintenance of a 2 to 1 ratio of renewable generation to energy storage resources as essential, and therefore the Energy Bureau may be inclined to favor the selection of additional Tranche 1 energy storage project proposals beyond the four PREPA has identified as least cost. Selecting the fifth through ninth Projects listed on Table 2 would in theory permit the attainment of the target 2 to 1 ratio, but at an annual cost of storage services that would substantially exceed the annual amounts budgeted for such services in the Fiscal Plan for 2024.”²⁷

PREPA submitted in the February 2 Motion, information on six additional energy storage proposals in its response to Energy Bureau questions.²⁸ The April 28 Informative Motion updated this information, indicating that multiple project size options were available from certain proponents, and that one project had been erroneously included in the original six additional projects.²⁹ Notably, PREPA also indicated that upon review of information submitted by proponents in response to a request by PREPA in January 2022 to provide additional technical information, its contractor Sargent and Lundy found that many inputs changed, resulting in material differences in calculated LCOS values compared to the original proposals.³⁰ PREPA’s filing of ten projects in Table 2 now forms the basis for its consideration of utility scale projects for possible selection as Tranche 1 BESS resources.

PREPA indicates that of the ten projects listed in PREPA Table 2 and in Confidential Appendix A, one was mistakenly included in PREPA’s provision of six additional storage projects in its February 2 Motion. That proposal is ranked last by either PREPA’s proponent-developed LCOS metric as indicated in PREPA Table 2 or the first year per unit resource price as indicated in Confidential Appendix A. The Energy Bureau **DETERMINES** that that proposal

²⁶ *Id.*

²⁷ April 28 Informative Motion, p. 19, ¶ 32.

²⁸ Motion in Compliance with the January 28 Order Submitting Energy Storage Resources Information, the Next Two Projects Totaling 50 MW of Solar PV Resources and Memorandum of Law Requesting Confidential Treatment, *In Re. The Implementation of the Puerto Rico Electric Power Authority Integrated Resource Plan and Modified Action Plan*, Case. No. NEPR-MI-2020-0012 February 2, 2022 (“February 2 Motion”).

²⁹ April 28 Informative Motion, p. 13, ¶ 32.

³⁰ *Id.*, page 12-13.



ranked last in the Confidential Appendix A is to be excluded from further consideration for contract authorization in Tranche 1.

The Energy Bureau strongly **AGREES** with PREPA that the system needs energy storage capacity to support the broader reliability and resiliency needs of Puerto Rico. The integration of renewable resources in support of Act 17-2019³¹ public policy aims requires the presence of energy storage capacity in order to reduce the risk of curtailment of what will be newly installed solar PV energy, in increasing amounts and from both distributed and utility scale resources. The Energy Bureau further **DETERMINES** that this need for energy storage as a capacity resource is **URGENT**.

Since the transition of grid operation from PREPA to LUMA in June of 2021, Puerto Rico has experienced multiple incidences of system failures leading to loss of load across large portions of the island, for unacceptable lengths of time. While intermittent outages for individual or small pockets of electric system customers are not unreasonable, the scope and duration of outages seen since last year due at least in part to resource insufficiency is unacceptable. Part of the solution to provide increased resilience of grid operation is to have available, as soon as feasible, dispatchable capacity for LUMA to deploy. This is needed during normal operational activities including the need to schedule for maintenance and repair of existing older fossil generation, until it is replaced with new capacity resources. The IRP Order outcomes indicated that these new capacity resources include sizable amounts of battery energy storage. Battery energy storage can reduce the need to use fossil resources to provide operating reserve and energy. Battery energy storage can be deployed to support a wide array of ancillary service needs, in addition to a core functionality of "transferring" daytime solar PV output for availability during evening peak periods. The Energy Bureau **DETERMINES** that improving the resiliency of the electric system grid is fully supported by rapid deployment of battery energy resources. Battery energy storage deployment avoids future costs associated with older, less reliable fossil system generation and directly supports the integration of required renewable energy resources.

The two-to-one ratio of solar PV to battery energy storage generally seen in all optimal outcomes of IRP Order scenarios³² demonstrates the economic importance of ensuring battery storage presence as solar PV is installed. The Energy Bureau **DETERMINES** at this stage of the procurement process that maintaining a ratio of solar PV to 4-hour duration battery storage resources as close to 2 to 1 as is reasonably possible is **ESSENTIAL** to: i) support RPS³³ goals, ii) increase the resilience of the system, and iii) mitigate reliability concerns associated with inadequate capacity resources that lead to unacceptable levels of loss of load.

PREPA did not provide updated information on the specific escalators, degradation factors, or interconnection cost components of the proponent resources. Absent a clear trajectory of the pattern of costs over the contract period, the Energy Bureau at this time is unable to independently determine the real LCOS of the proponent proposals and relies upon nominal cost estimates from PREPA at this time for contract authorization. The Energy Bureau **DETERMINES** that comparing estimated nominal levelized costs based on PREPA-verified, proponent-provided cost information is sufficient to rank order the projects seen in PREPA Table 2 and Confidential Appendix A.

The Energy Bureau further **DETERMINES** that the urgency of need for capacity resources as set out in the reasoning above for reliability, resiliency and renewable energy integration combined with the overall portfolio-weighted cost of 490 MW of battery energy storage resources being within the range of mainland market costs for utility scale resources (i.e., less than \$232/MWh) supports the authorization granted to PREPA to finalize negotiations

³¹ Puerto Rico Energy Public Policy Act, April 11, 2019 ("Act 17-2019").

³² See, for example, IRP Order, Appendix C "Resource Scenario Modeling Results". August 24, 2020.

³³ Renewable Portfolio Standards ("RPS").



with the first nine proponents identified in Confidential Appendix A. The Energy Bureau **ORDERS** PREPA to finalize negotiations with the respondents for these nine projects.

Furthermore, the Energy Bureau authorization of nine BESS projects provides additional diversity in contractor selection, diversity in location of resources across the island, and diversity of interconnection voltage, as two 38 kV interconnected projects are included in the authorized approvals.

The Energy Bureau **APPROVES** PREPA's request for authorization to finalize negotiations with the 17 MW VPP provider, based on the record provided by PREPA of the proponent's ability to make the resource available for reasonable amounts of time and at costs comparable to those seen in the utility-scale resource proposals. The Energy Bureau **DETERMINES** at this time that the larger VPP proposal's failure to be available for sufficient periods of time excludes it from reasonable consideration as a capacity resource in Tranche 1 given its offered pricing. The Energy Bureau is mindful that VPP resources can be beneficial to the system even at lower levels of availability, and even at higher per unit costs than utility-scale battery resources. The Energy Bureau **ANTICIPATES** that future procurement tranches that include solicitation for VPP resources will contain options for those resource offerings that will better accommodate flexible availability parameters and the comparative evaluation of those offers.

The estimated levelized costs of roughly half of the BESS proposals seen in PREPA Table 2 and Confidential Appendix A are within the range of levelized costs seen in the 2021 Lazard Levelized Cost of Storage analysis. Notably, that analysis (focused on mainland North American) did not consider the extent to which a new island market for battery energy storage might reasonably incur additional delivery or implementation costs relative to more mature regions. Nonetheless, on a portfolio-weighted basis, the full complement of the first nine proposals listed in Table 2 is seen to be less than the upper end of Lazard's levelized cost range. The proposal costs are higher than those used as assumptions in the IRP process, which did not have access to any Puerto Rico market-based cost data.³⁴ However, the cost of competing capacity resources from the IRP analysis, namely combined cycle resources,³⁵ have also increased considerably from the IRP estimate.³⁶

The Modified Action Plan of the IRP Order calls for retirement, as soon as feasible but roughly by mid-decade, of the less efficient, higher-emitting heavy-oil fired steam resources at San Juan, Palo Seco and Aguirre.³⁷ Those resources come with considerable operational risk and may remain unavailable for a significant fraction of the time or require either extensive or regular maintenance in order to remain available as firm capacity resources.³⁸ As Puerto Rico transitions to a power system dominated by renewable-generated energy, the capacity provided by those resources will be replaced in large part by battery energy storage resources.

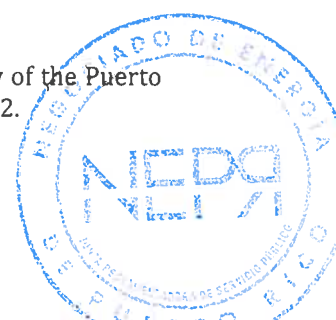
³⁴ PREPA, IRP filing at Section 6.5, Battery Storage, pages 6-27 through 6-32.

³⁵ Simple cycle combustion turbines and reciprocating engines were offered as capacity resources in the IRP modeling process, in addition to the fixed resource additions used in all scenarios. The model selected these resources, in relatively small quantities, but not at the scale of selection of battery energy storage resources, which are required for solar PV generation storage.

³⁶ PREPA, Attachment A to January 31, 2022, Motion, question 7b), indicates that the capital costs for a new combined cycle resource in San Juan were reported in 2021 to range from 1,431\$/kW to \$1,907/kW, in nominal currency. These values are 35%-81% higher than the estimate used in the IRP for a 302 MW combined cycle resource (\$1,055/kW, \$2021), based on the \$994/kW (\$2018) assumption from Exhibit 6-15 of the IRP filing (page 6-11).

³⁷ Puerto Rico is required to come into compliance with National Ambient Air Quality Standards (NAAQS - Puerto Rico is currently out of attainment) by mid-decade in parts of Puerto Rico due to sulfur dioxide emissions arising in large part from these oil-fired generation facilities.

³⁸ See, e.g., PREPA response to Request of Information #5, NEPR-MI-2021-0002, In Re: Review of the Puerto Rico Electric Power Authority's 10 Year Infrastructure Plan – December 2020. February 14, 2022.



The IRP Order Modified Action Plan approved a competitive solicitation framework for renewable energy resources.³⁹ Inherent in the planned procurement of more than 3,000 MW of solar PV (or other renewable technologies) and as much as 1,500 MW of battery storage resources,⁴⁰ over six tranches, that will be an evolving development of a competitive market for these resources in Puerto Rico. The Energy Bureau expects there to be variation in per unit costs for any particular solar PV, other renewable, or battery energy storage projects. Issues of scale, location, interconnection, financing, and other factors will lead to a range of costs for procurement of these resources in order to meet Puerto Rico's public policy goals. The Energy Bureau's consideration of a weighted portfolio price to define a threshold for battery energy storage project selection is reflective of this variation.

The Energy Bureau **ORDERS** PREPA to fully respond to the question contained in Appendix B on or by June 16, 2022.

The Energy Bureau **ORDERS** PREPA to finalize negotiations with the 9 BESS projects totaling 490MW and the 17MW VPP project. PREPA shall present final Energy Storage Service Agreements and the Grid Services Agreement to the Energy Bureau for their **FINAL APPROVAL**. PREPA shall present each agreement no later than ten (10) days after finalizing such negotiations.

The Energy Bureau, through the April 27 Resolution, ordered LUMA to file the final Tranche 1 technical studies and ordered PREPA to file the execution copies of the 18 approved PPOAs. Therefore, upon receiving the information of the final technical studies PREPA shall, as applicable, revise and finalize the negotiations with the 18 PPOA proponents and file for the **FINAL APPROVAL** of the Energy Bureau copies of PPOAs by June 30, 2022.

IV. CONFIDENTIALITY TREATMENT REQUEST

Act 57-2014⁴¹ establishes that any person having the obligation to submit information to the Energy Bureau, can request privilege or confidential treatment to any information that the party submitting understands deserves such protection.⁴² Specifically, Act 57-2014 requires the Energy Bureau to treat as confidential the submitted information provided that "the Energy Bureau, after the appropriate evaluation, believes such information should be protected".⁴³ In such case, the Energy Bureau "shall grant such protection **in a manner that least affects the public interest, transparency**, and the rights of the parties involved in the administrative procedure in which the allegedly confidential document is submitted."⁴⁴

Upon review of LUMA's and PREPA arguments and the law, the Energy Bureau **GRANTS** confidential designation and treatment to: i) the April 28 Informative Motion and its Attachment A; and ii) Attachment A of the April 28 Motion, for the reasons stated by LUMA and PREPA, since such information contains detailed information related to ongoing negotiations, strategies to prepare documents to be negotiated and proposals in the Tranche 1 RFP process, which, pursuant to applicable law and regulation are confidential until the adjudication and award process is final. The Energy Bureau **TAKES NOTICE** that once the adjudicative and award process of Tranche 1 is final, then such information shall become public.

³⁹ IRP Order, paragraph 859.

⁴⁰ IRP Order, paragraph 860, Table 17.

⁴¹ *Puerto Rico Energy Transformation and RELIEF Act*, as amended ("Act 57-2014").

⁴² Section 6.15 of Act 57-2014.

⁴³ *Id.*

⁴⁴ *Id.* (Emphasis added).




Be it notified and published.


Edison Avilés Deliz
Chairman


Ángel R. Rivera de la Cruz
Associate Commissioner


Lillian Mateo Santos
Associate Commissioner


Ferdinand A. Ramos Soegaard
Associate Commissioner


Sylvia B. Ugarte Araujo
Associate Commissioner

CERTIFICATION

I hereby certify that the majority of the members of the Puerto Rico Energy Bureau has so agreed on June 1st, 2022. I also certify that on June 13, 2022 a copy of this Resolution and Order was notified by electronic mail to the following: laura.rozas@us.dlapiper.com; margarita.mercado@us.dlapiper.com, kbolanos@diazvaz.law; and mvazquez@diazvaz.law and I have proceeded with the filing of the Resolution and Order issued by the Puerto Rico Energy Bureau.

For the record, I sign this in San Juan, Puerto Rico, today June 13, 2022.


Sonia Seda Gaztambide
Clerk



Confidential Appendix A

				Proponent / PREPA Reported LCOS (IEA Method)								
ID - Tag	Project MW	Cumulative MW if selected	Voltage	Regional Location	ITC / Standalone	Nominal LCOS \$/MWh	Nominal LCOS Weighted Portfolio \$/MWh	PREPA- reported 1st year contract price, Nominal \$/kW- year	1st year contract price, Nominal \$/kW-year, Adjusted for Daily Availability	Rank - LCOS	Rank - 1st year Price	First Year ESSA Cost
AX-1-E	20	20	115									
A-2-E	100	120	115									
C-2-E	100	220	115									
AZ-1-E	20	240	115									
L-3-E	100	340	115									
H-3-E	25	365	38									
W-2-E	50	415	115									
AA-2-E	50	465	115									
M-3-E	25	490	38									
Y-1-E	25	Not selected	38									
VPP-2	17	507	Distr.									
VPP-1	150	Not selected	Distr.									



Appendix B – Question for PREPA

1. Reference, page 21 of the April 28 Informative Motion: “Rather, it [the Evaluation Committee] directed the proponents on which inputs were required to calculate their own LCOS for each Tranche 1 RFP BESS project. The proponents then submitted their own LCOS values in accordance with the inputs they used to derive those values so that the Evaluation Committee could verify the calculations”.
 - a. State which specific inputs the Proponents were asked to use to derive their own LCOS.
 - b. For the ten proposed battery storage projected included in Table 2 in the April 28 Informative Motion, submit all data provided by proponents to PREPA.
 - c. Explain how the Evaluation Committee verified the calculations done by proponents and provide all workpapers used by the Evaluation Committee to complete this verification.

