

**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.**

RESOLUTION AND ORDER

I. SUMMARY

In this Resolution and Order the Energy Bureau of the Puerto Rico Public Service Regulatory Board (“Energy Bureau”) seeks additional information for the set of renewable energy and battery energy storage resources identified by PREPA in their December 16 Motion¹ as being evaluated in Phase III of the Tranche 1 RFP process.

The Energy Bureau finds that additional information is needed from the Puerto Rico Electric Power Authority (“PREPA”) to allow for a more thorough Phase III evaluation of respondent offerings for both solar PV and battery energy storage resources in Tranche 1 and directs PREPA to answer the questions included as Attachment A to this Resolution and Order.

The Energy Bureau has also determined at this time that in alignment with the directives set out in the August 24, 2020 IRP Order², and in consideration of a number of factors that reflect the benefits of meeting the initial quantity goals associated with procurement in Tranche 1, PREPA should continue its Phase III evaluation and directly consider additional projects currently not selected by PREPA in the December 16 Motion. These additional projects are listed herein.

The Energy Bureau expects to issue further directives in this matter after receiving response to the questions in Attachment A and after receiving additional information from PREPA concerning the status of potential virtual power plant (“VPP”) bespoke contracts.

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.³

On November 8, 2021 the Energy Bureau issued a Resolution and Order (“November 8 Order”) ordering PREPA to (i) on or before November 12, 2021, submit the results of Selection of Proposals for Phase III with the pricing evaluation per technology group required by the Energy Bureau together with copies of any communications to proponents selected to proceed to Phase III; and (ii) on or before December 1, 2021, complete Phase III

¹ 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, filed on December 16, 2021 in the instant proceeding (“December 16 Motion”).

² Final Resolution and Order on the Puerto Rico Electric Power Authority’s Integrated Resource Plan, *et al.* Review of the Puerto Rico Electric Power Authority Integrated Resource Plan, Case. No. CEPR-AP-2018-0001, August 24, 2020 (“IRP Order”).

³ IRP Order, pp. 266-268, ¶ 860.



and submit to the Energy Bureau for its evaluation and approval the corresponding draft Power Purchase and Operation Agreements.

On November 9, 2021, PREPA submitted a document titled *Motion Submitting Pricing Information Per Technology Group Regarding the Tranche 1 RFP and Request to Lift Imposition of Sanctions* ("November 9 Motion"). The submittal included a Sargent and Lundy ("S&L") report entitled *Renewable Energy Generation and Energy Storage RFP Tranche 1, Phase II: Qualitative and Pricing Evaluation* ("November 9 S&L Report").⁴

As part of the November 9 S&L Report, PREPA provided in *Exhibit A. Phase II Evaluation Summary* three (3) tables. Those tables contain information on the computed levelized cost of energy ("LCOE") and levelized cost of storage ("LCOS"). The first table contained a list of potential solar PV projects showing each potential project's total qualitative and pricing score, and a column labeled *LCOE (\$/MWh)* with numerical information based on the use of equations⁵ provided earlier in the report. A second table provided similar information except for battery storage offerings, and instead of a LCOE column, it contained a column labeled *LCOS (\$/MWh)*. A third three-column table contained information for three (3) virtual power plant ("VPP") offerings, with *Total Qualitative Score* and *LCOS (\$/MWh)* in the second and third columns, respectively, and the first column indicating the proposal offer identification tag *Proposal Tag*. No pricing information was provided in the VPP *LCOS (\$/MWh)* column of the third table.

No indication was provided at the time of the November 9 Motion as to the source of the LCOE or LCOS equations, or how their use could be considered in the context of the cost and benefits of solar PV or battery resources, or other resources, used as part of the IRP process. For both solar PV and battery energy storage resources, besides other resource options (including combustion turbine and combined cycle generation units), the IRP filing presented the cost assumption information primarily in real currency terms,⁶ although the inflation rate assumed for the IRP analyses does allow for conversion between real and nominal currencies as or if appropriate. The IRP analyses directly included the benefits associated with solar PV and battery energy storage resources. The LCOE and LCOS metrics do not provide information on the relative benefit of the solar PV or battery energy storage resources.

The levelized cost information provided in the first two tables of Exhibit A of the November 9 S&L Report was based on offer base rate and escalation pricing directly submitted by proponents, and the discount rate used in the formulations was 9%, as stated in the report.

On December 3, 2021, the Energy Bureau issued a Resolution and Order ("December 3 Resolution") directing PREPA to revise the formulations it uses to report on Tranche 1 respondent resource costs to be in line with the cost parameterization methods used in the IRP.

In the December 3 Resolution, for all solar PV projects, the Energy Bureau ordered PREPA to "develop a LCOE metric consistent across all respondents and consistent with the formulation used to estimate LCOE as presented in the IRP".⁷ The Energy Bureau also

⁴ In the November 9 Motion PREPA requested the November 9 S&L Report be granted confidential treatment.

⁵ The equations were based on an International Energy Agency (IEA) metric used for defining levelized cost of energy and levelized cost of storage, as noted in PREPA's December 8 filing, *Motion Submitting Updated Pricing Information per Technology Group in compliance with December 3, 2021, Resolution and Order*.

⁶ See IRP filing (June 7, 2019) generally Section 6, New Resource Options (pages 6-1 to 6-37), and specifically Exhibits 6-15, 6-17, 6-18, 6-21, 6-23, 6-24, 6-25, 6-31, 6-34, 6-35, 6-37, 6-38, 6-39, 6-40, *In re. Review of the Puerto Rico Electric Power Authority Integrated Resource Plan*, Case. No. CEPR-AP-2018-0001, June 7, 2019 ("IRP Filing").

⁷ December 3 Resolution, page 2.



ordered PREPA to not discount the energy term used in the denominator of the LCOE equation.

For battery energy storage resources, the Energy Bureau ordered PREPA to “prepare battery energy storage cost summaries for respondents’ offers to allow for meaningful comparison to the battery cost assumptions used in the IRP.”⁸ The Energy Bureau also directed PREPA to not discount the term in the denominator of any LCOS metric, if PREPA chose to use such a metric for battery storage.

On December 8, 2021, PREPA submitted a document titled *Motion Submitting Updated Pricing Information per Technology Group in Compliance with December 3, 2021, Resolution and Order* (“December 8 Motion”). The December 8 Motion included an attachment which PREPA requested confidential treatment with pricing information for the proposed solar PV and battery storage projects. That December 8 Motion and the associated attachment contained price data from respondents to the RFP for both solar PV and battery energy storage resources. PREPA presented four LCOE and four LCOS metrics as part of the filing, reflecting the IEA, IRP, NREL, and the December 3 Resolution formulations.⁹

PREPA noted that they “did not receive the information necessary to present the ESSA [energy storage services agreement] costs in a format that allows for meaningful comparison to the battery cost assumptions used in the IRP”.¹⁰

The December 8 Motion did not contain any pricing information for virtual power plant proponent offers in response to the Tranche 1 RFP.

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 the December 16 Motion PREPA indicated that they have successfully finalized Phase III offers to fifteen (15) proposals for Solar PV projects comprising a capacity of 732.7 MW. PREPA states these fifteen proposals are “at or below the threshold established”.¹¹ PREPA also states that “the LCOE prices may vary approximately +/- \$5/MWh after the required integration studies are concluded and the final interconnection cost estimates are determined by LUMA”.¹² PREPA did not include the FOMB¹³ approval for the submitted Bespoke Contracts as required for the Energy Bureau to commence its analysis of the contracts.

PREPA also indicated in the December 16 Motion that it has “effectively sought contracts for energy storage resources that encompass a capacity of 220 MW”.¹⁴ PREPA states it has used a threshold of \$120/MWh as an LCOS metric to apply to potential energy storage contracts when considering contract awards.¹⁵

⁸ *Id.*

⁹ The December 8 Motion and December 16 Motion both contain the detailed formulas used for these four metrics.

¹⁰ December 8 Motion, page 4.

¹¹ December 16 Motion, page 16.

¹² *Id.*

¹³ Financial Oversight and Management Board of Puerto Rico.

¹⁴ December 16 Motion, page 1.

¹⁵ *Id.*, page 16.



PREPA submitted Bespoke Contracts for renewable energy resources in Attachment B of the December 16 Motion. PREPA indicated that it plans to submit three Bespoke Contracts for energy storage resources on or before December 23, 2021. PREPA stated that it planned to submit Bespoke Contracts for VPP resources by January 30, 2022.¹⁶

PREPA included as Attachment A to the December 16 Motion a Tranche 1 RFP Evaluation Committee memorandum which PREPA requested confidential treatment ("Committee Memorandum"). In the Committee Memorandum PREPA lists the LCOE and LCOS (using its IEA formulation) for each of its proposed solar PV and energy storage contracts and describes how it used threshold parameters to select the set of projects it proposes for renewable energy and battery storage contract awards. The \$120/MWh threshold value PREPA used to select 220 MW of battery storage projects was based on information provided in the Committee Memorandum.

III. DISCUSSION AND FINDINGS

The levelized cost of energy and levelized cost of storage information was computed by PREPA based on direct base prices and escalators in proposed contracts. The Energy Bureau thus **FINDS** that this levelized cost information as filed in the November 9 S&L Report and as contained in the December 16 Motion represents a levelized cost computation in nominal, and not real, currency terms. The Energy Bureau **ORDERS** PREPA to file responses to Question 2 in Attachment A of this Resolution and Order and thus provide LCOE and LCOS information on the set of potential projects for Phase III evaluation based on real, in addition to nominal, metrics.

PREPA proposes contract awards for 732.72 MW of solar PV, based on its IEA-based LCOE metric for proposed projects at or below a \$105/MWh threshold. The Energy Bureau **ORDERS** PREPA to include and file with the Energy Bureau at least the next four (4) solar PV proposed offerings representing 130 MW additional nameplate capacity to PREPA's identified fifteen (15) projects as at this time being in alignment with the intentions of the IRP Modified Action Plan for deployment of renewable energy based on competitive procurement processes ("Four Additional PV"):

These projects meet the \$105/MWh threshold (IEA metric) based on the Energy Bureau's initial assessment of LCOE using real currency and using data from the December 16 Motion.

PREPA proposes contract awards for 220 MW of battery energy storage resources, based on its IEA-based LCOS metric for proposed projects at or below a \$120/MWh threshold. While the Energy Bureau is directing PREPA to answer all of the questions listed in Attachment A to this Resolution and Order, the Energy Bureau emphasizes the critical importance of answers to Questions 3 and 4 to allow for an interpretation of a battery storage cost threshold in alignment with the intentions of the IRP Modified Action Plan for deployment of battery energy storage capacity.

The Energy Bureau **ORDERS** PREPA to directly include and file with the Energy Bureau at least the next additional six (6) battery energy storage proposed offerings representing 445 MW additional to PREPA's identified three (3) project offerings, in its continuing Phase III evaluation process for battery energy storage resources ("Six Additional Storage").

The Energy Bureau **TAKES NOTICE** that the set of solar PV and battery energy storage resources that make up the planned procurements arising from the IRP's Modified Action Plan were seen to be beneficial to Puerto Rico ratepayers, following complex and extensive analyses that considered current Puerto Rico law, especially renewable energy standard goals and direction to phase out the use of fossil-fueled resources. While LCOS and LCOE

¹⁶ December 16 Motion, page 17.



metrics are valuable in assessing responses to the Tranche 1 RFP, the benefits that those resources bring to the electric power system, over the near and long term, are by no means reflected solely in those cost metrics, absent consideration of key additional factors.

Key additional factors beyond LCOE and LCOS metrics, and current thresholds noted by PREPA in the December 16 Motion, that PREPA and LUMA must consider during the completion of the Phase III evaluation process, when considering further resource procurements beyond those identified in the December 16 Motion, include but are not limited to the following:

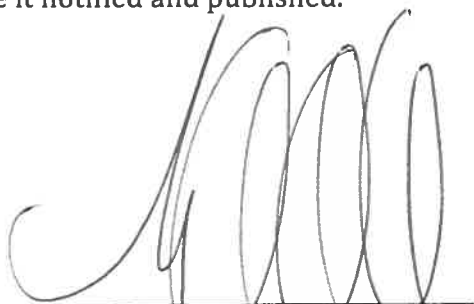
1. Gauging the overall competitiveness of the response to the Tranche 1 RFP.
2. The ability to timely meet 2025 Renewable Portfolio standard requirements.
3. The need to soon retire older fossil-fueled units that are both environmentally damaging, and susceptible to outages and repair needs that degrade system reliability and resource adequacy. Battery energy storage in quantities aligned with the procurement tranche quantity guidance directly supports the ability to retire these units.
4. The need to integrate large quantities of solar PV in part by implementation of battery energy storage resources.
5. The need to consider interrelationships between the installation timing, geographical and electrical locational synergies affecting overall transmission system reinforcement needs, and overall quantities of solar PV and battery storage resources in order to fully capture the benefits of adhering to the IRP procurement tranche pacing as set out in the IRP Order.

The Energy Bureau **FINDS** that additional factors beyond the specific use of LCOE and LCOS cost thresholds as used in the December 16 filing must be directly considered by PREPA in evaluating the set of procurements in response to the Tranche 1 RFP. The Energy Bureau **ANTICIPATES** a further Resolution and Order after reviewing responses to the Attachment A questions.

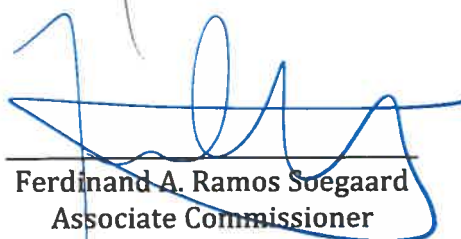
The Energy Bureau **ORDERS** PREPA to file on or before **January 10, 2022**, the following requests:

- i. To provide responses to questions in Attachment A of this Resolution and Order;
- ii. to file the Bespoke Contracts for VPP resources;
- iii. to provide the FOMB approval of the projects filed in the December 16 Motion;
- iv. to provide the documentation requested to include the Four Additional PV;
- v. to provide the documentation requested to include the Six Additional Storage.

Be it notified and published.


Edison Avilés Deliz
Chairman


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 December 28, 2021. Associate Commissioner Ángel R. Rivera de la Cruz did not intervene. I also certify that on December 28, 2021 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; mvazquez@diazvaz.law. I also certify that today, December 28, 2021, 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 December 28, 2021.

Sonia Seda Gattambide
Clerk



Attachment A – Questions for PREPA

1. Confirm or explain otherwise that the threshold parameters used to screen Tranche 1 RFP responses for potential solar PV and battery energy storage projects¹⁷ are in nominal currency terms, and not in real currency terms.
2. In the December 16 Motion PREPA indicates that the Tranche 1 Evaluation Committee adopted the IEA methodology for calculating LCOE and LCOS for solar PV and battery resource levelized cost computations.
 - a. Develop and submit LCOE and LCOS information for the IEA metrics in real currency terms for the set of projects considered in the December 8 Motion.
3. Regarding the December 16 Motion including Attachment A:
 - a. Provide in Excel file format with formulas intact the full results and workpapers associated with Table 2-3 and 2-4 of Attachment A, the Evaluation Committee memorandum. If necessary, include an update to the Attachment in the December 8 Motion which confidential treatment was requested and contains RFP results.
 - b. Provide the specific source for the monthly Capacity Payment used to compute energy storage project LCOS values as stated at page 7 of the Evaluation Committee Memorandum.
 - c. Explain why this specific monthly Capacity Payment was used to develop threshold LCOS values.
 - d. Was the value of avoiding future capacity costs other than those associated with new battery energy storage considered as part of the development of the monthly Capacity Payment used to develop LCOS threshold values? If so, explain how this was considered. If not, explain why this was not considered.
 - e. State whether this Monthly Capacity Payment guideline is in nominal or real terms.
 - f. Provide the specific, underlying “2022 Fiscal Plan guidance” used as the basis for calculating the LCOS threshold.
 - g. Provide underlying detailed calculations in Excel spreadsheet format used to develop the \$120/MWh LCOS threshold used to select the energy storage projects.
 - h. Is it PREPA’s understanding that the \$105/MWh threshold value for LCOE is to be interpreted as a nominal currency or real currency threshold? Explain the basis for your answer.
 - i. Is it PREPA’s understanding that the \$120/MWh threshold value as defined by PREPA for LCOS is to be interpreted as a nominal currency or real currency threshold? Explain the basis for your answer.
 - j. Explain if or how PREPA considered the combined roles played by battery energy storage in supporting solar PV integration, allowing for retirement of older fossil units, and reducing the need for new fossil-fueled sources of capacity when determining the threshold LCOS value.
4. About battery energy storage proposal parameters:
 - a. Confirm or explain otherwise that the proposed contract prices for battery energy storage projects include all costs associated with future capital requirements to ensure battery capacity output.

¹⁷ \$105/MWh – LCOE; \$120/MWh-LCOS. December 16, 2021 Motion, page 16.



- b. Confirm or explain otherwise that the level of battery capacity for the life of the contract is reflected in the combination of the initial capacity and the parameter "Capacity and System Efficiency Degradation".
5. Confirm or explain otherwise that all interconnection costs, including network upgrade cost allocation, are reflected in the RFP respondent prices, and are reflected in the levelized cost of storage metric for all battery energy storage proposals, and the levelized cost of energy metric for all solar PV proposals.
6. Provide the Evaluation Committee's assessment as to the overall competitiveness of the market response to the RFPs for:
 - a. Solar PV resources.
 - b. Energy storage resources?

Provide all background analysis used by the Evaluation Committee to support its assessment for each of subparts a) and b) above.

7. The underlying quantities of solar PV and battery energy storage in the Modified Action Plan were developed based on the results of production cost modeling conducted during the IRP.
 - a. In what way has the Evaluation Committee considered any differences between current cost estimates (and cost estimates rendered during PREPA's IRP analysis) for a new combined cycle power plant at Palo Seco, when determining the threshold LCOS value to use in examining the set of battery energy storage offers?
 - b. What is PREPA's current best estimate of the capital and operating costs for a new gas-fired combined cycle unit at Palo Seco?
8. What is PREPA's understanding of the \$105/MWh LCOE threshold it uses to screen solar PV projects? In what way is this threshold amount related to the assumptions used in the IRP that resulted in a Modified Action Plan and guidance to install solar PV and battery energy storage resources at levels roughly reflected in the plan for 6 tranches of procurement?
9. In the Evaluation Committee memorandum at page 8, PREPA states: "As established by the Energy Bureau in the IRP process: "if market prices offered in respond to a solicitation are unduly higher than expected (after accounting for PREPA's creditworthiness, local factors such as the cost of interconnection, and other appropriate factors), it could be a prudent course of action for PREPA to select fewer resources than expected, and defer capacity to a future procurement within the selected tranches". Provide the specific source for this quote.

