

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

IN RE: REVIEW OF THE PUERTO RICO
ELECTRIC POWER AUTHORITY INTEGRATED
RESOURCE PLAN

CASE NO.: NEPR-AP-2023-0004

SUBJECT: 4th Requests of Information (ROI)

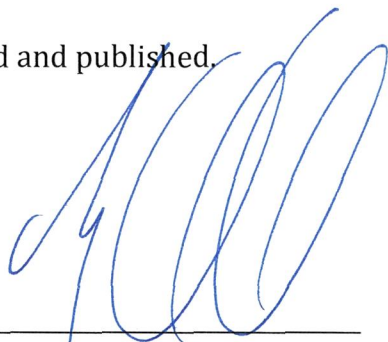
RESOLUTION AND ORDER

The Energy Bureau of the Puerto Rico Public Service Regulatory Board ("Energy Bureau") continues to review LUMA's¹ October 17, 2025, Integrated Resource Plan ("IRP") filing for completeness in alignment with the sections of Regulation 9021².

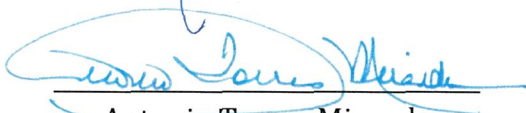
Attachment A of this Resolution and Order contains requirements of information ("ROI") which include detailed requests related to PRP Prime modeling, marginal energy costs, outage representations, build cost updates, battery resource operations in PLEXOS, and other clarifications necessary for the Energy Bureau's review of LUMA's 2025 IRP process³.

The Energy Bureau **ORDERS** LUMA to, **within ten (10) business days from the notification** of this Resolution and Order, file its response to the ROIs included in **Attachment A** of this Resolution and Order and file any PRP modification that LUMA has completed since the October 17, 2025, filing.

Be it notified and published.



Edison Avilés Deliz
Chairman



Antonio Torres Miranda
Associate Commissioner



Sylvia B. Ugarte Araujo
Associate Commissioner



Omar M. Rodríguez González
Associate Commissioner



¹ LUMA Energy LLC and LUMA Energy ServCo LLC (jointly referred as "LUMA").

² Regulation on Integrated Resource Plan for the Puerto Rico Electric Power Authority, Regulation 9021, April 24, 2018 ("Regulation 9021").

³ See Act 1-2025 and Act 2-2025.

CERTIFICATION

I certify that the majority of the members of the Puerto Rico Energy Bureau agreed on October 5, 2026. Associate Commissioner Ferdinand A. Ramos Soegaard did not intervene. I also certify that on October 6, 2026, I have proceeded with the filing of this Resolution and Order and was notified by email to RegulatoryPREBOrders@lumapr.com; nzayas@gmlex.net; rcruzfranqui@gmlex.net; mvalle@gmlex.net; alexis.rivera@prepa.pr.gov; nzayas@gmlex.net; Javier.arroyoplaza@us.dlapiper.com; margarita.mercado@us.dlapiper.com; Yahaira.delarosa@us.dlapiper.com; lrn@roman-negron.com; regulatory@genera-pr.com.

I sign this in San Juan, Puerto Rico, today October 6, 2026.



Sonia Seda Gaztambide
Clerk



Attachment A
Requests of Information (“ROIs”) to LUMA

1. **PRP.**
 - a. Provide the PLEXOS Solution Spreadsheet for any additional modifications that LUMA may have done to the original the PRP (PRP modified) run that matches or closely matches the format of the Solution Spreadsheets provided in the October 2025 IRP Filing.
 - b. How many iterations did the PRP modified scenario require to meet the expected unserved energy (EUE) requirement in the ST model?
2. **Marginal Energy Costs, PRP scenario.** The response provided to question 11a of the Third Set of ROIs post-filing (April 16, 2026) appears to contain hourly marginal price, as opposed to requested hourly marginal cost information.
 - a. Refer to attachment “CONFIDENTIAL_RFI-LUMA-AP-2023.0004-20260401-PREB-011”. Explain what the values provided represent. In the explanation, describe specifically which PLEXOS output metric was used to populate the response, how that value was determined, and whether it represents a price or marginal cost.
 - b. Describe the difference between the hourly price and the hourly marginal energy cost as reported in the PLEXOS ST module runs. In the answer, identify any factors that cause the two values to differ in a given hour (e.g. transmission congestion).
 - c. Provide the hourly marginal cost data for 2025-2044 from the final iteration of the ST modeling run for the PRP scenario in Excel format. Confirm that the hourly values provided are consistent with the annual value for the SRMC property from the “Region ST” tab of the solution spreadsheet. If they are not, explain why not.
 - d. Refer to the SRMC values for each resource in the “Gen ST” tab of the solution spreadsheets. Confirm or explain otherwise that these SRMC values inform the ultimate SRMC for the most expensive resource dispatched in each hour. In particular, confirm or explain otherwise that the SRMC represents the dispatch cost of the marginal unit or units used to meet load in each hour.
 - e. Provide the actual hourly marginal cost information for 2026-2045 for the PRP Modified scenario. Use the same format and property as the response for part (c) above.
3. **Forced Outage Rates Summary – PRP and PRP Modified – as Modeled in PLEXOS.**
 - a. For the legacy fossil units operated by Genera and for the AES and EcoElectrica units, provide a table that shows the original average forced outage rates by unit and by year for 2025 through 2044 as modeled in PLEXOS in the initial IRP Filing from October 2025, alongside the updated PRP’ forced outage rates for 2026 through 2045.
4. **Legacy and New Unit Outage Representation in PLEXOS.** In response to ROI-5 of the Third Set post-IRP filing (April 16, 2026), LUMA listed the difference in expected unserved energy (“EUE”) in 2024 and 2025 for the PRP model run, and the actual (or estimated) values seen in Puerto Rico. Those are shown in the table below. Notably, the actual levels provided in the ROI response are much lower than that seen in the PRP ST (final) model run.



	Modeled GWh of unserved energy (PLEXOS ST, PRP run)	Actual/Estimated GWh of unserved energy (ROI 5a 3 rd set)
2024	225	17.5
2025	52	12.9

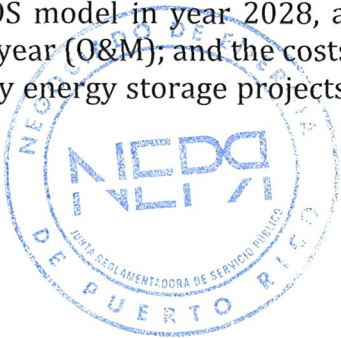
- a. Explain the reasons for any material differences between the modeled and actual outage patterns and unserved energy.
- b. Explain why LUMA considers its unit outage representation in PLEXOS to be reasonable for resource planning despite the difference in unserved energy amounts seen in the first two years of the model run versus the level of unserved energy that was actually seen (or estimated by LUMA) on the Puerto Rico system.
- c. Explain how LUMA estimated the unserved energy provided in response to the noted ROI-5a. Elaborate on the response’s statement that “LUMA did not use any per-customer assumptions to provide the estimate”.
- d. Does LUMA believe that the EUE inconsistency seen in the table provided in response to ROI-5a indicates that the underlying PLEXOS capacity expansion modeling overstates the levels of EUE and the extent of resource adequacy shortfall represented in the model for any given year with EUE? Explain why or why not.
- e. Provide in Excel format a summary sheet listing, for each of the legacy power plant units and for each new unit (fossil, biodiesel or battery only), for each year, the combined total (forced plus planned) average annual outage rate assumed for each power plant unit. Provide these for each of the years 2025 through 2044 for the PRP scenario. As necessary, discuss how the nameplate capacity vs. the actual available maximum capacity for any given unit affects these values.
- f. Provide the same parameters requested in e) above as used in the PRP modeling (PRP Modified) for each of the years 2026-2045.

5. **Build Cost updates – PRP Modified.**

- a. On “PRP Modified”, provide the build costs being used for those resources whose cost assumptions were updated.

6. **Costs – Utility-scale battery, solar PV, and fossil-fueled resources**

- a. Confirm or explain otherwise that the capital costs for resources listed in Tables 66 through 71 of the IRP, for the “with PR Scaling Factor” are all real dollar costs, and state which real dollar year forms the basis for the value.
- b. Confirm or explain otherwise that the capital costs for new resources contained in the PLEXOS solution set “Gen ST” tab or “Battery LT” tab are in nominal dollars and are based on the inflation rate of 2.5%/year listed on the “PVRR tbl” tab as applied to the real dollar costs presented in Tables 66 through 71 of the IRP.
- c. Provide a comparison between the equivalent monthly capacity payment (or cost), inclusive of capital and O&M costs, of a 4-hour battery energy storage system considered for installation in the PLEXOS model in year 2028, at a Table 69 cost of \$3,593/kW (capex), \$40.60/kW-year (O&M); and the costs of either Tranche 1, Tranche 2, or Tranche 4 battery energy storage projects as



reported in Tables 54-56 of the IRP, concerning fixed decision projects. State any assumptions used.

- d. Concerning the cost comparison in the response to c) above, discuss the range of cost difference (positive or negative) between these fixed decision battery projects and the PLEXOS model-offered battery project option, including LUMA's assessment of whether or not the projected battery costs included as PLEXOS resource options is higher or lower than the set of projects underway or under consideration as fixed decision projects in Puerto Rico.
- e. Given ongoing market pressure on the costs of new CT or CC resources on the mainland US, what is LUMA's current best recent estimate of the costs of new CT or CC resources for installation on Puerto Rico, during the period 2031-2035, in comparison to the costs contained in Tables 70 and 71 of the IRP and reflected in the PLEXOS model assumptions setup?

7. Battery usage in PLEXOS. IRP Section 8.2.4

- a. **Spinning and control reserve requirements.** Are battery resources providing regulation up (i.e., control reserves) nested within the spinning reserves requirement, or does the model require both of these requirements separately?
- b. **EUE and operational reserves.** The confidential Excel file referenced in April 16, 2026, response to ROI 4c of third set of ROIs post-filing indicates that battery resources provide ancillary service spinning and control reserves. In each iteration of the ST module run, does the model maintain the spinning and control reserve requirement (generally provided by battery resources) in all hours even if EUE is occurring in any given hour, or does the model allow the reserve requirement to be depleted to meet energy needs?
- c. **EUE and operational reserves.** Confirm or explain otherwise that the referenced Excel file to LUMA's April 16, 2026, response to Energy Bureau's ROI 4c. contains battery data for the final iteration (4b) of the ST module run. [The Excel file in question pertains to a file providing data on battery provision of spinning or control capacity, from a response to the Second Set of 2025 IRP Post Filing RFI responses, stating that this file contained the detail requested: CONFIDENTIAL – 2026.02.26_Attachment PRP_Reserve data for batteries- RFI 2-11-2.xls.]
- d. **EUE and operational reserves.** If the above response confirms that reserve data for batteries provided was for the final, 4b iteration run, provide the equivalent data to "CONFIDENTIAL – 2026.02.26_Attachment PRP_Reserve data for batteries- RFI 2-11-2.xls" for the 1b iteration (first ST module run after Run 1a LT) for the PRP scenario, and for the PRP prime scenario.

