NEPR

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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**: Informative Motion in Compliance with Resolution and Order of May 29, 2025, Request for Confidential Treatment, and Memorandum in Support of Confidentiality

INFORMATIVE MOTION IN COMPLIANCE WITH RESOLUTION AND ORDER OF MAY 29, 2025, REQUEST FOR CONFIDENTIAL TREATMENT, AND MEMORANDUM IN SUPPORT OF CONFIDENTIALITY

TO THE HONORABLE PUERTO RICO ENERGY BUREAU:

COME NOW LUMA Energy, LLC ("ManagementCo"), and **LUMA Energy ServCo, LLC** ("ServCo"), (jointly referred to as "LUMA"), and respectfully state and request the following:

I. Submission

1. On May 13, 2025, the Puerto Rico Energy Bureau ("Energy Bureau") entered a Resolution and Order directing LUMA to file its Integrated Resource Plan ("IRP") on October 17, 2025. Similarly, it ordered LUMA to file the Preferred Resource Plan's transmission and distribution system implications on November 21, 2025. Finally, the Energy Bureau instructed LUMA to use an updated scenario structure included in Attachment A to the May 13th Order to conduct IRP resource modeling to inform the selection of a Preferred Resource Portfolio.

2. On May 29, 2025, the Energy Bureau issued a Resolution and Order whereby it recognized that its consultants and LUMA personnel had engaged in several meetings to discuss resource modeling parameters associated with the scenario structure described in Attachment A to the May 13th Order. As part of those meetings, the Energy Bureau's consultants issued informal

requests for information to LUMA. Thus, the Energy Bureau directed LUMA to file the responses to those requests for information in this instant proceeding ("May 29th Order").

3. In compliance with the May 29th Order, LUMA hereby submits the responses to the informal requests for information posed by the Energy Bureau's consultants as *Exhibits 1 and 2*. Exhibit 1 corresponds to the responses to the informal requests for information exchanged with the Energy Bureau consultant on May 23, 2025. *Exhibit 2* corresponds to a revised version of the responses to the informal requests for information previously exchanged with the Energy Bureau consultant. These revised responses are the result of a discussion held with the Energy Bureau consultant. LUMA provides these documents, supported by preliminary information. Data, estimates, and other information provided now may change and be revised as LUMA develops the 2025 IRP.

II. Request for Confidential Treatment

4. LUMA respectfully submits that certain information and/or documents included in *Exhibits 1 and 2* should be designated as confidential material and protected from disclosure. Certain information and/or documents included in *Exhibits 1 and 2* are protected from disclosure as trade secrets; *see, e.g.*, Act 80-2011, P.R. Laws Ann. tit. 10, §§ 4131-4144 (2023) pursuant to the Energy Bureau's Policy on Management of Confidential Information. *See* Energy Bureau's Policy on Management of Confidential Information, CEPR-MI-2016-0009, issued on August 31, 2016, as amended by the Resolution dated September 20, 2016.

A. Applicable Laws and Regulations to Submit Information Confidentially Before the Energy Bureau

6. The bedrock provision on the management of confidential information filed before this Energy Bureau is Section 6.15 of Act 57-2014, known as the "Puerto Rico Energy Transformation and Relief Act." It provides, in pertinent part, that: "[i]f any person who is required

to submit information to the Energy Commission believes that the information to be submitted has any confidentiality privilege, such person may request the Commission to treat such information as such . . . . " 22 LPRA § 1054n. If after appropriate evaluation the Energy Bureau determines that the information should be protected, "it 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." *Id.* § 1054n(a).

7. The confidential information shall be provided "only to the lawyers and external consultants involved in the administrative process after the execution of a confidentiality agreement." *Id.* § 1054n(b). Finally, Act 57-2014 provides that this Energy Bureau "shall keep the documents submitted for its consideration out of public reach only in exceptional cases. In these cases, the information shall be duly safeguarded and delivered exclusively to the personnel of the [Energy Bureau] who need to know such information under nondisclosure agreements. However, the [Energy Bureau] shall direct that a nonconfidential copy be furnished for public review." *Id.* § 1054n(c).

8. Relatedly, in connection with the duties of electric power service companies, Section 1.10(i) of Act 17-2019 states that electric power service companies shall provide the information requested by customers, except for confidential information under the Rules of Evidence of Puerto Rico.

9. Moreover, the Energy Bureau's Policy on Confidential Information details the procedures a party should follow to request that a document or portion thereof be afforded confidential treatment. In essence, the referenced Policy requires identifying confidential information and filing a memorandum of law explaining the legal basis and support for a request to file information confidentially. *See* CEPR-MI-2016-0009, Section A, as amended by the

Resolution of September 20, 2016, CEPR-MI-2016-0009. The memorandum should also include a table that identifies the confidential information, a summary of the legal basis for the confidential designation, and why each claim or designation conforms to the applicable legal basis of confidentiality. *Id.* at ⁋ 3. The party that seeks confidential treatment of information filed with the Energy Bureau must also file both a "redacted" or "public version" and an "unredacted" or "confidential" version of the document that contains confidential information. *Id.* at ⁋ 6.

B. Grounds for Confidentiality

10. The Energy Bureau's Policy on Management of Confidential Information states the following with regard to access to validated Trade Secret Information:

> 1. Trade Secret Information
>
> Any document designated by the [Energy Bureau] as Validated Confidential Information because it is a trade secret under Act 80-2011 may only be accessed by the Producing Party and the [Energy Bureau], unless otherwise set forth by the [Energy Bureau] or any competent court.

Id. at § D (on Access to Validated Confidential Information).

11. Under the Industrial and Trade Secret Protection Act of Puerto Rico, Act 80-2011, P.R. Laws Ann. tit. 10, §§ 4131-4144 (2023), industrial or trade secrets are deemed to be any information:

> (a) That has a present or a potential independent financial value or that provides a business advantage, **insofar as such information is not common knowledge or readily accessible** through proper means by **persons who could make a monetary profit from the use or disclosure of such information**, and
> (b) for which reasonable security measures have been taken, as circumstances dictate, to maintain its confidentiality.

Id. § 4131, Section 3, Act. 80-2011.[1] They include, but are not limited to, processes, methods and mechanisms, manufacturing processes, formulas, projects, or patterns to develop machinery, and lists of specialized clients that may afford an advantage to a competitor. *See* Statement of Motives, Act 80-2011; *see also* Puerto Rico Open Data Law, Act 122-2019, Article 4 (ix) (exempting from public disclosure trade secrets) and Article 4(x) (exempting from public disclosure commercial or financial information whose disclosure will cause competitive harm).

12. The Puerto Rico Supreme Court has explained that the trade secrets privilege protects free enterprise and extends to commercial information that is confidential in nature. *Ponce Adv. Med. v. Santiago Gonzalez,* 197 DPR 891, 901-02 (2017) (citation omitted).

13. The Energy Bureau should protect part of the responses to the informal requests for information, and the work papers on the results, assumptions, and inputs of the 2025 IRP included in *Exhibits 1 and 2* because they pertain to processes and methods that may prove advantageous or useful to LUMA's competitors in the energy business and utilities in Puerto Rico. LUMA takes reasonable security measures, such as this one, to maintain the confidentiality of its data and information in draft form.

14. LUMA respectfully submits that part of the responses to the informal requests for information, and the work papers on the results, assumptions, and inputs of the 2025 IRP presented as part of LUMA's response in *Exhibits 1 and 2* should be designated as commercially sensitive or trade secret information. This designation is a reasonable and necessary measure to protect the information and enable LUMA to compete fairly in the future.

[1] Relatedly, Rule 513 of the Rules of Evidence of Puerto Rico provides that the owner of a trade secret may invoke the privilege to refuse to disclose, and to prevent another person from disclosing trade secrets, provided that these actions do not tend to conceal fraudulent actions or lead to an injustice. 32 P.R. Laws Ann. Ap. VI, R. 513. If a court of law mandates disclosure of a trade secret, precautionary measures should be adopted to protect the interests of the owner of the trade secret. *Id.*

15. It is respectfully submitted that the right of public access to information is promoted and protected by the public version. The protection of the specific information pertaining to the information will not hinder nor preclude the public in a material way from gaining access to relevant and necessary information. As such, the interest in the public viewing the information that LUMA hereby requests be kept confidential is outweighed by the harm that LUMA would be exposed to should the information be made available to the public.

VI. Identification of Confidential Information.

16. In compliance with the Energy Bureau's Policy on Confidential Information, CEPR-MI-2016-0009, below is a table summarizing the hallmarks of this request for confidential treatment.

Document	**Name**	**Pages in which Confidential Information is Found, if applicable**	**Summary of Legal Basis for Confidentiality Protection, if applicable**	**Date Filed**
Exhibit 1	Responses to Informal Requests for Information	Page 8	Trade Secret Information under Section D(1) of the Energy Bureau's Policy on Confidential Information, CEPR-MI-2016-0009	June 10, 2025
Exhibit 2	Revised Responses to Informal Requests for Information	Page 11	Trade Secret Information under Section D(1) of the Energy Bureau's Policy on Confidential	June 10, 2025

Document	Name	Pages in which Confidential Information is Found, if applicable	Summary of Legal Basis for Confidentiality Protection, if applicable	Date Filed
			Information, CEPR-MI-2016-0009	
	Workpapers	Entire file	Trade Secret Information under Section D(1) of the Energy Bureau's Policy on Confidential Information, CEPR-MI-2016-0009	June 10, 2025

WHEREFORE, LUMA respectfully requests that the Energy Bureau **take notice** of the aforementioned for all purposes, **approve the request for confidential treatment** of certain information submitted with *Exhibits 1 and 2,* and **deem** LUMA complied with the Resolution and Order of May 29, 2025.

WE HEREBY CERTIFY that this Motion was filed using the electronic filing system of this Energy Bureau and that electronic copies of this Motion will be notified to the Puerto Rico Electric Power Authority: lionel.santa@prepa.pr.gov and through its attorneys of record Mirelis Valle-Cancel, mvalle@gmlex.net; and Alexis G. Rivera Medina, arivera@gmlex.net; and Genera PR, LLC, through its attorney of record Luis R. Román Negrón, lrn@roman-negrom.com.

RESPECTFULLY SUBMITTED.

In San Juan, Puerto Rico, on June 10, 2025.

DLA Piper (Puerto Rico) LLC
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San Juan, PR 00901-1969
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/s/ Yahaira De la Rosa Algarín
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Exhibit 1

2025 Integrated Resource Plan (2025 IRP)

Exhibit 1

NEPR-AP-2023-0004

First Set of Unofficial 2025 IRP Prefiling RFI

by the Puerto Rico Energy Bureau's Technical Consultant

LUMA

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

On April 30, 2025, and May 1, 2025, Synapse Energy Economics, Inc. (Synapse), the Puerto Rico Energy Bureau's (Energy Bureau) Technical Consultant, issued two separate Unofficial Requests For Information (First Set of Unofficial 2025 IRP Prefiling RFI) via email to LUMA.

This filing includes the responses to all questions issued by Synapse in April 30, 2025, and May 1, 2025. The questions are located in the attached document **FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-A.** LUMA submits in this First Set of Unofficial 2025 IRP Prefiling RFI information related to: 1) Renewable energy and BESS costs, 2) Load and DPV forecasts, 3) Updates on the fixed decisions COD and capacities, 4) PLEXOS modeling parameters and their sources.

Please note that the results and answers provided herein by LUMA are based on the most recent data obtained prior May 22 and is subject to change as LUMA continues to review and confirm the assumptions that will be used for the scenarios approved by the Energy Bureau in the Resolution and Order of May 13, 2025 (May 13, 2025, R&O).

LUMA would appreciate the data as soon as possible but no later than May 28 in order to allow time to load and check the new assumptions by May 30.

2025 INTEGRATED RESOURCE PLAN

List of Responses and Attachments

Response ID	Document Type	Response Subject
FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-A	Word Document	FIRST UNOFFICIAL RFI Questions from the Energy Bureau's Technical Consultant
CONFIDENTIAL FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-008a	Excel document CONFIDENTIAL	IRP Inputs, assumptions, parameters and costs
CONFIDENTIAL FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-008b	Excel document CONFIDENTIAL	IRP Load and DPV Forecast

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-001

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

1. Renewable energy capital costs and battery costs considered together as base or low cost – not paired (inputs separate), but costs move together to reduce permutations. Trajectory of costs for all fossil and PV/BESS/Wind resources – "scaler" trajectory to be revisited. Separate scenario(s) for different scaler trajectory assumption if needed to test robustness in face of potential decreasing costs steeper than current scaler. These costs and relative costs are critical assumptions.

RESPONSE

LUMA agrees to move renewable and battery costs together. LUMA desires to work with Synapse to define a reasonable cost trajectory for the Energy Bureau Ordered Scenarios 3 and 5 so they can contribute to LUMA's planned selection of the Preferred Portfolio.

LUMA will accept any reasonable cost trajectory provided by Synapse for Energy Bureau Ordered Scenarios 4 and 6.

LUMA will need Synapse inputs no later than May 28.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-002

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

2. Peak load in high load case – reflecting decreasing LF (i.e., peakier trend) over period. No other load sensitivity except higher DPV projection case will lead to lower energy load than base case.

RESPONSE

LUMA intends to use its most recent high-load forecast which includes an independent forecast of energy and hourly peak demands. LUMA plans to use its high load forecast for the Energy Bureau Ordered Scenario 2 and some of its allotted flexibility Scenarios, (i.e., the Energy Bureau Ordered Flexibility Scenarios 7 to 11). LUMA also plans to use a low load forecast for some of its allotted flexibility Scenarios. All scenarios other than Scenario 2 and the LUMA allotted flexibility portfolios will be run using the base case forecast. Except the controlled DBESS variation in the Energy Bureau Ordered Scenario 13, all load modifier input will remain at the base case for all core and supplemental scenarios, i.e., DPV, EE, EV or CHP and controlled DBESS.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-003

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

3. DPV projection same in all cases except for one scenario with high DPV and high DBESS control.

RESPONSE

It is LUMA's understanding of the Energy Bureau Ordered Scenarios that all scenarios will assume the base level of DPV growth and only Scenario 13 will assume a higher level of controlled DBESS.

NOTE: Synapse will work with LUMA to select one of the original defined scenarios for the higher controlled DBESS trajectories, i.e., select from scenarios 6, 7, 8 or 9 from the scenarios used in the March 2025 IRP Filing of the modeling results. LUMA will need Synapse's feedback no later than May 28.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-004

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

4. Base hard-coded resource assumptions include 460 MW CCGT plant. Two scenarios exclude this plant, one scenario delays it. Need confirmation of extent of hard coded resources for planning:

a. T1 PV

b. T1 BESS

c. T2 PV

d. T2 BESS (6 Hr)

e. ASAP Ph 1 (185 MW) and Ph 2 (175 MW)

f. LUMA 38 kV BESS (100 MW)

g. Genera BESS (430 MW)

h. Genera Peakers (268 MW)

RESPONSE

It is LUMA's understanding that the Energy Bureau Ordered Scenarios only have a single variation of the 460 MW Energiza plant, i.e., supplemental run 14. In addition, there are changes to the assumptions for some of the other fixed decisions, including:

a. T1 PV: COD and capacity changes

b. T1 BESS: COD and capacity changes

c. T2 PV: No change

d. T2 BESS: COD and capacity changes

e. ASAP

i. ASAP Ph 1: Capacity changes- ASAP Phase 1: 196 MW- Fixed Decision

ii. ASAP Phase 2: [redacted] - will remain an optional PLEXOS Economic decision [redacted]

f. LUMA 38 kV BESS (100 MW): These batteries will not be considered firm capacity for energy supply. They will contribute the operational reserves used for frequency and voltage control

g. 4x25 MW BESS in the Transmission system will not be considered as part of the 2025 IRP resources, as these batteries are for grid stabilization purposes

h. Genera BESS (430 MW): Fixed decision- 382 MW

Genera Peakers (268 MW): LUMA plan to use the 182 MW as the capacity of the peakers that we understand has been approved by been approved by the Energy Bureau. If Synapse can provide the justification for the 268 MW capacity, with capacity and location of each unit, we can adjust.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-005

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

5. Size of maximum CC unit allowed (400? Less?) – Synapse recommends less than 400 MW nominal per prior 2025 IRP discussions.

RESPONSE

LUMA plans to use the current values in our PLEXOS model, which includes two units greater than 400 MW capacity, the Energiza 460 MW unit and the 551 MW generic combined cycle unit available for selection by PLEXOS. At this time, LUMA does not plan to add the additional 80 MW to the Energiza capacity.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-006

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

6. Other variables to hold constant or minimal change across all scenarios

   a. Fuel oil costs

   b. Distributed PV trajectory (1 scenario with high DPV)

   c. DBESS just two states (base, and high DBESS for 2 scenarios)

   d. PR100 base EE load forecast

   e. Load factor and hourly patterns (same for all base except high DPV exception, and one peakier scenario as high load)

   f. Agricultural land use assumptions

   g. Act 1-2025 modeling updates, including:

      i. Assume coal plant retirement date of end of 2032

      ii. RPS trajectory soft target – either as is currently structured, or reset for soft target starting 2035

      iii. Treatment of Aguirre steam plant (units 1 and 2) – both out of service; and 800 MW of temporary generation (assume in service)

RESPONSE

a. With the exception of the five scenarios designated LUMA Flexibility, LUMA agrees to hold fuel oil, diesel, and biodiesel fuel prices constant at the base case forecasts for the remaining seven core scenarios and five supplemental scenarios. For the five scenarios designated LUMA Flexibility, LUMA will make the decisions regarding the assumptions.

b. With the exception of the five scenarios designated LUMA Flexibility, LUMA agrees to hold the DPV forecasts at the base forecast for the remaining seven core scenarios and five supplemental

scenarios. For the five scenarios designated LUMA Flexibility, LUMA will make the decisions regarding the assumptions.

c. LUMA will follow the definition of the Energy Bureau Ordered Scenarios that includes only one supplemental scenario (scenario 13 that includes a high controlled DBESS forecast). The remaining core and supplemental scenarios will assume the most likely DBESS levels used in the March 2025 filings.

d. LUMA will use the PR100 base EE forecast in all Core and Supplemental Scenarios.

e. With the exception of the five scenarios designated LUMA Flexibility, LUMA will use the base or high-load forecast as designated in the Energy Bureau Ordered Scenarios. For the five scenarios designated LUMA Flexibility, LUMA will make the decisions regarding the assumptions.

f. LUMA will use the most likely assumption of "Less Land," as designated and used in the March 2025 filing for all the Energy Bureau Ordered Core and Supplemental Scenarios.

g. See responses below:

i. LUMA will assume that the AES coal plants retire 2032 as a fixed decision in all core and supplemental scenarios ordered by the Energy Bureau.

ii. LUMA will include a soft target beginning in 2035 and ramp up to 100% by 2050 for all scenarios except 16 and 17. In Scenario 16 (Alternative RPS 1), LUMA will include a soft target beginning in 2025 with a ramp up to 2050. In Scenario 17 (Alternative RPS 2), LUMA will not include an RPS soft target until very late in the planning horizon (2040- 2044, ramp to 2050).

iii. LUMA will assume Aguirre 1 and 2 units are Out of Service for all the Energy Bureau ordered core and supplemental scenarios.

LUMA will assume the 800MW of temporary generation to be in service based on the following proposed COD estimate:

- 200 MW on October 1, 2025 in Aguirre
- 200 MW on January 1, 2026 in Aguirre
- 200 MW by March 1, 2026 in Costa Sur
- 200 MW by June 1, 2026 in Costa Sur

We propose the emergency units be assumed to be available for operation until 6 months after the planned COD date of the Energiza 460 MW unit. If Synapse or the Energy Bureau have different recommendations, please provide it by May 28.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-007

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

7. Other related issues for discussion

a. A need to ensure that the modeled trajectories of changing capital costs for renewables and batteries, and fossil costs (i.e., CTs and CCs), are reasonable. How do the trajectories of the "scalers" (i.e., ratio of Puerto Rico to mainland US costs for capital expense) evolve? This is a follow up to ROI 6, question 13, and data in files.

b. Bumpy" peak load trajectories and clarification on which peak load data in PLEXOS is applicable to capacity expansion results. PASA vs. LT vs. ST data on peak load.

c. Document the methodology for how the modeling process applies LOLE (loss of load expectation) constraints (with resulting reserve margin outcomes) and how their temporal granularity choices in the LT module are valid. Document iterative steps between ST and LT modules, and whether any re-optimization.

    i. LOLE – based on LOLP. LOLP details from PLEXOS needed. Documentation – provision of PLEXOS configurations – must be clearer.

d. Costs for DBESS - why is this included in the PVRR table? DBESS capital costs are not a utility cost.

e. Gas fuel cost trajectory - what is the source for this? Reconcile with US EIA AEO 2025 the Henry Hub indexing (i.e., the 115% x HH + $7.95 /MMBTU standard contract price) for PLEXOS fuel input pricing.

f. Source of biodiesel fuel costs and Puerto Rico availability levels. We suggest contingency scenario(s) where no biodiesel is available on the Island (or too costly).

g. What are LUMA's currently proposed 27 scenarios? How do these compare with our proposed scenarios? And how do they compare with the 40 runs that they already filed? To be worked out by LUMA and Synapse at 5/1/2025 call.

h. Additional [informal?] discovery requests Synapse has for LUMA, to help finalize understanding to come to agreement on scenario matrix for final filing.

2025 INTEGRATED RESOURCE PLAN

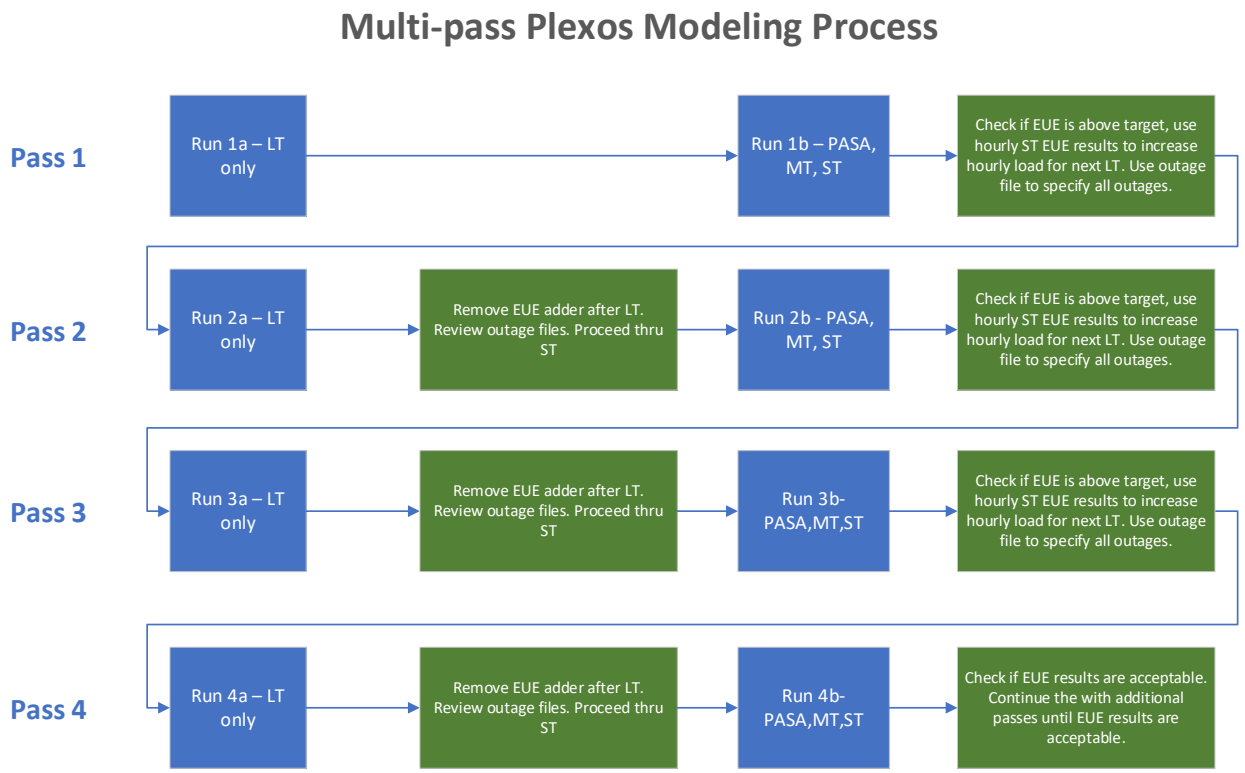
RESPONSE

a. LUMA has requested its Technical Consultant provide additional support for this cost projections.

b. The data from ST is the only peak load data that you can consider as representative of the forecasts. The data from LT is impacted by the iterative methodology we used to arrive at acceptable unserved energy results. See the response to the next question.

c. Please see methodology description in the graphic below that follows.

2025 INTEGRATED RESOURCE PLAN



*The results of an initial run are used to obtain an initial set of forced and planned outages

d. The DBESS costs included in the PVRR table are the utility costs associated with the program administration. There are no battery CapEx or OpEx in the figures shown for the DBESS programs.

e. To develop the natural gas price forecast, Black & Veatch analyzed PREPA's existing contracts with Naturgy and New Fortress Energy. These two entities currently import natural gas in the form of LNG to the primary gas-fired power plants at Costa Sur and San Juan. In these contracts, the fuel prices are based on cost components that include the Unit Cost and the Unit Fuel Cost, where Unit Fuel Cost is the Henry Hub natural gas futures index price multiplied by 1.15 and the Unit Cost accounts for the transportation and delivery elements of the total fuel cost and varies by supply period. In the forecast used for this IRP, the 2025 through 2028 Unit Fuel Cost forecast was based on Henry Hub futures from December 2023 to January 2024 and it was assumed that the Unit Cost remains constant. For the years beyond 2028 through 2044, the 2023 Energy Information Administration's Annual Energy Outlook (AEO) Reference Case annual growth rate for Henry Hub Spot prices were applied to develop the long-term natural gas price forecast For remote sites in Puerto Rico not located near an LNG import location, it was assumed that LNG would be transported to the power plant sites using trucks hauling ISO containers. The cost of using ISO containers for transportation adds to the total delivered LNG cost. The forecast of delivered prices of LNG to power plant sites using ISO containers assumed that the estimated road transport cost adder is $0.073/ton-kilometer in 2023$ or 0.15 cents/Mcf-kilometer

f. The fuel price shown reflects a blend of biodiesel and diesel with an increasing percentage of biodiesel over time. The biofuel used in the IRP begins with a blend of 62% of biodiesel and 38% diesel in 2025, increasing to 98% biodiesel by 2044. To develop a price forecast for biodiesel, Black & Veatch surveyed potential biodiesel suppliers such as Chevron Renewable Energy Group, Neste, and Targray, and obtained pricing information. Generally, biodiesel commodity prices are linked to New York Harbor Heating Oil Futures, with a nominal $0.85/gallon adder, and the delivery prices, which refer to the costs of transporting biodiesel to its destination, are estimated to be at a nominal rate $0.80/gallon. Black & Veatch utilized the NY Harbor Heating Oil futures from March 2024 and included the aforementioned adders to determine the delivered biodiesel prices for various biodiesel blends. Black & Veatch then developed and utilized a schedule for the introduction of biodiesel, with the initial phase involving a blend of 62% biodiesel and 38% diesel (B60) in 2025. Subsequently, it was assumed that there will be a gradual increase of 1-2% in the blend each year until the blend

will reach 98% biodiesel (B100) and remain at this level thereafter.LUMA will include no biodiesel available scenario as Scenario 14 of the Energy Bureau ordered scenarios.

g. With the recent Energy Bureau ordered scenarios, this question is no longer relevant.

h. With the recent Energy Bureau ordered scenarios, and the two informal information requests LUMA received from Synapse, and for which LUMA is responding here, LUMA believes this question is no longer relevant.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-008

SUBJECT

Initial Modeling Questions / Check before Final Runs

REQUEST

8. Update as necessary and provide a final "inputs and assumptions and parameters and costs" file, with all key trajectories including (but not limited to):

a. load (energy and peak),

b. resource capital costs (build costs, by year), for each/all of utility-scale PV, BESS (all durations), CT, CC, RICE, Wind

c. resource O&M (fixed and variable) costs,

d. fuel cost trajectories,

e. PLEXOS configuration parameters (e.g., but not limited to, LT Plan and ST Schedule chronology parameters),

f. DPV build/additions by year.

If for some reason the variables in this file might change during the course of conducting the runs, please explain (we would not expect that). Ensure that differences in assumptions for any given base/high/low trajectory are clearly labeled, and that any/all "build cost" data or separate data files is included. As necessary, state whether values are in nominal or real currency.

We are not asking for reconciliation to earlier, preliminary answers provided in response to ROIs, but we expect the file(s) in response to this question to be comprehensive and clear. Workpapers to be filed with the final IRP will need to clearly identify sources for costs – where feasible, please include sources for cost estimations in this file.

The responses to Q. 13 in the ROI-6th set referenced escalation factors for capital costs used in the PR100 study. It is not clear to us that that study clearly indicated *relative* capital cost trajectories over time between PV/BESS resources, and fossil resources. Please provide further explanation of the

determination of the base case and low case scaler trajectories and the relation between the scaler trajectories included in this answer, or informing any updated input assumptions concerning these costs.

RESPONSE

a. – f. LUMA will provide any updates as necessary to the requested elements with the exception of item "e", the PLEXOS Configuration parameters. The PLEXOS parameters are too numerous and the effort would be too burdensome to provide in a separate document or file in a format other than the native PLEXOS model format.

The most recent assumptions LUMA intends to use in the future PLEXOS modeling can be found in the attached file: CONFIDENTIAL_FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-008a

The forecast used in the PLEXOS modeling can be found in the attached file: CONFIDENTIAL_FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-008b

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-009

SUBJECT

Initial Modeling Questions / Check before Final Runs

REQUEST

9. Refer to LUMA's Second Interim Filing, Table 4 (PPRP Capacity Balance) as well as CONFIDENTIAL_SupDoc_Port E_FlexScenario#1_PreferredCase.xlsm (tabs: Region LT, Region ST, PVRR_tbl, PASA) and CONFIDENTIAL_SupDoc_IRP_Forecasts.xlsx:

a. Explain the reason for the differences in annual peak demand values shown for the Preliminary Preferred Resource Plan across each of the following: Table 4 of the Interim Filing, tab 'Region LT' and tab 'Region ST' of the Portfolio E file, and the "Base Core Forecast" tab of the Forecasts file, and the "PASA" tab of the preferred portfolio results (Portfolio E, flex scenario 1)

b. Explain why there are unintuitive spikes for some years in the peak load trajectory values for the Region LT and Region ST tabs.

c. Explain the reason for the differences in "Generation Capacity (MW)" values for 2025-2027 between the Region ST tab and the Region LT tab. If these differences arise from the iterative steps used, confirm and explain.

d. Explain how the battery energy storage charging load is accounted for in any / all PLEXOS runs. Does the native load energy values include this load, or is it separate from native load tabulations on the various output results tabs

RESPONSE

a. Only the peak data in the PLEXOS ST demand output and its associated Region ST data can be considered representative of the forecasted peak load. Please refer to LUMA's response to Synapse RFIs from 4/30/2025 Email, question 6 and the two bullets requesting an explanation for the bumpy peaks and the PLEXOS methodology.

b. Only the peak data in the PLEXOS ST demand output and its associated Region ST data can be considered representative of the forecasted peak load. Please refer to LUMA's response to

Synapse RFIs from 4/30/2025 Email, question 6 and the two bullets requesting an explanation for the bumpy peaks and the PLEXOS methodology.

c. LUMA will need to investigate the data for the 2027 to 2035 years.

d. In PLEXOS modeling, the BESS charging load is accounted for separately from the native load. Charging of BESS units is treated as an additional demand on the system and is not included within the native load values.

Specifically, the native load refers to the base electricity demand from end users and does not incorporate the energy consumed for charging BESS.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-010

SUBJECT

Initial Modeling Questions / Check before Final Runs

REQUEST

10. Expected Unserved Energy and Planning Reserve Margin in Plexos LT module, and responses to ROI-7 Question 7a and 7b

a. Confirm, or explain otherwise that LOLE at 2.4 hours/year, and not any measure of expected unserved energy (EUE), was used as the input parameter guiding the capacity expansion results in the LT module.

b. Explain how the iteration between LT and ST is/was done, and the extent to which re-optimization of the build results occurs.

c. Confirm that the LOLE is based on the LOLP parameter.

d. Explain how the LOLP parameter is developed / input, for the system as a whole or on a transmission planning area basis, or otherwise.

e. Explain how the outage rates (forced or planned, as appropriate) are used in determining the resources available to meet load within the LT or ST modules.

f. Provide a comprehensive table of the input parameters used for all LT modeling runs that constrain the model to meet specific LOLE in each year, or to meet (or be less than) threshold values for expected unserved energy.

RESPONSE

a. As LUMA stated previously, PLEXOS does not have the capability to use LOLE or expected unserved energy as an input parameter to guide the development of either the LT or ST results. However, LOLE can be calculated from the results of the ST model. LOLE results from the LT model are not useful for planning since the results do not use a probabilistic approach to address forced outages. Working within the capabilities, LUMA, its Technical Consultant and Energy Exemplar developed an iterative modeling process using the results of the ST model for the

annual expected unserved energy hours and the number of annual outage events to calculate the LOLE and determine if the results meet the goal of 2.4 hours per year.

LUMA is using a target of 0.1 day/year (2.4 hours/year) LOLE to ensure a high level of reliability in Puerto Rico's energy system.

b. Please refer to LUMA's response to Synapse RFIs from 4/30/2025 Email, question 6 and the two bullets requesting an explanation for the bumpy peaks and the PLEXOS methodology.

c. As stated in the response to the Synapse question 3a above, LOLE is based on annual expected unserved energy and the annual number of outage events per year.

d. The unserved energy and the resulting LOLE are both based on the entire Puerto Rico electrical system including all 8 TPAs.

e. Please refer to LUMA's response to Synapse RFIs from 4/30/2025 Email, question 6 and the bullet requesting an explanation for PLEXOS methodology.

f. LUMA uses the hourly forced outages and the planned maintenance from prior ST runs as the input to the subsequent LT runs. This process is performed for each iteration of each scenario which typically requires an average of 4 iterations per scenario to reach acceptable results. Please refer to LUMA's response to Synapse RFIs from 4/30/2025 Email, question 6 and the bullet requesting an explanation for PLEXOS methodology.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-011

SUBJECT

Initial Modeling Questions / Check before Final Runs

REQUEST

11. Refer to LUMA's Revised Second Interim Filing, confidential results files (including PVRR tbl and Gen ST tabs) and input assumptions file.

a. What is the original source for costs for the annual capital costs assigned to the San Juan 460 MW CC unit, as used in the "Unit Additions Annualized Capital Costs ($000) (includes fixed decisions annual costs)" field in the main table of the PVRR tbl tab?

b. Those costs are from the "cptl costs" tab. Explain the reason for the "cptl costs" real cost value trajectory for the years 2024 through 2033, and the exception (to the trend) for the value used in 2028.

c. What is the source for the annual fixed O&M costs assigned to the San Juan 460 MW CC unit and contained in the Gen ST tab of the scenario results files?

d. The information the Energy Bureau has on the annual contract costs for fixed O&M for the 460 MW CC unit is considerably different (i.e., higher) than the costs contained in the Plexos results file. As necessary, provide an update to the fixed O&M input cost assumption and explain how any such update would affect the modeling results for any or all of the executed scenarios.

e. Has the 460 MW CC unit been subject to economic dispatch and economic unit commitment in the PLEXOS ST model executions? Provide all detail documenting its commitment and dispatch status as used in PLEXOS.

RESPONSE

a. The cost estimates for the 460 MW Energiza unit were provided by LUMA's technical consultant.

b. The cost estimates for the 460 MW Energiza unit were provided by LUMA's technical consultant. The cost trajectory from 2024 to 2033 aligns with the cost trajectory of the generic thermal units considered in the IRP study.

Since the COD for this unit is June 2028, the capital costs for that year only account for the duration that the unit is expected to be in service during that period

c. The cost estimates for the 460 MW Energiza unit was provided by LUMA's technical consultant.

d. Please provide the data that the Energy Bureau has available for the 460 MW Energiza unit. As LUMA has indicated, it would like to get the best information available by May 28 to use in the revised modeling. The cost and performance data we are using to date for the 460 MW Energiza unit was estimated by LUMA's technical consultant.

e. The Energiza 460 MW unit has been subject to economic dispatch and economic unit commitment in the PLEXOS model. LUMA believes looking at the historical modeling results for the dispatch of this unit will not be useful based on the major changes that will be implemented in the new Energy Bureau ordered scenarios.

Exhibit 2

2025 Integrated Resource Plan (2025 IRP)

Exhibit 2

NEPR-AP-2023-0004

First Set of Unofficial 2025 IRP Prefiling RFI by the Puerto Rico Energy Bureau's Technical Consultant

LUMA

NEPR-AP-2023-0004

On April 30, 2025, and May 1, 2025, Synapse Energy Economics, Inc. (Synapse), the Puerto Rico Energy Bureau's (Energy Bureau) technical consultant, issued two separate Unofficial Requests For Information (First Set of Unofficial 2025 IRP Prefiling RFI) via email to LUMA.

This filing includes the responses to all questions issued by Synapse in April 30, 2025, and May 1, 2025. The questions are in the attached document **FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-A.** LUMA submits in this First Set of Unofficial 2025 IRP Prefiling RFI information related to: 1) Renewable energy and battery energy storage system (BESS) costs, 2) Load and DPV forecasts, 3) Updates on the fixed decisions COD and capacities, 4) PLEXOS® modeling parameters and their sources.

Please note that the results and answers provided herein by LUMA are based on the most recent data obtained prior to May 22 and is subject to change as LUMA continues to review and confirm the assumptions that will be used for the scenarios approved by the Energy Bureau in the Resolution and Order of May 13, 2025 (May 13 R&O).

List of Responses and Attachments

Response ID	Document Type	Response Subject
FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-A	Word Document	FIRST UNOFFICIAL RFI Questions from the Energy Bureau's Technical Consultant
CONFIDENTIAL FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-008a	Excel document CONFIDENTIAL	IRP Inputs, assumptions, parameters and costs
CONFIDENTIAL FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-008b	Excel document CONFIDENTIAL	IRP Load and DPV Forecast

List of Acronyms

Acronym	Definition
AEO	Annual Energy Outlook
ASAP	Accelerated Storage Addition Program
B100	biodiesel
BESS	battery energy storage system
CAPEX	capital expenditures
CC	combined cycle
CCGT	combined cycle gas turbine
CHP	combined heat and power
COD	commercial operations date
CT	combustion turbine
DBESS	distributed battery energy storage system
DPV	distributed solar photovoltaics
EE	energy efficiency
EV	electric vehicles
IRP	Integrated Resource Plan

Acronym	Definition
ISO	International Organization for Standardization
kV	Kilovolt
LOLE	loss of load expectation
LOLP	loss of load probability
LNG	liquefied natural gas
LT	long term
MW	Megawatt
OPEX	operating expense
PASA	projected assessment of system adequacy
PV	solar photovoltaics
PVRR	present value revenue requirement
PR100	Puerto Rico Grid Resilience and Transition to 100% Renewable Energy Study
PREPA	Puerto Rico Electric Power Authority
R&O	Resolution and Order
ST	short term
T1	Tranche 1

Acronym	Definition
T2	Tranche 2
TPA	Transmission Planning Area

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-001

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

1. Renewable energy capital costs and battery costs considered together as base or low cost – not paired (inputs separate), but costs move together to reduce permutations. Trajectory of costs for all fossil and PV/BESS/Wind resources – “scaler” trajectory to be revisited. Separate scenario(s) for different scaler trajectory assumption if needed to test robustness in face of potential decreasing costs steeper than current scaler. These costs and relative costs are critical assumptions.

RESPONSE

LUMA agrees to move renewable and battery costs together, so that when modified for the modeling scenario. LUMA is open to work with Synapse to define a reasonable cost trajectory for May 13 Resolution and Order (R&O) Core Scenarios 3 and 5 so that the results of these scenarios can contribute to LUMA’s planned selection of the Preferred Portfolio.

It was decided that LUMA will choose assumptions that have a reasonable basis for the cost estimates that can be explained and provide a reasonable range between the low, base, and high cost estimates.

RESPONSES TO APRIL 30, 2025, AND MAY 1, 2025, INFORMAL REQUESTS OF INFORMATION

2025 INTEGRATED RESOURCE PLAN REPORT

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-002

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

2. Peak load in high load case – reflecting decreasing LF (i.e., peakier trend) over period. No other load sensitivity except higher DPV projection case will lead to lower energy load than base case.

RESPONSE

LUMA intends to use its most recent high-load forecast which includes an independent forecast of energy and hourly peak demands. LUMA plans to use its high load forecast for Scenario 2 as ordered by the Energy Bureau in the May 13 R&O and in some of the allotted flexibility scenarios, (May 13 R&O Flexibility Scenarios 7 to 11). LUMA also plans to use a low-load forecast for some of its allotted flexibility scenarios.

All scenarios listed in the May 13 R&O, other than Scenario 2 and the LUMA allotted flexibility portfolios 7 to 11 will be run using the base case forecast. Except for the controlled distributed battery energy storage system (DBESS) variation in the May 13 R&O Scenario 13, all load modifiers inputs will remain at the base level for all core and supplemental scenarios, i.e., distributed solar photovoltaics (DPV), energy efficiency (EE), electric vehicles (EV) or combined heat and power (CHP), and controlled distributed battery energy storage systems (DBESS).

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-003

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

3. DPV projection same in all cases except for one scenario with high DPV and high DBESS control.

RESPONSE

It is LUMA's understanding that all the scenarios required in the May 13 R&O will assume the base level of DPV growth and only Scenario 13 will assume a higher level of controlled DBESS.

Synapse will select the growth trajectory of the controlled DBESS from one of the original four controlled DBESS growth scenarios of the May 13 R&O (Scenarios 6, 7, 8 or 9).

LUMA will define the controlled DBESS trajectory for Scenario 13 of the May 13 R&O.

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-004

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

4. Base hard-coded resource assumptions include 460 MW CCGT plant. Two scenarios exclude this plant, one scenario delays it. Need confirmation of extent of hard coded resources for planning:

a. T1 PV

b. T1 BESS

c. T2 PV

d. T2 BESS (6 hr)

e. ASAP Ph 1 (185 MW) and Ph 2 (175 MW)

f. LUMA 38 kV BESS (100 MW)

g. Genera BESS (430 MW)

h. Genera Peakers (268 MW)

RESPONSE

It is LUMA's understanding that the May 13 R&O scenarios only have a single variation of the 460 Megawatt (MW) Energiza plant (Supplemental Scenario 14). In addition, there are changes to the assumptions for some of the other fixed decisions, including:

a. Tranche 1 photovoltaic (PV): commercial operations date (COD) and capacity changes.

b. Tranche 1 battery energy storage system (BESS): COD and capacity changes.

c. Tranche 2 PV: No change.

d. Tranche 2 BESS (6hr): COD and capacity changes.

e. Accelerated Storage Addition Program (ASAP).

i. ASAP Ph 1: Capacity changes- ASAP Phase 1: 196 MW- Fixed Decision

ii. ASAP Phase 2: [redacted] - will remain an optional PLEXOS® Economic decision [redacted]

f. LUMA 38 Kilovolt (kV) BESS (100 MW): These batteries will not be considered firm capacity for energy supply as they are designated for grid support. They will contribute the operational reserves used for frequency and voltage control.

g. Genera BESS (430 MW): LUMA will assume a fixed decision- 430 MW in BESS additions.

h. Genera Peakers (268 MW): LUMA plans to use the 244 MW as the capacity of the peakers which is based on the Genera interconnection applications submitted to LUMA for these units. However, Genera indicated in a recent conversation that the total unit capacity will be higher than 244 MW based on the latest information from its bidders. If Genera is able to provide information to justify an expected capacity for the planned peakers that is higher than 244 MW, LUMA will assume a higher capacity up to 268 MW maximum, which is the capacity LUMA understands to have been approved by the Energy Bureau.

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-005

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

5. Size of maximum CC unit allowed (400? Less?) – Synapse recommends less than 400 MW nominal per prior 2025 IRP discussions.

RESPONSE

LUMA plans to use the current values in our PLEXOS® model, which includes two units greater than 400 MW capacity, the Energiza 460 MW unit and the option for one or more 551 MW generic combined cycle (CC) units (based on a GE 7HA.02 with a 1x1 configuration) available for selection by PLEXOS®. At this time, LUMA does not plan to add the additional 80 MW to the Energiza capacity that is apparently under consideration.

The next smaller CC unit under 400 MW, for which cost estimates are available, is a 373 MW unit (based on a GE 7F.05 in a 1x1 configuration); but this smaller unit is less fuel efficient than the larger 551 MW unit.

RESPONSES TO APRIL 30, 2025, AND MAY 1, 2025, INFORMAL REQUESTS OF INFORMATION

2025 INTEGRATED RESOURCE PLAN REPORT

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-006

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

6. Other variables to hold constant or minimal change across all scenarios

   a. Fuel oil costs

   b. Distributed PV trajectory (1 scenario with high DPV)

   c. DBESS just two states (base, and high DBESS for 2 scenarios)

   d. PR100 base EE load forecast

   e. Load factor and hourly patterns (same for all base except high DPV exception, and one peakier scenario as high load)

   f. Agricultural land use assumptions

   g. Act 1-2025 modeling updates, including:

      i. Assume coal plant retirement date of end of 2032

      ii. RPS trajectory soft target – either as is currently structured, or reset for soft target starting 2035

      iii. Treatment of Aguirre steam plant (units 1 and 2) – both out of service; and 800 MW of temporary generation (assume in service)

RESPONSE

a. With the exception of the five scenarios designated LUMA Flexibility (May 13 R&O Flexibility Scenarios 7 to 11), LUMA agrees to hold fuel oil, diesel, and biodiesel fuel prices constant at the base case forecasts for the remaining seven core scenarios and five supplemental scenarios. For the five scenarios designated LUMA Flexibility, LUMA will make the decisions regarding the assumptions.

b. With the exception of the five scenarios designated LUMA Flexibility (May 13 R&O Flexibility Scenarios 7 to 11), LUMA agrees to hold the DPV forecasts at the base forecast for the remaining seven core scenarios and five supplemental scenarios. For the five scenarios designated LUMA Flexibility, LUMA will make the decisions regarding the assumptions.

c. LUMA will follow the definition of the May 13 R&O Scenarios that includes only one Supplemental Scenario (scenario 13 that includes a high controlled DBESS forecast). The remaining Core and Supplemental Scenarios will assume the most likely DBESS levels used in the March 2025 filings.

d. LUMA will use the Puerto Rico Grid Resilience and Transition to 100% Renewable Energy Study (PR100).

e. Base EE forecast in all Core and Supplemental Scenarios.

f. Except for the five scenarios designated LUMA Flexibility (May 13 R&O Flexibility Scenarios 7 to 11), LUMA will use the base or high-load forecast as designated in the May 13 R&O Scenarios. For the five scenarios designated LUMA Flexibility, LUMA will make the decisions regarding the assumptions.

g. LUMA will use the most likely assumption of “Less Land,” as designated and used in the March 2025 filing for all the May 13 R&O Core and Supplemental Scenarios.

h. See responses below:

   i. LUMA will assume that the AES coal plants retire at the end of 2032 as a fixed decision in all Core and Supplemental Scenarios of the May 13 R&O

   ii. As ordered by the Energy Bureau in the May 13 R&O, LUMA will include a soft target beginning in 2035 and ramp up to 100% by 2050 for all scenarios except 16 and 17. In Scenario 16 (Alternative RPS 1), LUMA will include a soft target beginning in 2025 with a ramp up to 2050. In Scenario 17 (Alternative RPS 2), LUMA will not include an RPS soft target until very late in the planning horizon (e.g.,2040- 2044, ramp to 2050, with specifics to be determined later)

   iii. As ordered by the Energy Bureau in the May 13 R&O, LUMA will assume Aguirre 1 and 2 units are out of service for all the Core and Supplemental Scenarios

   LUMA will assume the 800MW of temporary generation to be in service based on the following proposed COD estimate:

   - 200 MW on October 1, 2025, in Aguirre
   - 200 MW on January 1, 2026, in Aguirre
   - 200 MW by March 1, 2026, in Costa Sur
   - 200 MW by June 1, 2026, in Costa Sur

We propose the emergency units be assumed to be available for operation until six months after the planned COD date of the Energiza 460 MW unit.

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-007

SUBJECT

Notes on Variables/Scenarios Interaction

REQUEST

7. Other related issues for discussion

a. A need to ensure that the modeled trajectories of changing capital costs for renewables and batteries, and fossil costs (i.e., CTs (combustion turbine) and CCs (combined cycle)), are reasonable. How do the trajectories of the "scalers" (i.e., ratio of Puerto Rico to mainland US costs for capital expense) evolve? This is a follow up to ROI 6, question 13, and data in files.

b. "Bumpy" peak load trajectories and clarification on which peak load data in PLEXOS is applicable to capacity expansion results. Projected assessment of system adequacy (PASA) vs. long-term vs. short-term data on peak load.

c. Document the methodology for how the modeling process applies LOLE (loss of load expectation) constraints (with resulting reserve margin outcomes) and how their temporal granularity choices in the LT module are valid. Document iterative steps between ST and LT modules, and whether any re-optimization.

    i. LOLE – based on LOLP (loss of load probability). LOLP details from PLEXOS needed. Documentation – provision of PLEXOS configurations – must be clearer.

d. Costs for DBESS - why is this included in the PVRR table? DBESS capital costs are not a utility cost.

e. Gas fuel cost trajectory - what is the source for this? Reconcile with US EIA AEO 2025 the Henry Hub indexing (i.e., the 115% x HH + $7.95 /MMBTU standard contract price) for PLEXOS fuel input pricing.

f. Source of biodiesel fuel costs and Puerto Rico availability levels. We suggest contingency scenario(s) where no biodiesel is available on the Island (or too costly).

g. What are LUMA's currently proposed 27 scenarios? How do these compare with our proposed scenarios? And how do they compare with the 40 runs that they already filed? To be worked out by LUMA and Synapse at 5/1/2025 call.

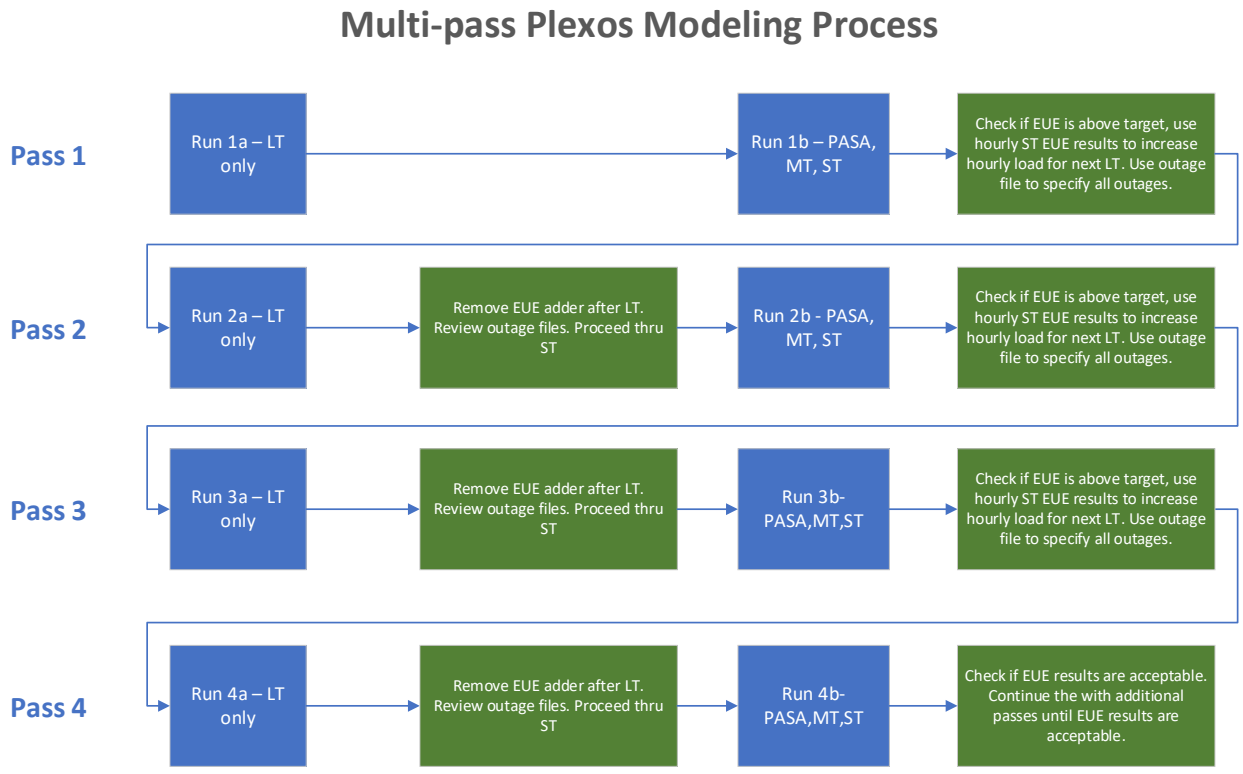
h. Additional [informal?] discovery requests Synapse has for LUMA, to help finalize understanding to come to agreement on scenario matrix for final filing.

RESPONSE

a. LUMA believes the capital cost trajectories are reasonable and do reflect a reasonable relationship between different generation technologies and between Puerto Rico and mainland US.

b. The data from the PLEXOS® short-term (ST) phase is the only peak load data that you can consider as representative of the forecasts. The data from the PLEXOS® long-term phase (LT) is adjusted by the iterative methodology we used to arrive at acceptable unserved energy results. See the response to the next question.

c. Please see methodology description in the graphic below that follows.



*The results of an initial run are used to obtain an initial set of forced and planned outages.

d. The DBESS costs included in the present value revenue requirement (PVRR) table are the utility costs associated with the program administration. There are no battery capital expense (CapEx) or operating expense (OpEx) in the figures shown for the DBESS programs.

e. To develop the natural gas price forecast, LUMA's technical consultant analyzed the Puerto Rico Electric Power Authority's (PREPA) existing contracts with Naturgy and New Fortress

Energy. These two entities currently import natural gas in the form of liquefied natural gas (LNG) to the primary gas-fired power plants at Costa Sur and San Juan. In these contracts, the fuel prices are based on cost components that include the unit cost and the unit fuel cost, where unit fuel cost is the Henry Hub natural gas futures index price multiplied by 1.15 and the unit cost accounts for the transportation and delivery elements of the total fuel cost and varies by supply period. In the forecast used for this Integrated Resource Plan (IRP), the 2025 through 2028 unit fuel cost forecast was based on Henry Hub futures from December 2023 to January 2024 and it was assumed that the unit cost remains constant. For the years beyond 2028 through 2044, the 2023 Energy Information Administration's Annual Energy Outlook (AEO) reference case annual growth rate for Henry Hub Spot prices were applied to develop the long-term natural gas price forecast. For remote sites in Puerto Rico not located near an LNG import location, it was assumed that LNG would be transported to the power plant sites using trucks hauling International Organization for Standardization (ISO) containers. The cost of using ISO containers for transportation adds to the total delivered LNG cost. The forecast of delivered prices of LNG to power plant sites using ISO containers assumed that the estimated road transport cost adder is $0.073/ton-kilometer in 2023$ or 0.15 cents/Mcf-kilometer.

f. The fuel price shown reflects a blend of biodiesel and diesel with an increasing percentage of biodiesel over time. The biofuel used in the IRP begins with a blend of 62% of biodiesel and 38% diesel in 2025, increasing to 98% biodiesel by 2044. To develop a price forecast for biodiesel, the technical consultant surveyed potential biodiesel suppliers such as Chevron Renewable Energy Group, Neste, and Targray, and obtained pricing information. Generally, biodiesel commodity prices are linked to New York Harbor Heating Oil Futures, with a nominal $0.85/gallon adder, and the delivery prices, which refer to the costs of transporting biodiesel to its destination, are estimated to be at a nominal rate $0.80/gallon. The technical consultant utilized the NY Harbor Heating Oil futures from March 2024 and included the aforementioned adders to determine the delivered biodiesel prices for various biodiesel blends. The technical consultant then developed and utilized a schedule for the introduction of biodiesel, with the initial phase involving a blend of 62% biodiesel and 38% diesel (B60) in 2025. Subsequently, it was assumed that there will be a gradual increase of 1-2% in the blend each year until the blend will reach 98% biodiesel (B100) and remain at this level thereafter. LUMA will use Supplemental Scenario 14 of the May 13 R&O as a no biodiesel available scenario.

g. With the recent Energy Bureau ordered scenarios, this question is no longer relevant.

h. With the recent Energy Bureau ordered scenarios and LUMA's response to Synapse's request for information provided here, LUMA believes this question is no longer relevant.

RESPONSES TO APRIL 30, 2025, AND MAY 1, 2025, INFORMAL REQUESTS OF INFORMATION

2025 INTEGRATED RESOURCE PLAN REPORT

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-008

SUBJECT

Initial Modeling Questions / Check before Final Runs

REQUEST

8. Update as necessary and provide a final "inputs and assumptions and parameters and costs" file, with all key trajectories including (but not limited to):

a. load (energy and peak),

b. resource capital costs (build costs, by year), for each/all of utility-scale PV, BESS (all durations), CT, CC, RICE, Wind

c. resource O&M (fixed and variable) costs,

d. fuel cost trajectories,

e. PLEXOS® configuration parameters (e.g., but not limited to, LT Plan and ST Schedule chronology parameters),

f. DPV build/additions by year.

If for some reason the variables in this file might change during the course of conducting the runs, please explain (we would not expect that). Ensure that differences in assumptions for any given base/high/low trajectory are clearly labeled, and that any/all "build cost" data or separate data files is included. As necessary, state whether values are in nominal or real currency.

We are not asking for reconciliation to earlier, preliminary answers provided in response to ROIs, but we expect the file(s) in response to this question to be comprehensive and clear. Workpapers to be filed with the final IRP will need to clearly identify sources for costs – where feasible, please include sources for cost estimations in this file.

The responses to Q. 13 in the ROI-6th set referenced escalation factors for capital costs used in the PR100 study. It is not clear to us that that study clearly indicated *relative* capital cost trajectories over time between PV/BESS resources, and fossil resources. Please provide further explanation of the determination of the base case and low case scaler trajectories and the relation between the scaler trajectories included in this answer, or informing any updated input assumptions concerning these costs.

RESPONSE

a. – f. LUMA will provide any updates as necessary to the requested elements with the exception of item "e", the PLEXOS® configuration parameters. The PLEXOS® parameters are too numerous, and the effort would be too burdensome to provide in a separate document or file in a format other than the native PLEXOS® model format.

The most recent assumptions LUMA intends to use in the future PLEXOS® modeling can be found in the attached file: CONFIDENTIAL_FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-008a

The forecast used in the PLEXOS® modeling can be found in the attached file: CONFIDENTIAL_FIRST UNOFFICIAL RFI-LUMA-AP-2023.0004-20250522-008b

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-009

SUBJECT

Initial Modeling Questions / Check before Final Runs

REQUEST

9. Refer to LUMA's Second Interim Filing, Table 4 (PPRP Capacity Balance) as well as CONFIDENTIAL_SupDoc_Port E_FlexScenario#1_PreferredCase.xlsm (tabs: Region LT, Region ST, PVRR_tbl, PASA) and CONFIDENTIAL_SupDoc_IRP_Forecasts.xlsx:

a. Explain the reason for the differences in annual peak demand values shown for the Preliminary Preferred Resource Plan across each of the following: Table 4 of the Interim Filing, tab 'Region LT' and tab 'Region ST' of the Portfolio E file, and the "Base Core Forecast" tab of the Forecasts file, and the "PASA" tab of the preferred portfolio results (Portfolio E, flex scenario 1)

b. Explain why there are unintuitive spikes for some years in the peak load trajectory values for the Region LT and Region ST tabs.

c. Explain the reason for the differences in "Generation Capacity (MW)" values for 2025-2027 between the Region ST tab and the Region LT tab. If these differences arise from the iterative steps used, confirm and explain.

d. Explain how the battery energy storage charging load is accounted for in any / all PLEXOS runs. Does the native load energy values include this load, or is it separate from native load tabulations on the various output results tabs

RESPONSE

a. Only the peak data in the PLEXOS® ST demand output and its associated Region ST data can be considered representative of the forecasted peak load. Please refer to LUMA's response to First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-007, question b requesting an explanation for the bumpy peaks and the PLEXOS® methodology.

b. Only the peak data in the PLEXOS® ST demand output and its associated Region ST data can be considered representative of the forecasted peak load. Please refer to response to First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-007, question b requesting an explanation for the bumpy peaks and the PLEXOS® methodology.

c. Only the peak data in the PLEXOS® ST demand output and its associated Region ST data can be considered representative of the forecasted peak load. Please refer to response to First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-007, question b requesting an explanation for the bumpy peaks and the PLEXOS® methodology.

d. In PLEXOS® modeling, the BESS charging load is accounted for separately from the native load. Charging of BESS units is treated as an additional demand on the system and is not included within the native load values.

Specifically, the native load refers to the base electricity demand from end users and does not incorporate the energy consumed for charging BESS.

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-010

SUBJECT

Initial Modeling Questions / Check before Final Runs

REQUEST

10. Expected Unserved Energy and Planning Reserve Margin in Plexos LT module, and responses to ROI-7 Question 7a and 7b

a. Confirm, or explain otherwise that LOLE at 2.4 hours/year, and not any measure of expected unserved energy (EUE), was used as the input parameter guiding the capacity expansion results in the LT module.

b. Explain how the iteration between LT and ST is/was done, and the extent to which re-optimization of the build results occurs.

c. Confirm that the LOLE is based on the LOLP parameter.

d. Explain how the LOLP parameter is developed / input, for the system as a whole or on a transmission planning area basis, or otherwise.

e. Explain how the outage rates (forced or planned, as appropriate) are used in determining the resources available to meet load within the LT or ST modules.

f. Provide a comprehensive table of the input parameters used for all LT modeling runs that constrain the model to meet specific LOLE in each year, or to meet (or be less than) threshold values for expected unserved energy.

RESPONSE

a. LUMA is using a target of 0.1 day/year (2.4 hours/year) of loss of load expectation (LOLE) as a planning target to ensure a Puerto Rico's energy system achieves a high level of reliability within the planning horizon of the 2025 IRP.

PLEXOS® does not have the capability to use LOLE or expected unserved energy as an input parameter to guide the development of either the LT or ST results. However, LOLE can be calculated from the results of the ST model. LOLE results from the LT model are not useful for planning since the results do not use a probabilistic approach to address forced outages. Working within the capabilities, LUMA, its technical consultant, and Energy Exemplar developed an

iterative modeling process using the results of the ST model for the annual expected unserved energy hours and the number of annual outage events to calculate the LOLE and determine if the results meet the goal of 2.4 hours per year.

b. Please refer to LUMA's response to Synapse RFIs from 4/30/2025 email, question 6, and the two bullets requesting an explanation for the bumpy peaks and the PLEXOS® methodology.

c. As stated in the response to the Synapse question 3a above, LOLE is based on annual expected unserved energy and the annual number of outage events per year.

d. The unserved energy and the resulting LOLE are both based on the entire Puerto Rico electrical system including all eight Transmission Planning Areas (TPA).

e. Please refer to response to First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-007, question c requesting an explanation of the PLEXOS® methodology.

f. LUMA uses the hourly forced outages and the planned maintenance from prior ST runs as the input to the subsequent LT runs. This process is performed for each iteration of each scenario which, on average thus far, requires an average of four iterations per scenario to reach acceptable results. Please refer to response to First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-007, question c requesting an explanation of the PLEXOS® methodology.

NEPR-AP-2023-0004

Response: First Unofficial RFI-LUMA-NEPR-AP-2023-0004-20250522-011

SUBJECT

Initial Modeling Questions / Check before Final Runs

REQUEST

11. Refer to LUMA's Revised Second Interim Filing, confidential results files (including PVRR tbl and Gen ST tabs) and input assumptions file.

a. What is the original source for costs for the annual capital costs assigned to the San Juan 460 MW CC unit, as used in the "Unit Additions Annualized Capital Costs ($000) (includes fixed decisions annual costs)" field in the main table of the PVRR tbl tab?

b. Those costs are from the "cptl costs" tab. Explain the reason for the "cptl costs" real cost value trajectory for the years 2024 through 2033, and the exception (to the trend) for the value used in 2028.

c. What is the source for the annual fixed O&M costs assigned to the San Juan 460 MW CC unit and contained in the Gen ST tab of the scenario results files?

d. The information the Energy Bureau has on the annual contract costs for fixed O&M for the 460 MW CC unit is considerably different (i.e., higher) than the costs contained in the Plexos results file. As necessary, provide an update to the fixed O&M input cost assumption and explain how any such update would affect the modeling results for any or all of the executed scenarios.

e. Has the 460 MW CC unit been subject to economic dispatch and economic unit commitment in the PLEXOS ST model executions? Provide all detail documenting its commitment and dispatch status as used in PLEXOS.

RESPONSE

a. The cost estimates for the 460 MW Energiza unit were provided by LUMA's technical consultant.

b. The cost estimates for the 460 MW Energiza unit were provided by LUMA's technical consultant. The cost trajectory from 2024 to 2033 aligns with the cost trajectory of the generic thermal units considered in the IRP study.

Since the COD for this unit is June 2028, the capital costs for that year only account for the duration that the unit is expected to be in service during that period.

c. The cost estimates for the 460 MW Energiza unit was provided by LUMA's technical consultant.

d. During the remote discussions held between representatives from LUMA and Synapse, on May 28 and May 29, 2025, LUMA requested that Synapse provide the data it possesses for the 460 MW Energiza unit no later than May 30 to use in the revised modeling. The cost and performance data LUMA has and is using for the 460 MW Energiza unit was estimated by LUMA's technical consultant.

e. The Energiza 460 MW unit has been subject to economic dispatch and economic unit commitment in the PLEXOS® model. LUMA believes looking at the previous modeling results for the dispatch of this unit will not be useful based on the major changes that will be implemented in the new Energy Bureau ordered scenarios.