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

NEPR

Received:

Nov 18, 2024

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IN RE: REVIEW OF THE PUERTO RICO ELECTRIC POWER AUTHORITY INTEGRATED RESOURCE PLAN	**CASE NO.:** NEPR-AP-2023-0004 **SUBJECT**: Motion Submitting Responses to the Sixth Set of IRP Prefiling Period Requests of Information and Request for Confidential Treatment, and Memorandum in Support of Confidentiality

MOTION SUBMITTING RESPONSES TO THE SIXTH SET OF IRP PREFILING PERIOD REQUESTS OF INFORMATION, 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. Introduction:

1. LUMA is committed to supporting and advancing the transformation of Puerto Rico's energy system into one that is more resilient, cleaner, and sustainable for all. As Operator of the transmission and distribution system, LUMA is responsible for developing an Integrated Resource Plan ("IRP") that outlines the transformation of the island's energy resources over the next two decades. The goal of the IRP is to reflect the energy needs and priorities of our customers while advancing responsibly towards clean energy objectives that will serve Puerto Rico for generations to come.

2. LUMA's approach to energy planning considers diverse factors, including resource constraints, cost dynamics, and technological integration. Its objective is to ensure that the IRP presents a diverse and analytically robust set of future scenarios and resource portfolios. This will help create a sustainable and reliable energy future for Puerto Rico, aligning with both customer needs and the island's public policy energy goals.

3. LUMA herein submits as *Exhibit 1* the responses addressing inquiries included in the *Sixth Request for Information* from the Puerto Rico Energy Bureau ("Energy Bureau") regarding the results of the base case and the assumptions and parameters used by LUMA and Black and Veatch ("B&V"), LUMA's IRP Technical Consultant.

II. Submission and Request for Confidentiality

4. On October 29, 2024, the Energy Bureau entered a Resolution and Order in which it instructed LUMA, among other matters, to respond on or before twenty (20) days to a *Sixth Request for Information* set forth in Attachment A to the Resolution and Order ("October 29th Order").

5. In compliance with the October 29th Order, LUMA hereby submits as *Exhibit 1* the information responsive to the *Sixth Request for Information*. LUMA provides these documents supported by preliminary information. Data, estimates, and other information provided now may change and be revised as LUMA develops the IRP.

6. LUMA respectfully submits that certain information and/or documents included in *Exhibit 1* should be designated as confidential material protected from disclosure. Certain information and/or documents included in *Exhibit 1* 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 Resolution dated September 20, 2016.

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

7. 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).

8. 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).

9. 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.

10. 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 who 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.

IV. Grounds for Confidentiality

11. 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).

12. 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).

13. 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).

14. The Energy Bureau should protect certain working documents and/or information included in *Exhibit 1* 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.

15. LUMA respectfully submits that certain working documents and/or information presented as part of LUMA's response in *Exhibit 1* 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.

16. 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 working documents and/or information will not hinder nor preclude the public in a material way from gaining access to relevant and necessary information to the working documents and/or 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.

[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.*

V. Identification of Confidential Information.

17. 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	LUMA's Response to Sixth Pre-Filing Period RFI, RFI-LUMA-AP-2023.0004-20241029-PREB-004	Page 17	Trade Secret Information under Section D(1) of the Energy Bureau's Policy on Confidential Information, CEPR-MI-2016-0009	November 18th, 2024
Exhibit 1	LUMA's Response to Sixth Pre-Filing Period RFI, RFI-LUMA-AP-2023.0004-20241029-PREB-005a	Page 18	Trade Secret Information under Section D(1) of the Energy Bureau's Policy on Confidential Information, CEPR-MI-2016-0009	November 18th, 2024
Exhibit 1	LUMA's Response to Sixth Pre-Filing Period RFI, RFI-LUMA-AP-2023.0004-20241029-PREB-005b	Page 19	Trade Secret Information under Section D(1) of the Energy Bureau's Policy on Confidential Information, CEPR-MI-2016-0009	November 18th, 2024
Exhibit 1	LUMA's Response to Sixth Pre-Filing Period RFI, RFI-LUMA-AP-2023.0004-20241029-PREB-005c	Page 20	Trade Secret Information under Section D(1) of the Energy Bureau's Policy on Confidential Information,	November 18th, 2024

Document	Name	Pages in which Confidential Information is Found, if applicable	Summary of Legal Basis for Confidentiality Protection, if applicable	Date Filed
			CEPR-MI-2016-0009	

WHEREFORE, LUMA respectfully requests that the Energy Bureau **take notice** of the aforementioned for all purposes, **approve the request for confidential treatment** of certain documents and/or information submitted with *Exhibit 1* to this Motion, and **deem** LUMA to have complied with the Resolution and Order of October 29, 2024.

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 González & Martínez, Mirelis Valle-Cancel, mvalle@gmlex.net; and Alexis G. Rivera Medina, arivera@gmlex.net; and Genera PR, LLC: brannen@genera-services.com; kbolanos@genera-pr.com; regulatory@genera-pr.com.

RESPECTFULLY SUBMITTED.

In San Juan, Puerto Rico, on November 18, 2024.

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/s/ Yahaira De la Rosa Algarín
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Exhibit 1

2025 Integrated Resource Plan

(2025 IRP)

Attachment A Responses to Sixth Set of 2025 IRP Prefiling RFI

LUMA

Executive Summary

This comprehensive response by LUMA addresses inquiries from the Energy Bureau regarding LUMA's responses to ROI 5 [1]related to the Base Case – Scenario 1 of the 2025 IRP (formerly referred to as the 2024 IRP and now referred to henceforth as the 2025 IRP).

LUMA is committed to supporting and advancing the transformation of Puerto Rico's energy system into one that is more resilient, cleaner, and sustainable for everyone. As operator of the transmission and distribution system, LUMA is responsible for developing an Integrated Resource Plan (IRP) that maps out the transformation of the island's energy resources over the next two decades. LUMA is developing an IRP that best reflects the energy needs and priorities of our customers, while reliably and responsibly progressing towards the clean energy goals that will best serve the interests of Puerto Rico for generations to come. LUMA's approach to energy planning incorporates diverse considerations such as resource constraints, land usage, cost dynamics, and technological integration.

All the information and model results contained herein are subject to change as further work is completed for the 2025 IRP. LUMA appreciates the opportunity to provide responsive information to the Energy Bureau and its Consultants in order to further a more robust 2025 IRP. LUMA's goal is to ensure that the 2025 IRP presents a diverse and analytically robust set of future scenarios and resource portfolios in order to map a sustainable and reliable energy future for Puerto Rico that is responsive to customer needs and Puerto Rico's energy public policy objectives.

[1] Responses to ROI 5 were submitted by LUMA on September 11, 2024.

2025 INTEGRATED RESOURCE PLAN

NEPR-AP-2023-0004

RESPONSE: RFI-LUMA-AP-2023.0004-20241029-PREB

INTRODUCTION

The Puerto Rico Energy Bureau (Energy Bureau) issued on October 29, 2024, a Resolution and Order (October 29th R&O) ordering LUMA to submit responses to the Sixth Set of Prefiling 2025 Integrated Resource Plan (2025 IRP) Requests for Information Requests for Information (RFI). LUMA hereby complies and submits its response to Attachment A of the October 29th R&O addressing questions on: 1) 4-hour battery resources; 2) Biodiesel fuel and build costs; 3) Present Value of Revenue Requirements (PVRR) computation; 4) New Genera peaking units; 5) New San Juan Combined Cycle (CC) unit costs; 6) Natural Gas CC unit added in 2032; 7) Core load and related Transmission and Distribution (T&D) system loss accounting; 8) Annual peak capacity; 9) Energy efficiency (EE); 10) Distributed Photo Voltaic (DPV); 11) Distributed Battery Energy Storage System (DBESS); 12) Flexible demand load; and 13) Resource capital costs

Please note that the following LUMA responses are based on the best information available but should be considered preliminary pending potential revisions to the data and results that would be included in the planned May 16, 2025, filing of the full IRP.

Data, estimates, or other information provided now may change and may be revised as LUMA develops the 2025 IRP.

List of Acronyms

ACRONYM	DEFINITION
BESS	Battery Energy Storage System
CC	Combined Cycle
CHP	Combined Heat and Power
CO2	Carbon Dioxide
DBESS	Distributed Battery Energy Storage
DPV	Distributed Photovoltaic
DR	Demand Response
EE	Energy Efficiency
ELCC	Effective Load Carrying Capacity
EPC	Engineering, Procurement and Construction
EV	Electric Vehicle
FO&M	Fixed Operation and Maintenance
IRP	Integrated Resource Plan
LOLE	Loss Of Load Expectation
LOLP	Loss Of Load Probability
LT	Long-Term
NEM	Net Energy Metering
PR	Puerto Rico
PVRR	Present Value Revenue Requirement
RPS	Renewable Portfolio Standard
ST	Short-Term
TPA	Transmission Planning Area
VO&M	Variable Operation and Maintenance

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-001a

SUBJECT

Base Case result filing, September 11, 2024: 4- hour battery resources

REQUEST

Reference: Input Assumptions file, tab "Batteries". The tab references "CSV files\ExpansionInputs \BuildCost.csv" in the field for the build cost for new batteries. In the "Build Cost" tab of the file, the build cost of 4-hour battery resources (for example, the BESS-CLNA 4 HR, though all locational resources have the same cost trajectory) appears to be materially higher (e.g., for 2027, $4,217/kW (model) vs. $3,149/kW (R012)) than the build cost included in the response to the 2nd set of ROIs, question 10, Attachment 4.

a. Confirm, or explain otherwise, that the information in the tab "build cost" of the input assumptions file are the build cost parameters for the battery resources in the "Batteries" tab labeled "BuildCost.csv"

RESPONSE

Battery build costs were revised at the end of Q1 FY2024 after the ROI 2 was filed on April 1, 2024. The original costs used were based on NREL PR100 study publications. These inputs were revised and adjusted to provide a more accurate and realistic build costs based on the IRP Technical Consultant’s expertise and industry knowledge of actuals for engineering, procurement and construction (EPC) transactions of similar projects.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-001b

SUBJECT

Base Case result filing, September 11, 2024: 4- hour battery resources

REQUEST

Reference: Input Assumptions file, tab "Batteries". The tab references "CSV files\ExpansionInputs \BuildCost.csv" in the field for the build cost for new batteries. In the "Build Cost" tab of the file, the build cost of 4-hour battery resources (for example, the BESS-CLNA 4 HR, though all locational resources have the same cost trajectory) appears to be materially higher (e.g., for 2027, $4,217/kW (model) vs. $3,149/kW (R012)) than the build cost included in the response to the 2nd set of ROIs, question 10, Attachment 4.

b. Confirm that the build costs in the PLEXOS® input file for any base case and other scenario runs should be adjusted to reflect the noted ROI-2 response or explain otherwise.

RESPONSE

Refer to the response to RFI-LUMA-AP-2023.0004-20241029-PREB-1a. Build Costs were revised and adjusted to accurately reflect current market and construction costs based on projects with IRP Technical Consultant’s involvement in buy side and sell side operations in the United States.

LUMA does not plan to revert to build costs that were included in the response to the ROI 2.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-001c

SUBJECT

Base Case result filing, September 11, 2024: 4- hour battery resources.

REQUEST

Reference: Input Assumptions file, tab "Batteries". The tab references "CSV files\ExpansionInputs \BuildCost.csv" in the field for the build cost for new batteries. In the "Build Cost" tab of the file, the build cost of 4-hour battery resources (for example, the BESS-CLNA 4 HR, though all locational resources have the same cost trajectory) appears to be materially higher (e.g., for 2027, $4,217/kW (model) vs. $3,149/kW (R012)) than the build cost included in the response to the 2nd set of ROIs, question 10, Attachment 4.

c. The batteries tab contains parameters reflecting the "firm capacity" of the batteries, and the max capacity. Provide the ratio for firm capacity to max capacity for each of the categories of battery resource contained in the tab and explain how the firm capacity was derived or estimated for each category of battery. For example, the 4-hour batteries (such as BESS-CLNA 4 HR) appear to exhibit a firm-to-max capacity ratio of 60%, the Genera BESS batteries have a lower ratio, and the Tranche 1 BESS have the highest ratios.

RESPONSE

The varying firm capacity ratios reflect the Effective Load Carrying Capacity (ELCC) concept wherein the battery capacity added into the Puerto Rico system is assigned a declining capacity accreditation. As tranche-based batteries enter the system before Genera units and then are followed by any economic builds, the highest ELCC is assigned to tranche batteries, followed by a declining ELCC contribution level to additional battery installations, Genera units, and any economic additions.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-001d

SUBJECT

Base Case result filing, September 11, 2024: 4- hour battery resources.

REQUEST

Reference: Input Assumptions file, tab "Batteries". The tab references "CSV files\ExpansionInputs \BuildCost.csv" in the field for the build cost for new batteries. In the "Build Cost" tab of the file, the build cost of 4-hour battery resources (for example, the BESS-CLNA 4 HR, though all locational resources have the same cost trajectory) appears to be materially higher (e.g., for 2027, $4,217/kW (model) vs. $3,149/kW (R012)) than the build cost included in the response to the 2nd set of ROIs, question 10, Attachment 4.

d. Explain if or how the battery capacity max and/or firm capacity value is used as part of the capacity expansion algorithm when determining the optimal expansion.

RESPONSE

Firm capacity property for batteries and generator items is used for the specific capacity contribution of the particular asset towards the reserve margin requirement for the Puerto Rico system in the capacity expansion (Long-term (LT) phase) module of the PLEXOS® run. Firm capacity is only used in the LT phase of the model runs and does not impact dispatch specifications for assets in the subsequent Short-Term (ST) (hourly dispatch) phase of model runs. Max capacity property of batteries and generator items specifies the maximum capacity that the assets can dispatch to in hourly dispatch analysis of the system in the ST phase. This is more reflective of real dispatch characteristics where an asset cannot exceed its design limit.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-002a

SUBJECT

Base Case result filing, September 11, 2024: Biodiesel fuel / Conversion and build costs.

REQUEST

Reference: Fuel and build cost for biodiesel and biodiesel conversion and selection of biodiesel resources in the capacity expansion plan.

a. What is the source of the fuel costs for the biodiesel fuel used in the model?

RESPONSE

The source of biodiesel fuel cost was prepared by the IRP Technical Consultant fuel research team using various data sources. The IRP Technical Consultant conducted a literature review of biodiesel prices, contacted companies offering Biodiesel offtake quotes in the US, and created a specific forecast to use in Puerto Rico.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-002b

SUBJECT

Base Case result filing, September 11, 2024: Biodiesel fuel / Conversion and build costs.

REQUEST

Reference: Fuel and build cost for biodiesel and biodiesel conversion and selection of biodiesel resources in the capacity expansion plan.

b. Confirm, or explain otherwise, that the purpose of the biodiesel fuel option in the model is to allow the model to select biodiesel to meet RPS requirements for energy generation?

RESPONSE

Confirmed. The purpose of the Biodiesel fuel option is to allow flexible generation units to be able to meet Renewable Portfolio Standard (RPS) requirements for energy generation.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-002c

SUBJECT

Base Case result filing, September 11, 2024: Biodiesel fuel / Conversion and build costs.

REQUEST

Reference: Fuel and build cost for biodiesel and biodiesel conversion and selection of biodiesel resources in the capacity expansion plan.

c. Explain if there is any other reason for the biodiesel option to be included in the model and describe any additional information LUMA or B&V may have concerning the overall development or existence of a market for biodiesel fuel in Puerto Rico

RESPONSE

In addition to meeting the RPS requirement, another benefit of the biodiesel conversion option is that it allows the model to evaluate and select the conversion of existing thermal assets as an economic option. Conversion of existing generation units represents significant cost savings compared to building new facilities. The biodiesel fuel and its pricing assume that all the biodiesel used for electric generation will be shipped to Puerto Rico as currently occurs with fossil-based fuels. While there is currently a small biodiesel production capability in Puerto Rico that could offset some of the biodiesel shipped to Puerto Rico, no effort is planned for the 2025 IRP to study the development of expanded biodiesel markets or production capability in Puerto Rico.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-002d

SUBJECT

Base Case result filing, September 11, 2024: Biodiesel fuel / Conversion and build costs.

REQUEST

Reference: Fuel and build cost for biodiesel and biodiesel conversion and selection of biodiesel resources in the capacity expansion plan.

d. Explain why the biodiesel build costs for new resources are zero cost, while the biodiesel build costs for two existing resources (San Juan 6 CC, FEMA PS Gen 8 #1) are non-zero?

RESPONSE

Biodiesel build costs for new and existing resources were assigned a non-zero cost in the model.

Biodiesel build costs for new resources are reflected in the “Build Cost” property for generators defined in the “New Gas Gen Biodiesel” generator category. These costs are non-zero. All these generators are new build options for the model.

Existing thermal assets being considered for biodiesel conversions have a lower build cost than new unit introductions and a lower non-zero build cost to reflect component replacement costs for the assets to allow biodiesel combustion.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-002e

SUBJECT

Base Case result filing, September 11, 2024: Generation Fleet represented in PLEXOS®.

REQUEST

Reference: Fuel and build cost for biodiesel and biodiesel conversion and selection of biodiesel resources in the capacity expansion plan.

e. Explain LUMA's or B&V's understanding of why the model selected biodiesel fuel options given the very high per MMBtu cost of the fuel, compared to the per unit costs of solar PV utility scale alternatives as modeled.

RESPONSE

Solar PV by itself cannot be considered a comparable substitute for a biofueled generator that can be used as a dispatchable resource. Solar, without the addition of energy storage cannot contribute to the Puerto Rico system peak loads that occur after sunset. Without BESS, solar lacks the ability to provide output when solar radiation is reduced due to cloud cover and there is no ability to store excess solar output at times of low system load, etc. LUMA and the IRP Technical Consultant believe that biodiesel was selected as a less expensive option than the combination of solar and battery energy storage capacity.

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-003a

SUBJECT

Base Case result filing, September 11, 2024: PVRR computation

REQUEST

a. Confirm, or explain otherwise, that the build cost of the new San Juan unit and all other hard - coded BESS and solar PV resource build costs are not included in the computation of the net present value revenue requirements on tab “PVRR tbl”

RESPONSE

Build costs for all unit additions, including all fixed (hard coded) decisions, are included in the latest PVRR values, which will be submitted in the first interim IRP filing in November 2024.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-003b

SUBJECT

Base Case result filing, September 11, 2024: PVRR computation

REQUEST

b. Confirm, or explain otherwise, that the fuel, variable O&M, and fixed O&M costs of the operation of all hard -coded units is included in the computation of the net present value revenue requirements on tab "PVRR tbl".

RESPONSE

Confirmed. The fuel, variable operation and maintenance (VO&M) costs, and fixed operation and maintenance (FO&M) costs for hard-coded units are included in the computation of the PVRR.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-003c

SUBJECT

Base Case result filing, September 11, 2024: PVRR computation

REQUEST

c. Confirm, or explain otherwise, that LUMA will include the estimated build costs when computing the overall PVRR in any future base case model runs.

RESPONSE

Confirmed. LUMA will include the estimated build costs when computing the overall PVRR in any future base case model runs.

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-004

CONFIDENTIAL

SUBJECT

Base Case result filing, September 11, 2024: New Genera Peaking Units

REQUEST

New Genera Peaking Units. On July 23, 2024 the Energy Bureau approved Genera's request for new fossil peaking resources, totaling 244 MW, less than the total of 336 MW of resources noted in LUMA's June 18, 2024 response to question 2b of the 4th set of ROIs. Case NEPR-MI-2022-0005. The Energy Bureau did not approve the 3x50 MW of resources requested for the San Juan site.

a. Confirm, or explain otherwise, that LUMA can update the input assumptions for Genera peaking resources for any new base case model runs to reflect the Energy Bureau's approval of a lesser amount of resources than contained in Genera's initial request.

RESPONSE

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-005a

CONFIDENTIAL

SUBJECT

Base Case result filing, September 11, 2024: Build cost, outage rates and heat rates for the New San Juan CC unit

REQUEST

a. Confirm, or explain otherwise, that the new San Juan CC unit was hard-coded into the model, for operation beginning January 1, 2028.

RESPONSE

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-005b

CONFIDENTIAL

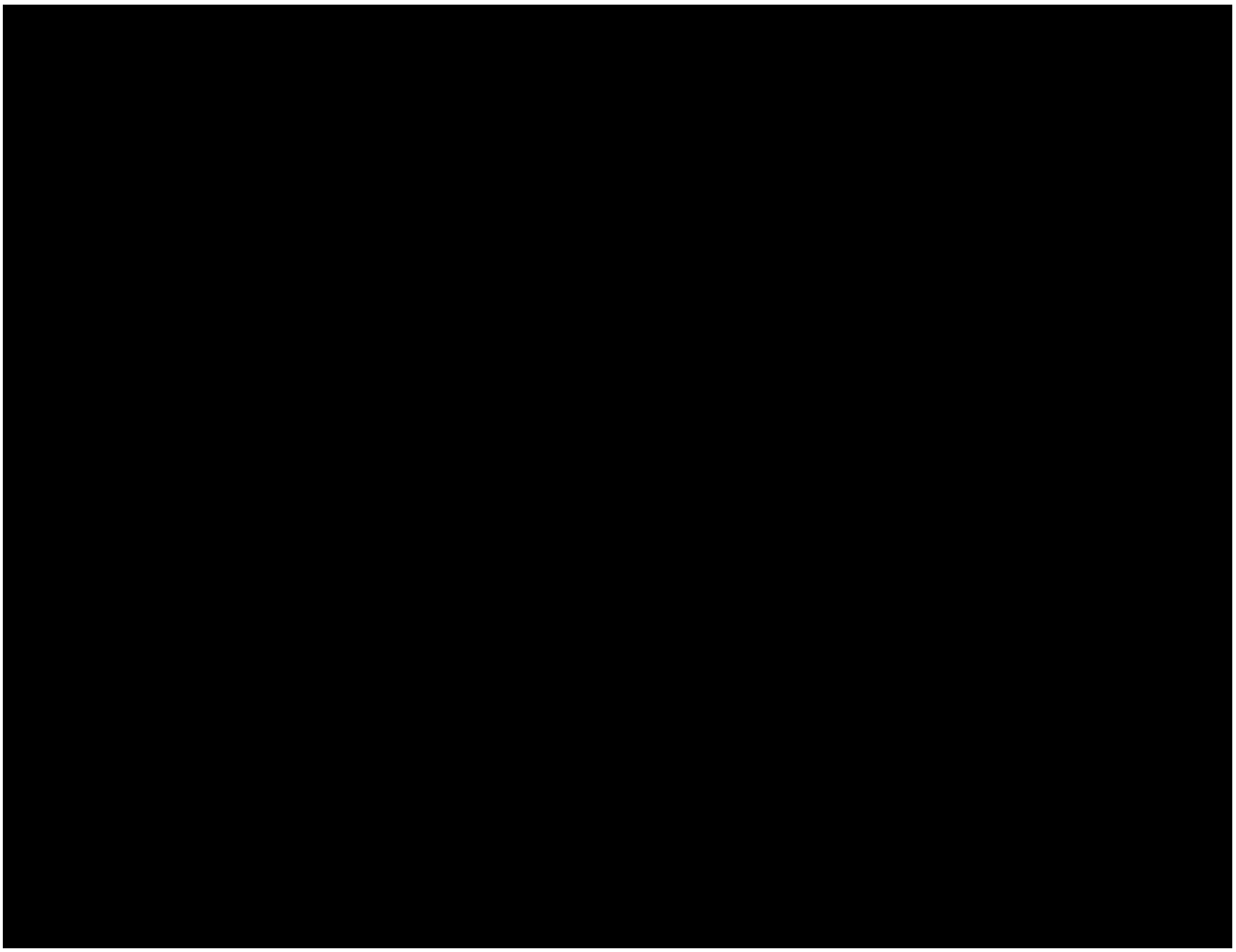
SUBJECT

Base Case result filing, September 11, 2024: Build cost, outage rates and heat rates for the New San Juan CC unit

REQUEST

b. What is the source for the outage rates and heat rates used for operation of the new San Juan CC unit?

RESPONSE



2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-005c

CONFIDENTIAL

SUBJECT

Base Case result filing, September 11, 2024: Build cost, outage rates and heat rates for the New San Juan CC unit

REQUEST

c. Does LUMA have a source for the build cost for the new San Juan CC unit, and can LUMA use that information to model the build costs for the unit?

RESPONSE

[redacted]

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-006a

SUBJECT

Base Case result filing, September 11, 2024: New natural gas unit in 2032

REQUEST

In 2032, the model retires a series of legacy units and adds a new natural gas CC unit

a. What is LUMA / B&V's understanding of what drove the model to retire the units it retired, and added the unit it added, given the underlying level of capacity and peak load existing in 2031?

RESPONSE

LUMA and the IRP Technical Consultant understand that the main driver of adding large thermal generation is the requirement of the model to meet stringent Loss of Load Expectation (LOLE) criteria and minimize incidents of unserved energy. Modeling results showed few instances of capacity shortfall but when a capacity shortfall event occurred, the amount of shortfall was large. The large capacity shortfall events require either multiple smaller dispatchable assets or larger capacity dispatchable assets to address the shortfall. Due to the lower dollar per MW capital costs of larger dispatchable assets versus smaller units, the model chooses larger units to meet the capacity shortfall based on economics. As part of its decision-making, the model also evaluates cost and reliability considerations and may choose to delay the retirement of generation to meet load.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-006b

SUBJECT

Base Case result filing, September 11, 2024: New natural gas unit in 2032

REQUEST

In 2032, the model retires a series of legacy units and adds a new natural gas CC unit

a. What specific parameters and what specific values for those parameters in the model were associated with the underlying capacity expansion / retirement decisions made by the model for the year 2032?

RESPONSE

In the referenced base case run, the IRP Technical Consultant applied simultaneously the following parameters to the model:

1. Heavy fuel oil units were required to retire between 2030 and 2034;
2. A capacity reserve margin of 40% in 2032 was applied to drive capacity expansion/retirement decisions; and
3. An RPS goal of 30.13% in 2032 is to attain an annual goal reflecting a straight-line increase in renewables from the current levels to 60% by 2040.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-007a

SUBJECT

Base Case result filing, September 11, 2024: Core Load and related Transmission and Distribution (T&D) system loss accounting

REQUEST

a. Confirm, or explain otherwise, that the core load values (GWh and MW) in the workpaper files to ROI 5 ("RFI-LUMA-_IRP_Forecasts.xlsx" at Tab "Base Core and Modifier Summary") reflect load impact at the system generator and include the effect of T&D losses. As necessary explain if the loss effects are treated differently in PLEXOS® for any component of load or load modification.

RESPONSE

Confirmed. Core load and load modifier values in the PLEXOS® model reflect load impact at the system generator level.

Impacts of T&D losses are captured for RPS requirements. Inside the PLEXOS® model, RPS calculations are affected by using the “Loss Cfnt” variable.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-007b

SUBJECT

Base Case result filing, September 11, 2024: Core Load and related T&D system loss accounting

REQUEST

b. T&D loss effects are shown in the same file at Tab "Losses and TPA and Class Allocation". The maximum loss value seen in 10.3% for residential and agricultural. What is the source for these factors?

RESPONSE

The estimated loss rates are segmented into the categories listed below, some of which overlap:

- **Non-technical loss, which includes:**
  - Loss attributed to power theft
  - Systematic billing adjustments and changes
- **Net technical loss, which includes:**
  - Transmission loss
  - Substation Loss
  - Primary distribution loss
  - Secondary distribution loss
- **Gross technical loss, which includes:**
  - All items included in net technical loss (as noted above)
  - Auxiliary load consumption at power plants
  - Consumption by voltage level at LUMA/PREPA facilities (own use)
  - Consumption by voltage level from other unbilled and known legitimate users
- **Total loss, which includes:**
  - Non-technical loss
  - Gross technical loss

Guidehouse, which developed the Load Forecast for the 2025 IRP, used historical total loss rate data from FY 2009 to FY 2022, provided by LUMA, to calculate class-specific loss factors. LUMA also provided data on non-technical and net technical losses by transmission and distribution voltage level, which Guidehouse used to produce bottom-up estimates of customer class loss rates. Additionally, Guidehouse applied a calibration adjustment to convert net technical loss estimates to gross technical losses, ensuring consistency with top-down estimates from historical aggregate sales and generation data.

The net technical loss rates are a component of the total system loss rates, which include non-technical loss and gross technical loss. Guidehouse developed the loss rates based on data provided by LUMA using the following steps.

- LUMA provided monthly 12-month moving sums of technical and non-technical losses for each voltage level (transmission, primary, and secondary) between July 2009 and December 2022. Guidehouse used the data provided in its analysis and estimate of losses.
- Guidehouse used these data to estimate the average technical and non-technical loss rates for energy delivered on each service voltage level, accounting for the compound loss that occurs as energy flows downstream through the primary and secondary distribution systems.
- Guidehouse applied the average voltage-level loss rates to each customer class weighted by the share of energy delivered to final customers in that class via transmission, primary, or secondary voltage.

Finally, Guidehouse calibrated total loss to historical total system efficiency by adjusting net technical loss rates to account for factors not included in the originally provided loss data (e.g., auxiliary consumption at power plants, consumption at LUMA/PREPA facilities, and consumption from other unbilled and known legitimate users).

Table 1 below summarizes estimates of non-technical loss rates, net and gross technical loss rates, and total loss rates by customer class.[2]

Table 1: Customer Class Loss Rates

Customer Class	Non-Technical Loss (A)	Net Technical Loss (B)	Gross Technical Loss (C)	Total Loss (A + C)
Residential	3.7%	10.3%	15.2%	18.9%
Commercial	2.5%	7.7%	11.6%	14.1%
Industrial	1.0%	3.3%	5.2%	6.2%
Agriculture	3.7%	10.3%	15.2%	18.9%
Public Lighting	3.7%	10.3%	15.2%	18.9%
Other Authorities	0.9%	3.0%	4.7%	5.6%

Total loss is the difference between electricity at the generation source and metered sales.
All loss columns are defined as the percent of electricity output at the generation source.

Source: Guidehouse

The load forecasts modeled in PLEXOS® and provided in ROI 5 ("RFI-LUMA-_IRP_Forecasts.xlsx") consist of forecasts for:

[2] Class loss rate estimates are differentiated based on transmission/distribution voltage level. Residential, agriculture, and public lighting share common loss rates because LUMA provided data indicating that all customers in these classes are served by secondary distribution voltage.

- **Core Load -** the customer energy and demand from electrical processes, appliances, and lighting, including contribution from load modifiers that were installed as of the end of December 2023. Load modifiers consist of distributed photovoltaic solar (DPV), utility-controlled distributed battery energy storage systems (DBESS), energy efficiency programs, demand response programs, combined heat and power, and electrical vehicle charging.
- **Load Modifiers** – contributions to the customer energy and demand from the incremental growth of load modifiers that are installed after December 2023.

Both the Core Load and the Load Modifiers were forecasted at the customer meter and then translated to a generation equivalent value using the class-specific losses.

For the forecast of the core load, Guidehouse applied class-specific, total loss percentages, from the far-right column in Table 1 to calculate the equivalent generation needed. The core load values in ROI 5 ("RFI-LUMA-_IRP_Forecasts.xlsx") reflect generation equivalent values after the application of the class-specific total loss values. However, for the forecast of the Load Modifiers, LUMA applied the net technical loss percentage from the middle column in Table 1 to translate the Load Modifiers at the customer meter to an equivalent generation value. It was appropriate to use only the net technical loss for the load modifier forecasts since all the other elements of the total loss that are not included in the net technical loss (i.e., non-technical loss, auxiliary load consumption at power plants, consumption at LUMA/PREPA facility (own-use), and consumption from other unbilled and known legitimate users) were already accounted for in calculating the generation equivalent of the Core Load forecast and do not generally vary with incremental changes in customer load.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-007c

SUBJECT

Base Case result filing, September 11, 2024: Core Load and related T&D system loss accounting

REQUEST

c. The "GenerationChart" tab in the file in response to ROI 5 question 1 (base case results file) contains a "Load Losses" column with values ranging roughly from 84.5% to 84.7%. Confirm or explain otherwise that this value represents a total loss percentage of roughly 15.3 to 15.5%.

RESPONSE

Confirmed. The values in the “Load Losses” column reflect a total loss percentage of roughly 15.3% to 15.5%. System Load is affected with a factor of 100% less 15.3% / 15.5%.

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-007d

SUBJECT

Base Case result filing, September 11, 2024: Core Load and related T&D system loss accounting

REQUEST

d. Reconcile the system loss percentage values as seemingly modeled with load (or otherwise) in PLEXOS® with the information provided in the “RFI-LUMA- IRP Forecasts” file that seems to be significantly lower than the values in the" Losses and TPA and Class Allocation" tab.

RESPONSE

Please refer to the response to RFI-LUMA-AP-2023.0004-20241029-PREB-007b.

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-008

SUBJECT

Base Case result filing, September 11, 2024: Annual Peak Capacity

REQUEST

a. For each of the load types (Base, EE, DBESS, CHP, Flex Demand, EV) peak capacity values on the "Base Core & Modifier Summary" tab of ROI 5 ("RFILUMA_ TRP_Forecasts.xlsx") please explain the source of these values.

b. Please confirm that the MW values for each of the load types reflect their contribution to net system peak.

RESPONSE

a. The sources of the forecast elements are provided in Table 2.

Table 2: Forecast Element Sources

Item	Forecast Element	Source
1	Base Core Load	Guidehouse estimate
2	Energy Efficiency (EE)	PR100 Ground Up Estimate
2	DBESS	PR100
3	Combined Heat and Power (CHP)	LUMA estimate
4	Flexible Demand	Guidehouse estimate
5	Electric Vehicle (EV)	PR100 estimate with LUMA revisions made to Light Duty Vehicle Efficiency estimates.

b. The Base Core Load, EE, CHP, Flex Demand, and EV are shown as estimated contributions to system peak load. However, as explained in response to 009a, the EE forecast of both GWh savings, and its System Peak Load impact have been revised. Finally, the DBESS element is dispatched by PLEXOS® and may or may not be dispatched at the time of the system peak load.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-009a

SUBJECT

Base Case result filing, September 11, 2024: Energy Efficiency

REQUEST

a. Explain why the base energy efficiency forecast (annual GWh) increased in ROI 5 ("RFI-LUMA-_IRP_Forecasts.xlsx") relative to ROI 2 ("CONFTDENTIAL_RFILUMA Attachment_1.xlsx"). In particular, include explanation for how energy efficiency which avoids T&D losses is accounted for in the energy and peak demand input assumptions.

RESPONSE

The energy forecast data provided in ROI 5 is the data currently being used in the IRP modeling. Between filing the response to ROI 2 and ROI 5, LUMA modified its assumptions as to when EE program savings would begin and found errors in LUMA's translation of the PR100 forecast of EE savings. This corrected EE data provided in ROI 5 substantially increased the expected annual energy savings from the EE programs.

The ROI 2 response provided a forecasted annual peak MW impact from the EE programs, but it also contained errors in the values. However, in the ROI 5 response, only a profile of hourly EE savings was provided for each hour of a typical weekday and a typical weekend day, for each month and each year. Nonetheless, no data stated the annual EE peak savings in MW in ROI 5.

In the new Table 3 below (created for this Sixth RFI), LUMA used the profile of hourly EE savings data provided in ROI 5 to calculate the EE savings from the ROI 5 data, coincident with the system peak load assumed to occur on a September weekday at 2100 hours. The forecasted system peak load for the IRP is based on an analysis of the forecasted Core Load Data. Consistent with the higher forecasted kWh savings from EE shown in ROI 5 than those provided in ROI 2, the forecasted EE peak savings in MW using the hourly profile data from ROI 5 is higher than the EE peak savings provided in ROI 2.

Table 3: EE Coincident Peak Savings Calculated Using ROI 5 EE Hourly Profile

Fiscal Year	EE Peak Savings at Generator (MW)
2025	80
2026	166
2027	208
2028	252
2029	281
2030	310
2031	338
2032	357
2033	375
2034	375
2035	373
2036	370
2037	375
2038	382
2039	390
2040	404
2041	415
2042	425
2043	434
2044	442

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-009b

SUBJECT

Base Case result filing, September 11, 2024: Energy Efficiency

REQUEST

a. Explain why the base energy efficiency peak forecast (annual MW) is unchanged between ROI 5 ("RFI-LUMA-_IRP_Forecasts.xlsx") and ROI 2 ("CONFIDENTIAL_RFI-LUMA Attachment_1.xlsx") while the energy (annual GWh) forecast is changed.

RESPONSE

Refer to response to RFI-LUMA-AP-2023.0004-20241029-PREB-009a.

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-009c

SUBJECT

Base Case result filing, September 11, 2024: Energy Efficiency

REQUEST

a. State how the energy and peak values were included in the PLEXOS® model (i.e. as a load modifier on an annual basis or an hourly basis).

RESPONSE

Hourly load profiles specific to customer class and for each Transmission Planning Area (TPA) were used as base data. Forecast energy and peak values were used to scale the hourly profiles to target energy and peak values for future years. Ultimately, an hourly load forecast was created and included in the PLEXOS® model for each TPA and customer class. The customer class level load is read as an input in the “Nodes” component of the model, where load data files are assigned to multiple Bands that get summed up for each TPA.

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-009d

SUBJECT

Base Case result filing, September 11, 2024: Energy Efficiency

REQUEST

a. Confirm whether the annual base EE peak and energy values on the "Base Core & Modifier Summary" tab were directly entered in PLEXOS®. If not confirmed, provide the base EE peak and energy values that were used in PLEXOS®.

RESPONSE

The annual base EE peak and energy values were not directly entered in PLEXOS®. The inputs into PLEXOS® consist of hourly EE profiles for future years, derived from the data provided in the spreadsheets. Calendar year annual values from the “Base EE” tab were used as inputs to scale these annual values to create the corresponding hourly profiles provided in the “Base EE Hrly Profile” tab. This process enabled the generation of an hourly EE profile forecast. Once developed, the hourly EE forecast was input into PLEXOS® for each TPA, which is then subtracted from the hourly system load.

.

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-010a

SUBJECT

Base Case result filing, September 11, 2024: Distributed PV

REQUEST

a. While the responses to "RFT-LUMA-AP-2023.0004-20240311-PREB-002" indicated that EE and DER resources would be modeled on the demand side and "grossed up" with T&D losses, confirm whether LUMA modeled distributed PV as a load modifier on the demand-side or as generation on the supply-side, as "DPV" is listed as a generation resource in the Gen ST tabulations in the base results file.

RESPONSE

The contributions from DPV installations made prior to January 2024 are included in the core load forecast and serve as a load modifier embedded in the core load forecast. Incremental DPV installations made from January 2024 onward are modeled as a generation-side resource under the “DPV” Generators category. EE is modeled as a demand reduction load profile.

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-010b

SUBJECT

Base Case result filing, September 11, 2024: Distributed PV

REQUEST

a. If modeled on the supply-side, explain the reason for this approach, given LUMA's response to "RFI-LUMA-AP-2023.0004-20240311-PREB-002a".

RESPONSE

DPV is modeled on the supply side to segregate PLEXOS® elements used in the RPS calculation. The RPS calculation requires different treatments for customer load in the denominator and renewable generation in the numerator. DPV provides both a reduction to load in the denominator and any DPV NEM export to the system also contributes to the renewable generation in the numerator. Since the DPV impacts both the numerator and denominator, categorizing DPV as a supply-side resource in PLEXOS® proved to be the most straightforward approach for the RPS calculation.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-010c

SUBJECT

Base Case result filing, September 11, 2024: Distributed PV

REQUEST

a. Explain why neither the total DPV (GWh) forecast or the Incremental DPV Less Residential Rebound forecast on the "Base Core & Modifier Summary" tab of ROI 5 ("RFL-LUMA-_IRP_Forecasts.xlsx") is the same as the total generation from generators in the DPV category from the "Gen ST" tab of ROI 5 ("RFILUMA- AP-2023.0004-20240820-PREB-OO 1A_BaseCaseResults.xlsm"

RESPONSE

DPV category Generation (GWh) reported values match closely to DPV forecasts provided in “RFL-LUMA-_IRP_Forecasts.xlsx” Excel file tab “Base CY – DPV&BESS – NEM” calendar year forecast values in CU44 to DB65 cell references. PLEXOS® models calendar years; hence, input-output needs to be an apple-to-apple comparison on a calendar year basis.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-010d

SUBJECT

Base Case result filing, September 11, 2024: Distributed PV

REQUEST

a. Confirm, or explain otherwise, that the DPV values (GWh and MW) on the "Base Core & Modifier Summary" tab of ROL 5 ("RFI-LUMA- _IRP_Forecasts.xlsx") reflect impact at the system generator and include the GWh loss reducing effects.

RESPONSE

The DPV shown on the "Base Core & Modifier Summary" tab shows the DPV at the customer meter and does not reflect T&D losses. The DPV impact at the generator is shown by TPA on the tab “Base CY – DPV&BESS – NEM” and “Base FY – DPV&BESS – NEM.”

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-010e

SUBJECT

Base Case result filing, September 11, 2024: Distributed PV

REQUEST

a. Do the DPV values (GWh and MW) on the "Base Core & Modifier Summary" tab of ROI 5 ("RFT-LUMA-_IRP_Forecasts.xlsx") as used in PLEXOS® modeling include the 28.5% rebound effect discussed in ROI 3 Question 9b and ROI 4 Question 3b "RFI-LUMA-AP-23.0004.20240618-PREB-003b"?

RESPONSE

LUMA and the IRP Technical Consultant have revised the approach to the rebound effect based on additional research conducted by the load forecasting team. LUMA has determined that the rebound effect is already embedded within the load and/or DPV forecasts. Furthermore, LUMA concluded that the assessment of the rebound effect is not yet complete. As such, the magnitude may not be as high as 28.5%

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-011a/b

SUBJECT

Base Case result filing, September 11, 2024: Distributed BESS

REQUEST

a. Confirm whether LUMA modeled distributed BESS as a load modifier on the demand-side or as generators on the supply-side.

b. If modeled on the supply side explain the reason for this approach, as LUMAs response "RFI-LUMA-AP-2023.0004-20240311-PREB-002a" stated DBESS would be included as load modifiers.

RESPONSE

a. DBESS is modeled as a load modifier on the supply side.

b. Refer to response to RFI-LUMA-AP-2023.0004-20241029-PREB-010b. Due to the complex RPS calculation, only system demand and EE are kept on the load/demand modeling part of PLEXOS®. All energy generators are modeled on the supply side.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-011c

SUBJECT

Base Case result filing, September 11, 2024: Distributed BESS

REQUEST

c. Explain what the "New Distributed Storage" category of resources from the "Battery LT" tab of ROI 5 ("RFI-LUMA-AP-2023.0004-20240820-PREBOO1A_BaseCaseResults.xlsm" represents.

RESPONSE

“New Distributed Storage” is an optional build option given to the capacity expansion module to reflect the possibility of further DBESS development on the island if deemed economical. DBESS capital costs (or program costs) are typically more expensive than utility-level BESS installations. This cost impact is reflected in the Build Costs property such that New Distributed Storage has a higher build cost than utility-scale battery options (4 hr, 6 hr, 8 hr, 10 hr categories).

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-011d/e

SUBJECT

Base Case result filing, September 11, 2024: Distributed BESS

REQUEST

d. Confirm whether these New Distributed Storage resources are proxies for the DBESS in lieu of the load modifier approach.

e. If confirmed, explain why the New Distributed Storage resources have zero VO&M costs and only have FO&M costs.

RESPONSE

d. New Distributed Storage category assets are not proxies but a build option for the model to choose based on economics. If chosen as a resource in capacity expansion, this will further expand the DBESS program.

e. New Distributed Storage resources have zero VO&M as LUMA would not operate the batteries. The assets have a FO&M representing any fixed expenses for LUMA to host the capacity on the grid, for example, incentives for customers or administrative charges to process generation from the assets, etc.

2025 INTEGRATED RESOURCE PLAN

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-012a/b

SUBJECT

Base Case result filing, September 11, 2024: Flexible Demand Load

REQUEST

a. Please explain how LUMA used the Flex Demand MW values on the "Base Core & Modifier Summary" tab of ROT 5 ("RFI-LUMA_IRP_Forecasts.xlsx").

b. Please provide and explain the assumptions used to produce these values.

RESPONSE

a. Flex Demand is modeled as the “Demand Response” (DR) category of assets. They are modeled as zero-cost assets, which can reduce demand for up to 40 hours per year. The amount of reduction is specified in the time varying MW value in the model.

b. Assumptions for DR modeling:

- Zero cost to dispatch supply-side assets.
- Max Capacity and Min Stable levels are the same. Whenever this asset is called upon, it reduces load by a fixed amount.

Attachment A

NEPR-AP-2023-0004

Response: RFI-LUMA-AP-2023.0004-20241029-PREB-013

SUBJECT

Base Case result filing, September 11, 2024: Resource Capital Cost

REQUEST

a. Provide the resource capital cost trajectories that LUMA expects to use for scenario 6.

RESPONSE

Scenario 6 uses a Low-resource capital cost trajectory.

The IRP Technical Consultant developed a low-resource capital cost trajectory. The base case trajectory was based on the expected island escalation factors of capital costs used in the PR100 study. Scenario 6 uses a low resource cost trajectory, developed by LUMA and the IRP Technical Consultant, where island escalation to mainland capital costs is less than that of the base case. The main assumption driving the trajectory is that in the low case, resource costs are expected to mirror the mainland capital cost of resources by 2032 for thermal assets. For renewables, the trajectory is similar, except renewable capital costs are expected to have a more gradual rate of cost decline to about 10% premium to mainland costs by 2035 owing to foreign goods dependent supply chain for renewables, exposing capital costs to foreign supply chain constraints.

Table 4: Thermal Cost Scaler

YEAR	BASE CASE SCALER	LOW CASE SCALER
2025	2.0	2.0
2026	1.9	1.9
2027	1.83	1.8
2028	1.74	1.7
2029	1.66	1.7
2030	1.57	1.2
2031	1.48	1.1
2032	1.40	1.0
2033	1.39	1.0
2034	1.39	1.0
2035 -45	1.39	1.0

Table 5: Thermal Low Case Build Costs

DATE	18V50DF 1X0	2X1 SGT-800	7F.05 1X0	7F.05 1X1	7HA.02 1X1	LM2500 1X0	LM6000 1X0
1/1/2025	4,592	3,716	1,972	3,014	2,336	3,400	3,977
1/1/2026	4,394	3,556	1,887	2,884	2,236	3,254	3,806
1/1/2027	4,197	3,396	1,802	2,754	2,135	3,108	3,635
1/1/2028	4,000	3,237	1,718	2,625	2,035	2,961	3,464
1/1/2029	3,802	3,077	1,633	2,495	1,934	2,815	3,293
1/1/2030	2,703	2,188	1,161	1,774	1,375	2,002	2,342
1/1/2031	2,555	2,068	1,097	1,677	1,300	1,892	2,213
1/1/2032	2,407	1,948	1,034	1,580	1,225	1,782	2,085
1/1/2033	2,394	1,937	1,028	1,571	1,218	1,772	2,073

Table 6: Renewable Cost Scaler and Low Case Renewable Costs

	RENEWABLE COST SCALERS		LOW CASE RENEWABLE COSTS ($/KW)	
YEAR	BASE	LOW	SOLAR LOW CASE CAPITAL COST ($/KW)	WIND LOW CASE CAPITAL COST ($/KW)
2025	2.25	2.25	1868	4414
2026	2.164	2.164	1739	4276
2027	2.078	2.078	1613	4135
2028	1.992	1.992	1489	3991
2029	1.906	1.906	1367	3845
2030	1.82	1.53	1249	3697
2031	1.734	1.444	1257	3753
2032	1.648	1.358	1265	3810
2033	1.562	1.272	1272	3867
2034	1.476	1.186	1279	3925
2035-45	1.39	1.10	1287	5611