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**: Motion Submitting Revised Presentation of Initial Technical Hearing

MOTION SUBMITTING REVISED PRESENTATION OF INITIAL TECHNICAL HEARING

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:

1. On March 13, 2026, the Puerto Rico Energy Bureau ("Energy Bureau") entered a Resolution and Order reiterating the scheduling of an Initial Technical Hearing in this instant proceeding for March 19, 2026, at 9:30 a.m. ("March 13th Order"). In addition to establishing the agenda and format of the Initial Technical Hearing, the Energy Bureau directed LUMA to file an electronic copy of its presentation with the Energy Bureau's Clerk on or before March 17, 2026.

2. On March 17, 2025, LUMA filed a *Motion Submitting Presentation for Initial Technical Hearing*, with a copy of the required presentation. It also submitted a copy of the presentation to the Energy Bureau's Clerk.

3. During the Initial Technical Hearing, LUMA identified certain corrections to numbers and values included therein, as well as missing legends for some of the graphs. Therefore, LUMA hereby submits a revised version of the presentation for the Initial Technical Hearing as *Exhibit 1* to this Motion.

WHEREFORE, LUMA respectfully requests that the Energy Bureau **take notice** of the aforementioned and **accept** the revised version of the presentation of the Initial Technical Hearing as *Exhibit 1* to this Motion.

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: Alexis Rivera, alexis.rivera@prepa.pr.gov, and through its counsel of record, Natalia Zayas Godoy, nzayas@gmlex.net, Richard Cruz Franqui, rcruzfranqui@gmlex.net, and Mirelis Valle Cancel, mvalle@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 March 27, 2026.

DLA Piper (Puerto Rico) LLC
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/s/ Yahaira De la Rosa Algarín
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Exhibit 1

2025 Integrated Resource Plan

Puerto Rico Energy Bureau
Revised Initial Technical Hearing Presentation

March 27, 2026

Agenda

- Rules of Conduct / Remote Participation – Energy Bureau
- 2025 IRP Overview - LUMA
- Stakeholder Engagement - LUMA
- Modeling Methods, Input Assumptions and Sources - LUMA
- Resource Modeling Results, Preferred Resource Plan (PRP) and Action Plan - LUMA
- Transmission and Distribution Issues – PRP, and generally - LUMA
- Questions

2025 IRP Overview

2025 IRP Overview

- As operator of Puerto Rico's transmission and distribution ("T&D") system, LUMA's role is to be an objective planner using its technical expertise and sophisticated analyses and modeling to recommend an optimal plan for Puerto Rico
- LUMA does not own or operate generation resources and does not hold primary responsibility for the policy decisions that determine future energy resource projects
- Under the Operation and Maintenance Agreement and Regulation 9021, LUMA is responsible for preparing, presenting, and defending the current and future Integrated Resource Plans ("IRP")

2025 IRP Overview

- The 2025 IRP is a public policy decision and planning tool for the benefit of utilities and regulators that maps out the least-cost, most reliable, and sustainable way to supply electricity, and must be updated every three years
- In developing the 2025 IRP, LUMA remains technology-agnostic, enabling a unique approach focused on delivering the greatest benefits to customers at the lowest cost to meet the requirements established by given conditions that follow public energy policy

2025 IRP Overview – Primary Goals of the IRP

- Define a Preferred Resource Plan that:
  - Meets Regulation 9021 requirements with the lowest Present Value Revenue Requirement (“PVRR”)
  - Incorporates prudent assumptions, forecasts, and estimates
  - Makes reasonable progress toward reaching 100% renewable energy by 2050
  - Transitions Puerto Rico to a reliable generation fleet that meets typical utility industry standards for reliability, i.e., loss of load expectation (LOLE) and Expected Unserved Energy (EUE)

2025 IRP Overview

- LUMA's 2025 IRP is guided by six main objectives:

1. Prioritizing the reduction of nominal energy supply costs
2. Achieving compliance with the Renewable Portfolio Standard ("RPS")
3. Building a cleaner energy future by reducing carbon emissions
4. Optimizing technology diversity
5. Enabling decentralized generation
6. Reducing the impact of outages for our customers by achieving industry-standard reliability, as measured by the Loss of Load Expectation ("LOLE")

2025 IRP Overview – Findings

- Based on the 2025 IRP findings, LUMA recommends that any new thermal generation be designed with fuel flexibility, capable of operating on:
  - LNG
  - Fossil diesel
  - Renewable diesel 100% biodiesel and biodiesel blends

2025 IRP Overview- 2025 IRP Sections

IRP Section Name	Regulation 9021 Section
Part 1: Introduction and Summary	Section 2.02
Part 2: Planning Environment	Section 2.03(B)
Part 3: Load Forecast	Section 2.03(C)
Part 4: Existing Resources	Section 2.03(D)
Part 5: Resource Needs Assessment	Section 2.03(E)
Part 6: New Resource Options	Section 2.03(F)
Part 7: Assumptions and Forecasts	Section 2.03(G)
Part 8: Resource Plan Development	Section 2.03(H)
Part 9: Caveats and Limitations	Section 2.03(I)
Part 10: Action Plan	Section 2.03(K)
Appendix 1: Transmission and Distribution Planning	Section 2.03(J)

2025 IRP – Resource Modeling Methods

- Regulation 9021 requires the use of technically robust analyses and modeling for the development of the 2025 IRP
- LUMA modeled 12 primary and five supplemental scenarios, approved by the Energy Bureau, which were submitted in the following three filings:
  - The first filing consisted of the IRP report and the 12 primary scenarios, submitted on October 17, 2025, from which LUMA selected the Recommended Preferred Resource Plan
  - The second filing included the submission of the results of the LUMA's PSSE analysis submitted on November 21, 2025
  - The third filing consisted of the results for five supplemental scenarios, submitted on December 19, 2025

Stakeholder Engagement

2025 IRP - Stakeholder Engagement

- In 2023, LUMA launched an initiative, known as the Solutions for the Energy Transformation of Puerto Rico ("SETPR"), with a structured and multi-phased strategy to collaborate with Stakeholders during the development phase of the 2025 IRP:
  - LUMA developed a website to receive comments and distribute announcements
  - LUMA completed four SETPR meeting rounds, holding 35 workshops with 275 total participants. Meetings were hosted in 8 different municipalities and virtually, with English and Spanish sessions. Participants represented private companies, government, community groups, commercial/professional associations, generators, and individual customers
  - LUMA used the feedback received from stakeholders to design the objectives and scenarios for the 2025 IRP

2025 IRP - Stakeholder Engagement

Selected Objectives:

- Diversity of generation technologies
- Reduction of costs
- System resilience and reliability
- Increase in DG and storage

Stakeholders focused on:

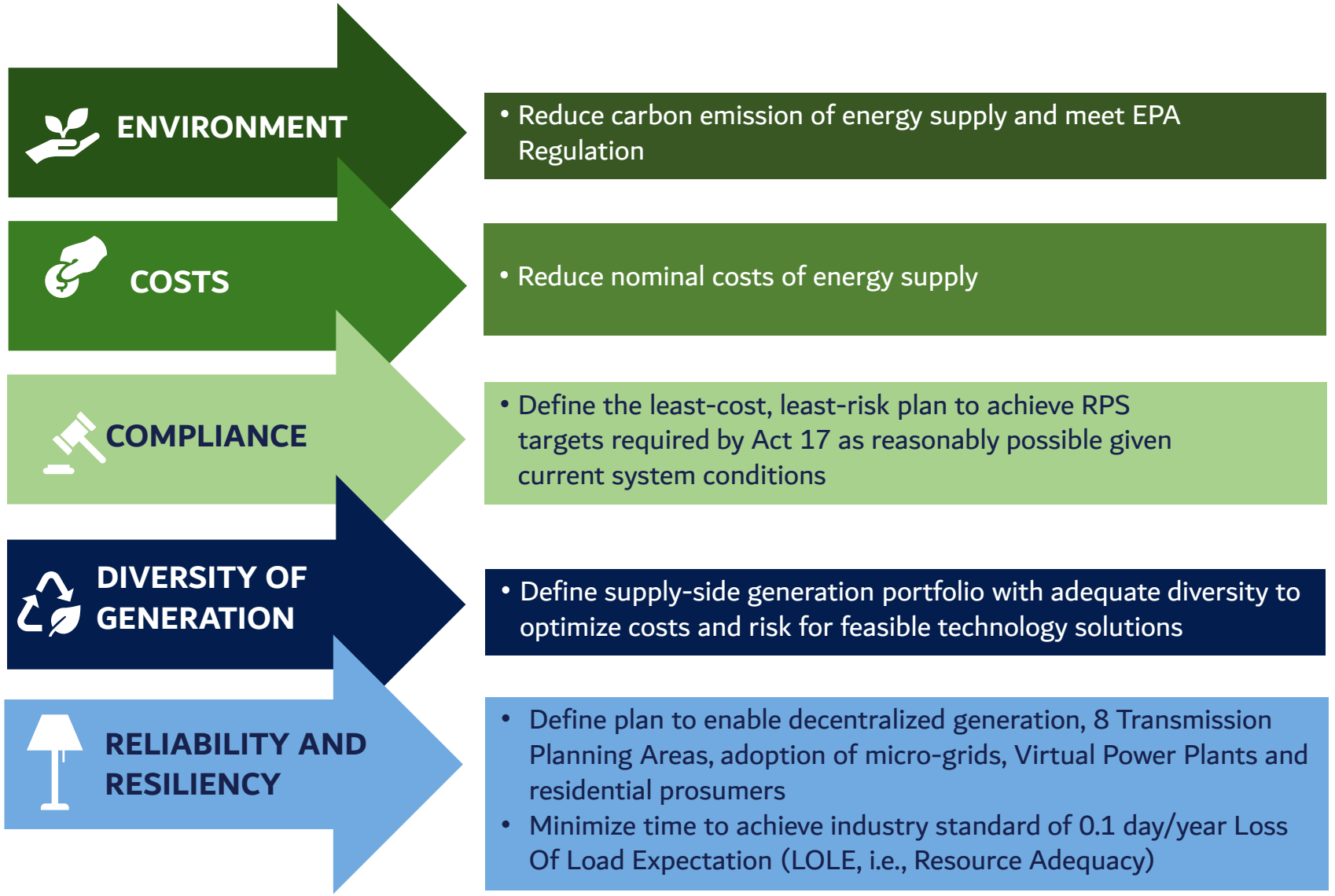
- Modeling assumptions
- Technology selection
- Scenario development rationale
- Biofuel conversion timing
- Major energy projects and policy changes
- T&D infrastructure and planning
- Import dependence of fuels
- Distributed solar and DER integration
- Financial and cost considerations

Key changes included:

- Removal of interim RPS goal under Act 17-2010
- AES coal extension to 2032
- Addition of 800 MW temporary emergency generation
- Aguirre 1 & 2 assumed out of service for full IRP horizon

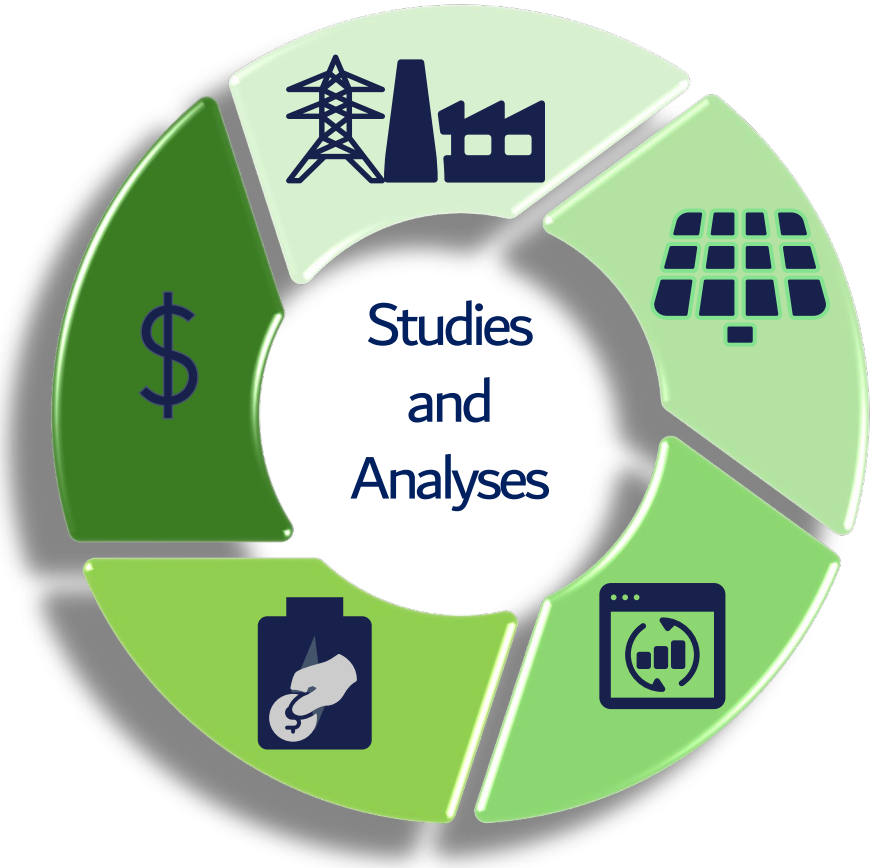
2025 IRP – Stakeholder Engagement

2025 IRP – Stakeholder Engagement – Objectives



Input Assumptions and Sources

2025 IRP - Input Assumptions and Sources



- Load Forecast
- Distributed energy resources
- Existing resources
- New resource options
- Reliability improvement

*Regulation 9021 Section H.2.a "*The IRP shall use a Capacity Expansion Model to develop least-cost Resource Plans that meet customer needs under the reference case scenario and various future scenarios*"

2025 IRP - Input Assumptions and Sources - Resource Options

- LUMA evaluated candidate resource options based on five key criteria:
  - Maturity of technology
  - Cost
  - Supply chain
  - Timeline for availability
  - Sustainability
- Resources that meet the five primary criteria and can sufficiently meet LUMA's customers' demand and energy needs during the 20-year Integrated Resource Plan (IRP) planning period were considered for the 2025 IRP

2025 IRP – Energy Technologies Considered

SELECTED

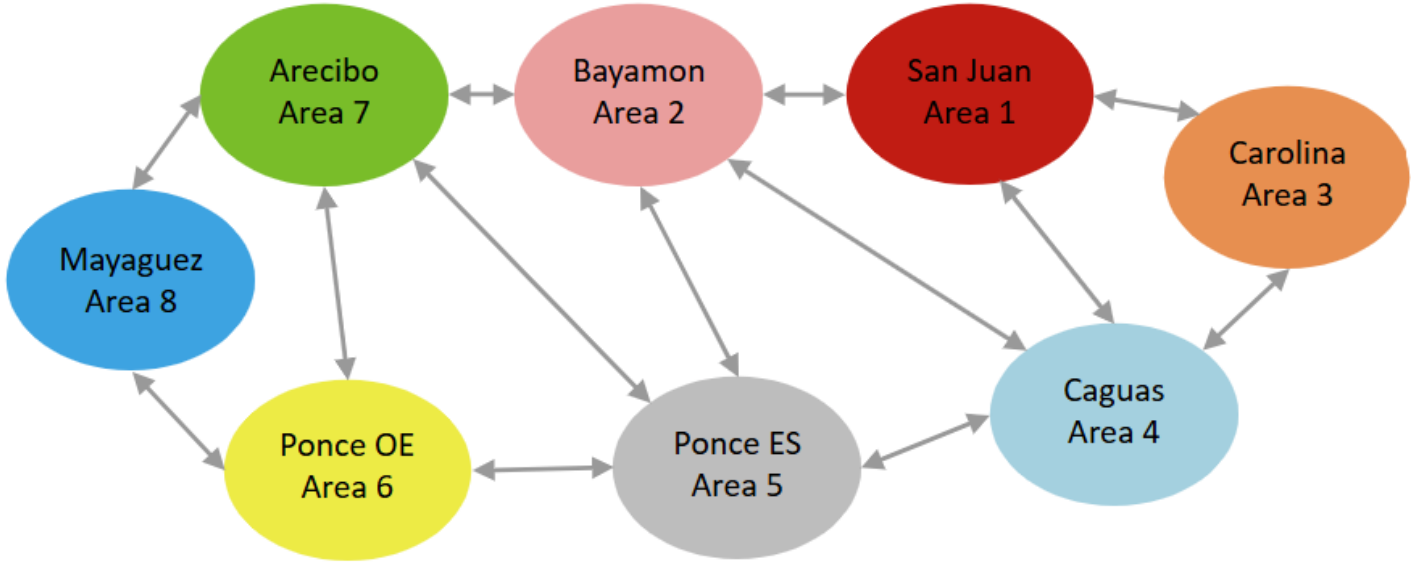
1. Liquified Natural Gas
2. Biodiesel
3. Distributed & Utility Scale Solar PV
4. Distributed & Utility Scale Batteries
5. Hydroelectric
6. Wind (Onshore & Offshore)
7. Renewable Diesel

NOT SELECTED

1. Hydrogen
2. Municipal Waste
3. Ocean Thermal Energy Conversion (OTEC)
4. Small Modular Reactor (SMR)
5. Wave and Tidal System
6. Other Biofuels

LUMA

2025 IRP – Eight Transmission Planning Areas (TPAs)



- LUMA segmented Puerto Rico into eight TPAs to differentiate:
  - Location of loads
  - Location of generation
  - Renewable resource potential
  - Fuel delivery
  - Transmission capacity

2025 IRP - Fixed Decisions Summary (Additions and Retirements)*

Additions

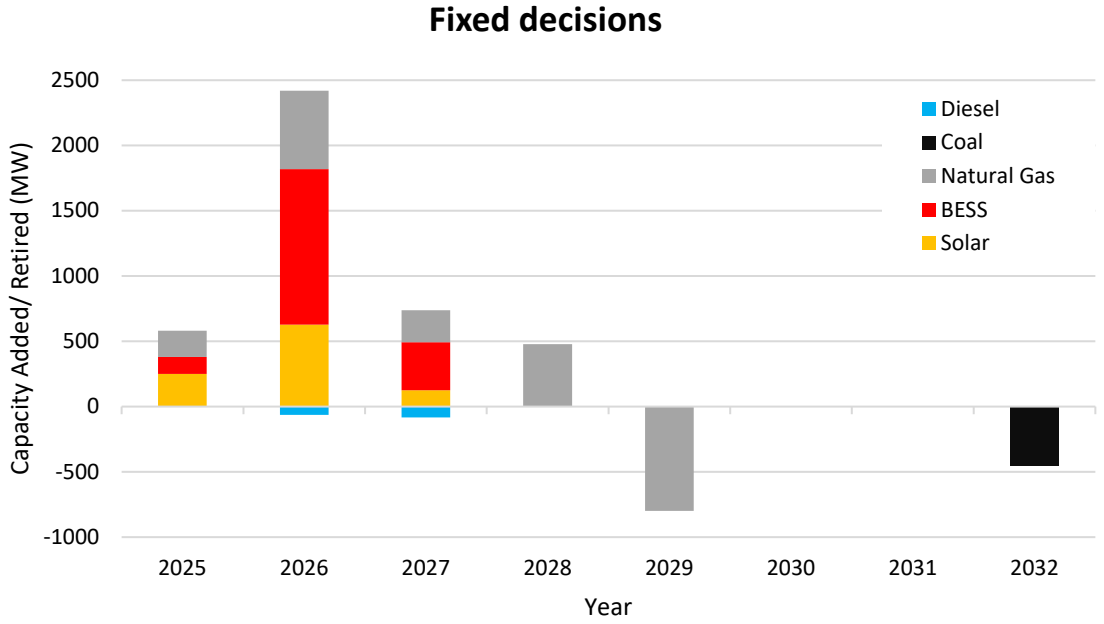
- Natural Gas
  - Energiza: 478 MW
  - Genera Peakers: 244 MW
  - Emergency Generators: 800 MW
- Solar
  - Non-Tranche Projects: 200 MW
  - Tranche 1: 739 MW
  - Tranche 2: 66 MW
- Hydro
  - PREPA HydroCo Refurbishment 38 MW
- BESS
  - Tranche 1: 535 MW
  - Tranche 2: 60 MW
  - Tranche 4: 50 MW
  - Genera BESS: 430 MW
  - ASAP / Competitive Process : 190 MW

Retirements

- Coal: 454 MW in 2032 per Act 1-2025
- Diesel: 147 MW
- Natural Gas (Emergency Generators): 800 MW coordinated with Energiza COD

The presented results are preliminary and subject to change.

	2025	2026	2027	2028	2029	2030	2031	2032
Solar	250	629	126					
BESS	131	1191	368					
Hydro		38						
Natural Gas	200	600	244	478	-800			
Coal								-454
Diesel		-63	-84					



*Values are as defined at the time the modeling commenced (Cutoff date is May 30, 2025)

2025 IRP - Resource Locations for Fixed Decisions (Additions)

Arecibo
Tranche 1 PV: 90 MW
Tranche 1 BESS: 50 MW
Tranche 2 BESS: 60 MW
Genera Batteries : 101 MW
BESS: 50 MW
Hydro: 4 MW

Bayamon
Genera Batteries: 101MW

San Juan
Gas Gen: 478 MW

Carolina
BESS: 20 MW

Mayaguez
Tranche 1 PV: 35 MW
Tranche 2 PV: 40 MW

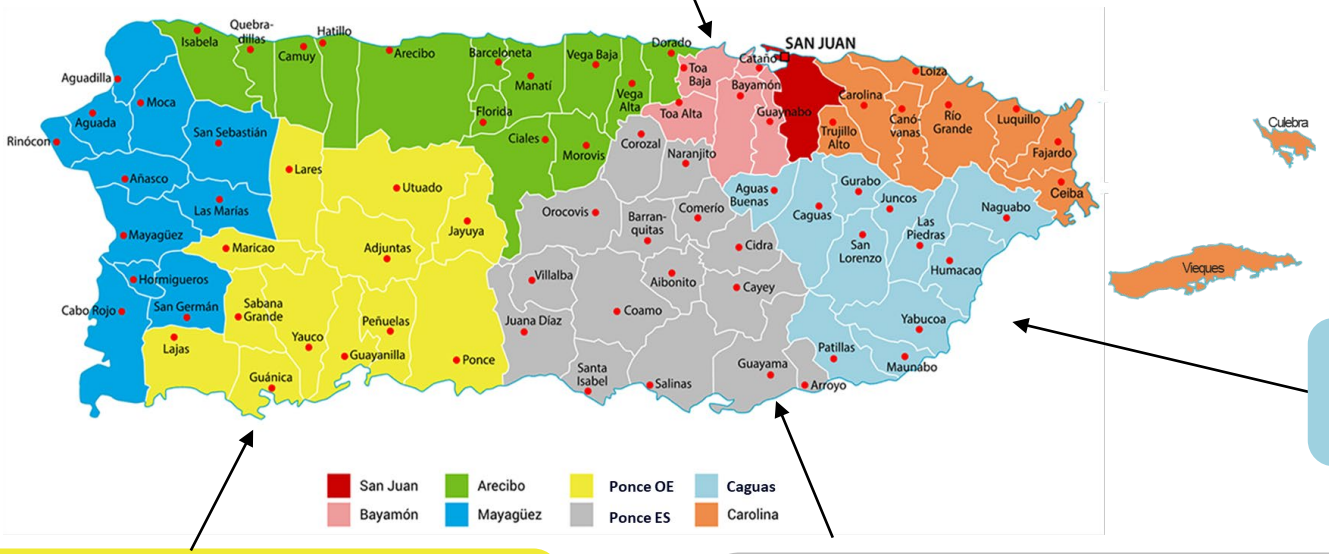
Caguas
Tranche 1 PV: 205 MW
Tranche 1 BESS: 25 MW
Tranche 2 PV: 26 MW
Genera Batteries: 40 MW
Genera Peak. Unit: 72 MW
BESS: 40 MW

Ponce OE
Tranche 1 BESS: 125 MW
Genera Batteries : 30 MW
Genera Peak. Unit: 136 MW
BESS: 20 MW
Hydro: 26 MW
Emergency generator: 400 MW

Ponce ES
Tranche 1 PV: 408 MW
Tranche 1 BESS: 335 MW
Genera Batteries: 158 MW
Genera Peak. Unit: 36 MW
BESS: 60 MW
Hydro: 4 MW
Emergency generator: 400 MW

2025 IRP – Resource Locations for Fixed Decisions (Retirements)

Bayamon
Genera GT: 42 MW



Caguas
Genera GT: 63 MW

Ponce OE
Emergency generator: 400 MW

Ponce ES
AES 1 and 2: 454 MW
Emergency Generator: 400 MW
Genera GT: 42 MW

2025 IRP - RPS Annual Targets

Legislation Requirement

Item	Source	RPS Target
RPS Legislation	Act 1-2025	100% RPS by 2050 No interim targets

For PLEXOS Model

Item	Source	RPS Method
RPS Base Assumptions	Agreement with PREB Tech. Consultant	Start annual RPS targets in 2035 and ramp to 100% RPS by 2050
RPS Scenario 16	Agreement with PREB Tech. Consultant	Start annual RPS targets in 2025 and ramp to 100% RPS by 2050, which is similar to targets proposed by LUMA before Act 1-2025 changes
RPS Scenario 17	Agreement with PREB Tech. Consultant	Start annual RPS targets in 2044 and ramp to 100% RPS by 2050

Resource Modeling Methods

2025 IRP - Resource Modeling Methods

- LUMA used the industry-standard resource planning software PLEXOS® to:
  - Simulate the operation of the Island's electric system under different forecast conditions and assumptions
  - Develop portfolios of resources capable of meeting specified energy, demand and reliability requirements
  - Estimate the cost of each portfolio, expressed as a Present Value Revenue Requirement (PVRR), over the 20-year study period for a given scenario
- Each portfolio of resources evaluated under a specific scenario is referred to as a "Resource Plan"

2025 IRP – Resource Modeling Methods

- PLEXOS® is a sophisticated, state of the art, industry standard power market planning model that simulates that ability of a utility's existing resources and new resource options to meet the forecast customer load
- The model is run under a variety of hypothetical future scenarios to assess the resources' ability to meet the customer load and reliability requirements under a range of plausible future conditions
- The resulting resource plan is a least lifecycle cost portfolio as measured by the present value revenue requirement over the 20-year study period

2025 IRP - Scenarios and Characteristics*

#	Core Scenarios Description**	Load Forecast	Solar & Battery Capital Costs	Gas plant capital costs (CCs & GTs)	Level of DBESS Control	Natural Gas Fuel Cost	Biodiesel Option	Fixed Decisions
1	Base assumptions for all variables	Base	Base	Base	Base	Base	Yes	Base
2	High load (Peaker/Low LF) with base assumptions for other variables	High	Base	Base	Base	Base	Yes	Base
3	Base load with high fossil capital costs	Base	Base	High	Base	Base	Yes	Base
4	Base load with low renewable energy capital costs and high fossil capital costs	Base	Low	High	Base	Base	Yes	Base
5	Base load with high gas fuel costs	Base	Base	Base	Base	High	Yes	Base
6	Base load with high gas fuel costs and high gas capital costs	Base	Base	High	Base	High	Yes	Base
7	Flex Run of Portfolio B (from Scenario 2) run under Scenario 1 conditions	Base	Base	Base	Base	Base	Yes	Base
8	Flex Run Portfolio A (from Scenario 1) run under Scenario 2 conditions	High	Base	Base	Base	Base	Yes	Base
9	Flex run of either Portfolio A (from Scenario 1) under low load conditions	Low	Base	Base	Base	Base	Yes	Base
10	Flex Run Portfolio A (from Scenario 1) Run under high costs and high load (stress) conditions	High	Base	High	Base	Base	Yes	Base
11	Flex Run B (from Scenario 2) run under high cost and high load (stress) conditions	High	Base	High	Base	Base	Yes	Base
12	Biodiesel is unavailable/too costly on island	Base	Base	Base	Base	Base	No	Base

These Scenarios were flexibility analyses that tested portfolios under a range of future conditions

Results of Core Scenarios were filed with the Energy Bureau on October 17, 2025

* Core Scenarios approved by the Energy Bureau's May 13, 2025, R&O

** Due to Act 1-2025, the RPS requirement assumed in all core scenarios ramps from 2035-2050

2025 IRP – Scenarios and Characteristics

#	Supplemental Scenarios Description	Load Forecast	Solar & Battery Capital Costs	Gas plant capital costs (CCs & GTs)	Level of DBESS Control	Natural Gas Fuel Cost	Biodiesel Option	Fixed Decisions
13	High DBESS control with base assumptions for other variables	Base	Base	Base	High	Base	Yes	Base
14	No NGCC 460 MW San Juan*	Base	Base	Base	Base	Base	Yes	No NGCC
15	Marine Cable	Base	Base	Base	Base	Base	Yes	Base
16	Alternative RPS 1**	Base	Base	Base	Base	Base	Yes	Base
17	Alternative RPS 2***	Base	Base	Base	Base	Base	Yes	Base

Results of Supplemental Scenarios were filed with the Energy Bureau on November 21, 2025

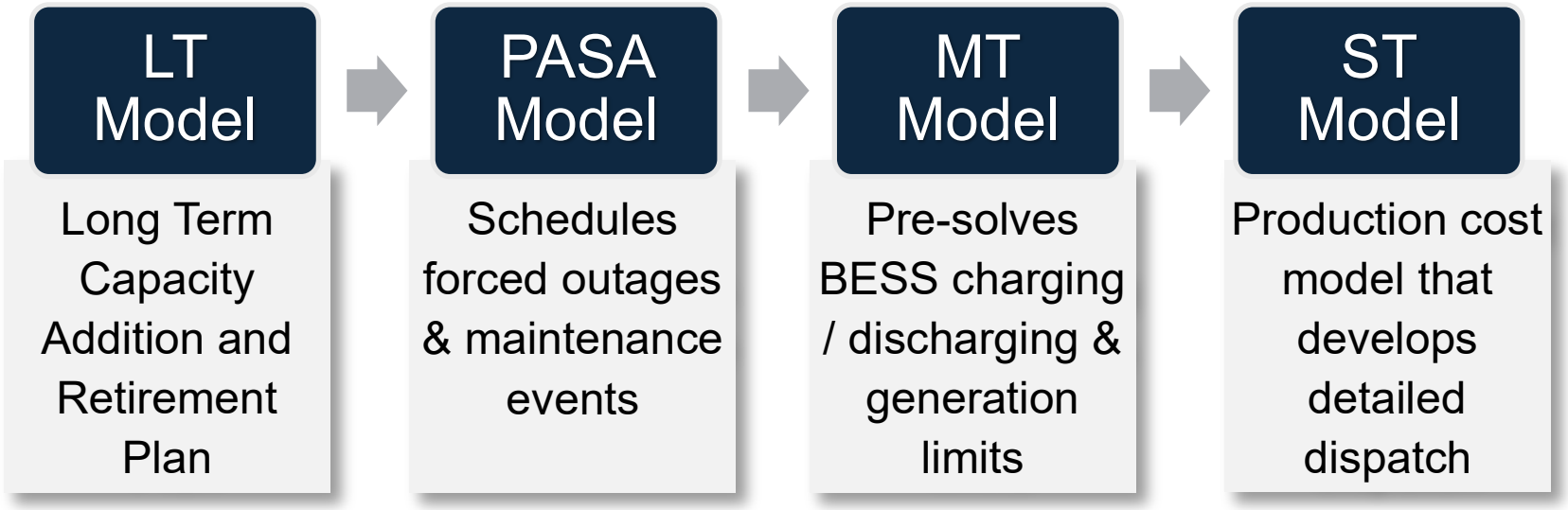
*Scenario 14 removes the Energiza unit

**Alternative RPS 1: RPS target beginning 2025 (Ramp to 2050)

***Alternative RPS 2: No RPS target until late in planning horizon (2040-2044, ramp to 2050)

2025 IRP – PLEXOS Model Structure

- PLEXOS uses four models to perform different steps in each model run



2025 IRP – LT Model Functionality

- The LT model uses a simplified method of:
  - Derating the supply resources to account for the impact of outages
  - Unit commitment and dispatch
- While the LT defined resource plans show zero Expected Unserved Energy (EUE) in the LT output, the same resource plan results in very high EUE when modeled in the ST model, which uses a more robust, probabilistic treatment of outages

2025 IRP – EUE Results for LT and ST Models*

LT Model EUE Results PRP Run 1A

Fiscal Year	Max Unserved Energy (MW)	Unserved Energy (GWh)	Unserved Energy Hours (h)
2024	716.0	21.9	360
2025	0	2.3	30
2026	0	0.2	2
2027	0	-	-
2028	0	-	-
2029	0	-	-
2030	0	-	-
2031	0	-	-
2032	0	-	-
2033	0	-	-
2034	0	-	-
2035	0	-	-
2036	0	-	-
2037	0	-	-
2038	0	-	-
2039	0	-	-
2040	0	-	-
2041	0	-	-
2042	0	-	-
2043	0	-	-
2044	0	-	-

The LT model results in zero EUE for all years starting in 2027, which is the first year, the model is able to add new resources

*Using the Same Resource Plan

ST Model EUE Results PRP Run 1B

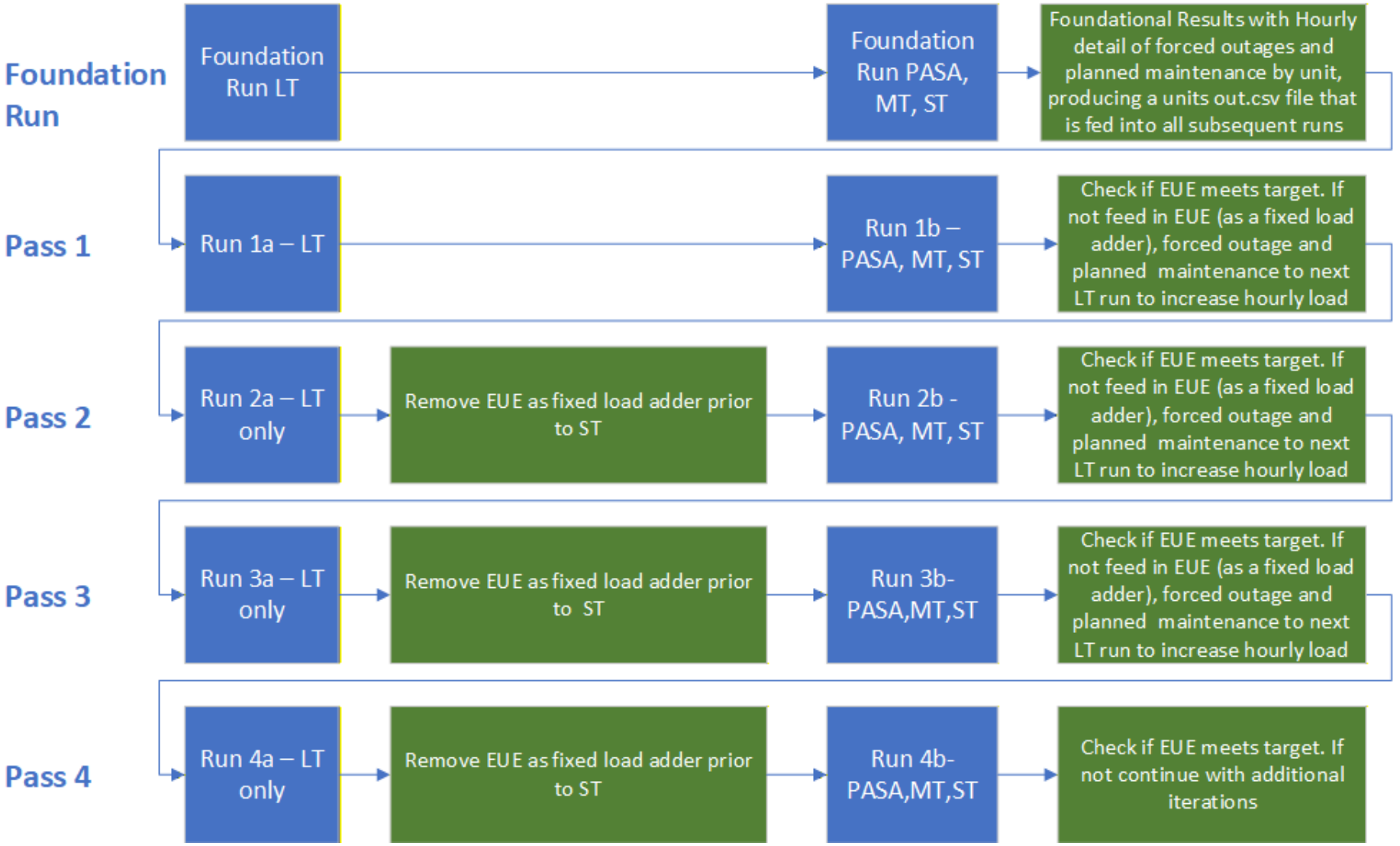
Fiscal Year	Max Unserved Energy (MW)	Unserved Energy (GWh)	Unserved Energy Hours (h)
2024	1,007.4	224.8	1,230
2025	704.7	51.7	377
2026	416.2	1.6	8
2027	303.7	3.2	28
2028	0	-	-
2029	0	-	-
2030	629.9	7.1	38
2031	961.4	16.0	67
2032	915.4	25.9	84
2033	571.6	24.3	129
2034	726.6	6.1	24
2035	1160.2	51.7	128
2036	720.3	10.7	77
2037	781.5	20.1	92
2038	870.9	20.2	75
2039	416.4	5.6	42
2040	714.9	12.3	64
2041	543.6	20.0	106
2042	398.9	1.8	12
2043	0	-	-
2044	0	-	-

The ST model results in much higher EUE values in most years. Target EUE is to achieve industry standard reliability of ≤ 2.4 Hours/Year by 2038

2025 IRP – Iterative Process Development

- Discussions between Energy Exemplar, LUMA's Technical Consultant and LUMA arrived at an iterative, multi-pass modeling approach to define resource plans with acceptable EUE results
  - Method uses the ST solution to provide feedback on EUE to the LT in a subsequent iteration, which results in the LT changing the expansion plan to improve the EUE in the following ST
  - Initial foundation run used to determine and then lock down planned and forced outages, for all existing and fixed decision additions. This serves to limit the movement of outages across scenarios
  - Method bypasses use of the LT model default derate approach to outages with a much more realistic approach to outages

2025 IRP – Iterative PLEXOS Modeling Methodology



Foundation run used to obtain initial set-up for forced & planned outages

Iterative modeling runs used to attain acceptable EUE results

2025 IRP - Illustrative Foundational Run Output for a Sample Resource

- Table shows sample hourly outage schedule, inclusive of forced and planned outages for a single resource obtained from the foundational run
- In subsequent runs, planned and forced outage functionality is then turned off for all units included in the foundational run

Resource Name	Datetime		1= Outage 0= No Outage
Sample Resource	1/1/2030	1:00	0
Sample Resource	1/2/2030	19:00	1
Sample Resource	1/3/2030	6:00	0
Sample Resource	1/8/2030	3:00	1
Sample Resource	1/8/2030	6:00	0
Sample Resource	2/3/2030	19:00	1
Sample Resource	2/3/2030	22:00	0
Sample Resource	2/11/2030	3:00	1
Sample Resource	2/11/2030	6:00	0
Sample Resource	2/20/2030	17:00	1
Sample Resource	2/21/2030	3:00	0
Sample Resource	2/21/2030	15:00	1
Sample Resource	2/21/2030	19:00	0
Sample Resource	3/7/2030	18:00	1
Sample Resource	3/7/2030	22:00	0
Sample Resource	3/20/2030	14:00	1
Sample Resource	3/20/2030	18:00	0
Sample Resource	3/31/2030	12:00	1
Sample Resource	3/31/2030	23:00	0
Sample Resource	4/30/2030	13:00	1
Sample Resource	4/30/2030	17:00	0

2025 IRP - Illustrative ST model results for Unserved Energy (USE) by TPA

- Table shows USE from the ST, by hour and by TPA, in MWs
- Outage data from the ST model is fed back in as an added fixed load at the specific hours shown in the next iteration of the LT model
- The added fixed load incents the next iteration of the LT model to refine the expansion plan to address the unserved energy

Unserved Energy (MW)

Datetime	Arecibo	Bayamon	Caguas	Carolina	Mayaguez	Ponce ES	Ponce OE	S Juan
10/31/2030 0:00	0	0	0	0	0	0	0	0
10/31/2030 1:00	0	0	0	0	0	0	0	0
10/31/2030 2:00	0	0	0	0	0	0	0	0
10/31/2030 3:00	0	0	0	0	0	0	0	0
10/31/2030 4:00	0	0	0	0	0	0	0	0
10/31/2030 5:00	0	0	0	0	0	0	0	0
10/31/2030 6:00	0	0	0	0	0	0	0	0
10/31/2030 7:00	0	0	0	0	0	0	0	0
10/31/2030 8:00	0	0	0	0	0	0	0	0
10/31/2030 9:00	0	0	0	0	0	0	0	0
10/31/2030 10:00	0	0	0	0	0	0	0	0
10/31/2030 11:00	0	0	0	0	0	0	0	0
10/31/2030 12:00	0	0	0	0	0	0	0	0
10/31/2030 13:00	0	0	0	0	0	0	0	0
10/31/2030 14:00	0	0	0	0	0	0	0	0
10/31/2030 15:00	0	0	0	0	0	0	0	0
10/31/2030 16:00	0	0	0	0	0	258.8	0	30.7
10/31/2030 17:00	0	0	0	0	178.5	196.1	0	89.8
10/31/2030 18:00	0	231.1	0	169.06	48.9	267.1	0	0
10/31/2030 19:00	0	167.2	0	0	194.3	244.3	0	0
10/31/2030 20:00	83.4	167.8	0	0	0	219.7	0	0
10/31/2030 21:00	0	0	0	156.39	185.8	257.2	0	0
10/31/2030 22:00	176.5	127.9	0	0	0	253.3	0	0
10/31/2030 23:00	8.0	8.0	0	0	169.5	157.5	0	0

2025 IRP – Iterative ST Feedback Into Next LT Run

- The cumulative unserved energy from each ST run is fed back into the next subsequent LT run
- EUE Targets are only set for 2030 and beyond in the IRP

All values in GWh

Iteration Step	Iterative Step			
	1	2	3	4
Iteration 1 (2030 to 2044) – GWh				
ST USE Output - "b" run	222.1			
LT Input of Fixed Load Adder to next "a" run		222.1		
Iteration 2 (2030 to 2044) – GWh				
ST USE Output - "b" run		35.0		
LT Input of Fixed Load Adder to next "a" run			256.8	
Iteration 3 (2030 to 2044) - GWh				
ST USE Output - "b" run			4.9	
LT Input of Fixed Load Adder to next "a" run				261.7
Iteration 4 (2030 to 2044) - GWh				
ST USE Output - "b" run				0.2
LT Input of Fixed Load Adder to next "a" run				

2025 IRP - Iterative ST Results - EUE and Number of Hours with EUE

Annual EUE (GWh)

Year	Run 1b EUE (GWh)	Run 2b EUE (GWh)	Run 3b EUE (GWh)	Run 4b EUE (GWh)
2025	51.7	51.7	51.7	51.7
2026	1.6	1.6	1.6	1.6
2027	3.2	3.2	3.2	3.2
2028	-	-	-	-
2029	-	-	-	-
2030	7.1	-	-	-
2031	16	0.3	0.2	0.2
2032	25.9	0.3	-	-
2033	24.3	4.3	2.7	-
2034	6.1	2.3	2	-
2035	51.7	2.1	-	-
2036	10.7	1.6	-	-
2037	20.1	7.2	-	-
2038	20.2	5.1	-	-
2039	5.6	11.9	-	-
2040	12.3	-	-	-
2041	20	-	-	-
2042	1.8	-	-	-
2043	-	-	-	-
2044	-	-	-	-

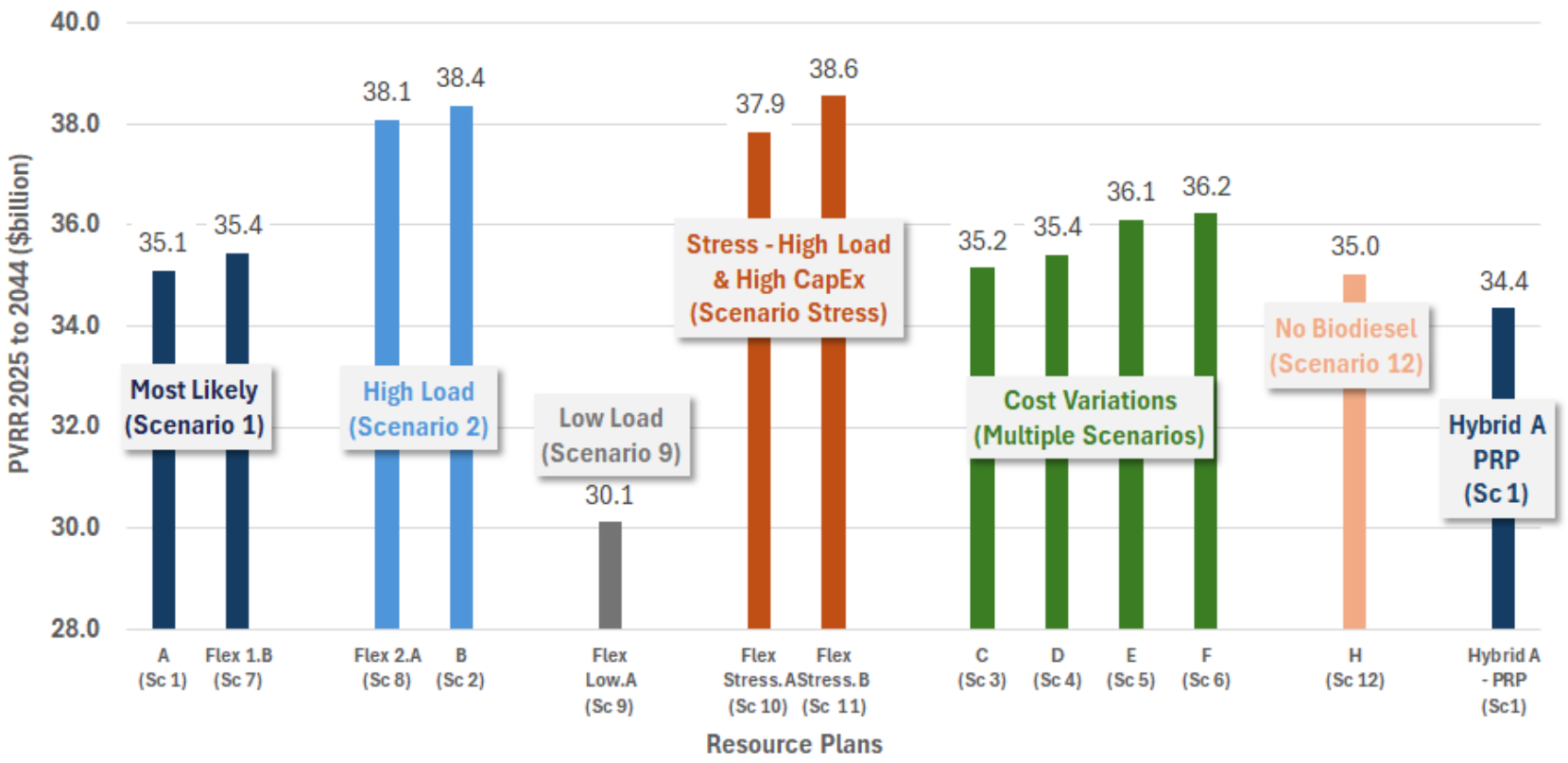
Annual Number of Hours with EUE

Year	Run 1b EUE (Hours)	Run 2b EUE (Hours)	Run 3b EUE (Hours)	Run 4b EUE (Hours)	EUE Target
2025	377	376	375	375	No Target
2026	8	8	8	8	No Target
2027	28	29	27	34	No Target
2028	-	-	-	-	No Target
2029	-	-	-	-	No Target
2030	38	-	-	-	60.6
2031	67	7	4	5	40.4
2032	84	6	-	-	26.9
2033	129	36	17	-	18
2034	24	15	18	-	12
2035	128	14	-	-	8
2036	77	11	-	-	5.3
2037	92	27	-	-	3.5
2038	75	27	-	-	2.4
2039	42	45	-	-	2.4
2040	64	-	-	-	2.4
2041	106	-	-	-	2.4
2042	12	-	-	-	2.4
2043	-	-	-	-	2.4
2044	-	-	-	-	2.4
Total - 2030 to 2044	**938**	**188**	**39**	**5**	

- EUE reliability targets begin in year 2030, the first year when PLEXOS is allowed to add non-BESS resources, and reach 2.4 hours/year in 2038, which is equivalent to the industry standard target of 0.1 hour/year or 1 day in 10 years.

Resource Modeling Results

2025 IRP – Summary of Scenario PVRR Results



Legend

Resource Plan	Scenario Description
1.A	Base assumptions for all variables
2.B	High load conditions with base assumptions for other variables
3.C	Base load with high natural gas plant capital costs
4.D	Base load with low renewable energy capital costs and high fossil capital costs
5.E	Base load with high natural gas fuel costs
6.F	Base load with high natural gas fuel costs and high natural gas plant capital costs
Flex 1.B	Flex Run for Resource Plan B run under Scenario 1 conditions
Flex 2.A	Flex Run Resource Plan A run under Scenario 2 conditions
Fles Low.A	Flex Run for Resource Plan A run under Low Load conditions
Flex Stress.A	Flex Run of Resource Plan A run under Stress conditions
Flex Stress.B	Flex Run of Resource Plan B run under Stress conditions
12.H	Base assumptions for all variables but biodiesel is unavailable
Hybrid A-PRP	Base assumptions with ASAP Phase 2 BESS optional and battery efficiency corrected

2025 IRP – Scorecard

Portfolio / Scenario	Environment				Affordability (Costs)				Compliance	Diversity of Generation				
	Avg CO2eq-2025 to 2044 (tons/GWh)	Avg CO2eq-2044 (tons/GWh)	Acres of Land Used	Year last heavy fuel oil unit operates	PVRR for source scenario ($B)	LCOE ($/kWh)			% RPS Achieved in 2044 (67% was Target)	Fossil energy in 2044 (%)	Solar energy in 2044 (including DPV) (%)	Biodiesel energy in 2044 (%)	Wind energy in 2044 (%)	Other energy sources in 2044 (%)
						5-year 2025 to 2029	10- year 2025 to 2034	20-year 2025 to 2044						
A / Scenario 1	354	144	6,030	2032	35.106	0.183	0.195	0.212	67%	43%	32%	22%	2%	1%
B / Scenario 2	359	168	6,030	2031	38.366	0.181	0.194	0.209	67%	43%	26%	28%	1%	1%
C / Scenario 3	357	162	6,030	2032	35.150	0.183	0.196	0.212	67%	43%	32%	22%	2%	1%
D / Scenario 4	357	161	6,030	2032	35.406	0.183	0.197	0.214	67%	43%	32%	22%	2%	1%
E / Scenario 5	358	160	6,030	2032	36.103	0.191	0.203	0.218	67%	43%	32%	22%	2%	1%
F / Scenario 6	355	160	6,030	2032	36.228	0.191	0.204	0.219	67%	43%	32%	22%	2%	1%
1.B / Scenario 7	346	161	6,030	2031	35.443	0.184	0.200	0.214	67%	44%	32%	22%	2%	1%
2.A / Scenario 8	362	169	6,030	2034	38.089	0.181	0.193	0.208	67%	44%	26%	28%	1%	1%
Low.A / Scenario 9	339	136	6,030	2031	30.117	0.189	0.202	0.215	67%	43%	50%	2%	3%	1%
Stress.A / Scenario 10	367	168	6,030	2034	37.855	0.181	0.191	0.206	67%	43%	26%	28%	1%	1%
Stress.B / Scenario 11	359	167	6,030	2031	38.552	0.181	0.195	0.210	67%	44%	26%	28%	1%	1%
H / Scenario 12	354	141	71,955	2034	35.028	0.183	0.194	0.211	71%	44%	40%	0%	15%	1%
I / Scenario 13	373	277	6,030	2033	36.112	0.183	0.199	0.217	67%	43%	32%	2%	22%	1%
J / Scenario 14	374	280	6,030	2030	35.321	0.182	0.195	0.212	67%	43%	32%	2%	22%	1%
K / Scenario 15	368	286	6,030	2030	35.274	0.184	0.198	0.214	67%	23%	43%	2%	30%	2%
L / Scenario 16	378	281	6,030	2033	36.615	0.183	0.198	0.221	80%	34%	32%	2%	31%	1%
M / Scenario 17	378	288	6,030	2030	35.332	0.183	0.196	0.214	36%	65%	32%	2%	0%	1%
PRP	379	281	6,030	2032	34.355	0.183	0.193	0.209	67%	44%	31%	22%	2%	1%

Low - Better
Medium
High

High - Better
Medium
Low

2025 IRP – Scorecard

Portfolio / Scenario	System Reliability and Resiliency											DBESS control (%)
	Year 0.1/year LOLE achieved & sustained	Total LOLP Hours (2025 to 2044)	% Annual Energy from DER (2044)	Year 2044 %TPA Peak Load (MW) at system peak hour* that is served by internal MW capacity in TPA (includes utility scale generation, UBESS, DR & CHP)								
				San Juan	Bayamon	Arecibo	Mayaguez	Ponce OE	Ponce ES	Caguas	Carolina	
A / Scenario 1	2032	417	20%	257%	-2%	97%	4%	241%	103%	26%	10%	25%
B / Scenario 2	2030	1291	17%	218%	3%	91%	13%	352%	120%	19%	24%	25%
C / Scenario 3	2039	404	20%	156%	2%	77%	6%	423%	72%	66%	38%	25%
D / Scenario 4	2028	398	20%	222%	-2%	47%	15%	280%	143%	40%	34%	25%
E / Scenario 5	2034	419	20%	230%	-2%	42%	6%	314%	133%	39%	18%	25%
F / Scenario 6	2033	407	20%	230%	3%	93%	0%	310%	85%	36%	8%	25%
1.B / Scenario 7	2028	399	20%	181%	17%	34%	4%	426%	99%	51%	18%	25%
2.A / Scenario 8	2030	1292	17%	195%	19%	19%	1%	475%	130%	26%	89%	25%
Low.A / Scenario 9	2036	130	28%	166%	6%	75%	5%	349%	109%	72%	14%	25%
Stress.A / Scenario 10	2028	398	20%	229%	14%	82%	40%	359%	46%	34%	25%	25%
Stress.B / Scenario 11	2030	1292	17%	242%	19%	46%	16%	348%	113%	25%	18%	25%
H / Scenario 12	2034	398	17%	183%	2%	83%	6%	343%	112%	41%	35%	25%
I / Scenario 13	2033	391	19%	186%	-16%	51%	-20%	329%	204%	40%	44%	60%
J / Scenario 14	2034	375	20%	249%	-2%	43%	-2%	329%	82%	26%	40%	25%
K / Scenario 15	2043	376	20%	141%	0%	18%	211%	312%	160%	16%	18%	25%
L / Scenario 16	2028	405	20%	179%	-2%	62%	10%	392%	155%	31%	8%	25%
M / Scenario 17	2028	2027	20%	179%	4%	72%	18%	389%	128%	31%	18%	25%
PRP	2032	422	20%	223%	10%	31%	3%	310%	173%	29%	8%	25%

Low - Better
Medium
High

High - Better
Medium
Low

Preferred Resource Plan (PRP)

2025 IRP - PRP Discussion

- The Fixed Decisions dominate the PRP and PVRR and, as a result, changes in many of the scenarios result in only small differences in PVRRs across the various Resource Plans
- LUMA tested changes in costs assumptions in Scenarios 3 to 6, 10 and 11, and biodiesel still resulted in the lowest cost across these scenarios. Changes in key cost assumptions could potentially shift which resources are most economic for Puerto Rico
- Given evolving technology and fuel costs, LUMA recommends that future generation solicitations be technology-neutral and allow for a broad mix of options

2025 IRP - PRP Discussion (continued)

- The PRP is based on a hybrid analysis developed from LUMA's base set of assumptions
- Referred to in modeling as Hybrid Resource Plan A, the PRP ranked as the top-performing plan in terms of both cost and system reliability, as compared to other portfolios
- The PRP represents the most balanced and cost-effective strategy to meet Puerto Rico's long-term electricity needs while supporting customer affordability and policy goals, including the transition to 100% renewable energy by 2050

2025 IRP - PRP Discussion (continued)

- The PRP begins with a five-year Action Plan (2025–2030), consisting of 90% previously identified “Fixed Decisions,” including:
  - Over 1,000 MW of solar resources
  - Nearly 1,700 MW of battery energy storage systems (BESS)
  - More than 1,500 MW of thermal resources
- From 2031 through the remainder of the 20-year study period, the PRP includes additional thermal generation—initially fueled by LNG and later converted to biodiesel—though new capacity additions are dominated by the Fixed Decisions

Energy Resource	Total 2025 to 2030 (MW)	Percent of Total Capacity
Distributed Generation (DPV and CHP) Implemented by Customers	378	9%
Fixed Decision Generation Implemented by Others	2,565	59%
Fixed Decision Batteries Implemented by Others	1,365	31%
PRP Recommended Customer Programs Implemented by LUMA	56	1%
Grand Total	**4,364**	**100%**

2025 IRP – PRP Overview

- **Resource Plan Hybrid A** was selected as the PRP with the lowest Present Value Revenue Requirement (PVRR) cost alternative across all scenarios: **$34.4B** spread throughout the next 20 years
- After **PSS®E Transmission analysis**, PVRR increases to a range of **$34.6B to $35.8B**
- **Renewables:** No new UPV or wind is selected post-Action Plan (First 5 years); however distributed PV (DPV) is expected to steadily expand
    - UPV: 805 MW from Tranches 1 & 2, plus 200 MW from non-tranche projects
    - DPV: Significant annual growth, reaching over 2,222 MW by 2044 contributing to the energy supply
- **Thermal Generation:** New thermal units are added, with a strong emphasis on biodiesel compatibility
    - 1,622 MW of new thermal capacity added (not including the 800 MW of temporary emergency generation that is added and then removed by 2029)
    - 66% (1,069 MW) of new capacity is either converted to biodiesel or begins operation as a biodiesel unit

2025 IRP - PRP Results – Unit Additions

Row Labels	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	Grand Total	
CHP	47	22	13	13	5																100	
DR				1	14	22	37	31	21	17	13	19	26	41	56	58	75	91	91	48	661	
DPV	146	44	16	20	23	29	33	40	44	42	37	37	42	50	60	70	80	89	99	108	1,109	
Hydro Gen		38																			38	
Emergency Generator	198	594																			792	
Thermal Gen				478																	478	
SAN JUAN 460MW CC				478																	478	
New Genera Units			244																		244	
2X17MW 18V50DF Jobos			36																		36	
2X17MW 18V50DF Yabucoa			36																		36	
2X50MW Costa Sur			136																		136	
2X9MW 18V50DF Daguao			36																		36	
New Gas Gen							105		373												478	
7F.05 1x1_S Juan									373												373	
LM2500 1x0_S Juan							35														35	
LM2500 1x0_Ponce OE							35														35	
LM2500 1x0_Arecibo							35														35	
New Gas Gen Biodiesel													452			373					825	
7F.05 1x0_S Juan Biodiesel													226								226	
7F.05 1x1_S Juan Biodiesel																373					373	Conversion
7F.05 1x0_Bayamon Biodiesel													226								226	
New Genera Units Biodiesel											36				172					36	244	
2X17MW 18V50DF Jobos Biodiesel																				36	36	Conversion
2X17MW 18V50DF Yabucoa Biodiesel											36										36	Conversion
2X50MW Costa Sur Biodiesel															136						136	Conversion
2X9MW 18V50DF Daguao Biodiesel															36						36	Conversion
BioDieselConversions											75										75	
Biodiesel_FEMA SJ Gen+ 6 #5											25										25	Conversion
Biodiesel_FEMA SJ Gen+ 6 #1											25										25	Conversion
Biodiesel_FEMA SJ Gen+ 6 #3											25										25	Convervsion
Solar	90	50	60																		200	
Tranche 1 Solar	160	579																			739	
Tranche 2 Solar			66																		66	
Grand Total	641	1,327	399	512	42	51	175	71	438	59	161	56	520	91	288	501	155	180	190	192	6,049	

2025 IRP - PRP Results – Unit Additions

Row Labels	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	Grand Total
New Distributed Storage			**3**	**5**	**5**	**6**	**2**	**3**	**3**	**3**	**3**	**4**	**4**	**5**	**6**	**6**	**3**	**4**	**4**	**4**	**71**
ASAP Phase 1		**190**																			**190**
EcoElectrica 4hr BESS		20																			20
Fonroche Humacao Solar 4hr BESS		40																			40
Horizon Energy BESS_Phase1		20																			20
Punta Lima Wind Farm BESS_Phase1		40																			40
San Fermin Solar Farm BESS_Phase1		20																			20
Yarotek (Oriana) 4hr BESS		50																			50
ASAP Phase 2							**418**						**7**								**425**
Ciro ONE 4hr BESS Phase 2							98														98
Ciro Two BESS_Phase2							48														48
Fonroche Humacao Solar 4hr BESS Phase 2							28														28
Guayama Solar Energy BESS_Phase2							35														35
Juncos I PV BESS_Phase2							3														3
Landfill Gas Technologies Fajardo BESS_Phase2							7														7
Landfill Gas Technologies Toa Baja BESS_Phase2													7								7
Punta Lima Wind Farm BESS_Phase2							28														28
San Fermin Solar Farm BESS_Phase2							53														53
Solaner BESS_PHase2							28														28
Tetris Power BESS_Phase2							14														14
XZERTA-TEC BESS_Phase2							42														42
Yabucoa YFN BESS_Phase2							35														35
New Genera Units	**131**	**141**	**158**																		**430**
Aguirre - 4HR			158																		158
Cambalache - 4HR	52																				52
CostaSur - 4HR	30																				30
Palo Seco - 4HR		101																			101
Vega Baja - 4HR	49																				49
Yabucoa - 4HR		40																			40
Regulation Only_BESS				**100**																	**100**
Tranch 4 BESS			**50**																		**50**
Tranche 1 BESS		**435**	**100**																		**535**
Tranche 2 BESS			**60**																		**60**
Grand Total	**131**	**766**	**371**	**105**	**5**	**6**	**420**	**3**	**3**	**3**	**3**	**4**	**11**	**5**	**6**	**6**	**3**	**4**	**4**	**4**	**1,861**

2025 IRP – PRP — Retirement Recommendations

- As part of the transition to a more modern, resilient, and cleaner energy system, the PRP outlines a series of strategic retirements of aging and less efficient generation assets. These retirements are carefully timed and contingent on the successful addition or conversion of new capacity, ensuring that system reliability is not compromised during the transition
- In total, the PRP anticipates the retirement **of 1,339 MW** of generation capacity by the end of 2031

2025 IRP - PRP Results – Unit Retirements

Row Labels	2026	2027	2029	2030	2031	2032	2033	2035	2036	2037	2038	2039	2040	2041	2042	2044	Grand Total	
Land Fill Gas Gen														**2**	**2**		**4**	Retired
Emergency Generator			**792**														**792**	Retired
Thermal Gen				**300**	**100**	**180**	**454**	**100**	**165**		**360**	**380**					**2,039**	
AES_1 (Coal)							227										227	Retired
AES_2 (Coal)							227										227	Retired
AGUIRRE 1 CC (Diesel)									165								165	Retired
AGUIRRE 2 CC (Diesel)								100									100	Retired
COSTA SUR 5 (LNG)												380					380	Retired
COSTA SUR 6 (LNG)											360						360	Retired
PALO SECO 3 (HFO)						180											180	Retired
PALO SECO 4 (HFO)				200													200	Retired
SAN JUAN 7 (HFO)				100													100	Retired
SAN JUAN 9 (HFO)					100												100	Retired
FEMA Gen (LNG)								**75**									**75**	
FEMA SJ Gen+ 6 #1								25									25	Conversion
FEMA SJ Gen+ 6 #3								25									25	Conversion
FEMA SJ Gen+ 6 #5								25									25	Conversion
New Gas Gen (LNG)													**373**				**373**	
7F.05 1x1_S Juan													373				373	Conversion
New Genera Units (LNG)								**36**				**172**				**36**	**244**	
2X17MW 18V50DF Jobos																36	36	Conversion
2X17MW 18V50DF Yabucoa								36									36	Conversion
2X50MW Costa Sur												136					136	Conversion
2X9MW 18V50DF Daguao												36					36	Conversion
Peaker Gen (Diesel)	**63**	**84**															**147**	
GT01-Palo Seco		21															21	Retired
GT02-Palo Seco		21															21	Retired
GT20-Jobos	21																21	Retired
GT21-Daguao	21																21	Retired
GT22-Daguao	21																21	Retired
GT03-Palo Seco		21															21	Retired
GT12-Yabucoa		21															21	Retired
Solar						**2**	**20**		**30**	**55**							**107**	
Grand Total	**63**	**84**	**792**	**300**	**100**	**182**	**474**	**211**	**195**	**55**	**360**	**552**	**373**	**2**	**2**	**36**	**3,781**	

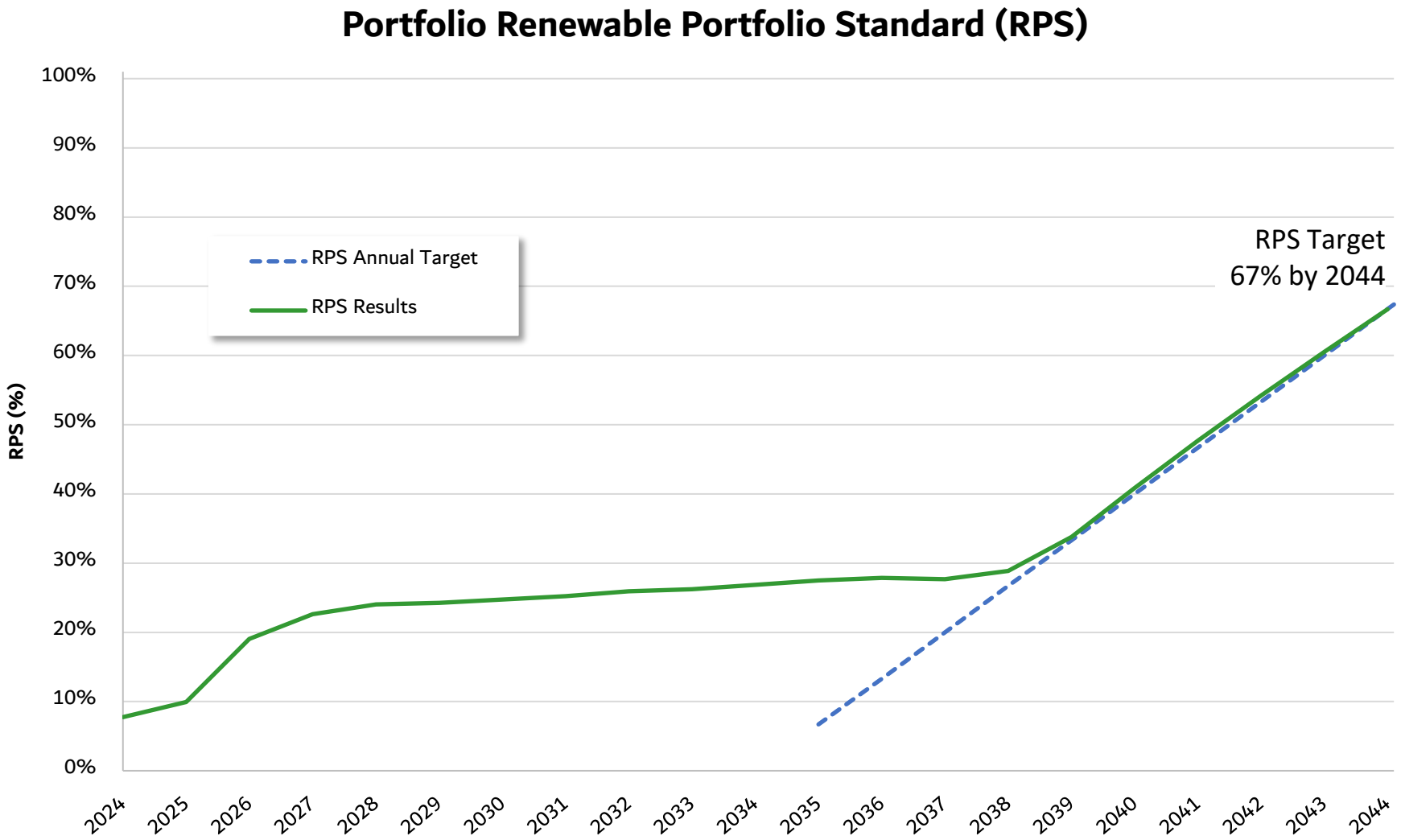
2025 IRP – PRP Results - Generation Chart

Diversity of Generation

Year	Fossil	Solar	Wind	Biodiesel	Other Generation	RPS Attained
2025	90%	8%	2%	0%	0%	10%
2030	74%	22%	2%	0%	1%	25%
2035	75%	22%	2%	0%	1%	27%
2040	64%	26%	2%	8%	1%	41%
2044	44%	32%	2%	22%	1%	67%

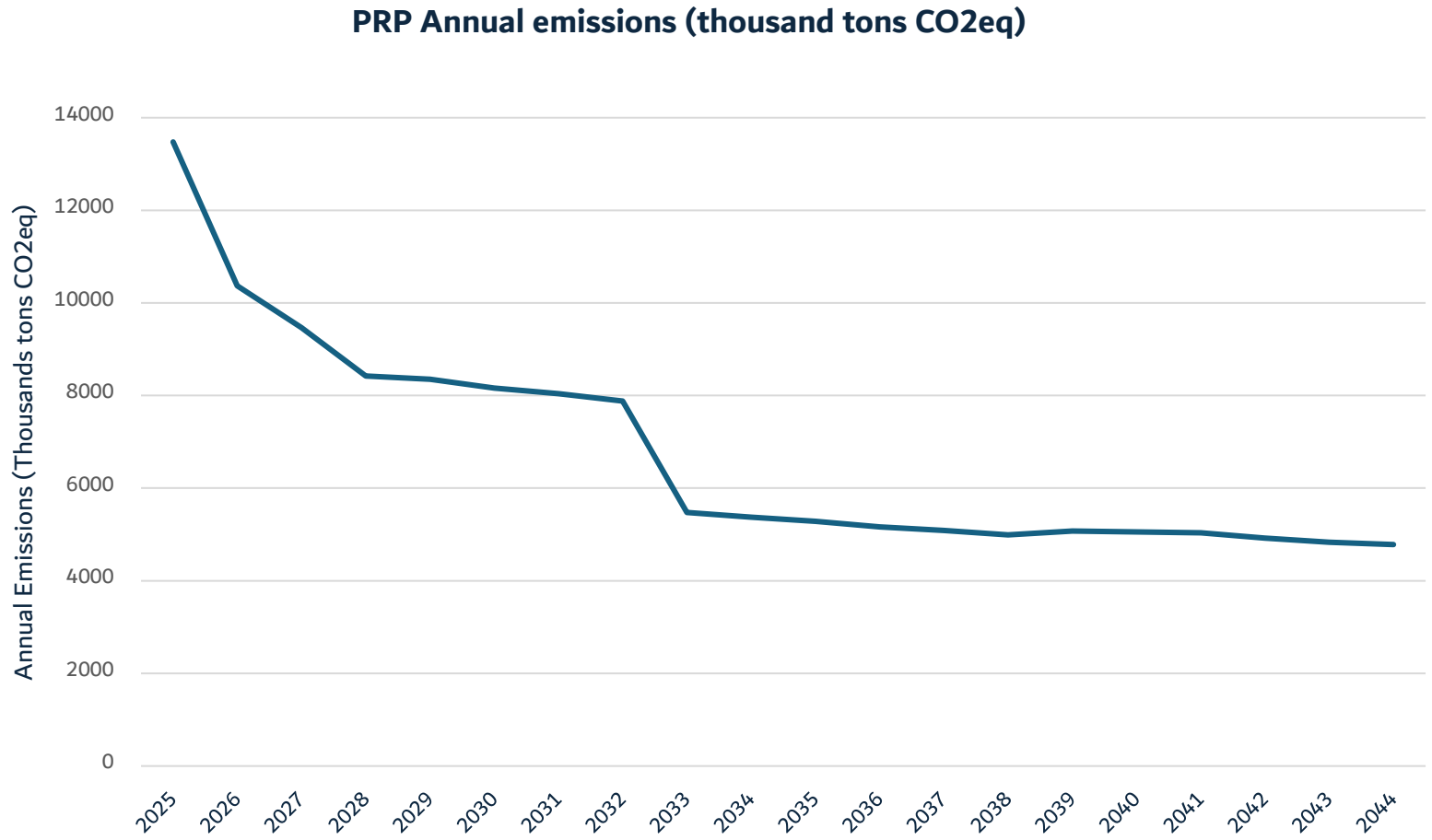
- Fossil generation includes coal, diesel, Heavy Fuel Oil and Liquefied Natural Gas
- Solar generation includes distributed solar
- Other generation includes hydro and landfill generation
- BESS is not included in this table as generation since the Energy Bureau has not defined them as generation

2025 IRP – PRP Results – Renewable Portfolio Standard



2025 IRP – PRP Results - Emissions Data*

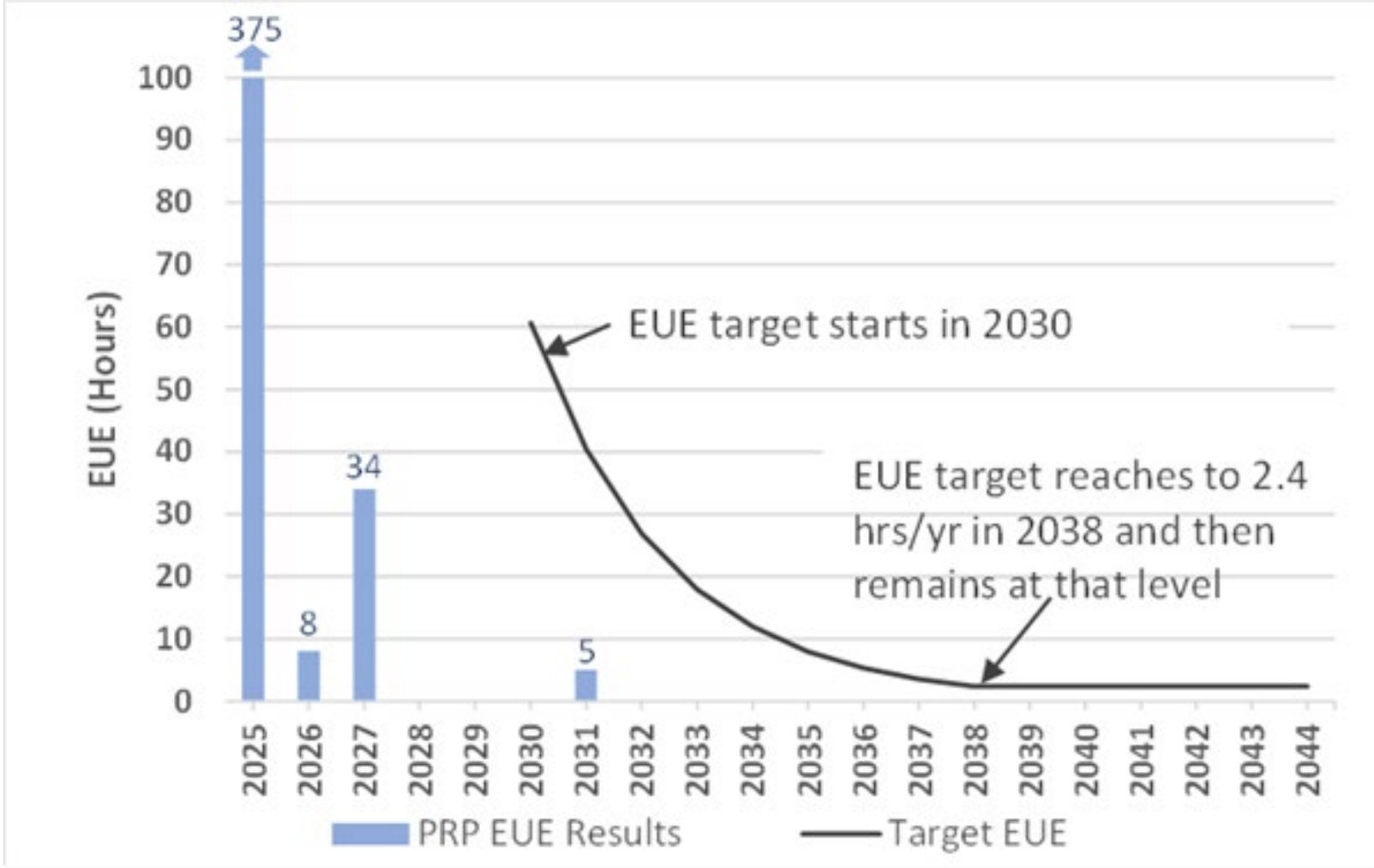
- Preferred Resource Plan accounts a 63.5% emissions reduction from 2025 levels



* Source: Results generated by PLEXOS® based on unit characteristics inputs

2025 IRP – PRP Results – Expected Unserved Energy*

Expected Unserved Hours

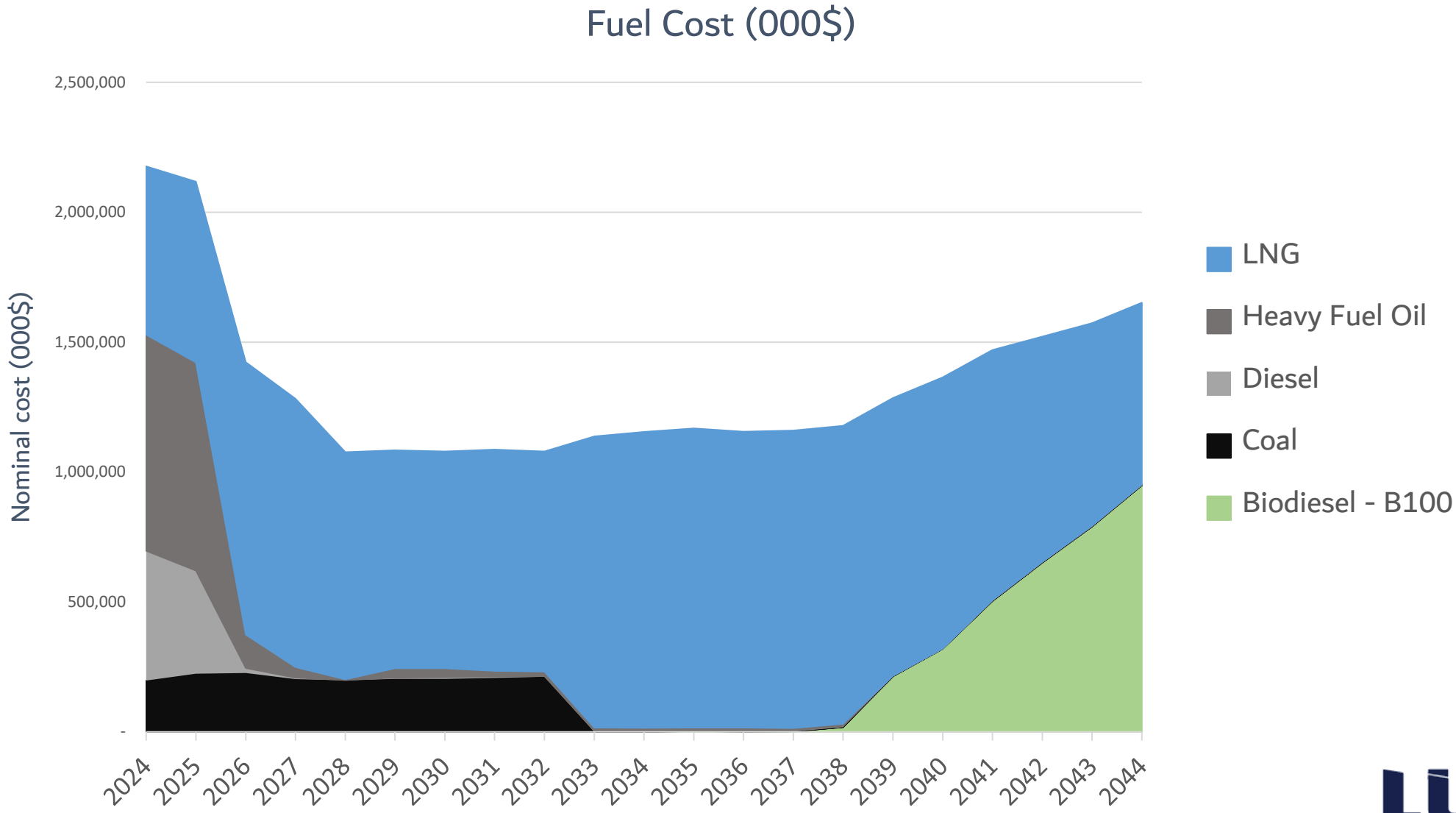


* The presented EUE hours would be related to capacity. It does not consider T&D issues in the system

2025 IRP – PRP Results — New Generation Mix

- **Fuel Transition**
  - Recommends transitioning from fossil fuels to biodiesel, assuming forecasted capital costs for fuel and generation remain as forecasted
    - Biodiesel is favored as the lowest cost option to meet renewable requirements based on current cost estimates
    - PRP includes biodiesel conversion of existing LNG units begin in 2035 to support achieving RPS of 100% renewable energy by 2050
    - Meeting the RPS targets is the primary driver behind the recommendation to use biodiesel
    - Specific timing of biodiesel conversions can be adjusted based on actual conditions

2025 IRP – PRP Results – Fuel Costs



2025 IRP – Planning Reserve Margin (PRM)

- The planning reserve margin referenced by the Energy Bureau's question is an outcome (a result) of the scenario modeling simulations. PRM was not used by LUMA as a planning input. The PRP is the least cost plan, obtained using PLEXOS, that meets the requirements and constraints with the given assumptions (serve forecasted load, operating reserve requirements, fixed decisions, capex assumptions, etc.). A result with a lower planning reserve margin would have almost certainly (based on LUMA's prior testing with PRM) resulted in an infeasible solution, e.g., the results included unacceptable levels of EUE

2025 IRP – LCOE for PRP with Biodiesel and Scenario 12 with no Biodiesel

- Cumulative LCOE for each successive year from 2025 shows that, in all but the first year, the LCOE is lower for the PRP
- In addition, 20-year PVRR is also less for PRP, $34.4B for PRP, versus $35B for Resource Plan H

Calendar Year	PRP Cumulative LCOE by Year ($/MWh)	Resource Plan H Cumulative LCOE by Year ($/MWh)	LCOE of PRP Minus Resource Plan H ($/MWh)
2025	$177.04	$176.90	$0.14
2026	$174.99	$175.00	-$0.01
2027	$179.17	$180.25	-$1.08
2028	$183.96	$185.66	-$1.71
2029	$187.67	$189.73	-$2.06
2030	$190.45	$192.76	-$2.31
2031	$193.62	$195.80	-$2.18
2032	$196.31	$198.40	-$2.09
2033	$198.47	$200.48	-$2.01
2034	$200.38	$202.46	-$2.08
2035	$202.17	$204.64	-$2.47
2036	$203.65	$206.43	-$2.78
2037	$205.31	$208.06	-$2.75
2038	$206.86	$209.82	-$2.96
2039	$208.51	$211.73	-$3.22
2040	$210.24	$213.56	-$3.32
2041	$212.40	$215.75	-$3.36
2042	$214.21	$217.72	-$3.51
2043	$215.99	$219.77	-$3.78
2044	$217.76	$222.03	-$4.26

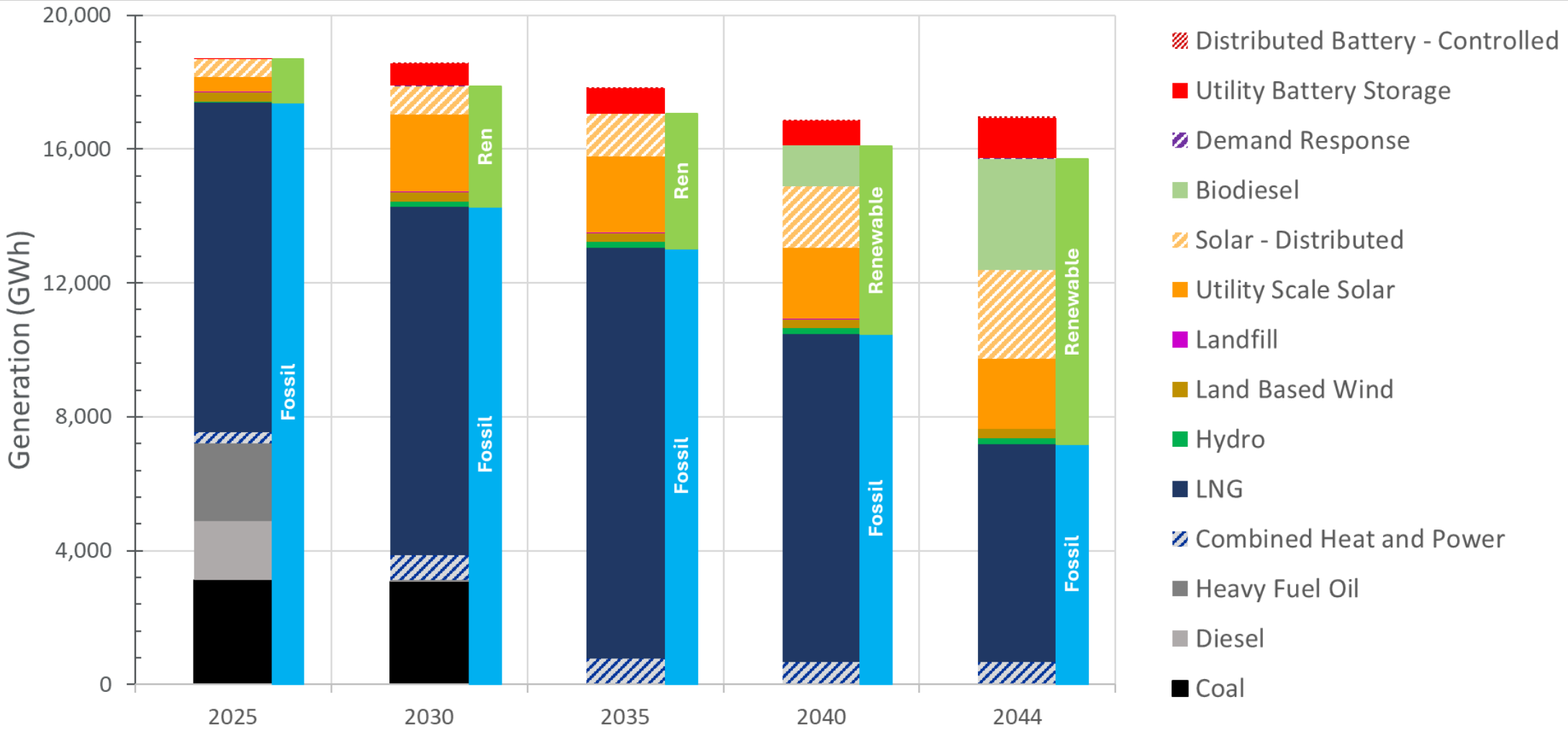
2025 IRP –Selection of PRP versus a no Biodiesel Option

- LUMA recommended the PRP with strict adherence to the requirements of Regulation 9021 by considering all performance indicators and recommending the PRP using the PVRR results as the primary selection criteria
- However, given the relatively small differences between the PVRR results of the PRP (with biodiesel) and Resource Plan H (with no biodiesel), LUMA recommends that using the latest information, that would ultimately be from future resource solicitations, to update the IRP to determine the final selection of resources, rather than locking into a selection based on the 2025 IRP results

2025 IRP – PRP Results — New Generation Mix

- **Transmission Considerations**
  - New generation is primarily sited near existing infrastructure (e.g., San Juan, Costa Sur), reducing fuel infrastructure and grid upgrade needs
- **Long-Term Planning**
  - PRP can support achieving 100% renewable energy by 2050
  - PRP provides flexibility to adapt to future uncertainties in load, fuel costs, and technology

2025 IRP – PRP Results - Energy Resources



Action Plan

2025 IRP - Action Plan

- Section 2.03(K) of Regulation 9021 outlines the framework for the 2025 Integrated Resource Plan (IRP). It requires a detailed Action Plan for the first five years, based on the PRP
- Covers the period from 2025 to 2030, includes recommendations in three categories:
    1. Energy resource changes,
    2. Transmission expansion
    3. Guidance on distributed generation, fixed decisions, customer programs, and new gas generation

2025 IRP - Action Plan

Summary of energy resource additions for 2025 to 2030

Energy Resource	2025	2026	2027	2028	2029	2030	Grand Total
Customer Distributed Generation							
CHP	47	22	13	13	5		100
DPV	146	44	16	20	23	29	278
Fixed Decision Generation							
PREPA HydroCo Repairs		38					38
Emergency Generators	200	600					800
Energiza Gas CC				478			478
New Genera Units			244				244
Non-Tranche Solar	90	50	60				200
Tranche 1 Solar	160	579					739
Tranche 2 Solar			66				66
Fixed Decision Batteries							
ASAP Phase 1		190					190
New Genera Units	131	141	158				430
Regulation 4x25 BESS				100			100
Tranche 1 BESS		435	100				535
Tranche 2 BESS			60				60
Tranche 4 BESS			50				50
PRP Recommended Customer Programs							
Demand Response				1	14	22	37
Controlled DBESS			3	5	5	6	19
Grand Total	**774**	**2,099**	**770**	**617**	**47**	**57**	**4,364**

2025 IRP - Action Plan

Preferred Resource Plan Energy Resource Additions By Category in First 5-Years (MW)

Energy Resource	Grand Total 2025 to 2030	Percent	Summary of LUMA's Actions to Support Implementation
Distributed Generation	378	9%	Process and assess interconnection applications and continue upgrades to distribution system to enable increased distributed generation.
Fixed Decision Generation	2,565	59%	Process and assess interconnection applications, negotiation of interconnection agreements, and implementation of any required transmission network upgrades.
Fixed Decision Batteries	1,365	31%	Process and assess interconnection applications, negotiation of interconnection agreements, and implementation of any required transmission network upgrades.
PRP Customer Programs	56	1%	Design and administration of programs approved by the Energy Bureau.
Grand Total	**4,364**	**100%**	

2025 IRP - Action Plan

PRP Energy Resource Retirements for 2025 to 2030 (MW)

Energy Resource	2025	2026	2027	2028	2029	2030
Emergency Generator					800	
PALO SECO 4 (Optional)						200
SAN JUAN 7 (Optional)						100
GT01-Palo Seco (Diesel)			21			
GT02-Palo Seco (Diesel)			21			
GT20-Jobos (Diesel)		21				
GT21-Daguao (Diesel)		21				
GT22-Daguao (Diesel)		21				
GT03-Palo Seco (Diesel)			21			
GT12-Yabucoa (Diesel)			21			
Grand Total		**63**	**84**	**0**	**800**	**300**

2025 IRP - Action Plan

Summary listing of the recommended Action Plan

Energy Resource	Frequency Of Update or Communication	Primary Responsibility	Stakeholders to be Informed
CHP	Bi-annual	Energy Bureau	LUMA
Hydro	Monthly	PREPA	LUMA, Energy Bureau
Emergency Generators	Monthly	PREPA	LUMA, Energy Bureau
Energiza Gas CC	Monthly	3PO	LUMA, Energy Bureau, P3A
New Genera Units	Biweekly	Genera	LUMA, Energy Bureau
Non-Tranche Solar	Monthly	Energy Bureau	LUMA, PREPA
Other projects	Monthly	Energy Bureau, PREPA or 3PO	LUMA
ASAP Phase 1	Biweekly - Stay	Energy Bureau	LUMA
ASAP Phase 2	Biweekly - Stay	Energy Bureau	LUMA
New Genera Batteries	Biweekly	Genera	LUMA, PREPA
BESS Tranche 1, 2 & 4	Biweekly	PREPA	Energy Bureau

2025 IRP – Notice of Issues with Modeling Results

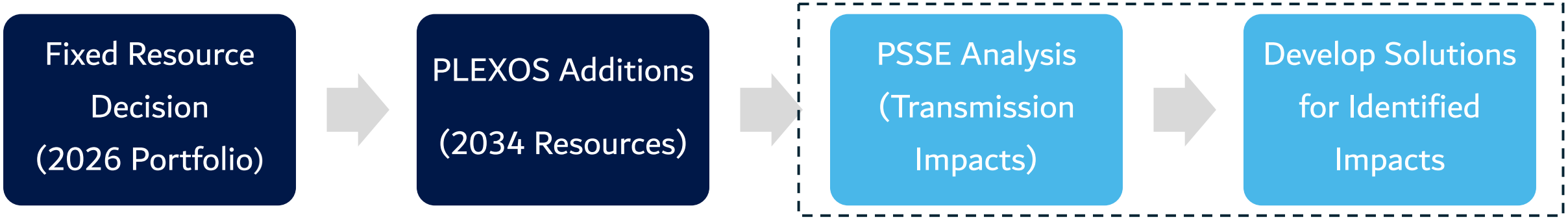
- LUMA uncovered four modeling issues with the scenarios filed. Three of the four issues are common to all 17 scenarios. None of the issues are expected to impact, the recommendation of the PRP or the relative ranking of the scenarios presented. The fourth item relates specifically to Scenario 14 and could affect Scenario 14's ranking relative to other scenarios but not change the PRP recommendation.
  1. PLEXOS® software bug impacting five units with mid-year start dates. Issue affects only Energiza and new Genera thermal peaking generators with mid-year commercial operation dates. PLEXOS® adds these generators earlier than intended in their first year of operation, resulting in incorrect generation and costs for the months prior to intended operation date
  2. Relates to the fixed operations and maintenance ("FOM") costs for certain generators. The FOM for some generic expansion units, if and/or when converted to biodiesel, was not properly included in model setup, resulting in lower FOM costs for this generation. Tests have been performed to confirm that correcting FOM costs does not impact PRP, which still relies on the thermal generation and transition to biodiesel to meet RPS

2025 IRP – Notice of Issues with Modeling Results

3. Variable operations and maintenance ("VOM") and FOM costs inputs to PLEXOS® for tranche projects. Some of these projects included duplicate VOM and FOM cost components. This issue occurred across all scenarios and, when corrected, the PVRR is reduced equally across all scenarios
4. A PLEXOS® software bug for which a workaround was created to correctly account for Energiza's fixed costs. The workaround was inadvertently left in place for Scenario 14 results and resulted in some of the Energiza costs be included in Scenario 14 which was intended to remove Energiza. When corrected, the results will lower the PVRR for Scenario 14 and will have no impact on any other scenarios

Appendix 1: Transmission and Distribution

Simple Process Overview: PSSE Analysis of the Preferred Resource Plan



- PSSE Analysis identifies implications PRP on transmission
  - ✓ Per Regulation 9021, analysis of near- and long-term, and multiple dispatch scenarios
- PSSE Analysis methodology employed NERC Transmission Planning (TPL 005-1) criteria
  - ✓ Determining contingencies
  - ✓ Requirement to mitigate thermal overloads and voltage violations under various outage scenarios
- Results
  - ✓ 2026 – Significant upgrades for existing deficiencies worsened by fixed resource decisions
  - ✓ 2034 – Significant upgrades driven by added resources and load assumptions

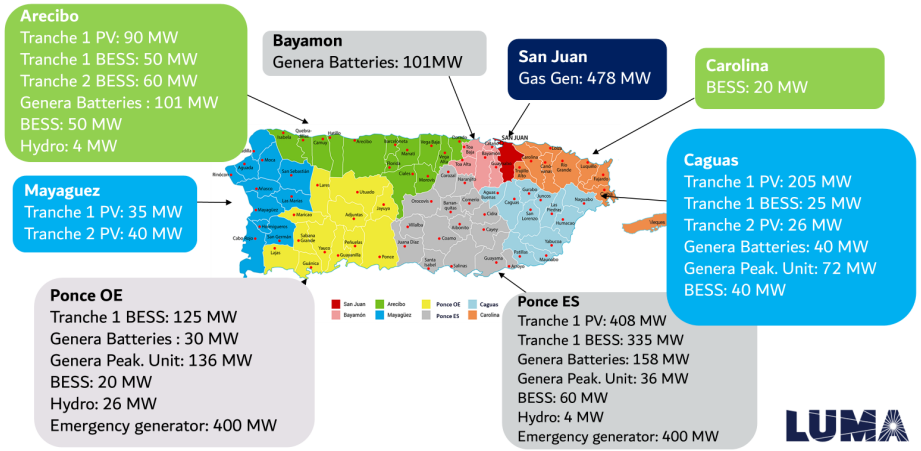
	2026	2034
Peak Solar	✓	✓
Peak Demand	✓	✓

	2026	2034	Cost Estimate
Thermal violations (Tables 23-25)	11	20	~ $710.5 M
Voltage violations (Tables 26-29)	32	34	~$314 M

PSS®E Analysis - Solutions

- Table 12: Summary of proposed N-1 and N-1-1 thermal solutions for both 2026 and 2034*

Year	Single Outage (N-1)		Double Outages (N-1-1)	
	Project Type	Quantity	Project Type	Quantity
2026	New Transformer	2	New Transformer	3
	Rebuild	3	Rebuild	4
	Reconductor	9	Reconductor	20
	Replace Transformer	1	Replace Transformer	1
2034	Rebuild	4	Rebuild	4
	Rebuild & Add New Transformer	1	Rebuild & Add New Transformer	1
	Reconductor	11	Reconductor	15
	Replace Transformer	2	Replace Transformer	1



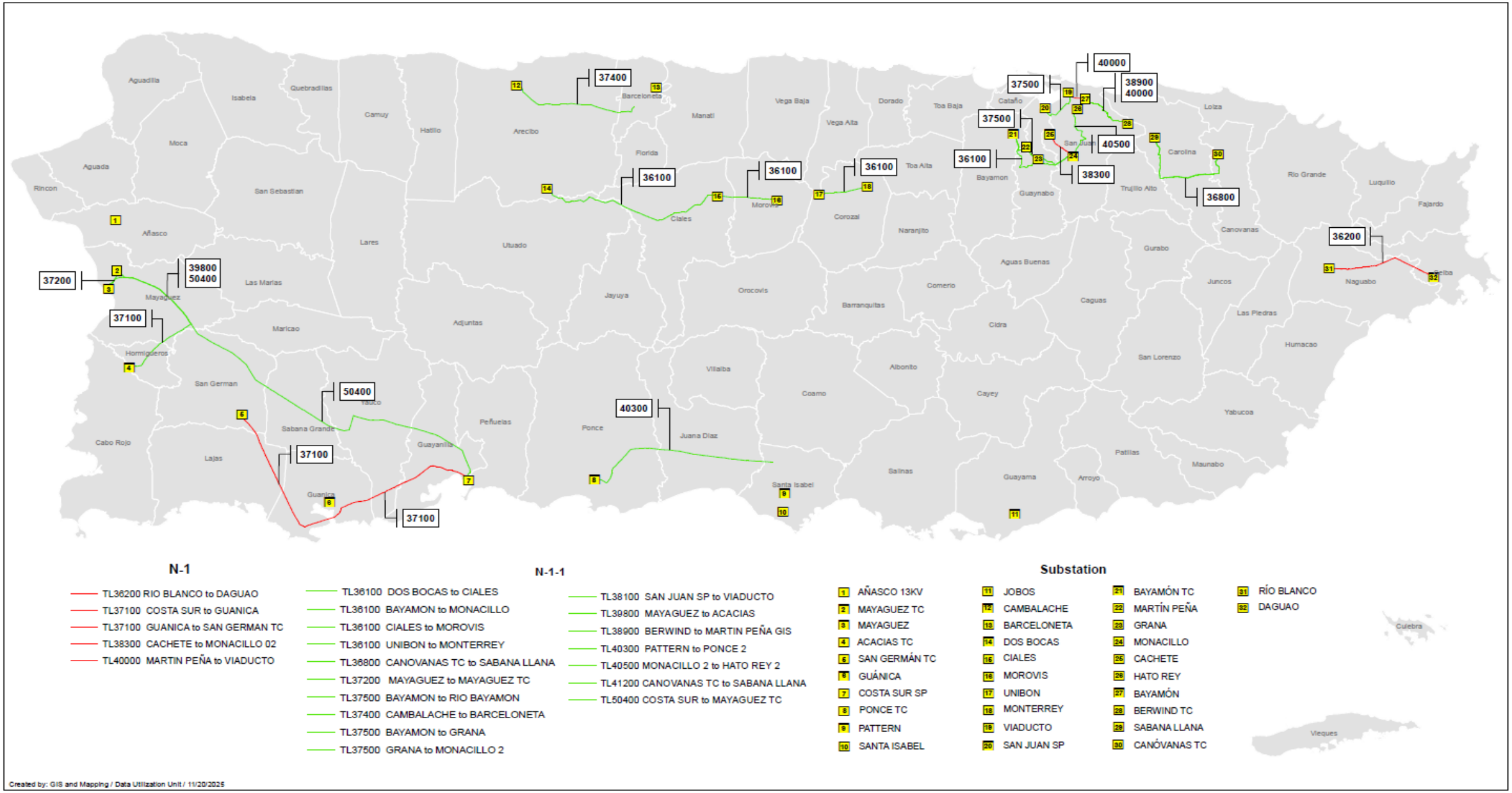
- Table 17: Summary of proposed N-1 and N-1-1 voltage violations solutions for both 2026 and 2034**

Year	Project Type	Single Outage (N-1)		Double Outages (N-1-1)	
		Quantity	MVAR	Quantity	MVAR
2026	Activate existing cap banks	1	31.7	2	56.9
	Place existing cap banks on voltage control	1	11.2	1	46.6
	New cap banks	10	570	5	218
	New SVC	6	345	1	25
	New BESS	1	30 MW		-
	New 230/115 kV transformers		-	1	-
	New 115 kV lines	2	-		-
	Change 230/115 kV transformer tap ratios	1	-		-
2034	Activate existing cap banks	1	31.7	2	56.9
	Place existing cap banks on voltage control	1	11.2	1	46.6
	New cap banks	10	570	5	166
	New SVC	6	345	2	85
	New BESS	1	30 MW		
	New 230/115 kV transformers			1	
	New 115 kV lines	2			
	Change 230/115 kV transformer tap ratios	1			

* 2025 Integrated Resource Plan - Transmission Needs Studies Report, November 21, 2025, filed in Case No. NEPR-AP-2023-0004, page 46

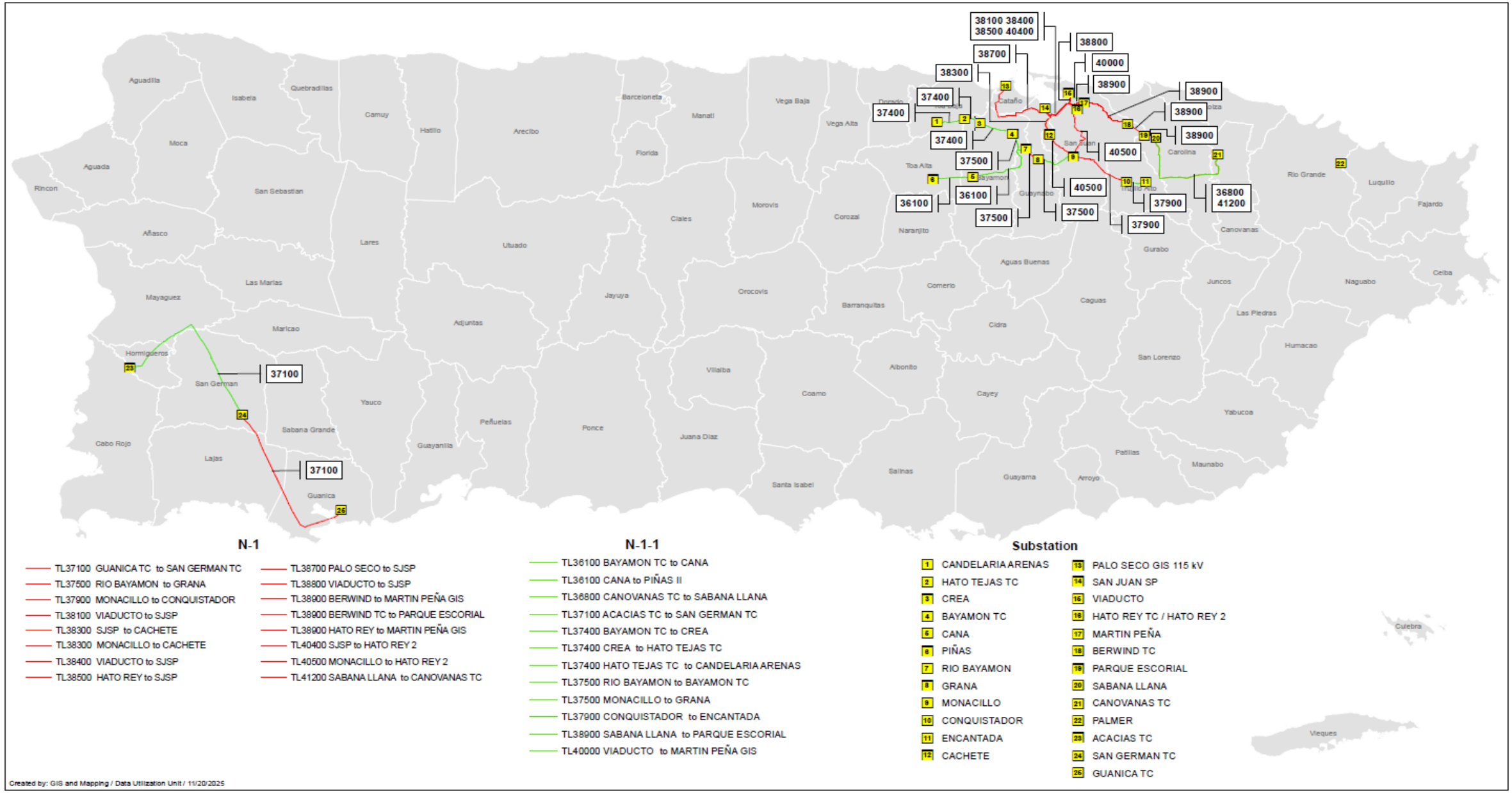
** *Id.*, page 57

2026 IRP Transmission Needs



Created by: GIS and Mapping / Data Utilization Unit / 11/20/2025

2034 IRP Transmission Needs



N-1

- TL37100 GUANICA TC to SAN GERMAN TC
- TL37500 RIO BAYAMON to GRANA
- TL37900 MONACILLO to CONQUISTADOR
- TL38100 VIADUCTO to SJSP
- TL38300 SJSP to CACHETE
- TL38300 MONACILLO to CACHETE
- TL38400 VIADUCTO to SJSP
- TL38500 HATO REY to SJSP
- TL38700 PALO SECO to SJSP
- TL38800 VIADUCTO to SJSP
- TL38900 BERWIND to MARTIN PEÑA GIS
- TL38900 BERWIND TC to PARQUE ESCORIAL
- TL38900 HATO REY to MARTIN PEÑA GIS
- TL40400 SJSP to HATO REY 2
- TL40500 MONACILLO to HATO REY 2
- TL41200 SABANA LLANA to CANOVANAS TC

N-1-1

- TL36100 BAYAMON TC to CANA
- TL36100 CANA to PIÑAS II
- TL36800 CANOVANAS TC to SABANA LLANA
- TL37100 ACACIAS TC to SAN GERMAN TC
- TL37400 BAYAMON TC to CREA
- TL37400 CREA to HATO TEJAS TC
- TL37400 HATO TEJAS TC to CANDELARIA ARENAS
- TL37500 RIO BAYAMON to BAYAMON TC
- TL37500 MONACILLO to GRANA
- TL37900 CONQUISTADOR to ENCANTADA
- TL38900 SABANA LLANA to PARQUE ESCORIAL
- TL40000 VIADUCTO to MARTIN PEÑA GIS

Substation

- 1 CANDELARIA ARENAS
- 2 HATO TEJAS TC
- 3 CREA
- 4 BAYAMON TC
- 5 CANA
- 6 PIÑAS
- 7 RIO BAYAMON
- 8 GRANA
- 9 MONACILLO
- 10 CONQUISTADOR
- 11 ENCANTADA
- 12 CACHETE
- 13 PALO SECO GIS 115 kV
- 14 SAN JUAN SP
- 15 VIADUCTO
- 16 HATO REY TC / HATO REY 2
- 17 MARTIN PEÑA
- 18 BERWIND TC
- 19 PARQUE ESCORIAL
- 20 SABANA LLANA
- 21 CANOVANAS TC
- 22 PALMER
- 23 ACACIAS TC
- 24 SAN GERMAN TC
- 26 GUANICA TC

Kilometers
0 5 10 20
1:425,000
N

Created by: GIS and Mapping / Data Utilization Unit / 11/20/2025

PSS®E Analysis – Costs

- Table 1: Summary of lower range of cost estimates

Year	Thermal Solutions (2025$)	Voltage Solutions (2025$)	Total Solutions (2025$)	Thermal Solutions (Nominal$)	Voltage Solutions (Nominal$)	Total Solutions (Nominal$)	PVRR Total Solutions (Nominal$)
2026	379,948,703	157,345,610	537,294,313	389,447,421	161,279,250	550,726,671	437,184,587
2034	295,071,652	7,134,080	302,205,732	368,504,060	8,909,488	377,413,548	161,866,202
Total	675,020,355	164,479,690	839,500,045	757,951,480	170,188,739	928,140,219	599,050,789

- Table 2: Summary of higher range of cost estimates

Year	Thermal Solutions (2025$)	Voltage Solutions (2025$)	Total Solutions (2025$)	Thermal Solutions (Nominal$)	Voltage Solutions (Nominal$)	Total Solutions (Nominal$)	PVRR Total Solutions (Nominal$)
2026	1,182,780,000	306,729,081	1,489,509,081	1,212,349,500	314,397,308	1,526,746,808	1,211,980,840
2034	848,750,362	7,134,080	855,884,442	1,059,972,898	8,909,488	1,068,882,386	458,425,334
Total	2,031,530,362	313,863,161	2,345,393,523	2,272,322,398	323,306,796	2,595,629,194	1,670,406,174

Existing Transmission Facilities Overview (Appendix 1 - Section 4.2)

Transmission Facilities Descriptions

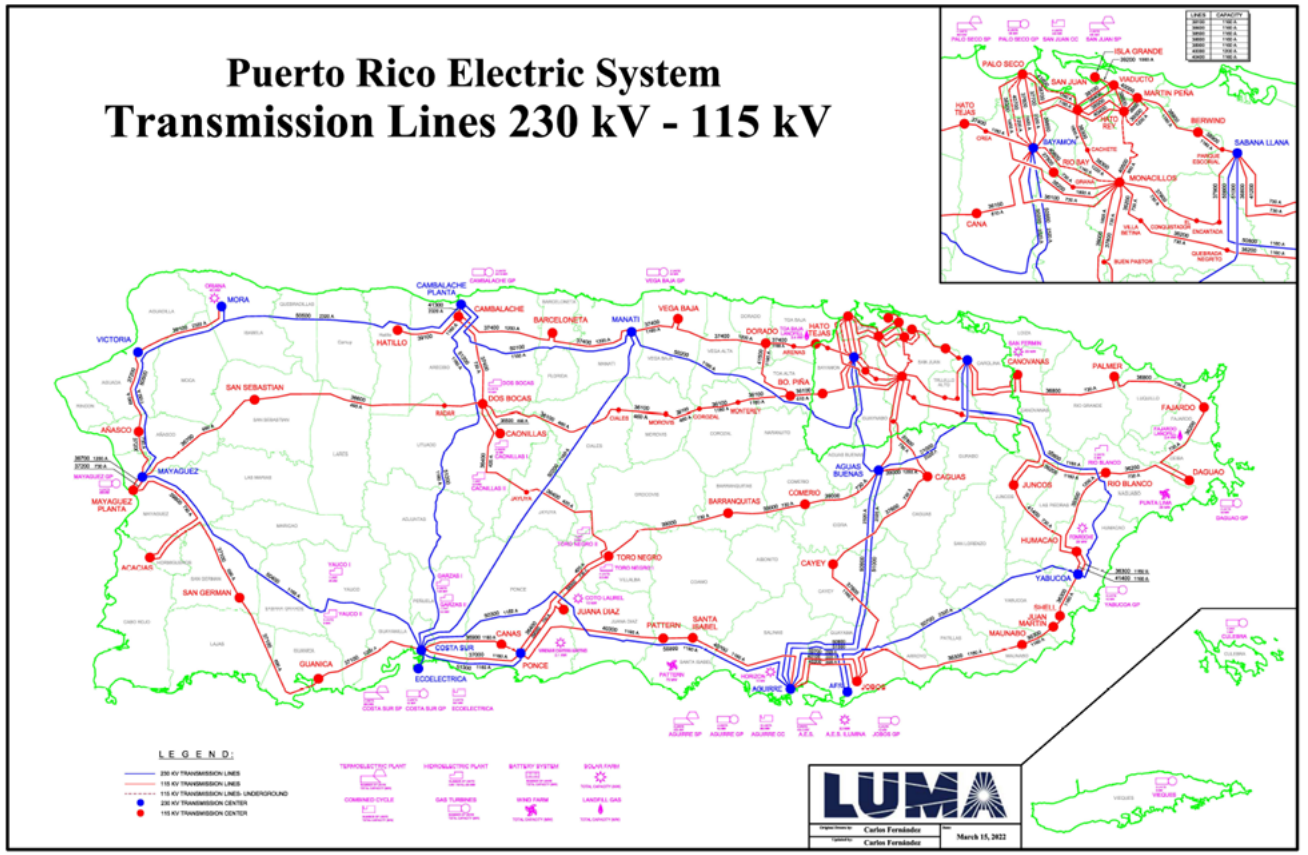
- 50 Transmission Centers
- 299 Substation Sites
- 342 Distribution Substations

Major Emerging Risks

- Small DER and utility scale PV are reducing minimum-daytime loads
- Conventional generation has minimum output level restrictions
- This reduces grid inertia, system stability, and frequency response to disturbances

Constrained Transmission Network

- Puerto Rico's transmission does not meet basic industry reliability (N-1)
- Upgrades are required both in baseline "existing conditions", as well as to interconnect new generation



Voltage Level	Line Miles
230 kV	424
115 kV	711
38 kV	1,563

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Existing Distribution Facilities Overview (Appendix 1 - Section 5)

Distribution Facilities Description

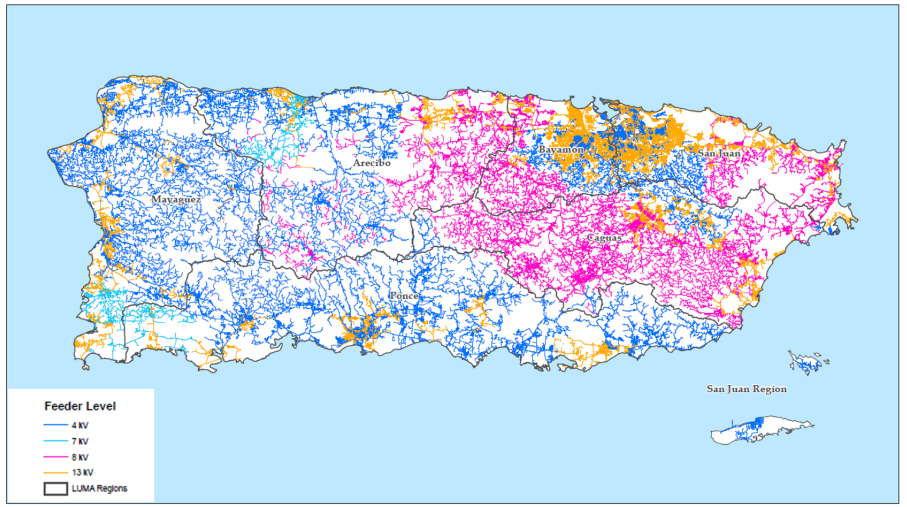
- 1,127 Distribution Circuits
- 342 Distribution Substations
- 5 Operating Voltages (4.16, 4.8, 7.2, 8.3, 13.2 kV)

Major Emerging Risks

- Poor reliability performance driven by under investments, end of life and failing assets, lack of redundancy and inadequate flexibility
- High volumes of small DER interconnecting with inadequate autonomous settings and without required system upgrades

Evolving Distribution System Needs

- Strong demand for new interconnection request drives investments needs
- Poor reliability drives need for capacity upgrades and voltage standardization
- High volumes of small DER drive need for Grid edge network upgrades and grid visibility



Voltage level	Number of substations	Percent of total	Aggregated capacity (MVA)	Percent of total	Number of circuits	Percent of Total
4.8 kV	1	0.3%	6.25	0.1%	2	0.2%
4.16 kV	176	51.5%	1,693.6	31.8%	612	54%
7.2 kV	6	1.75%	74.9	1.4%	18	1.6%
8.32 kV	54	15.8%	598.4	11.2%	164	15%
13.2 kV	105	30.7%	2,955	55.5%	331	29%
Total	342	100%	5,328.15	100%	1,127	100%

Existing Distribution Substations Overview

Substation Facilities Description

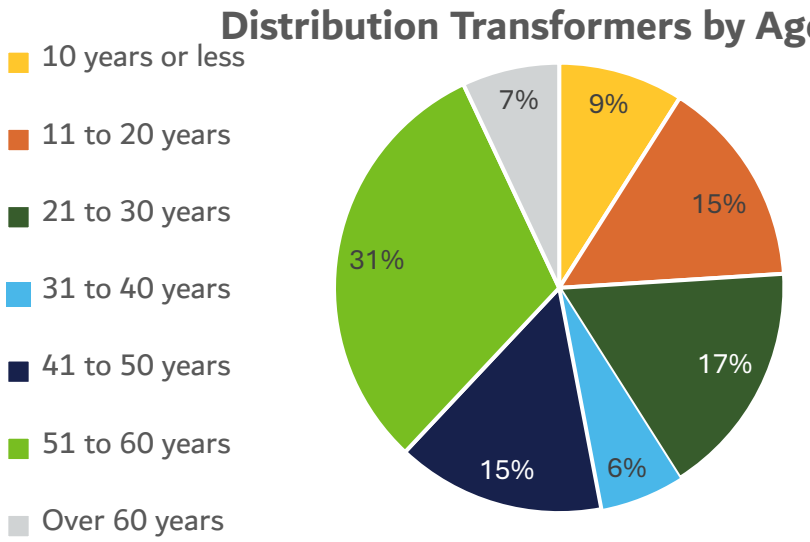
- 342 Distribution Substations
- 25 Over 90% capacity
- Over 50% of Transformers over design life of 40 years
- Often no redundancy due to voltage level difference

Major Emerging Risk

- High transformer failure rate due to end of life and not maintain assets
- FEMA Advisory Base Flood Elevation maps identified 87 of 299 substation sites in high-risk flood hazard, 18 are in regulatory floodway with high probability of flooding

Constrained Substation Transformers

- Load growth and economic development are drivers for substation capacity upgrades
- Enhancing reliability also requires rebuilds to provide redundancy and flexibility for substation transformers

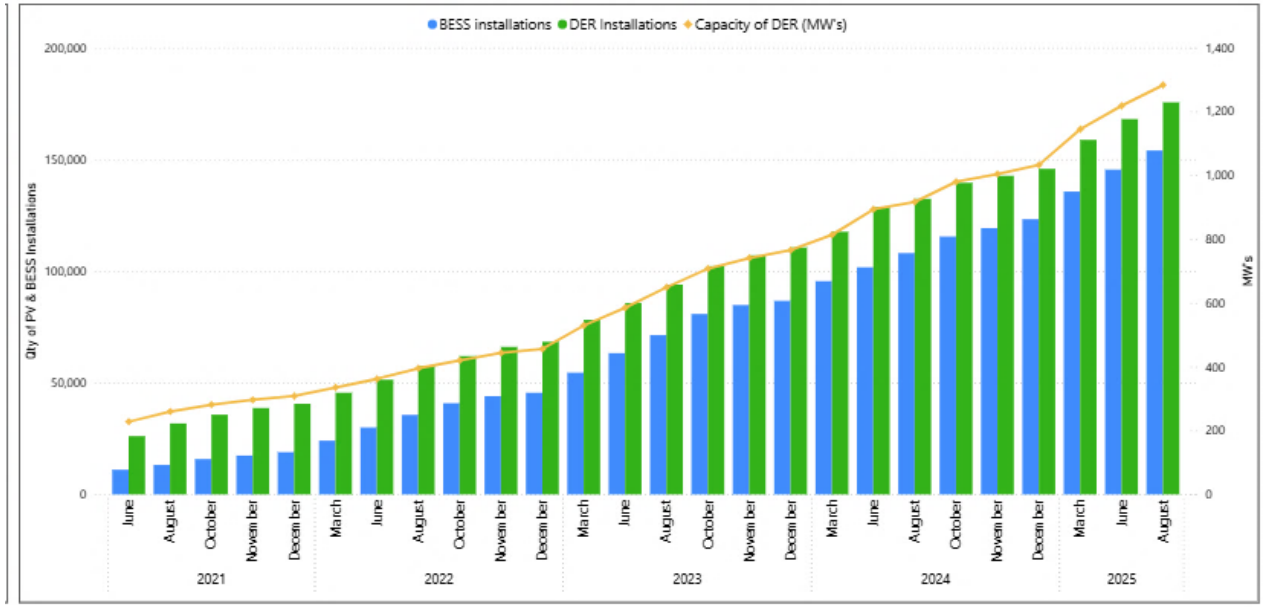


Region	Number of Substations	Loading Over 90%	Loading Forecasted Over 90%	Area Planning Substations Over 90%
Arecibo	37	4	3	2
Bayamón	48	2	3	4
Caguas	57	4	3	4
Mayagüez	58	6	2	6
Ponce	50	6	2	4
San Juan	93	3	6	2

Distributed Energy Resources (DER)

DER integration statistics

- **Installations:** 26,000 to 175,000 (Jun 21 – Oct 25)
- **Rooftop solar PV:** 1,282 MWs
- **Battery Energy Storage:** 153,000 installations, 850 MW / 2,600 MWh



Growing Safety Issues

- Current practices violate industry safety practices as defined by National Fire Protection Association (NFPA) and National Electric Code (NEC)
- Thermally overloaded transformers and distribution circuits are being identified, but funding mechanisms abruptly cut due to legislative actions. Risks identified by NFPA/NEC :
  - **Fire Hazards:** "Electrical distribution … equipment involved in overloading cause significant home and non-home fires, resulting in hundreds of deaths, thousands of injuries, and billions in damages annually."
  - **Equipment Damage:** "Chronic overheating from overloads melts wire insulation, damages motors, and reduces the lifespan of electrical components."
  - **Operational Downtime:** In industrial settings, overloading leads to frequent, costly interruptions when breakers trip and equipment fails (ex. It worsens reliability)

Incorporating Higher Levels of DER

Customer Transformer Overloads	• Reduced system sizes • Reduce exported power • **Upgrade transformer** to higher capacity
Daytime High Voltage	• Smart Inverter: Volt/VAR • Smart Inverter: Volt/Watt • Small solar PV systems per home • Reduce exported power per home
"Duck-curve" Daytime Low Loads	• Home batteries provide frequency response • Daytime battery charging during low loads
Islanding risks	• Increased likelihood of unintentional islanding on feeders with very high DER penetration • DER generation can mask outages/faults, delaying protection operation

- ✓ Smart Inverter settings can provide short-term and mid-term benefits by reducing the likelihood and impact of solar PV causing high-voltage (Volt/VAR and Volt/Watt)
- ✓ These settings provide a "do-no-harm" at the point of interconnection, with each inverter regulating its own voltage to prevent high-voltage to other customers

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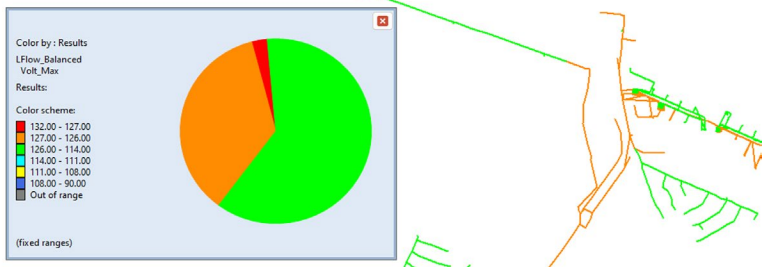
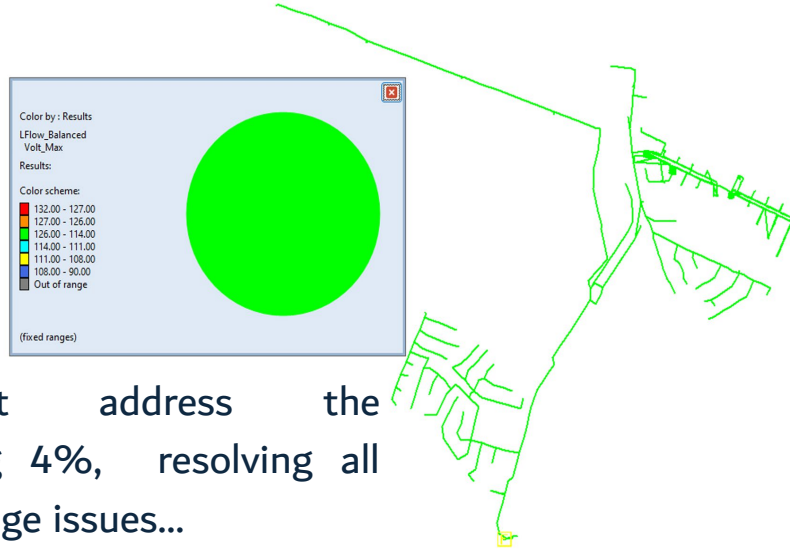
Urgent Intervention Needed – Updated Smart Inverter Settings (Appendix 1 Section – 6.4)

Case	Aggregated PV Capacity (kW)	V max (%)	V min (%)	Sections with Violations	Hosting Capacity (Section with Max value) (kW)
DER Off	0	105	100	0 of 677	1315
DER On Without Settings	1,674	106.3	105	218 of 677	0
DER On with Settings (Volt/VAR)	1,674	106	103	28 of 677	30
DER On With Settings (Volt/VAR & Volt /Watt)	1,607	105	103	0 of 667	100



30% of the circuit sees high voltage with no Smart Inverter Settings

Volt/VAR at every PV reduces 95% of high voltages...
Highlights the need to implement retroactively



Volt/Watt address the remaining 4%, resolving all high voltage issues...
Highlights that only the worst-case locations are activated


Thank You
La gente primero.
La seguridad siempre.
LUMA