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

IN RE: PLAN PRIORITARIO PARA LA ESTABILIZACIÓN DE LA RED ELÉCTRICA	Case No.: NEPR-MI-2024-0005 Motion in Compliance with Resolution and Order of August 9, 2024

MOTION IN COMPLIANCE WITH RESOLUTION AND ORDER OF AUGUST 9, 2024

TO THE ENERGY BUREAU:

COMES NOW, GENERA PR, LLC ("Genera"), through its undersigned counsel and, very respectfully, states and prays as follows:

1. On June 13, 2024, the Puerto Rico Energy Bureau ("PREB") issued a *Resolution and Order* instructing the Puerto Rico Electric Power Authority ("PREPA"), LUMA Energy, LLC and Luma Energy ServCo, LLC ("LUMA"), and Genera PR LLC ("Genera"), to elaborate and present to the PREB their respective Electric System Stabilization Plans ("Preliminary Plan"). Genera presented its *Preliminary Plan* on July 8, 2024.

2. On August 9, 2024, PREB issued another Resolution and Order titled *Establishment of Procedural Calendar*, setting forth a work schedule in the present case ("*Scheduling Order*"). The *Scheduling Order* requires Genera, Luma and PREPA to file their respective presentations for the Virtual Technical Workshop by the deadline of September 9, 2024.[1]

1 The Scheduling Order requires the filing to be made by 2:00 p.m. However, due to the impending termination of the Shared Services Agreement, Genera encountered complications during the current data migration that hindered the compilation of the information necessary for the submission. Genera apologizes for this good faith unintentional delay.

3. In compliance with the *Scheduling Order*, we hereby submit the presentation Genera intends to use during the Virtual Technical Workshop. **(Exhibit #1).**

WHEREFORE, Genera respectfully requests PREB to take notice of the foregoing, accept the presentation submitted by Genera, and deem it in compliance with the *Resolution and Order* of August 9, 2024.

It is hereby certified 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 following attorneys who have filed a notice of appearance in this case: **Lcdo. Alexis Rivera**, arivera@gmlex.net; **Lcda. Laura T. Rozas**, laura.rozas@us.dlapiper.com; **Lcda. Valeria Belvis Aquino**, valeria.belvis@us.dlapiper.com.

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Exhibit 1

Electric System Stabilization Plan – Virtual Technical Workshop

GeneraPR

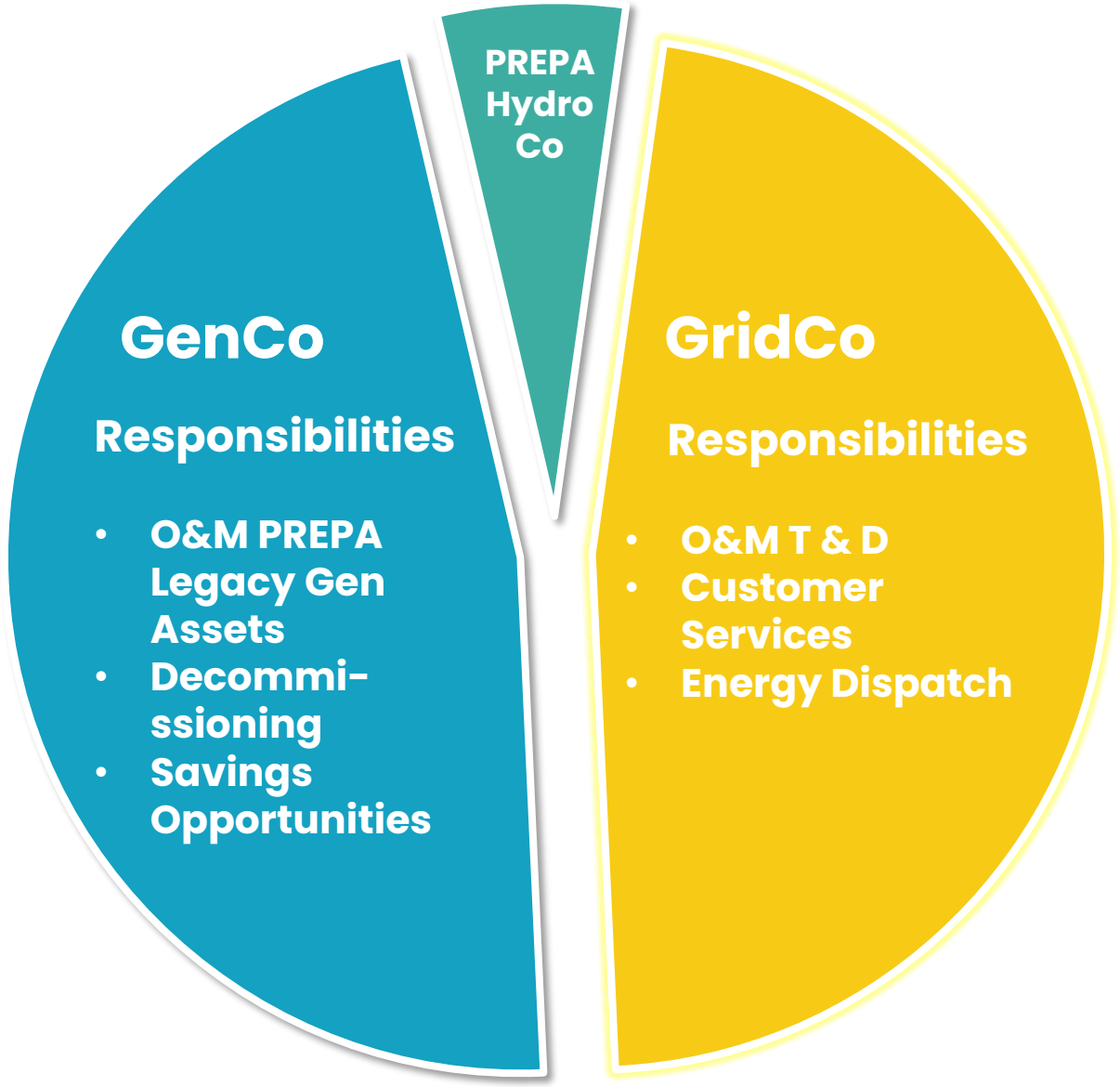
Electric System Stabilization Plan

Virtual Technical Workshop

NEPRMI20240005

September 11, 2024

Electric System Components



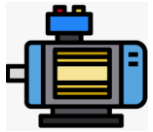
CONTENT

Genera's Stabilization 2 Year Plan

Capacity and Reliability Improvement Plan

Short-term Repairs

- Repairs to restore **800 MW of capacity** between Sep & Nov 2024
- Repairs to restore **500 MW of capacity** for 2025



Critical Components Replacement

- Reduce Forced Outages in 50%

BESS – Battery Energy Storage System Project

- Add **430 MW** to prevent 90% of load shedding

Peaker Project

- Add **244 MW** of black start and ancillary services

Work Plan To Increase Capacity

RECOMMENDED CAPACITY

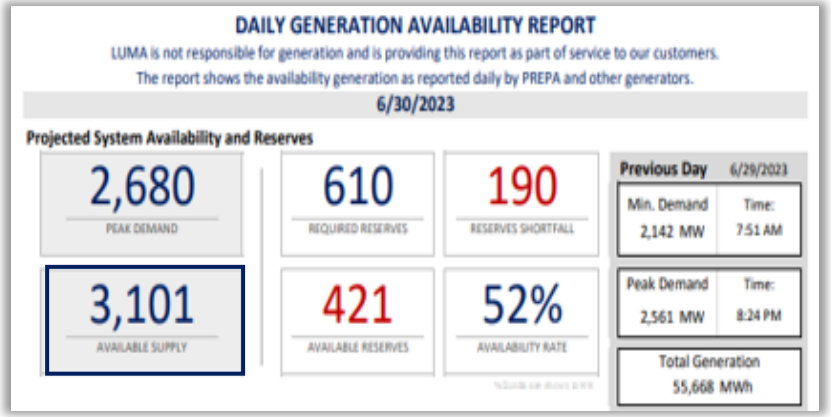
- **Capacity Increase Goals**
- **System Required Reserves**

Short-Term Repairs

PREPA's Generation System as Found on June 30, 2023

GENERATOR	COD	Nameplate Capacity (MW)	Capacity as of June 30, 23	Notes
Aguirre 1	May 1975	450	0	Under maintenance
Aguirre 2	Oct 1975	450	0	Under repair
San Juan 7	May 1965	100	0	Under maintenance
Palo Seco 3	Feb 1970	216	0	Under repair
Costa Sur 5	Sep 1972	410	180	In service with limitations
Costa Sur 6	Sep 1973	410	317	In service with limitations
Palo Seco 4	Jul 1970	216	185	In service with limitations
Ag CC 1&2	July 1977	592	197	In service with limitations
Mayaguez	Apr 2009	220	146	In service with limitations
Cambalache	Apr 1997	165	152	Failures and limitations
Peakers Fleet	(18) 1971 & (3) 2019	396	197	Failures and limitations
San Juan 5	Oct 2008	220	208	Normal operation
San Juan 6	Oct 2008	220	213	Normal operation
San Juan 9	June 1968	100	100	Normal operation
	TOTALS	4,165 MW	1,895 MW	Available Capacity

Generation Summary	MW	%
PREPA Total Installed Capacity	4,165	100%
Available Capacity as of June 30, 2023	**1,895**	**45%**
Private Generators	**1,058**	
Temporary Generation	**130**	
Hydro Gen	**18**	
Total Capacity	**3,101 MW**	


DAILY GENERATION AVAILABILITY REPORT

LUMA is not responsible for generation and is providing this report as part of service to our customers.
The report shows the availability generation as reported daily by PREPA and other generators.

6/30/2023

Projected System Availability and Reserves

2,680 PEAK DEMAND
610 REQUIRED RESERVES
190 RESERVES SHORTFALL
3,101 AVAILABLE SUPPLY
421 AVAILABLE RESERVES
52% AVAILABILITY RATE

Previous Day 6/29/2023
Min. Demand 2,142 MW Time: 7:51 AM
Peak Demand 2,561 MW Time: 8:24 PM
Total Generation 55,668 MWh

Unit in maintenance or repair

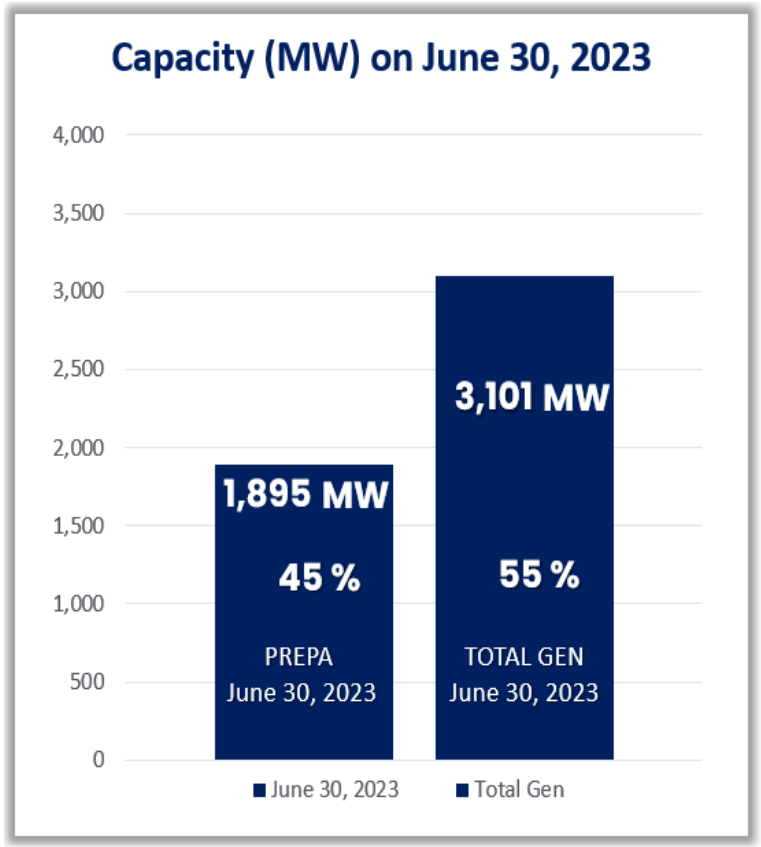
Unit in operation with limited capacity

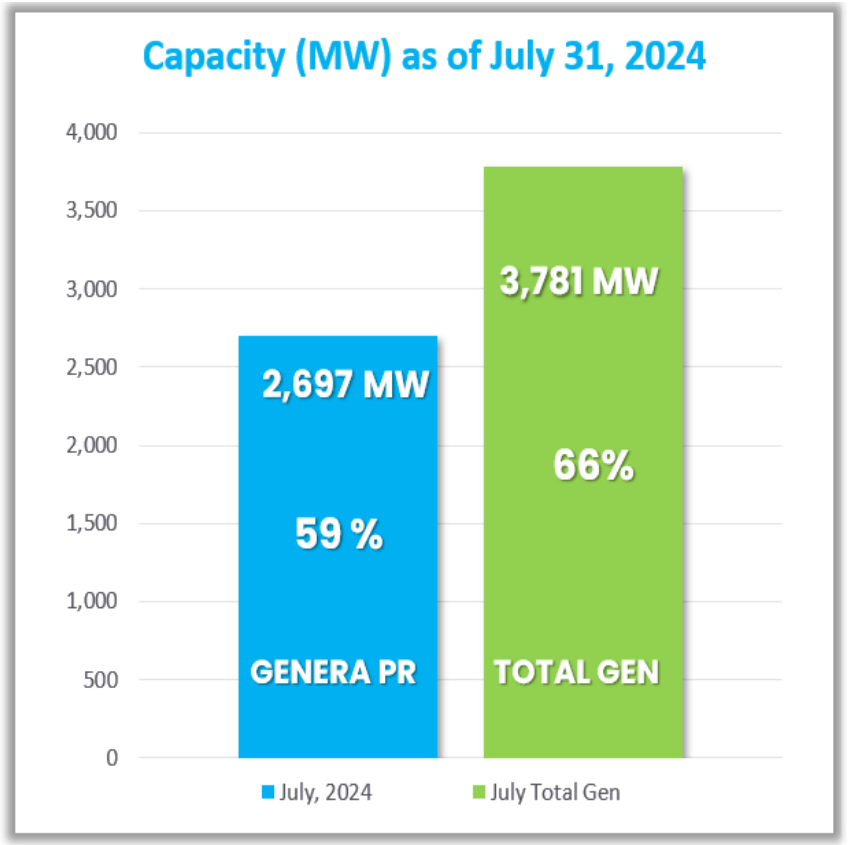
Unit in normal operation

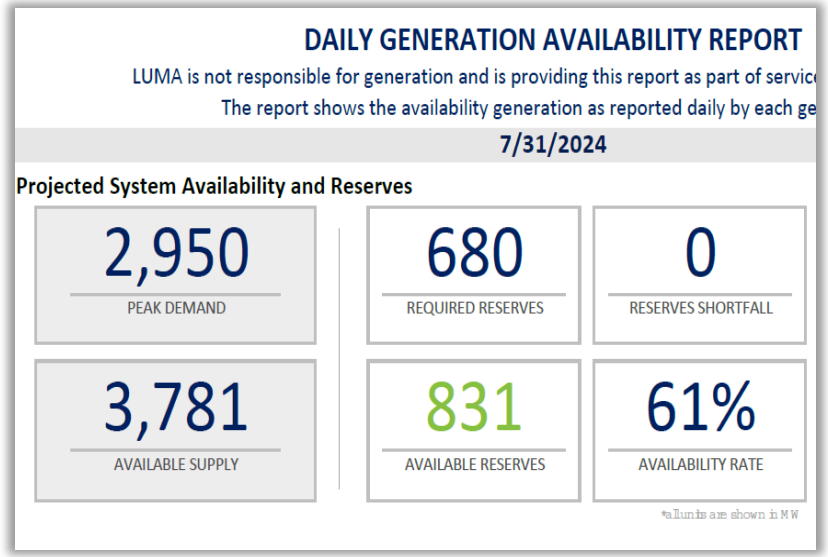
2023 –2024 Phases I of Short-Term Repairs

Phase I- Repairs					
Units Under Repair or Maintenance	Capacity (MW)	Reason Planned or Unplanned	Source of Investment	Expected Completion Date	Status as of Sep 6
San Juan 7	100	FO Gen Rotor Repair	Reserve Account	Q3 2024	In Service June 28
Palo Seco 3	180	Maintenance	NME & FEMA	Q3 2024	In Service June 30
Aguirre 1	60	Limitation	NME	Q3 2024	In Service May 28
TOTAL	**330 MW**				

KEY PERFORMANCE INDICATORS – CAPACITY 2023 VS ACTUAL (2024)







2024 -2025 Phases II & III of Short-Term Repairs

Phase II & III Repairs					
Units Under Repair or Maintenance	Capacity (MW)	Reason Planned or Unplanned	Source of Investment	Expected to be completed	Status as of Sep 6
SJ STG 5	55	FO Repair	Reserve Account	TBD – under assessment	**In Service Sep 3**
SJ STG 6	55	FO Repair	Reserve Account	TBD –under assessment	In Progress
Aguirre CC 2-1, 2-2	96	FO Transformer replacement	Reserve Account	3Q- 2024	In Progress
Mayaguez 3B	25	FO PT repair	Reserve Account	4Q-2024	In Progress
Aguirre 2	75	Air heater replacement Turbine LP seals	Critical Components	3Q-2025	Procurement
Aguirre 1	75	Air heater replacement Hydrogen leakage repair	Critical Components	3Q-2025	Procurement
Palo Seco 4	185	FO Generator Repair	Reserve Account	4Q-2025	In Progress
Phase II-III Sub-total	566				
Aguirre 1*	325	FO - Condensate Pump Repair & FAF	Reserve Account	Sep 11	In Progress
Aguirre 2*	360	FO BFP repair	Reserve Account	October - Nov	Procurement
SJ CTG 6*	155	FO Excitation system repair	Reserve Account	TBD – under assessment	In Progress

*Items listed in columns marked in orange were included after the presentation was submitted on September 9th, 2024.

September – October Short-Term Repairs

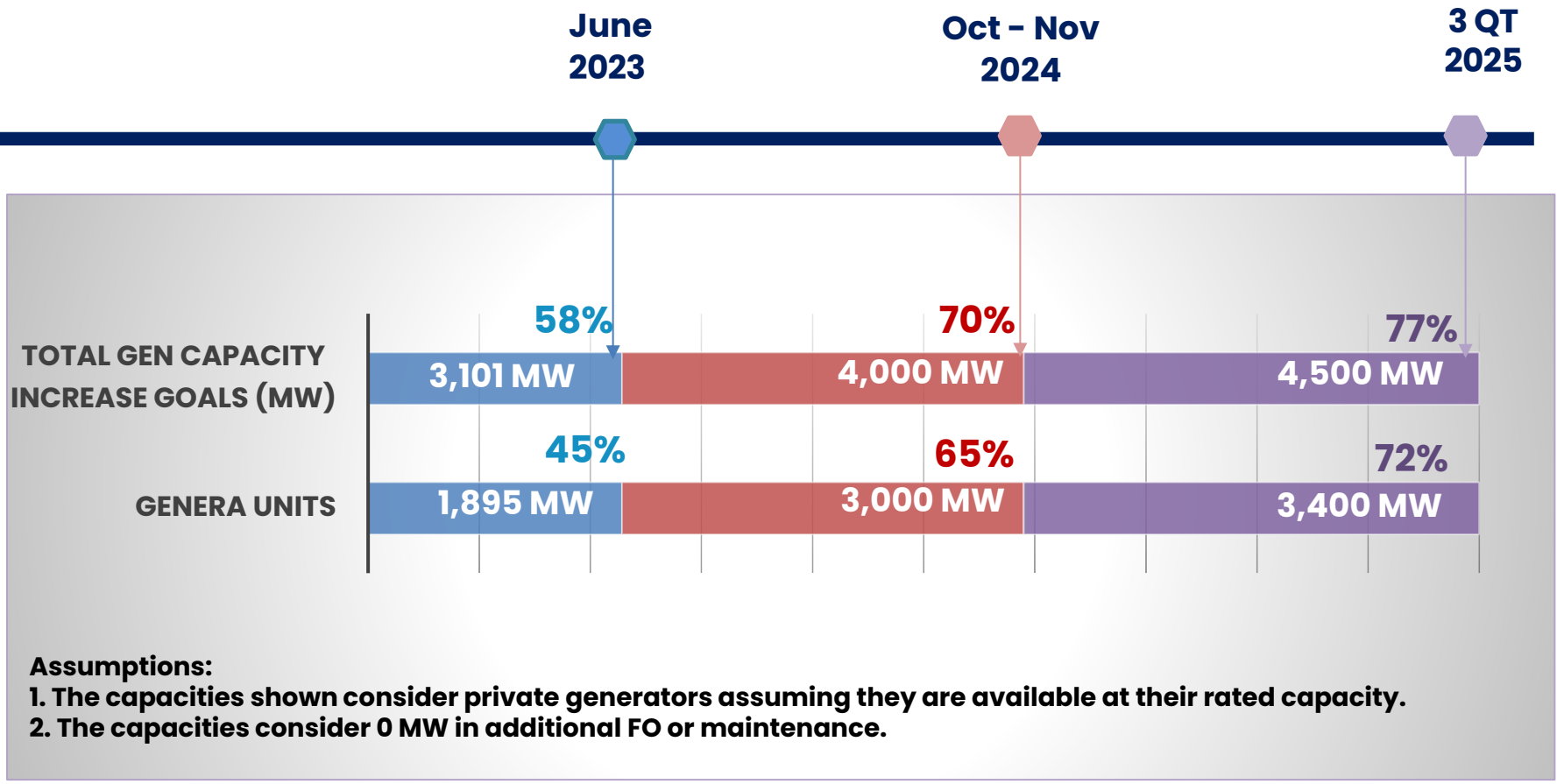
Generator Repair	Expected Capacity	COD	Total Added Capacity
Aguirre 1	325 MW	2nd Week of September	325 MW
Mayaguez 3B	25 MW	2nd Week of October	491 MW
Daguao Peaker	20 MW	3rd Week of October	
Aguirre CC 2-1, 2-2	96 MW	4th Week of October	
Aguirre 2	350 MW	October - November	
			816 MW

Workplan to Increase Capacity

2023 – 2025 Capacity Increase Goals

Strategic Projects

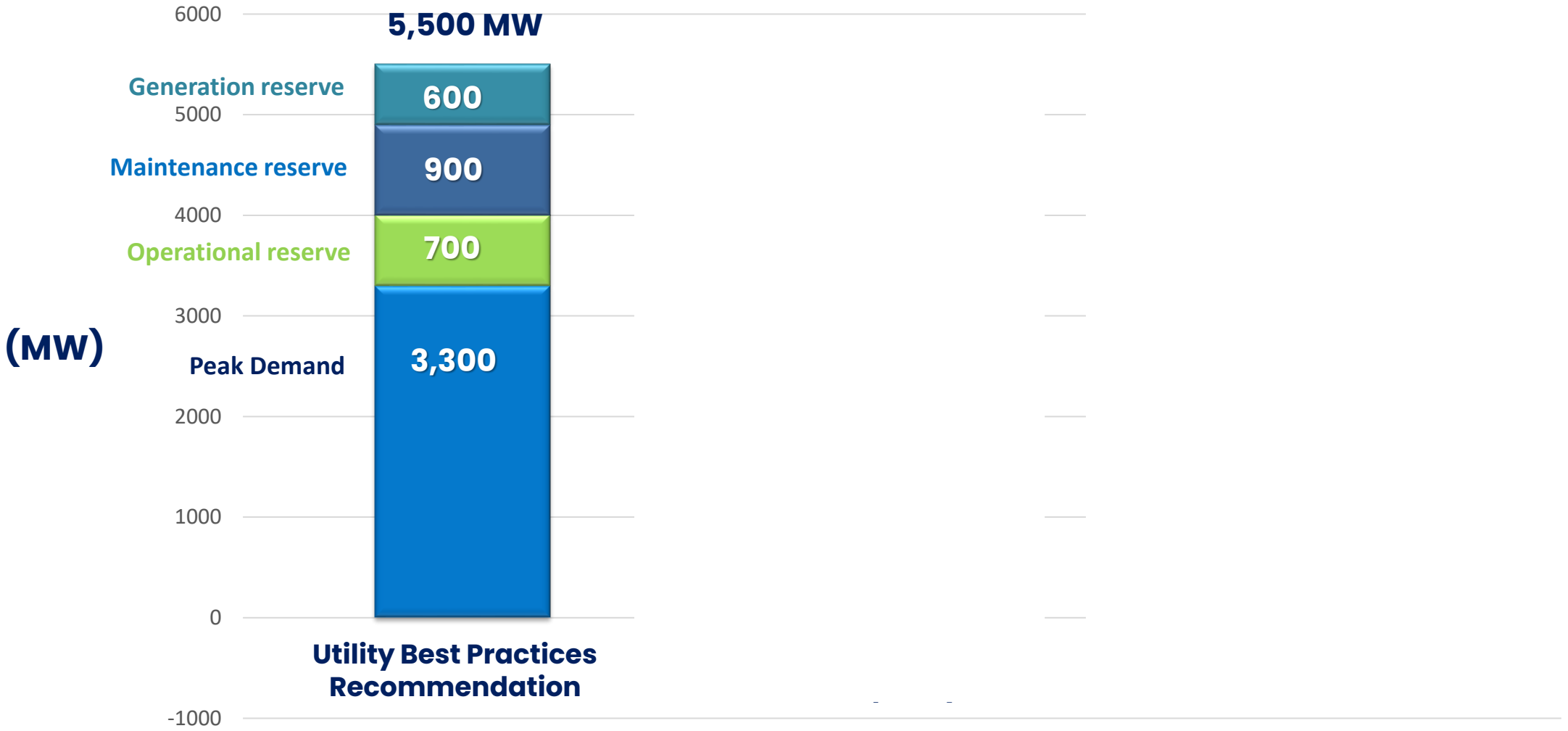
✓ Short-Term Repairs Goals in Phases



Assumptions:
1. The capacities shown consider private generators assuming they are available at their rated capacity.
2. The capacities consider 0 MW in additional FO or maintenance.

Genera's Stabilization 2 Year Plan

2025- 2027 Forecast Capacity Improvements



Work Plan to Improve Reliability

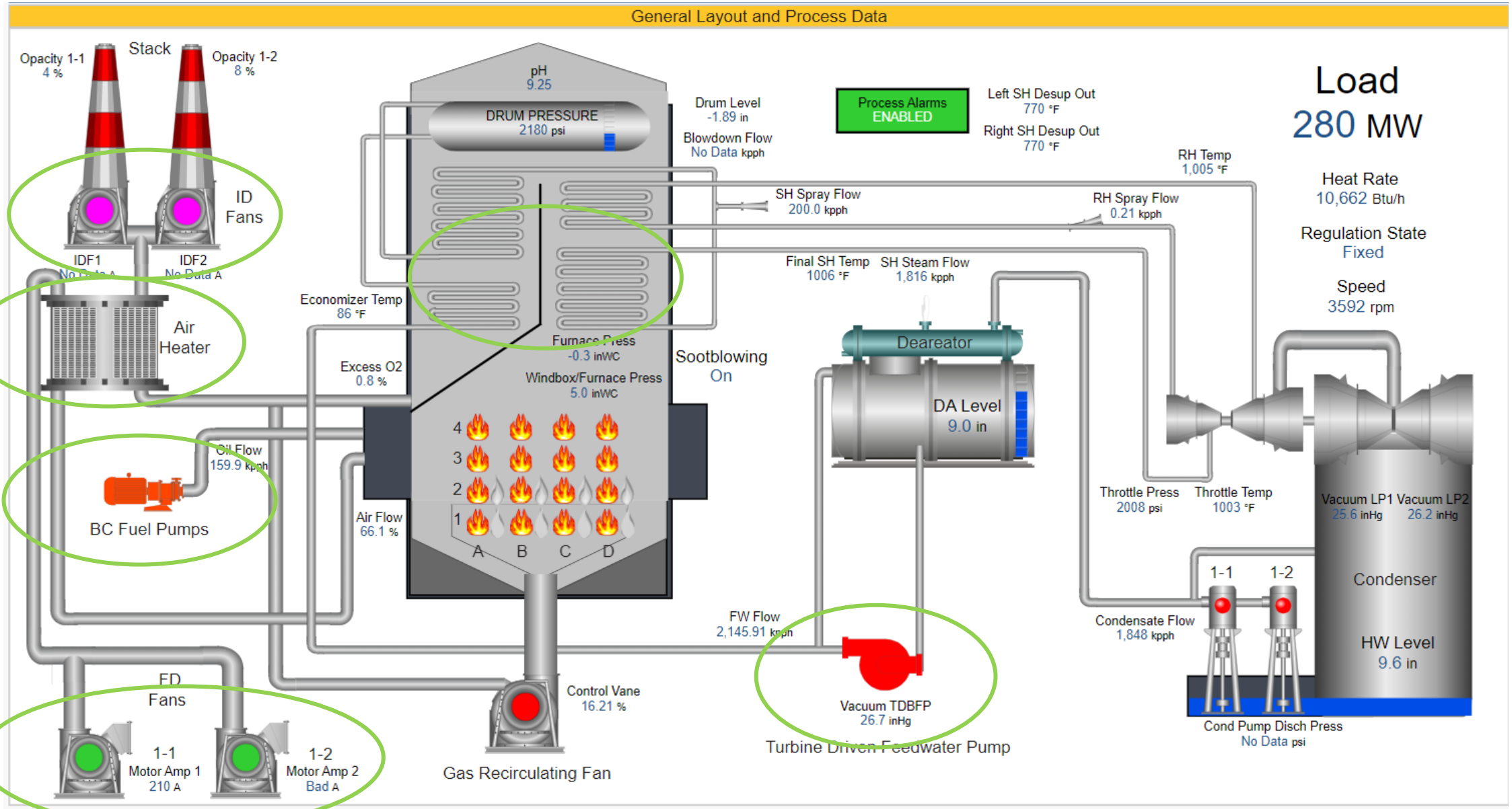
Reliability

GeneraPR

RELIABILITY IMPROVEMENT INITIATIVES

1. Forced Outage Reduction - Critical Components
2. Frequency Regulation Optimization
3. BESS –Adding spinning reserve and other ancillary services
4. Peaker – Black Start, Emergency Gen and Renewables Support

Forced Outage Reduction – Critical Components



1

Forced Outage Reduction – Critical Components

Goal – reduce Forced Outages in 50%

2024 — 88% Procurement

2025

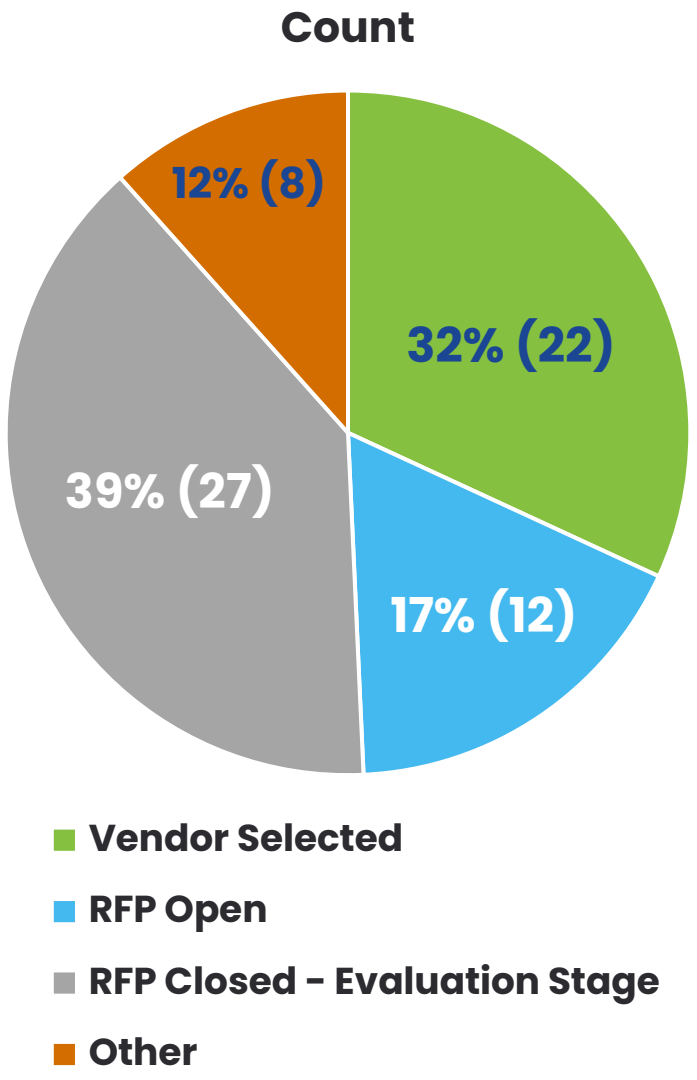
2026 — Component Replacement

Condenser Circulating Water Pumps Motors

Boiler Air Heaters

CRITICAL COMPONENTS STATUS

September 2024



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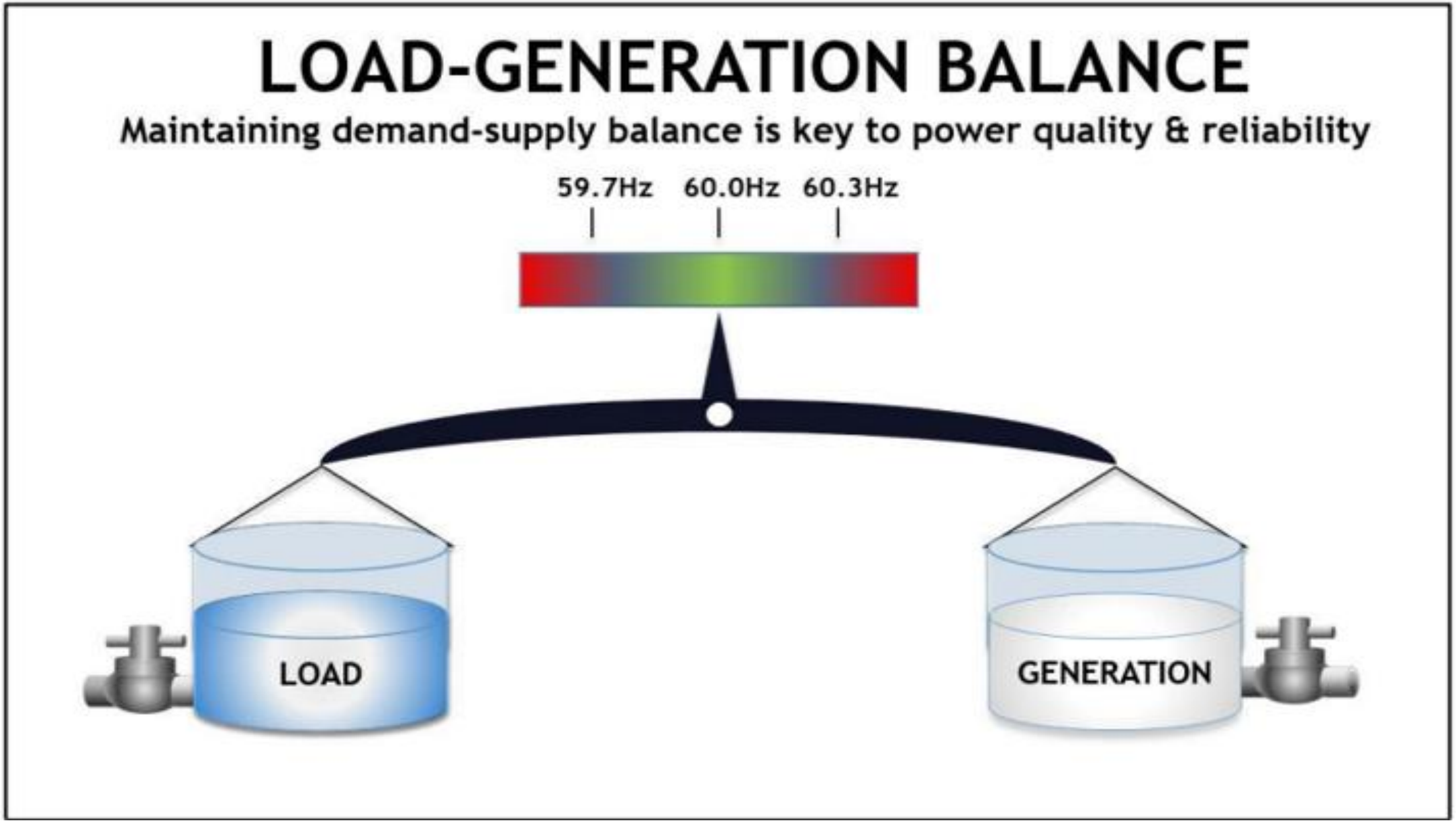
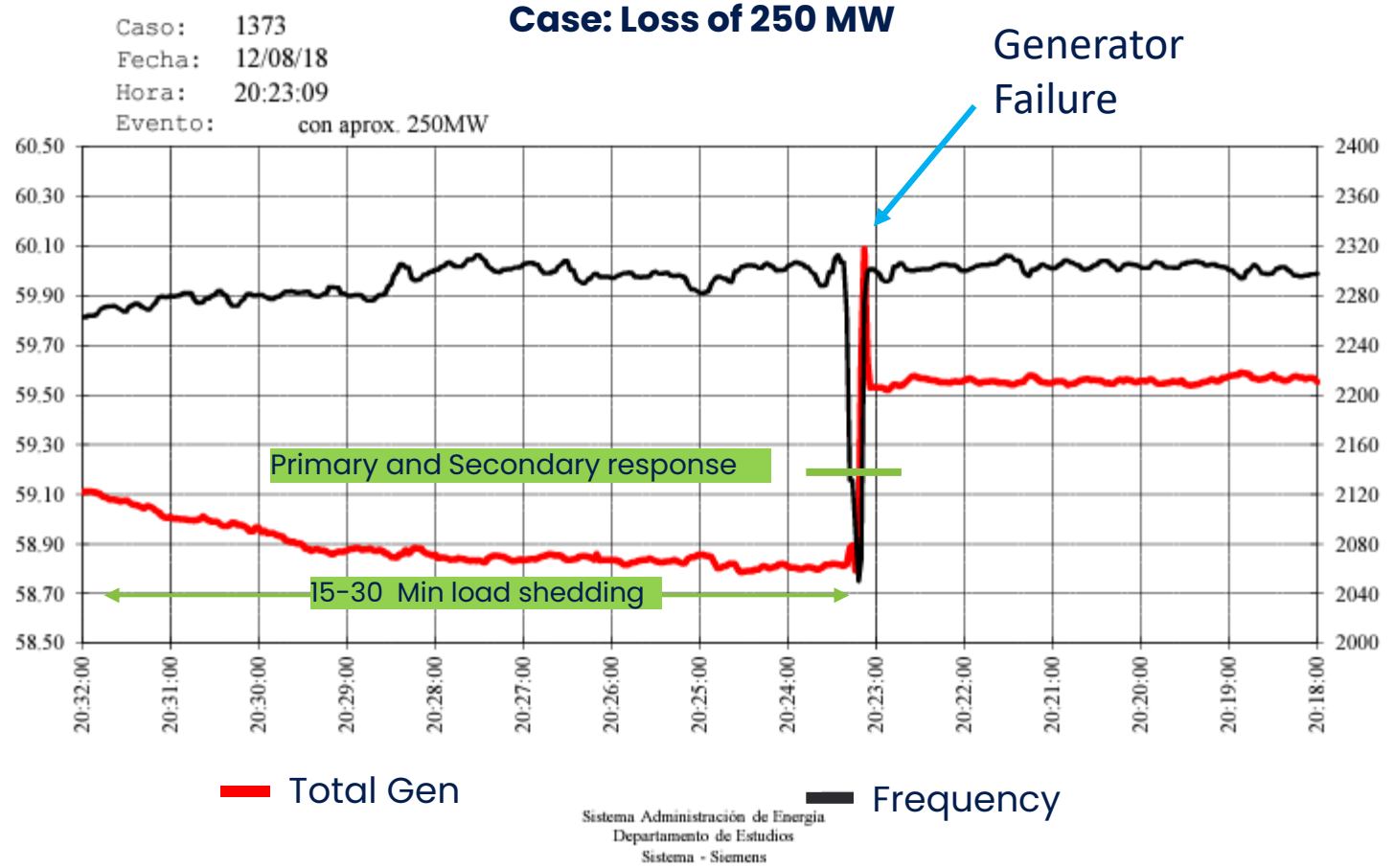
Frequency Regulation Optimization



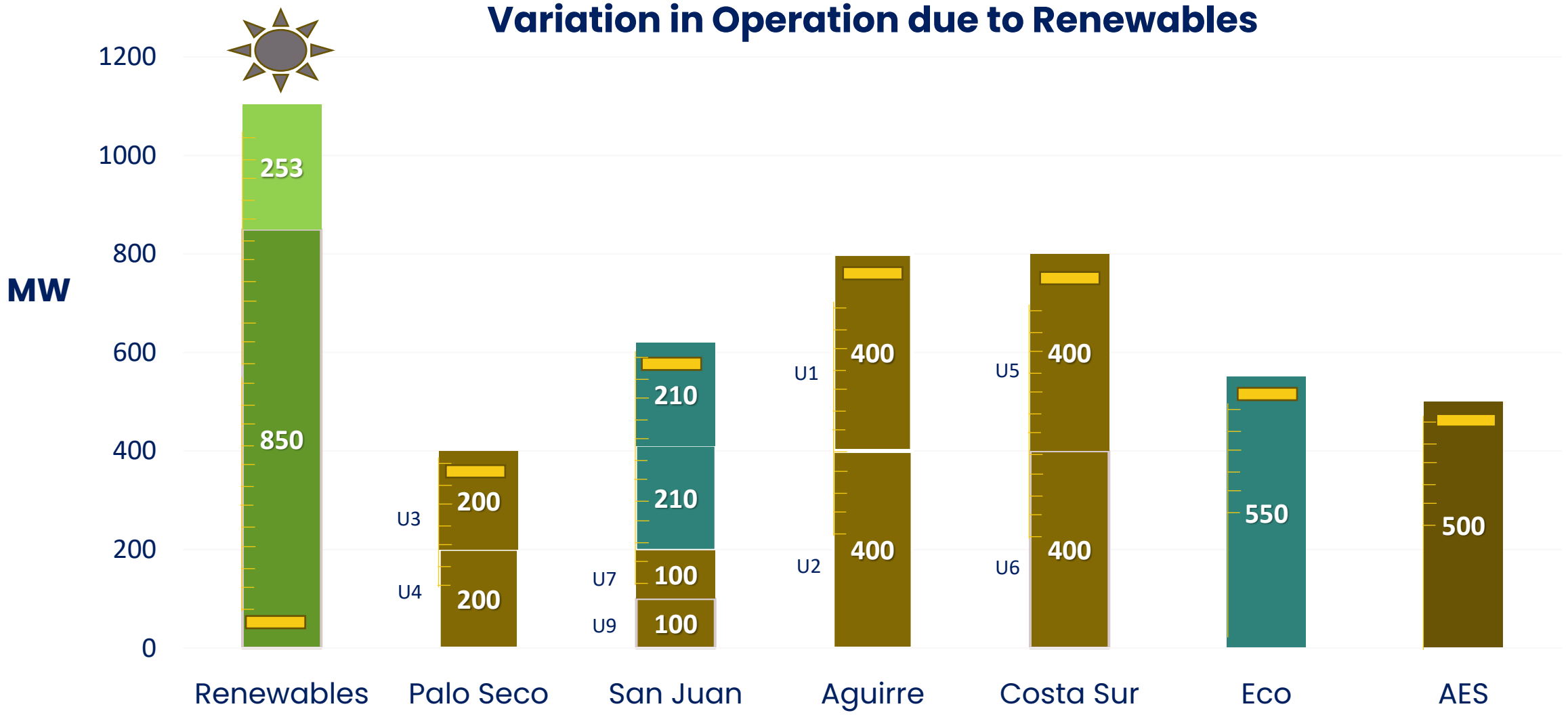
2 Frequency Regulation Optimization

Total Generation and Frequency

Case: Loss of 250 MW



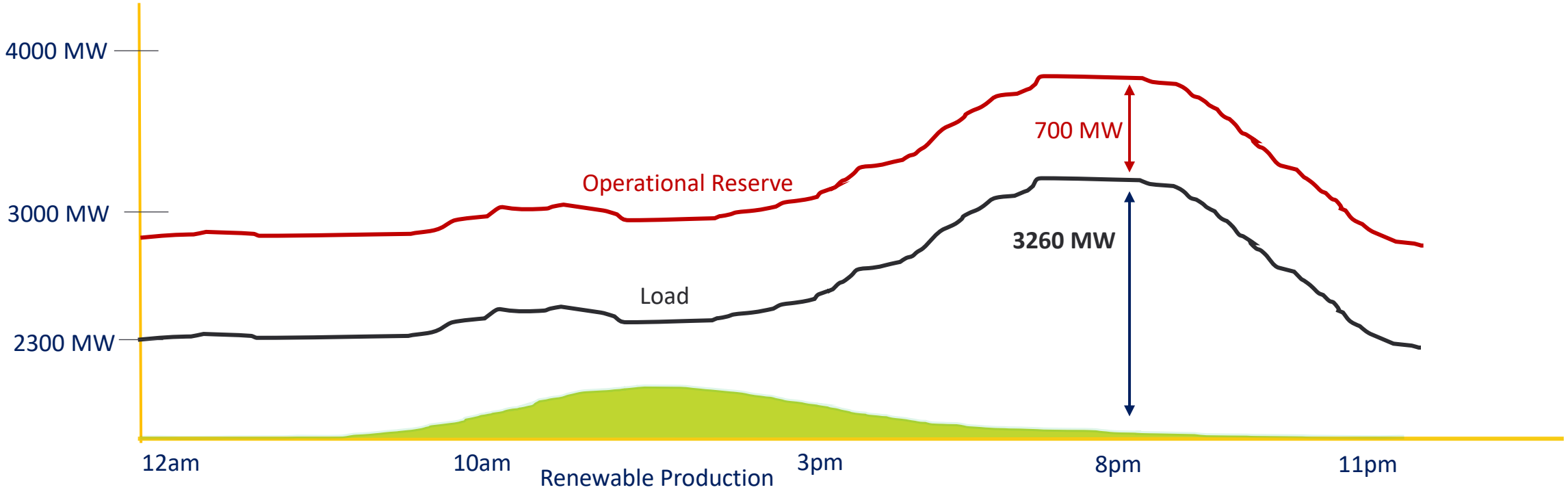
2 Frequency Regulation Optimization



Base load power plants generation capacities

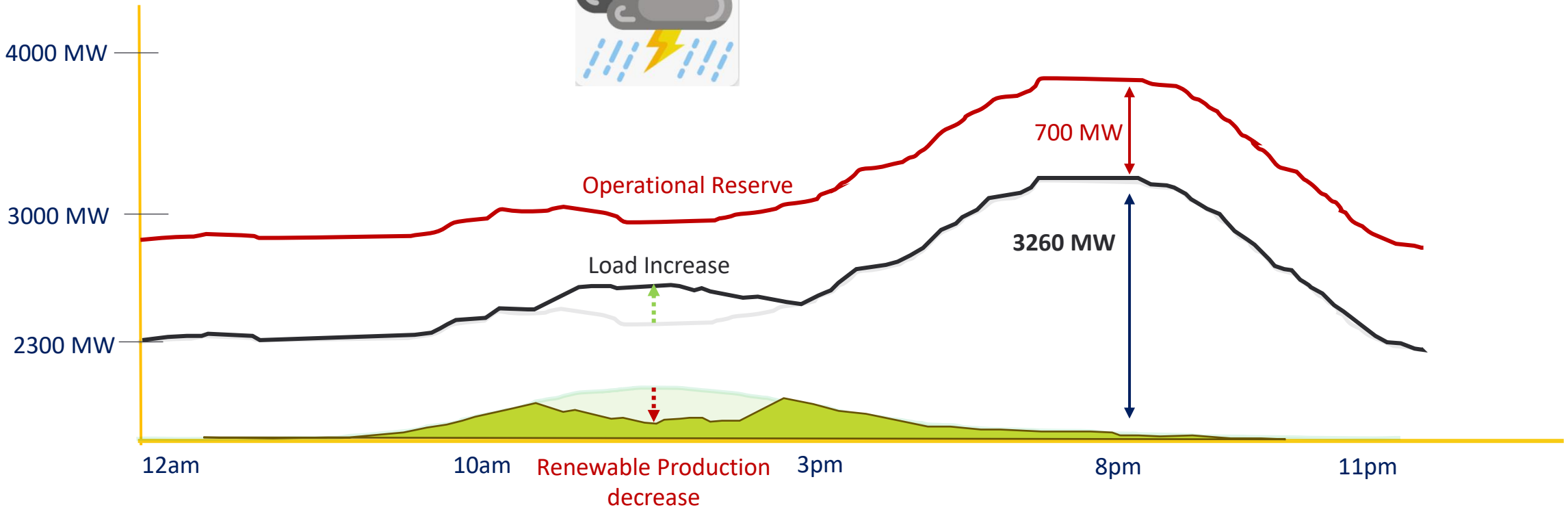
Frequency Regulation Optimization

Variability in solar power production due to weather



2 Frequency Regulation Optimization

Cloudy Day Event



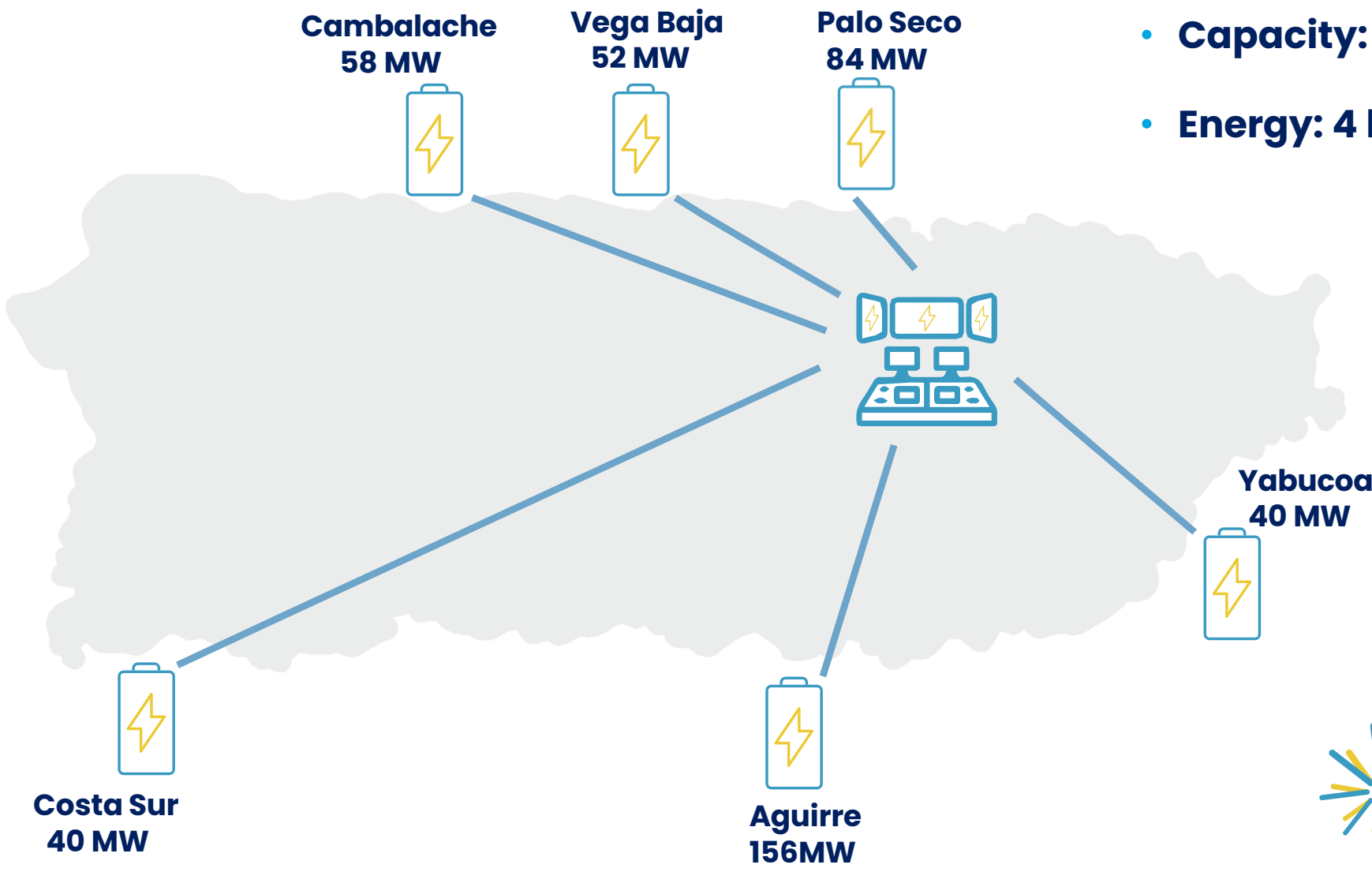
2 Frequency Regulation Optimization – Progress

Generator	Frequency Regulation in Operation As of June 30, 2023		Frequency Regulation in Operation As of July 2024	
Costa Sur 5	N		Y	30
Costa Sur 6	N		Y	30
Aguirre 1	N		Commissioning	
Aguirre 2	N		Y	80
San Juan 5	N		Commissioning	
San Juan 6	N		Commissioning	
San Juan 7	N		Under assessment	
San Juan 9	N		Y	10
Palo Seco 3	N		Y	20
Palo Seco 4	N		Under assessment	
Total		0 MW		170 MW

3

BESS –Add spinning reserve and other ancillary services

Proposed Locations and Capacity



- **Capacity: 430 MW**
- **Energy: 4 hours = 1,720 MWh**

GeneraPR

3

BESS –Add spinning reserve and other ancillary services

Criteria

- Brownfield construction (no new TL, right of ways or substation required)
- Maximize the available footprint
- Use existing POI MPT
- Reduced interconnection costs
- System requirements
- Optimize the available injection power capacity without violating thermal, voltage, or stability limits

BESS –Add spinning reserve and other ancillary services

Operation Modes

	Ancillary Services	Description
1	Fast Spinning Reserve	Instantaneous primary response
2	Frequency Regulation	Inject or absorbs power to follow a regulation signal
3	Load Balance	Uses storage to meet peak- load
4	Energy storage	Energy Storage during lest cost of energy production hours
5	Voltage Support	Inserts or absorbs reactive power to maintain voltage within required ranges on distribution or transmission system
6	Black Start	Helps to restore system after a blackout

3 BESS –Add spinning reserve and other ancillary services

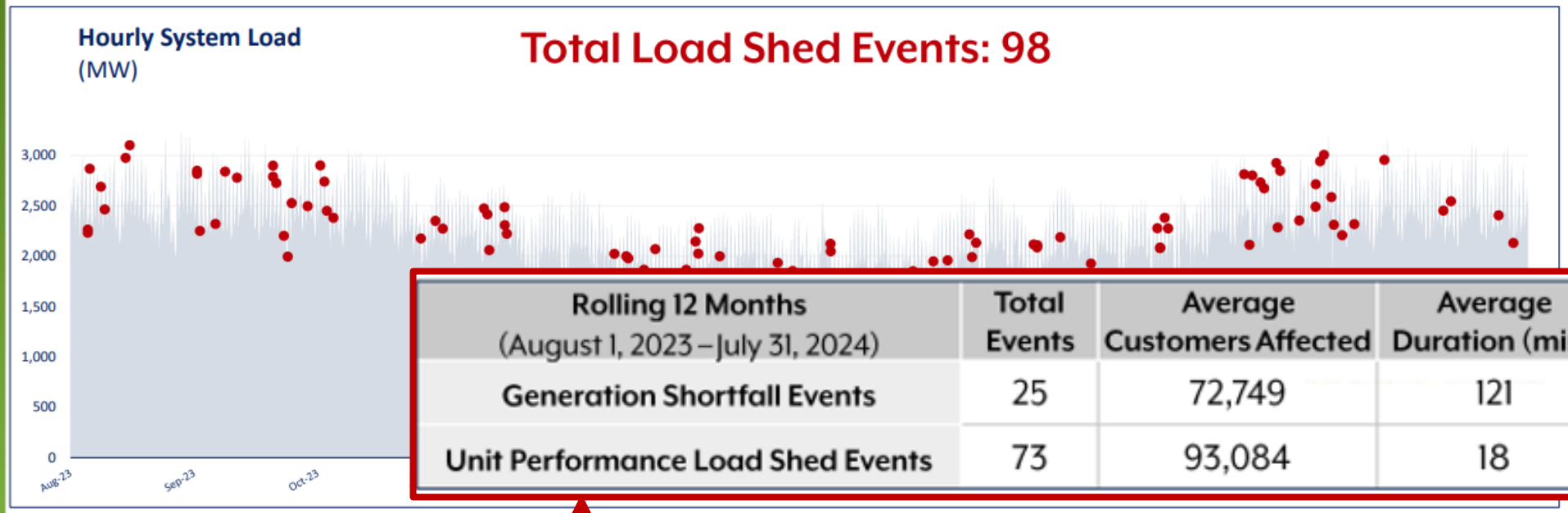
Benefits	How we are going to do it
1 Reduce Automatic load shedding by **90%**	Adding **Fast Spinning Reserve**
2 Reduce Manual load shedding by **90%**	Adding **dispatchable capacity** of 430 MW for 4 hours
3 Reduce Forced Outages	Adding **Frequency Regulation** (“shock absorb”)
4 Potential savings of over **$100 million**	Reduce generation production costs

Summary of Generation System

Load Shed Events

Load shed events can occur due to unexpected generation unit losses (Unit Performance Load Shed Events). Also, when the demand for electricity exceeds available supply levels, LUMA, as the system operator and in compliance with its responsibilities under the T&D OMA, implements load shedding to stabilize the electric system and prevent larger and longer outages (Generation Shortfall Events).

LUMA does not generate energy and can only operate the system with the electricity that is provided by GeneraPR, PREPA, and other island generators.



Rolling 12 Months (August 1, 2023 – July 31, 2024)	Total Events	Average Customers Affected	Average Duration (min)
Generation Shortfall Events	25	72,749	121
Unit Performance Load Shed Events	73	93,084	18

MTD (July 1, 2024 - July 31, 2024)	Total Events	Average Customers Affected	Average Duration (min)
Generation Shortfall Events	0	0	0
Unit Performance Load Shed Events	4	94,158	14

Rolling 12 Months (August 1, 2023 – July 31, 2024)	Total Events	Average Customers Affected	Average Duration (min)
Generation Shortfall Events	25	72,749	121
Unit Performance Load Shed Events	73	93,084	18

*Refer to Glossary of Terms on page 22 for a list of definitions and formulas.

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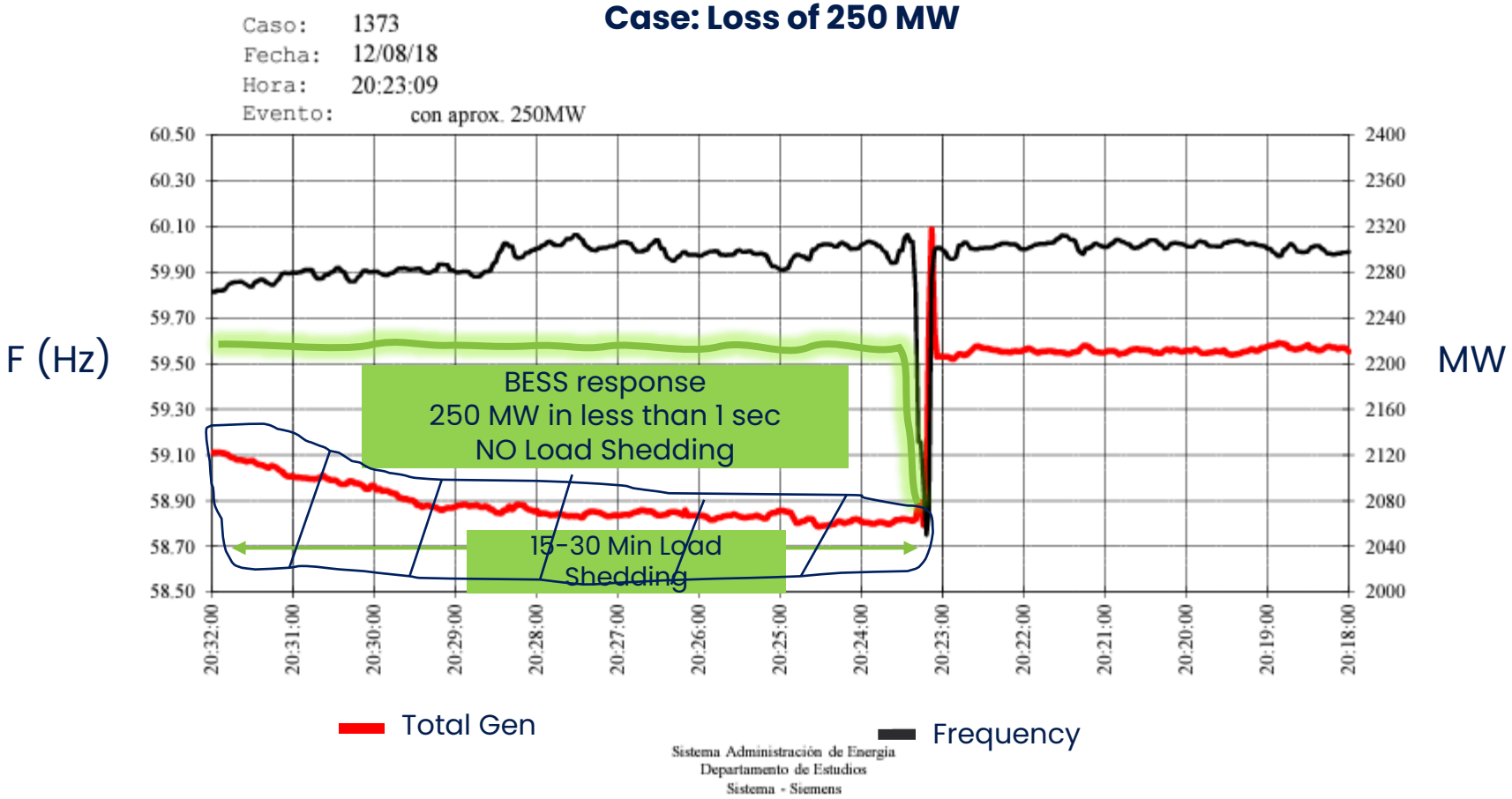
* Source: LUMA Monthly Generation Performance Report, July 2024. Available at https://lumapr.com/wp-content/uploads/2024/08/July-2024-Monthly-Generation-Performance-Report.pdf

3

BESS –Add spinning reserve and other ancillary services

Total Generation and Frequency

Case: Loss of 250 MW

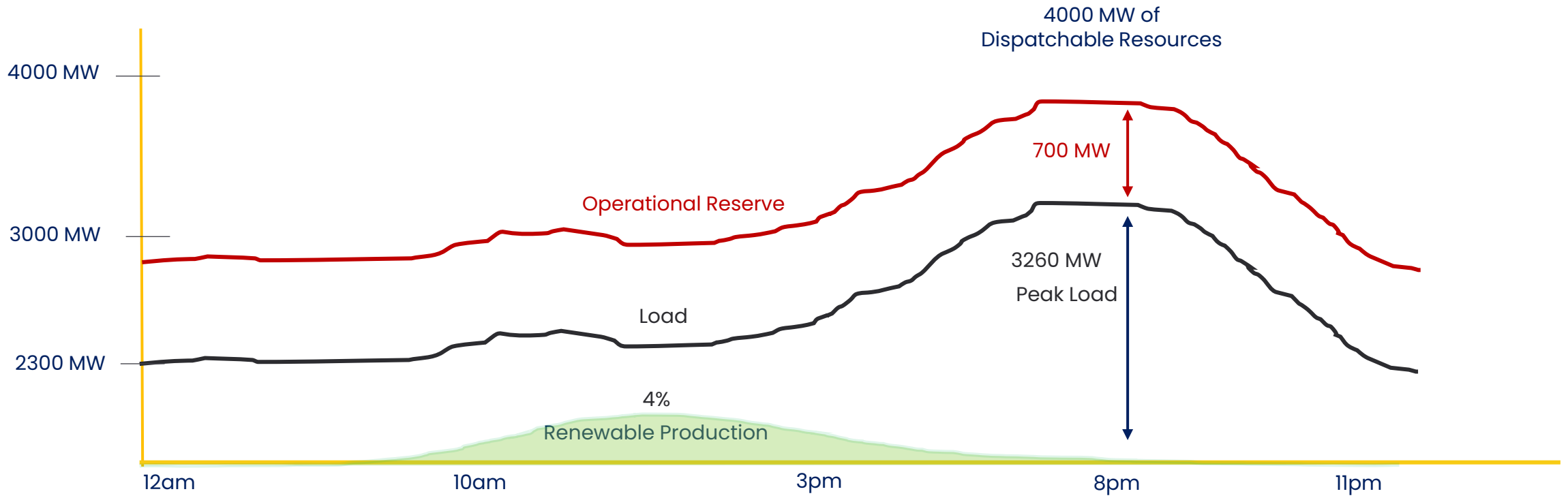


3

BESS –Add spinning reserve and other ancillary services

BESS Load Balance: Charge-Discharge Operation

Peak Demand 2023



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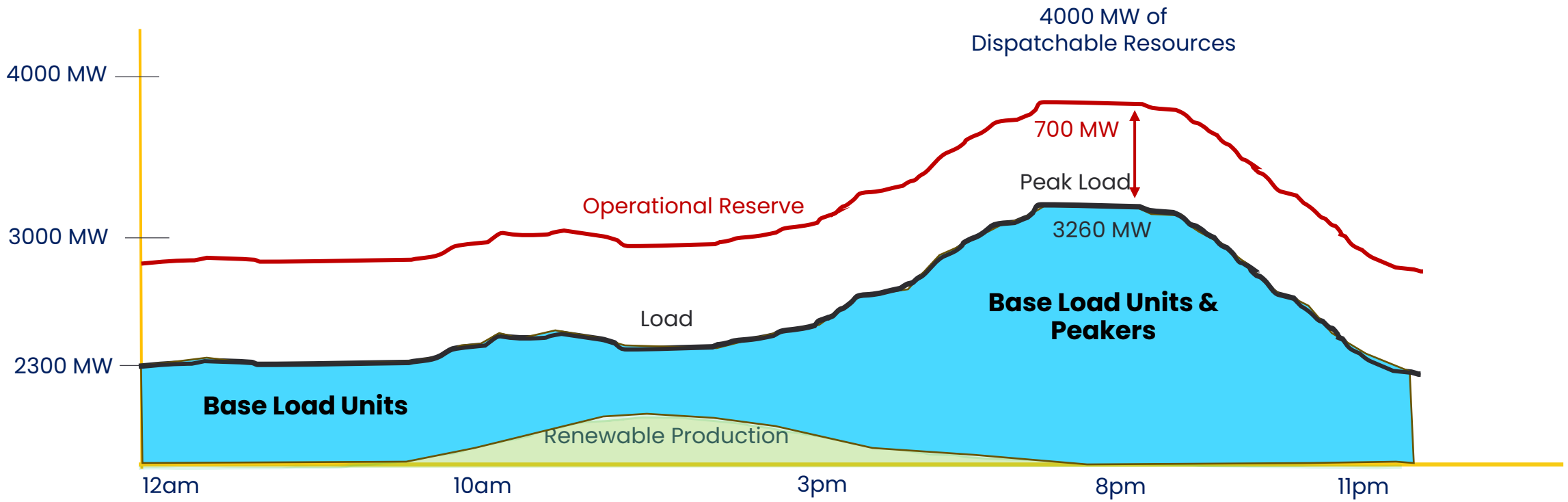
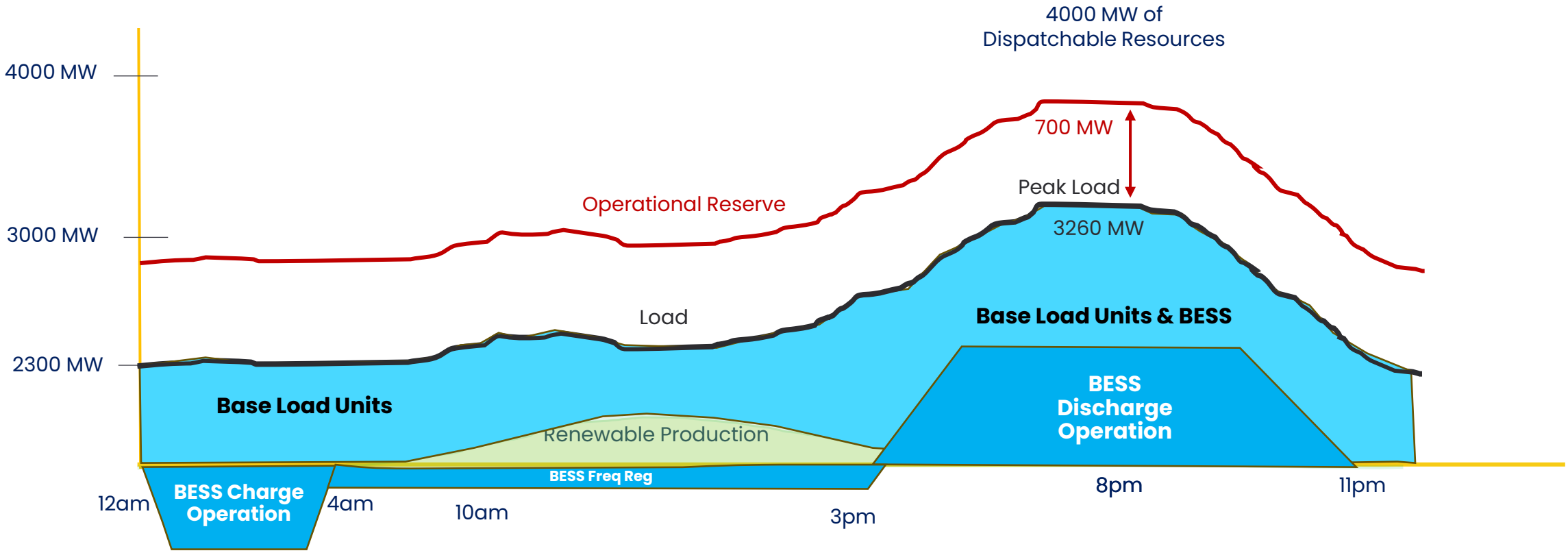
BESS –Add spinning reserve and other ancillary services

BESS Load Balance: Charge-Discharge Operation



3 BESS –Add spinning reserve and other ancillary services

BESS Load Balance: Charge-Discharge Operation



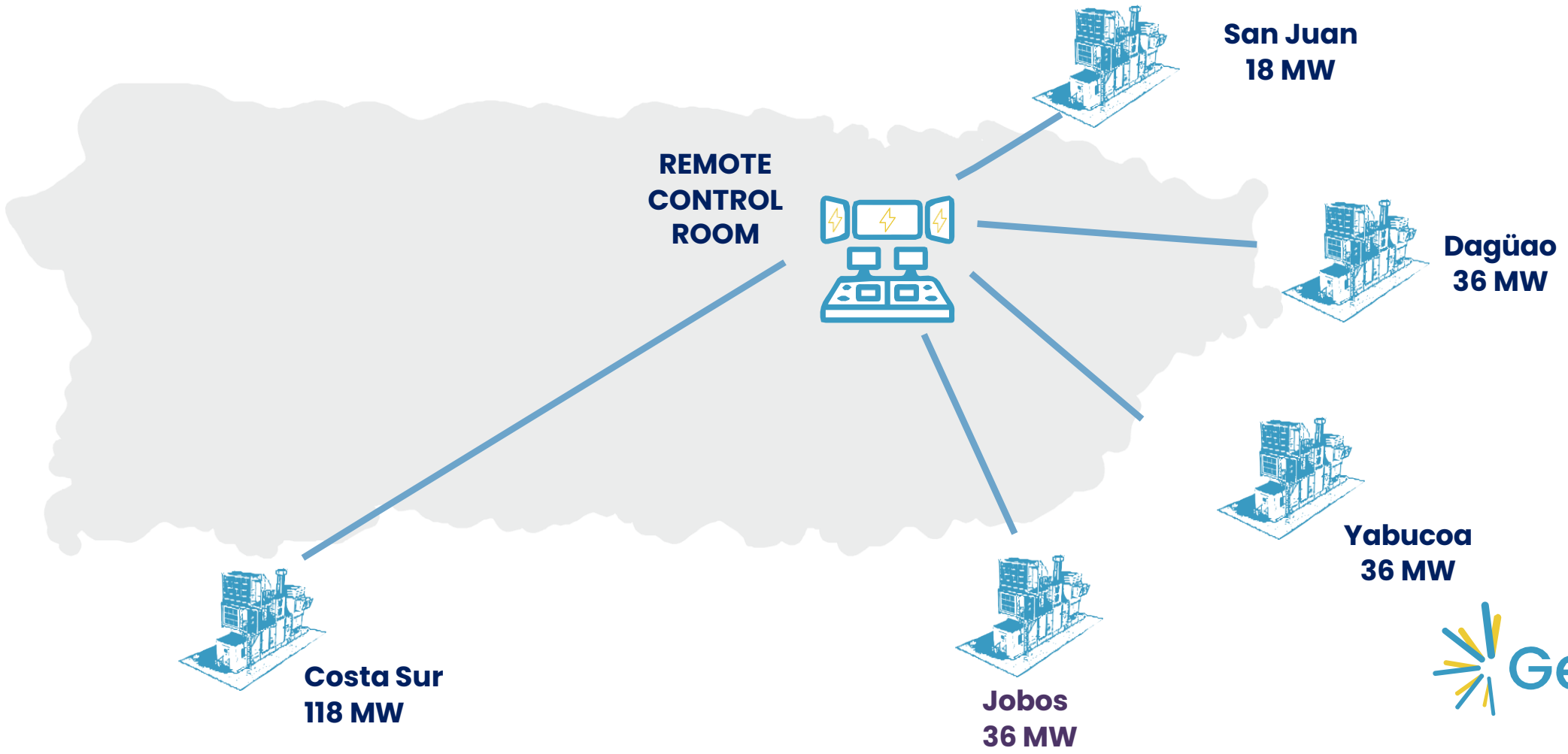
BESS Charge from most economical generation units

Peaker fleet will remain offline

Peaker – Black Start, Emergency Gen and Renewables Support

Proposed Locations and Capacity

PEAKER PROJECT
244 MW



GeneraPR

4 Peaker – Black Start, Emergency Gen and Renewables Support

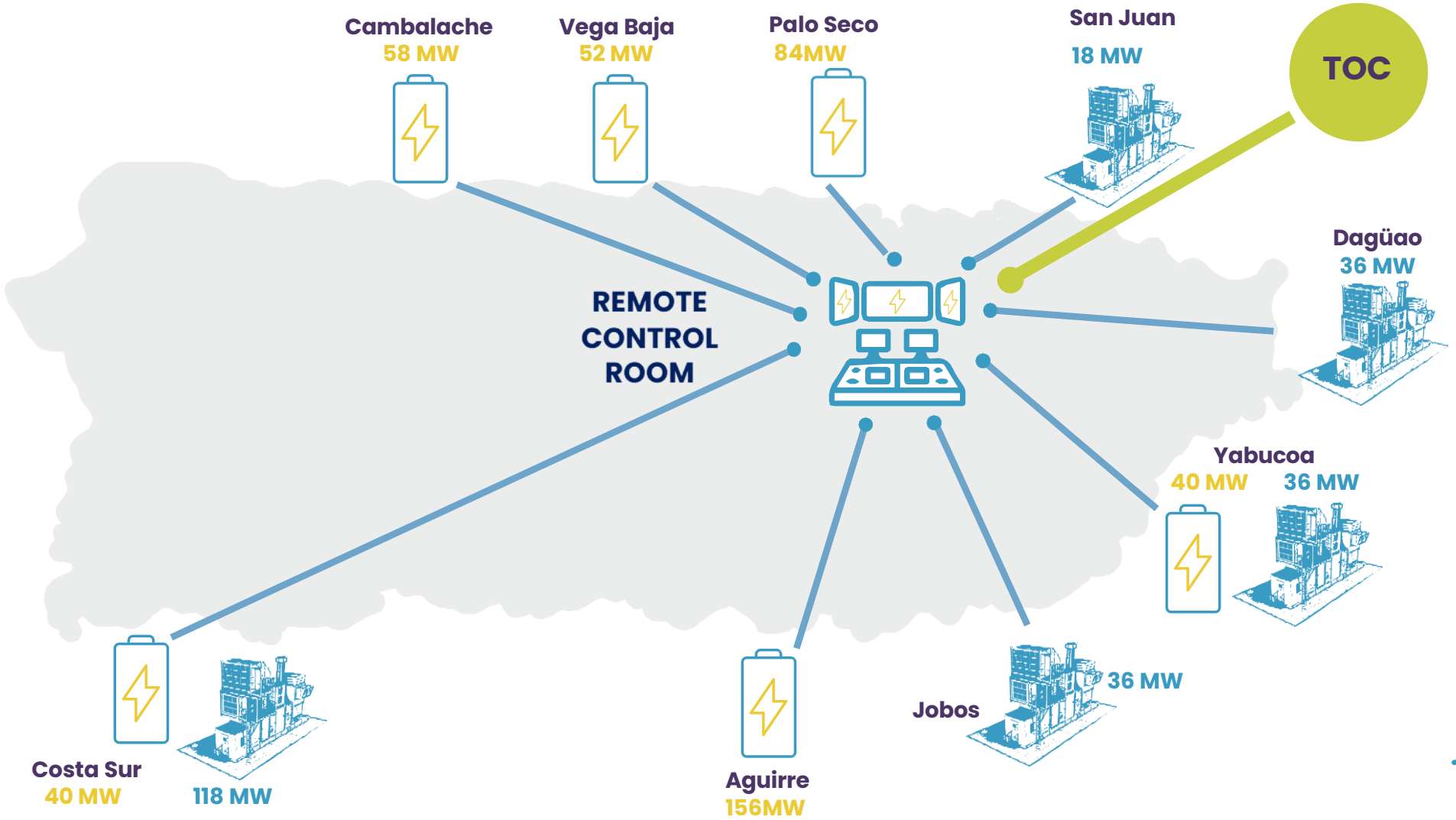
Current Peaker Fleet Description	
COD	1970
Capacity	21 MW/ea
Type of Use	Emergency / Black Start
Fuel	Diesel
Heat Rate	15,500 Btu/Kwh (22%)
Capacity Installed	396 MW
Capacity Available	191 MW

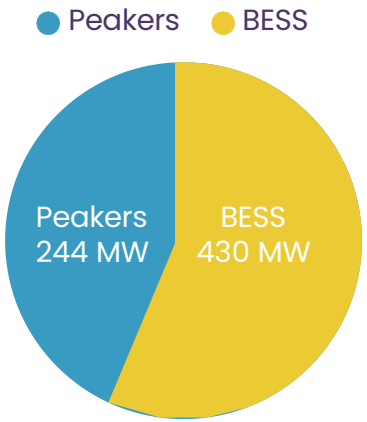
New Peaker Fleet Description	
High efficiency range	8100 – 9400 Btu/Kwhr (36 - 42%)
Capacity range	18 – 60 MW
Fuels	LNG, Diesel, Hydrogen
Remotely controlled	Yes
Type of use	Emergency / Black start
Ancillary Services	
Synch Condenser	Frequency Regulation
Voltage Control	Short Circuit Capabilities

4 Peaker – Black Start, Emergency Gen and Renewables Support

BENEFITS	DESCRIPTION
Ancillary services	• Off-line spinning reserve • Peak Shaving • Black Start Capabilities
Flexible Generation	• Fuel Flexibility: LNG, Diesel, Hydrogen • Rapid Start-Up and Shut-Down
High Efficiency	• Ranges between 36 and 42% in simple cycle • 65% in a combine cycle
Reduce generation production costs	• Savings

Proposed Locations and Capacity

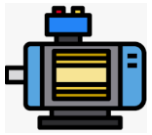




GeneraPR

Work Plan to Improve Reliability

Reliability Improve Plan Summary



Critical Components Replacement

- Reduce Forced Outages in 50%

Frequency Regulation Optimization

- Improve primary response to reduce load shedding
- Improve system stability
- Improve Power Quality

BESS – Battery Energy Storage System

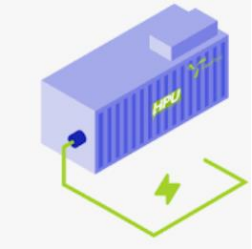
- Reduce 90% of load shedding
- Improve fast spinning reserve
- Improve frequency regulation
- Peak Shaving support
- Improve voltage regulation

Peaker

- Improve black start capabilities
- Increase spinning reserve
- Flexible generation

Additional Capacity to Supplement the Electric System

III Supplemental Capacity



Recommended Project: Supplemental Generation

- Add **565 MW** of temporary perfect generation on existing location

III Supplemental Capacity

Table 3-2: Calculated Resource Adequacy Risk Measures – All Sensitivity Cases

Scenario		Loss of Load Expectation (LOLE), Days / Year	Loss of Load Hours (LOLH), Hours / Year
Current System (Expected Case)		37.5	194.5
Current System +	New Emergency Generation (150 MW)	18.5	86.5
	New Emergency Generation (350 MW)	7.0	29.4
	New Emergency Generation (700 MW)	2.0	8.5
	Retirement of AES Coal	160.8	1,193.6
	Retirement of AES Coal + Tranche 1 (845 MW Solar PV + 220 MW 4-hr BESS)	90.7	542.6
	905 MW of 'Perfect Capacity'	0.1	0.3
	[illegible]	[illegible]	[illegible]
	220 MW of Standalone BESS (4-hr)	15.4	87.8
	845 MW Solar PV + 220 MW Solar-Paired BESS (4-hr) (Tranche 1 Projects)	14.5	65.1
	330 MW Flexible Combined Cycle	7.3	26.5
	221 MW (11 CTs x 21) Flexible Combustion Turbine	12.1	53.3
	250 MW Additional Distributed Solar PV	36.7	178.4
	25 MW Demand Response (8 Hour)	33.4	172.1
Load Sensitivity (Lower FY2024 Load Forecast)		26.3	119.2
Addition of Electric Vehicle Charging Load (6,000 new EVs)		38.2	198.0
Industry Benchmark Target		0.1	—

- **System Composition**: The system comprises multiple generators (i.e., thermal, renewable, hydro).
- **December 11, 2023**: LUMA presented the Resource Adequacy Report.
  - Scenario of 905MWof "Perfect Capacity" (a generator that can operate 100% of the time).
- **March 15, 2024**: PREPA purchased 340MW (total) TM2500.
  - 340MW available until December 31, 2025.
  - The TM2500 units are operated and maintained by Genera.
- **Capacity Requirement**: The system must be supplemented with 565MW of Perfect Capacity to achieve a 0.1 LOLE.
- **System Stability**: A stable system would provide additional reserves to perform timely routine maintenance and preventive maintenance projects.

* Source: LUMA Puerto Rico Electrical System Resource Adequacy Analysis Report, December 11, 2023. Available at Microsoft Word - Final_FY2024 LUMA Resource Adequacy Report_Aug2023_CleanCopy internal DLA comments 11.13.23 (002) (pr.gov)

III Supplemental Capacity

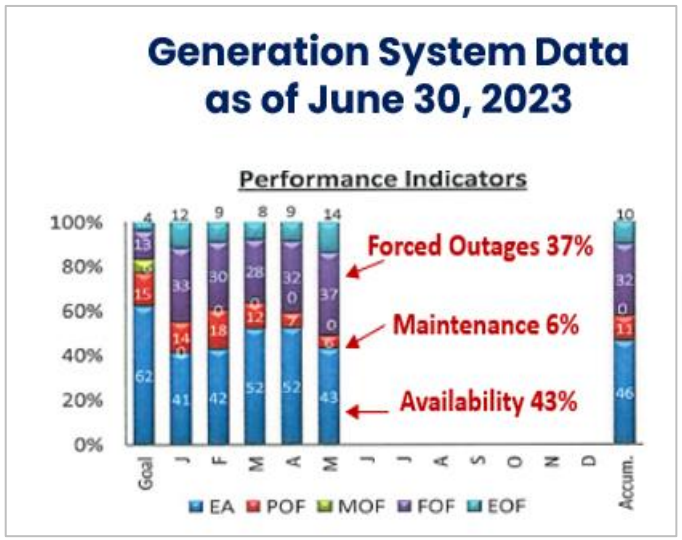
- **Genera's Suggestion**: PREB should initiate a procurement process to lease additional temporary generation.
- **Project Scope**: This project is for the Electric System, not for Genera.
- **Process Similarity**: The process could be modeled after FEMA/USACE missions.
- **Funding Advocacy**: A multisector group should be formed to advocate for funds to cover the lease expense.
- **Funding Opportunity**: An example is the language included in the Energy and Water Development and Related Agencies Appropriations Bill, 2025, currently pending before Congress.

Puerto Rico Power Generation Assets.—The Committee acknowledges that Puerto Rico has faced various natural disasters and economic challenges that have resulted in disruptions in services, such as a reliable and continuous power supply. It is imperative to provide Puerto Rico with power solutions that can be installed and maintained quickly while the necessary repairs and maintenance are carried out on publicly owned power plants and, in parallel, new clean power resources are procured. The Department shall provide to the Committee not later than 60 days after enactment of this Act a report detailing dispatchable generation assets that can be installed on the island and commissioned to inject power into the grid within 60 days or less and be sustained for a minimum of two years. The report shall also include potential funding strategies to secure the energy grid, as well as how the assets can be permitted to operate on an expedited basis without any permitting or dispatch capacity restrictions if required.

* Complete proposed bill is available at H.R.8997 - 118th Congress (2023-2024): Energy and Water Development and Related Agencies Appropriations Act, 2025 | Congress.gov | Library of Congress

PERFORMANCE GOALS

Capacity & Reliability



Baseline Metrics

Genera's Short-Term Goals

- 72% Genera's Capacity by Dec 2025
- 16% Forced Outage by Dec 2025
- 15% Planned Maintenance
- BESS 56 MW — Fast Spinning Reserve by Dec 2025
- 100% All Power Plants with Freq Regulation Capabilities by July 2025
- 90% Load Shedding Reduction by 2026

GeneraPR

APPENDIX

KEY TERMS

TERM	DEFINITION
AG	Aguirre Power Plant
BOP	Balance of Plant
CMB	Cambalache Power Plant
CS	Costa Sur Power Plant
DG	Daguao Power Plant
JB	Jobos Power Plant
PS	Palo Seco Power Plant
SJ	San Juan Power Plant
VB	Vega Baja Power Plant
YB	Yabucoa Power Plant

TERM	DEFINITION
BESS	Battery energy storage system
CC	Combined Cycle
CCGT P3	Combined Cycle Gas Turbine Public-Private Partnership
LGA	Legacy Generation Assets
LGA OMA	Puerto Rico Thermal Generation Facilities Operation and Maintenance Agreement
LNG	Liquefied Natural Gas
LOLE	Loss of Load Expectation
MW	Megawatt
NME	Necessary Maintenance Expense
O&M Services	Operation and Maintenance Services
OEM	Original Equipment Manufacturers
POI	Points of Interconnection
POU	Publicly Owned Power Utility
T&D OMA	Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement
T&D System	Transmission and distribution system and related facilities
T&D System Operator	LUMA
ULSD	Ultra-low Sulfur Diesel

Pre-SCD Status

DAILY GENERATION AVAILABILITY REPORT

LUMA is not responsible for generation and is providing this report as part of service to our customers.
The report shows the availability generation as reported daily by PREPA and other generators.

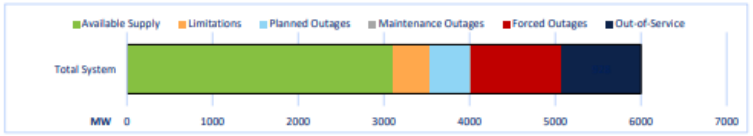
6/30/2023

Projected System Availability and Reserves

2,680 PEAK DEMAND	610 REQUIRED RESERVES	190 RESERVES SHORTFALL
3,101 AVAILABLE SUPPLY	421 AVAILABLE RESERVES	52% AVAILABILITY RATE

Previous Day	6/29/2023
Min. Demand 2,142 MW	Time: 7:51 AM
Peak Demand 2,561 MW	Time: 8:24 PM
Total Generation 55,668 MWh	

System Availability and Status



Availability and Status as reported by PREPA and other generators

DAILY GENERATION AVAILABILITY REPORT

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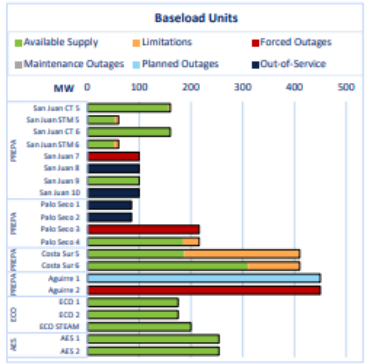
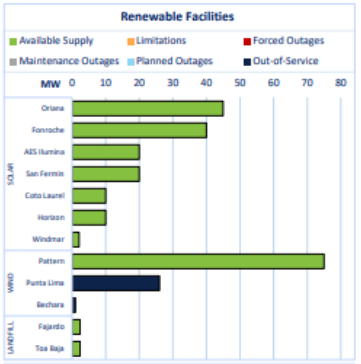
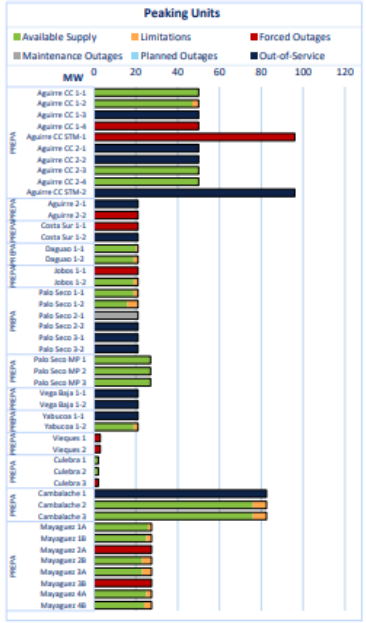
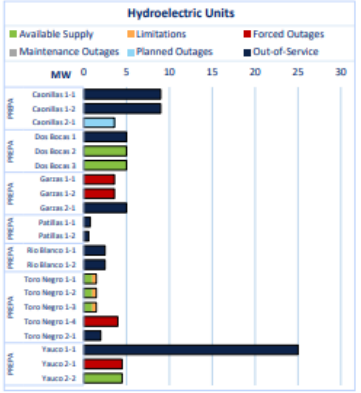
AVAILABILITY AND STATUS BY UNIT AS REPORTED BY EACH FACILITY









DAILY GENERATION AVAILABILITY REPORT

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PLANNED AND MAINTENANCE OUTAGES