

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

**NEPR**

**Received:**

**Oct 26, 2023**

**9:04 PM**

**IN RE:**

REVIEW OF THE PUERTO RICO  
ELECTRIC POWER AUTHORITY'S 10-  
YEAR INFRASTRUCTURE PLAN –  
DECEMBER 2020

**CASE NO.:** NEPR-MI-2021-0002

**SUBJECT:** Motion for Leave to Submit  
Amendment to Project and 406 BESSs Initial  
Scope of Work

**MOTION FOR LEAVE TO SUBMIT AMENDMENT TO PROJECT  
AND 406 BESSs INITIAL SCOPE OF WORK**

**TO THE HONORABLE PUERTO RICO ENERGY BUREAU:**

**COMES NOW GENERA PR LLC** (“Genera”), as agent of the Puerto Rico Electric Power Authority (“PREPA”),<sup>1</sup> through its counsels of record, and respectfully submits and prays as follows:

**I. Introduction**

Energy Storage Systems (“ESSs”) are “interconnected systems with an aggregate capacity of at least one (1) megawatt (MW) that absorb and store energy generated at a given time to be used later according to the need of the resource.” *See* Section 1020.07 (a)(28) of Act 60 Of 2019, as amended, also known as “Código de Incentivos de Puerto Rico”, (13 L.P.R.A. § 45018)

Energy storage is a highly adaptable and versatile asset that provides significant value and flexibility to the electrical grid. Battery energy storage systems (“BESSs”) can provide services at the transmission or bulk energy levels while delivering localized benefits that traditional

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<sup>1</sup> Pursuant to the *Puerto Rico Thermal Generation Facilities Operation and Maintenance Agreement* (“LGA OMA”), dated January 24, 2023, executed by and among PREPA, the Puerto Rico Public-Private Partnerships Authority (“P3 authority”) and Genera, Genera is the sole operator and administrator of the Legacy Generation Assets (defined in the LGA OMA) the sole entity authorized to represent PREPA before the Energy Bureau with respect to any matter related to the performance of any of the O&M Services provided by Genera under the LGA OMA.

generation capacity cannot provide. This is because the capacity for conventional generation is often larger, less scalable, less flexible and more responsive than energy storage. Additionally, traditional generation cannot be deployed in the distribution system near load pockets.

The BESSs technology can be integrated at multiple grid levels, from small behind-the-meter applications to the transmission level, with various power and energy capacities. Each of these technologies offers a range of benefits that can bring balance and resiliency to the grid. BESSs deployed at different levels of the electrical grid serve other functions. For example, a BESSs located at a distribution substation offers ancillary and distribution-based benefits.

Genera enthusiastically presents the BESSs Project to the Energy Bureau of the Public Service Regulatory Board (“Energy Bureau”), which will serve the latter purpose. Integrating renewable energy sources and the retirement of fossil-fueled generation will offer multiple benefits to the people of Puerto Rico. This includes reducing pollutant emissions, adding resilient generation that mitigates damages and reducing energy costs. However, it is essential to note that the retirement of fossil-fueled generation does not simply refer to generation that was ignited with fossil fuels; it also means the retirement of critical services to the grid.

Conventional power plants, such as those managed by Genera, provide dispatchable generation and ancillary services to the energy grid. Distributed or utility-scale solar generation does not provide these services, such as voltage regulation, frequency control, and fast response. These two systems are the most contracted renewable generation systems at the utility level. Therefore, once Puerto Rico receives the necessary renewable generation and fossil-fueled power plants are displaced, Genera must ensure that while planning to retire the fossil-fueled fleet, we are also planning to replace and improve the ancillary services that the retiring fleet would bring to the system.

Genera respectfully requests the Energy Bureau to consider the project presented in this motion and grant Genera leave to submit it to the Puerto Rico Central Office for Recovery, Reconstruction and Resiliency ("COR3") and, subsequently, the Federal Emergency Management Agency ("FEMA"). This project is aligned with the Puerto Rico Energy Public Policy, the Integrated Resource Plan, and multiple orders from the Energy Bureau. Genera believes that this project will be instrumental in assisting with the integration of renewable energy in Puerto Rico and will ultimately benefit the People of Puerto Rico.

## **II. Procedural Background**

1. On March 26, 2021, the Energy Bureau of the Puerto Rico Public Service Regulatory Board ("Energy Bureau") issued a Resolution and Order ("March 26<sup>th</sup> Resolution") in the instant case, through which it ordered PREPA to submit each new capital investment project for approval to avoid potential noncompliance with the Approved Integrated Resource Plan ("IRP") and Modified Action Plan. The Energy Bureau further ordered PREPA to submit the specific projects to the Energy Bureau at least thirty (30) calendar days before their submittal to the Puerto Rico Central Office for Recovery, Reconstruction and Resiliency ("COR3") and FEMA, and any other federal agency, and to continue reporting to the Energy Bureau and FEMA, within the next five (5) years, the progress of all ongoing efforts related to the final approval of the submitted projects not yet approved by the Energy Bureau.

2. On November 18, 2021, the Energy Bureau issued a Resolution and Order titled *Motion to Submit Fourth Group of Generation Projects* stating that "[a]ll PREPA's capital projects expenses require the Energy Bureau's approval."

3. On September 15, 2022, the Energy Bureau issued a Resolution and Order titled *Resolution on PREPA's September 3 and 7, 2022 Motions* ("September 15<sup>th</sup> Resolution"), through

which it analyzed and reviewed PREPA's *Motion to Inform Reallocation of FEMA 404 HMGP Funds and Request for Approval of Generation Projects*, filed by PREPA on August 2, 2022.

Pertinent to this motion, the Energy Bureau reached the following determination, among others:

Regarding PREPA's request for the reallocation of \$34.7 million for small scale residential PV with storage in "inaccessible sectors of Puerto Rico", the Energy Bureau reiterates its guidance that to the extent feasible under the Approved IRP and the Modified Action Plan, **PREPA can explore the acquisition of additional required capacity in a combination of renewable generation and BESS technology or BESS technology alone.**<sup>2</sup>

(emphasis added)

4. Another example of this Honorable Energy Bureau order regarding BESSs systems is when, on August 3, 2022, the Energy Bureau entered an order directing the P3 Authority to establish a request for proposals for a new CCGT; it also ordered PREPA to take actions to utilize federal funds for the development of energy storage projects.<sup>3</sup>

5. On January 24, 2023, Genera, PREPA and the P3 Authority executed the LGA OMA. According to the LGA OMA, Genera is the sole operator and administrator of the Legacy Generation Assets (as defined in the LGA OMA and hereinafter referred to as the "LGA") and is the exclusive entity authorized to represent PREPA before the Energy Bureau concerning any matter related to the performance of any of the O&M Services provided by Genera under the LGA OMA. In the LGA OMA, PREPA also delegated to Genera the right to communicate with agencies awarding federal funds as necessary to obtain and maintain grants of federal funds, submitting application materials to federal agencies, determining the scope of work of projects to be funded by grants of federal funds, and procuring goods and services to complete the scope of work using

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<sup>2</sup> See September 15<sup>th</sup> Resolution, at page 4.

<sup>3</sup> See Resolution and Order of August 3<sup>rd</sup>, 2022, in Case No. NEPR-MI-2021-0003, at page 8.

such grants, all in compliance with all applicable law and the terms of any applicable grant agreements, and subject to the oversight provisions throughout the LGA OMA.

6. Further, effective July 1, 2023, responsibility for O&M Services for the LGA transitioned from PREPA to Genera in accordance with the provisions of the LGA OMA. This transition designated Genera as the entity responsible for procuring and administering federal funds for the applicable LGA's repair, improvement, resiliency, construction, or hazard mitigation.<sup>4</sup>

### **III. Request for Leave to Proceed with BESSs Project and Related Activities**

7. In light of the above and in accordance with the March 26<sup>th</sup> Order, Genera respectfully requests the Energy Bureau to grant Genera leave to proceed with the BESSs and present the project to FEMA and COR3. The BESSs Project is part of Genera's mitigation initiative to improve the electric system's reliability. BESSs will provide a rapid spinning reserve, frequency regulation, voltage control, and other ancillary services required to keep the continuity of the service under emergency events and different scenarios that can put the system at risk of load shedding and blackouts. This acquisition of BESSs would also align with the Energy Bureau's March 26<sup>th</sup> Resolution and September 15<sup>th</sup> Resolution regarding the above-captioned case.

8. Regarding the BESSs Project, Genera proposes to use existing points of interconnections ("POI") in PREPA's legacy generation facilities to install utility-scale batteries. The intention is to co-locate BESSs with existing conventional generation, peakers or baseload, on each location to maximize the electrical injection capacity available without overloading the existing grid capabilities. This approach will provide flexibility and resiliency to the operation of the generation fleet. Batteries respond faster than conventional generators to frequency and voltage variations caused by weather conditions, renewable energy and other grid events.

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<sup>4</sup> See Section 5.8(c) of the LGA OMA.

9. BESSs will offer grid-support ancillary services such as fast-spinning reserve, load balance, and frequency regulation. Fast-spinning reserve response can inject up to 100% battery capacity within seconds, potentially preventing most load-shedding caused by forced generation outages. The frequency regulation could be the primary response to protect current base-load thermoelectric generators from frequency and voltage ride-through events. This fast active power source function can continuously inject or absorb energy from the grid as a function of system frequency deviations to help manage and maintain frequency at 60 Hz.

10. The batteries that Genera will acquire will be available for dispatch upon request from the T&D System Operator. BESSs will inject active power at the interconnection point for up to 4 hours to cover temporary generation deficits or initiate fast-generating units. The system operator must ensure an adequate supply of generation capacity to meet peak demand reliably, typically met with higher-cost generators like gas plants. Depending on the load curve shape, BESSs can also ensure sufficient peaking generation capacity.

11. Genera proposes installing batteries at existing peaker fleet facilities and base-load power plant locations. The existing footprint will be maximized at each site for installing BESSs, new peakers, and other plant infrastructure. Monitoring and control will be conducted locally and remotely from Genera's operations center. The proposed locations and capacities are outlined in the following table:

	<b>Point of Interconnection</b>	<b>Capacity (MW)</b>	<b>Duration (Hours)</b>	<b>Estimated Cost</b>
1	Daguao peakers	20	4	\$ 30 MM
2	Yabucoa peakers	20	4	\$ 30 MM
3	Jobos peakers	20	4	\$ 30 MM

4	Aguirre Power Plant	100	4	\$ 150 MM
5	Costa Sur Power Plant	100	4	\$ 150 MM
6	Cambalache Power Plant	20	4	\$ 30 MM
7	Vega Baja peakers	50	4	\$ 75 MM
8	Palo Seco Power Plant	50	4	\$ 75 MMM
9	San Juan Power Plant	50	4	\$ 75 MM
	<b>Total</b>	<b>430 MW</b>	<b>1,720 MWh</b>	<b>\$ 645 MM</b>

12. A detailed SOW per facility will be submitted to FEMA in due course and after approved by the Energy Bureau. Genera has identified certain equipment and components with long lead (delivery) times under even the best circumstances. Given the world's current supply chain challenges, the lead times are anticipated to be even longer. Supply-chain disruptions caused by the COVID pandemic, the Russian invasion of Ukraine and recent events in the Middle East have created a bottleneck that has prevented the free-flow of goods in the global economy. These disruptions have led to product shortages and delays in product deliveries throughout various sectors. These supply-chain disruptions create inefficiencies in construction projects as contractors wait for the required material and equipment to be delivered. In addition, shortages also lead to price increases. Genera will acquire specific materials and equipment ahead of time to prevent any potential delays or interruptions. This will enable the manufacturing process and the development of the permanent scope of work to be formulation to continue simultaneously, allowing for the construction phase to begin as soon as both activities are completed. By avoiding any delays during the construction phase, the entire project will be completed more efficiently. The materials and equipment will be stored at a secure site(s), distribute them to specific projects as they are obligated and construction begins, and manage the inventory as time and construction

progress. With this, Genera will eliminate, or at least minimize, any potential construction schedule impacts. Therefore, a battery, transformers, and other major components cost estimate will be submitted to FEMA to amend Long Lead Items (Equipment) Project # 6763691, which is already obligated and will allow COR3 to disburse up to 50% in advance for equipment purchase. The amendment, titled *Generation Fleet Battery Energy Storage System (BESS) Project, Equipment Project, Version 2* (“Project Amendment”) and the *Generation Fleet Battery Energy Storage System (BESS) Project; 406 Initial SOW* (“406 Initial SOW”) (exhibits A and B, respectively), for evaluation and approval of the Energy Bureau.

13. The proposed capacities are subject to system impact, facilities studies and optimization of interconnection points. On October 24, 2023, Genera sent a letter to the T&D System Operator requesting information on the maximum power injection capacity at each interconnection point without violating thermal, voltage, or stability limits. Genera requested the T&D System Operator to provide the maximum injection capacity (in MW) for each of the 15 sites that comprise the combustion turbine peaking units at the Dagua, Yabu, Jobos, Aguirre, Costa Sur, Cambalache, Vega Baja, Palo Seco, and San Juan facilities. In the letter, Genera also asked for the study to be carried out with the assumption that Genera will increase the capacity of each main power transformer that connects the existing generators at each site and the main breaker, if necessary. This is important because either Genera or LUMA could increase the capacity at each site to supplement with additional storage.

14. Further, it is important to note that the T&D System Operator has proposed BESSs projects to be installed at T&D System facilities, which are mainly voltage control. Genera’s proposed BESSs Project, which is for the collocated installation of BESSs with conventional generation submitted by Genera, has two primary purposes: (1) to offer fast spinning reserve



services to avoid automatic load shedding caused by generators forced outages and second (2) to offer load balance services to avoid manual load shedding caused by deficiencies of generation.

15. A detailed description of the BESSs project and its benefits, as described by Genera in this motion, is attached as Exhibit C to this motion.

#### **IV. Conclusion**

The BESSs Project is aligned with the Puerto Rico Energy Public Policy, the Integrated Resource Plan, and multiple orders from the Energy Bureau. Genera believes that this project will be instrumental in assisting with the integration of renewable energy in Puerto Rico and will ultimately benefit the People of Puerto Rico. Thus, Genera respectfully requests the Energy Bureau to consider the BESSs Project and determine that it aligns with Puerto Rico's public policy. Furthermore, Genera respectfully requests the Energy Bureau to **grant** Genera leave to present to COR3 and FEMA the Project Amendment and the 406 Initial SOW and to continue with all activities required to complete all the essential documentation and analysis to complete the BESSs Project.

**RESPECTFULLY SUBMITTED.**

In San Juan, Puerto Rico, this 26<sup>th</sup> day of October 2023.

**ECIJA SBGB**  
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## CERTIFICATE OF SERVICE

We hereby certify that a true and accurate copy of this motion was filed with the Office of the Clerk of the Energy Bureau using its Electronic Filing System and that we will send an electronic copy of this motion to the attorney for PREPA, Lionel Santa Crispín, at [lionel.santa@prepa.pr.gov](mailto:lionel.santa@prepa.pr.gov); and to LUMA's counsel, Margarita Mercado, at [margarita.mercado@us.dlapiper.com](mailto:margarita.mercado@us.dlapiper.com), and Yahaira De La Rosa, at [yahaira.delarosa@us.dlapiper.com](mailto:yahaira.delarosa@us.dlapiper.com).

In San Juan, Puerto Rico, this 26<sup>th</sup> day of October 2023

*/s/ Joaquín M. Lago González*  
Joaquín M. Lago González

**EXHIBIT A**  
**BESS EQUIPMENT PROJECT AMENDMENT**

Version 2

**In Re: Battery Energy Storage System (BESS) Project Equipment**

Project # 673691

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## **I. Overview**

**Project Name: Generation Fleet Battery Energy Storage System (BESS) Project**

**Project Type: Equipment Project**

**Project Location: Multiple generation facilities**

## **II. Introduction**

On September 6, 2017, Puerto Rico's northern coastline was struck by Hurricane Irma, a Category 4 storm. Two weeks later, on September 17, Hurricane Maria tore through the island of Puerto Rico as a Category 5 storm. Subjected to 150+ mph winds and more than 25 inches of rain, 3.4 million residents lost power and a great deal of infrastructure, including critical facilities, was damaged. In particular, the electrical infrastructure suffered catastrophic impacts. In the aftermath, diligent recovery and reconstruction have been going on, not only to restore the electrical infrastructure to pre-storm function and capacity but to take this opportunity to bring it in line with current standards and technology. This "transformative moment in the history of Puerto Rico," as Governor Ricardo Rossello calls it, is an opportunity not just to rebuild the system but to transform it into a smarter, more resilient, and cleaner one. Puerto Rico's generation system must meet customer demand and have adequate additional capacity to comply with the reserve required by the standard operating procedures of the T&D system operator (LUMA). In terms of service continuity, the system must be reliable so that service interruptions are within the margins established in the electrical industry.

Unfortunately, the generation system presents critical performance metrics with a deficiency in capacity to meet the energy demand and the minimum reserve requirements. The forced outage percentage of the units is increasing while the generation capacity decreases. This combination of factors puts the continuity of the service at high risk, adversely affecting the quality of life of those who live in PR.

Genera is responsible for operating and maintaining PREPA's legacy asset generation fleet. The current fleet condition presents poor performance due to the impact of hurricanes María and Fiona. Generation capacity has been reduced to 46% of installed capacity. In

addition, of the generation units in operation, about 32% or 640 MW, are disconnected monthly, causing thousands of customers to suffer interruptions in their service.

Genera proposes adding energy storage in batteries to improve the system's reliability as part of the mitigation initiative. Batteries will provide a rapid spinning reserve, frequency regulation, voltage control, and other ancillary services required to keep the continuity of the service under emergency events and different scenarios that can put the system at risk of load shedding and blackouts.

The Puerto Rico Electric Power Authority (“PREPA”) is a public corporation of the Government of Puerto Rico created pursuant to Act No. 83 of May 2, 1941, as amended. PREPA owns and operates electric generation, transmission and distribution facilities serving Puerto Rico. As the sole electric utility in Puerto Rico, PREPA provides electricity to approximately 1.5 million customers. Since 2017, PREPA has performed damage assessments, studies and evaluations to identify areas of repair and improvements. These include transmission and distribution lines, electrical substations, generation plants, mitigation, and other improvements. On January 2023, PREPA and the Puerto Rico Public-Private Partnership Authority (“P3 Authority”) selected Genera PR, LLC (“Genera”) to operate, maintain and modernize the Generation system of PREPA for ten years through a public-private partnership.

Following Presidential Disaster Declarations 4337DR-PR (Hurricane Irma) and 4339DR-PR (Hurricane Maria), the Federal Emergency Management Agency (FEMA) has been working with PREPA to assist in recovery and repair efforts. In October 2020, FEMA approved Project #136271 Puerto Rico Electrical Power Authority Island Wide FEMA Accelerated Award Strategy (“FAASt”) in the amount of \$9.98 billion for PREPA to repair and restore the PR electric power infrastructure to industry standards without regard to pre-disaster condition and to restore components not damaged by the disaster when necessary to fully effectuate restoration of the disaster-damaged components to restore the function of the facility or system to industry standards, as authorized by Section 20601 of the Bipartisan Budget Act of 2018 and described in FEMA Recovery Policy FP-104-009-5 Version 2 (Implementing Section 20601 of the 2018 Bipartisan Budget Act through the Public Assistance Program, September 11, 2019). The facilities provide a critical service as defined in Stafford Act Section 406.[1]. The list of projects that will be undertaken using the FAASt project is still under development.

As part of the process, Genera has identified certain equipment and components that have long lead (delivery) times under even the best of circumstances. Given the world’s current supply chain challenges, the lead times are anticipated to be even longer. Supply-chain disruptions caused by the COVID pandemic, the Russian invasion of Ukraine, and recent events in the Middle East have become a bottleneck that has prevented the free-flow of goods in the global economy. These disruptions have led to product shortages and delays in product deliveries throughout various sectors. These supply-chain disruptions create

inefficiencies in construction projects as contractors wait for the required material and equipment to be delivered. In addition, shortages also lead to price increases. Based on this, Genera will procure selected materials and equipment in advance so that the fabrication commences as soon as possible and the expected delivery lead time delay be concurrent with the final formulation of the permanent work project and the start of the construction activities. Genera will store the materials and equipment at a secure site(s), distribute them to specific projects as they are obligated and construction begins, and manage the inventory as time and construction progress. With this, Genera will eliminate, or at least minimize, any potential construction schedule impacts. The identified equipment includes but is not limited to:

- Batteries
- Controllers
- Transformers
- Breakers

Version 1 was created to capture additional Applicant purchase and store Generation selected materials and equipment to eliminate or minimize any potential construction schedule impacts. In Version 1, a total of \$797,183,125.20 was awarded in support of purchasing and storing the selected materials and equipment to eliminate or at least minimize, any potential construction schedule impacts. Genera prepared Battery Project itemized list of materials and major equipment with long lead times and could be impacted by future events.

### III. **Scope of Work**

This FAASSt Sub-Project is to purchase and store the selected materials and equipment to eliminate or minimize any potential construction schedule impacts. Genera prepared an initial itemized list of materials and equipment currently seeing inventory shortages, have long lead times and could be impacted by future events.

Genera will manage the storage and eventual utilization of materials and equipment. Genera would track items across multiple locations from acquisition to final use. Material and equipment utilization would be tracked phase by phase and ensure that items assigned for a particular project are not used elsewhere as outlined and approved under the FAASSt obligated FEMA funding. This Scope of Work and Cost Estimate will *version* the already obligated project. Table 1 contains the itemized list, pricing based on actual vendor quotations, and publicly available prevailing prices.

SITE	EQUIPMENT	QUANTITY	UNIT COST 20-YEAR WARRANTY	ESTIMATED COST
Daguao peakers	4-hour 1 MW power output battery	20	\$1,187,000.00	\$ 23,740,000.00
Yabucoa peakers	4-hour 1 MW power output battery	20	\$1,187,000.00	\$ 23,740,000.00
Jobos Peakers	4-hour 1 MW power output battery	20	\$1,187,000.00	\$ 23,740,000.00
Aguirre Power Plant	4-hour 1 MW power output battery	100	\$1,187,000.00	\$ 118,700,000.00
Costa Sur Power Plant	4-hour 1 MW power output battery	100	\$1,187,000.00	\$ 118,700,000.00
Cambalache Power Plant	4-hour 1 MW power output battery	20	\$1,187,000.00	\$ 23,740,000.00
Vega Baja peakers	4-hour 1 MW power output battery	50	\$1,187,000.00	\$ 59,350,000.00
Palo Seco Power Plant	4-hour 1 MW power output battery	50	\$1,187,000.00	\$ 59,350,000.00
San Juan Power Plant	4-hour 1 MW power output battery	50	\$1,187,000.00	\$ 59,350,000.00
<b>Total</b>		<b>430</b>		<b>\$510,410,000.00</b>

Table 1



**Cost Estimate: Equipment and Materials:**

A. Battery Banks Packages – Battery Major Parts

B. Transformers-Generation Plants

Work to be Completed (WTBC): \$510,410,000.00

V2 Total = Version 1 + Change Requested = \$797,183,125.20 + \$510,410,000.00 = \$  
**1,307,593,125.2**

\*\*\*\*\* End of Version \*\*\*\*\*

406 HMP Scope

The project consists of equipment and Material procurement only. There is no HM opportunity for this project. Note: Part of these materials will be used as HM measures for another project.

**EXHIBIT B**

**BESS PROJECT 406 INITIAL SOW**

Version 0

**In Re: Battery Energy Storage System (BESS) Project Initial SOW**

Project # 673691

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## **I. Overview**

**Project Name: Generation Fleet Battery Energy Storage System (BESS) Project**

**Project Type: 406 Initial SOW**

**Project Location: Multiple generation facilities**

## **II. Introduction**

On September 6, 2017, Puerto Rico's northern coastline was struck by Hurricane Irma, a Category 4 storm. Two weeks later, on September 17, Hurricane Maria tore through the island of Puerto Rico as a Category 5 storm. Subjected to 150+ mph winds and more than 25 inches of rain, 3.4 million residents lost power and a great deal of infrastructure, including critical facilities, was damaged. In particular, the electrical infrastructure suffered catastrophic impacts. In the aftermath, diligent recovery and reconstruction have been going on, not only to restore the electrical infrastructure to pre-storm function and capacity but to take this opportunity to bring it in line with current standards and technology. This "transformative moment in the history of Puerto Rico," as Governor Ricardo Rossello calls it, is an opportunity to rebuild the system and transform it into a smarter, more resilient, and cleaner one. Puerto Rico's generation system must meet customer demand and have adequate additional capacity to comply with the reserve required by the standard operating procedures of the T&D system operator (LUMA). In terms of service continuity, the system must be reliable so that service interruptions are within the margins established in the electrical industry.

Unfortunately, the generation system presents critical performance metrics with a deficiency in capacity to meet the energy demand and the minimum reserve requirements. The forced outage percentage of the units is increasing while the generation capacity decreases. This combination of factors puts the continuity of the service at high risk, adversely affecting the quality of life of those who live in PR.

Genera is responsible for operating and maintaining PREPA's legacy asset generation fleet. The current fleet condition presents poor performance due to the impact of hurricanes María and Fiona. Generation capacity has been reduced to 46% of installed capacity. In addition, of the generation units in operation, about 32% or 640 MW, are disconnected monthly, causing thousands of customers to suffer interruptions in their service.

Genera proposes adding energy storage in batteries to improve the system's reliability as part of the mitigation initiative. Batteries will provide a rapid spinning reserve, frequency regulation, voltage control, and other ancillary services required to keep the continuity of the service under emergency events and different scenarios that can put the system at risk of load shedding and blackouts.

The Puerto Rico Electric Power Authority (“PREPA”) is a public corporation of the Government of Puerto Rico created pursuant to Act No. 83 of May 2, 1941, as amended. PREPA owns and operates electric generation, transmission and distribution facilities serving Puerto Rico. As the sole electric utility in Puerto Rico, PREPA provides electricity to approximately 1.5 million customers. Since 2017, PREPA has performed damage assessments, studies and evaluations to identify areas of repair and improvements. These include transmission and distribution lines, electrical substations, generation plants, mitigation, and other improvements. On January 2023, PREPA and the Puerto Rico Public-Private Partnership Authority (“P3 Authority”) selected Genera PR, LLC (“Genera”) to operate, maintain and modernize the Generation system of PREPA for ten years through a public-private partnership.

Following Presidential Disaster Declarations 4337DR-PR (Hurricane Irma) and 4339DR-PR (Hurricane Maria), the Federal Emergency Management Agency (FEMA) has been working with PREPA to assist in recovery and repair efforts. In October 2020, FEMA approved Project #136271 Puerto Rico Electrical Power Authority Island Wide FEMA Accelerated Award Strategy (“FAASt”) in the amount of \$9.98 billion for PREPA to repair and restore the PR electric power infrastructure to industry standards without regard to pre-disaster condition and to restore components not damaged by the disaster when necessary to fully effectuate restoration of the disaster-damaged components to restore the function of the facility or system to industry standards, as authorized by Section 20601 of the Bipartisan Budget Act of 2018 and described in FEMA Recovery Policy FP-104-009-5 Version 2 (Implementing Section 20601 of the 2018 Bipartisan Budget Act through the Public Assistance Program, September 11, 2019). The facilities provide a critical service as defined in Stafford Act Section 406.[1]. The list of projects that will be undertaken using the FAASt project is still under development.

### **III. Project Description**

Genera proposes to use existing points of interconnections (POI) in the PREPA’s legacy generation facilities to install utility-scale batteries. The intention is to co-locate BESS with existing conventional generation, peakers or base-load, on each location to maximize the electrical injection capacity available without overloading the existing grid capabilities. This approach will provide flexibility and resiliency to the operation of the generation fleet. Batteries respond faster than conventional generators to frequency and voltage variations due to weather conditions, renewable energy, and other grid events.

BESS will incorporate grid support ancillary services such as fast-spinning reserve, load balance and frequency regulation. Fast spinning reserve response has the function to inject up to 100% battery capacity in seconds. This instantaneous injection of reserve energy is a function of the rate of change and system frequency deviations in the event of a sudden loss of generation or unexpected ramp-up in demand. This operation mode could potentially prevent most load shedding due to forced outages caused by generation events. The frequency regulation could be the primary response to protect current base-load thermoelectric generators from frequency and voltage ride-through events. This fast active power source function can continuously inject or absorb energy from the grid as a function of system frequency deviations to help manage and maintain frequency at 60 Hz.

Batteries will be available to be dispatched at the T&D system operator's request. BESS will inject active power at the interconnection point for 4 hours to cover temporary generation deficits or start up fast-generating units. The System operator must ensure it has an adequate supply of generation capacity to reliably meet demand during the highest-demand periods in a given year or the peak demand. This peak demand is typically met with higher-cost generators, such as gas plants; however, depending on the shape of the load curve, BESS can also be used to ensure adequate peaking generation capacity.

#### IV. 406 Scope of Work

Genera is proposing to install batteries in existing peaker fleet facilities and base-load power plant locations to inject 430 MW of active power at the interconnection point for 4 hours to cover temporary generation deficits caused by a disaster event or start-up (blackstart) fast-generating units. On each site, Genera will maximize the use of the existing footprint to install BESS, new peakers and the balance of the plant. Batteries and peakers will be monitored and controlled locally and remotely from Genera's operation center. A detailed SOW will be submitted to FEMA per facility. The proposed location and capacity are included in Table 1.

Site (POI)	Equipment	Quantity	Unit Cost 20-year warranty	Estimated Cost	Installation Cost per unit	Total Cost Per Site
Daguao peakers	4-hour 1 MW power output battery	20	\$1,187,000.00	\$ 23,740,000.00	\$ 6,380,000.00	\$ 30,120,000.00
Yabucoa peakers	4-hour 1 MW power output battery	20	\$1,187,000.00	\$ 23,740,000.00	\$ 6,380,000.00	\$ 30,120,000.00

Jobos peakers	4-hour 1 MW power output battery	20	\$1,187,000.00	\$ 23,740,000.00	\$ 6,380,000.00	\$ 30,120,000.00
Aguirre Power Plant	4-hour 1 MW power output battery	100	\$1,187,000.00	\$ 118,700,000.00	\$ 31,900,000.00	\$150,600,000.00
Costa Sur Power Plant	4-hour 1 MW power output battery	100	\$1,187,000.00	\$ 118,700,000.00	\$ 31,900,000.00	\$150,600,000.00
Cambalache Power Plant	4-hour 1 MW power output battery	20	\$1,187,000.00	\$ 23,740,000.00	\$ 6,380,000.00	\$ 30,120,000.00
Vega Baja peakers	4-hour 1 MW power output battery	50	\$1,187,000.00	\$ 59,350,000.00	\$ 15,950,000.00	\$ 75,300,000.00
Palo Seco Power Plant	4-hour 1 MW power output battery	50	\$1,187,000.00	\$ 59,350,000.00	\$ 15,950,000.00	\$ 75,300,000.00
San Juan Power Plant	4-hour 1 MW power output battery	50	\$1,187,000.00	\$ 59,350,000.00	\$ 15,950,000.00	\$ 75,300,000.00
<b>Total</b>		<b>430 MW</b>		<b>\$510,410,000.00</b>	<b>\$137,170,000.00</b>	<b>\$647,580,000.00</b>

Table 1

### Cost Estimate: Equipment, Materials, and Installation:

A. Battery Packages – \$ 510,410,000.00

B. Transformers, Switchgears, .... –

C. Installation - \$137,170,000.00

Work to be Completed (WTBC): \$647,580,000.00

**EXHIBIT C**  
**BESS PROJECT PRESENTATION**





# Reliability and Modernization Project: BESSs

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October 26, 2023



# GENERATION SYSTEM CONDITIONS

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**> 32%**

**generation forced outages**

**> 3200MW**

**peak demand**

**> 95**

**load-shedding events since October 2022**

**< 47%**

**installed generation capacity**

**=**

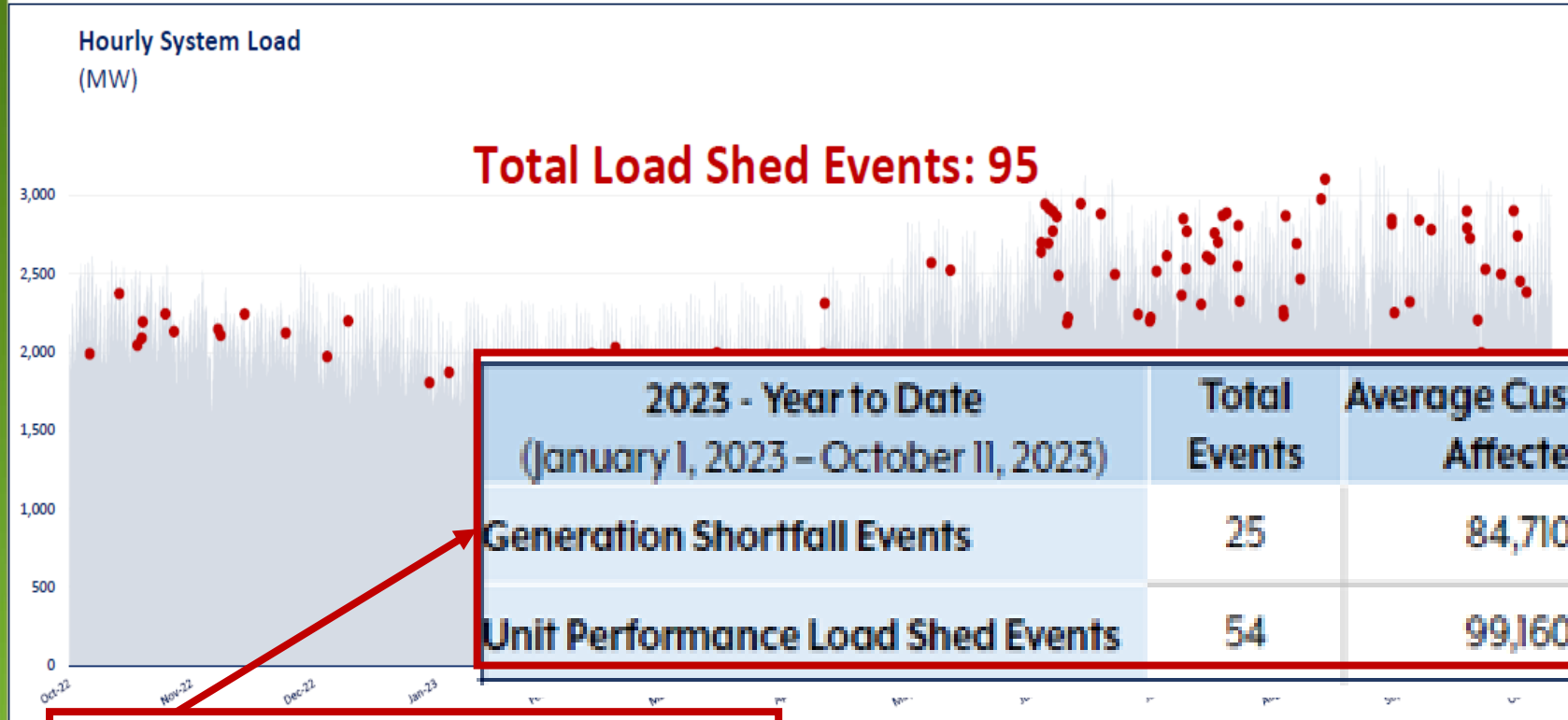
**reduced capacity of frequency primary response**



# GENERATION SYSTEM CONDITIONS

Current Generation: 95 load shed events have occurred since October 1, 2022

Updated until 10/11/2023



2023 - Year to Date (January 1, 2023 – October 11, 2023)	Total Events	Average Customers Affected	Average Duration (min)
Generation Shortfall Events	25	84,710	148
Unit Performance Load Shed Events	54	99,160	14

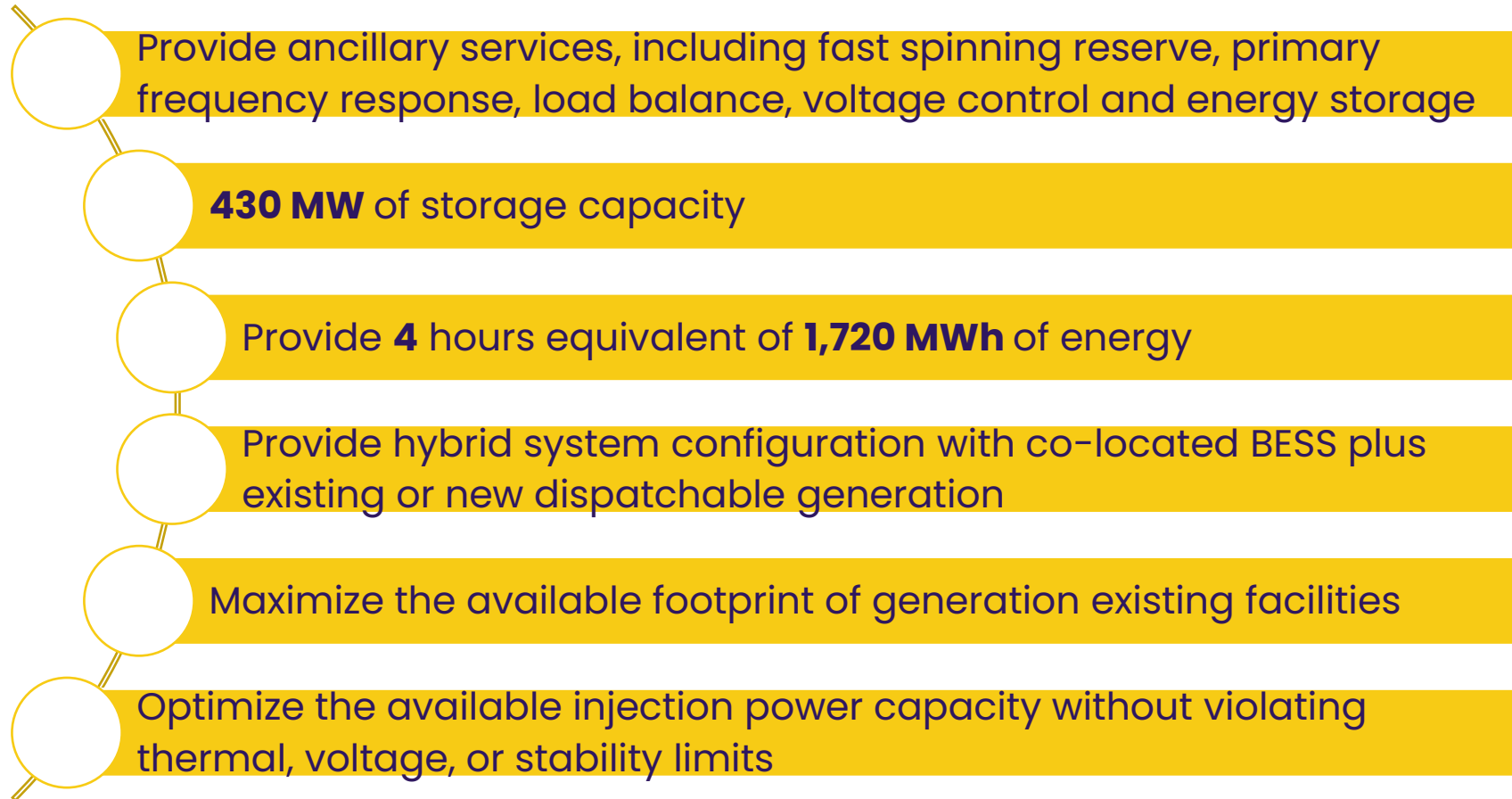
2022 - 3 months Post-Fiona (October 1, 2022 - December 31, 2022)	Total Events	Average Customers Affected	Average Duration (min)
Generation Shortfall Events	4	139,049	309
Unit Performance Load Shed Events	12	117,046	44

(Image from LUMA Generation Stabilization Report (October 2022))



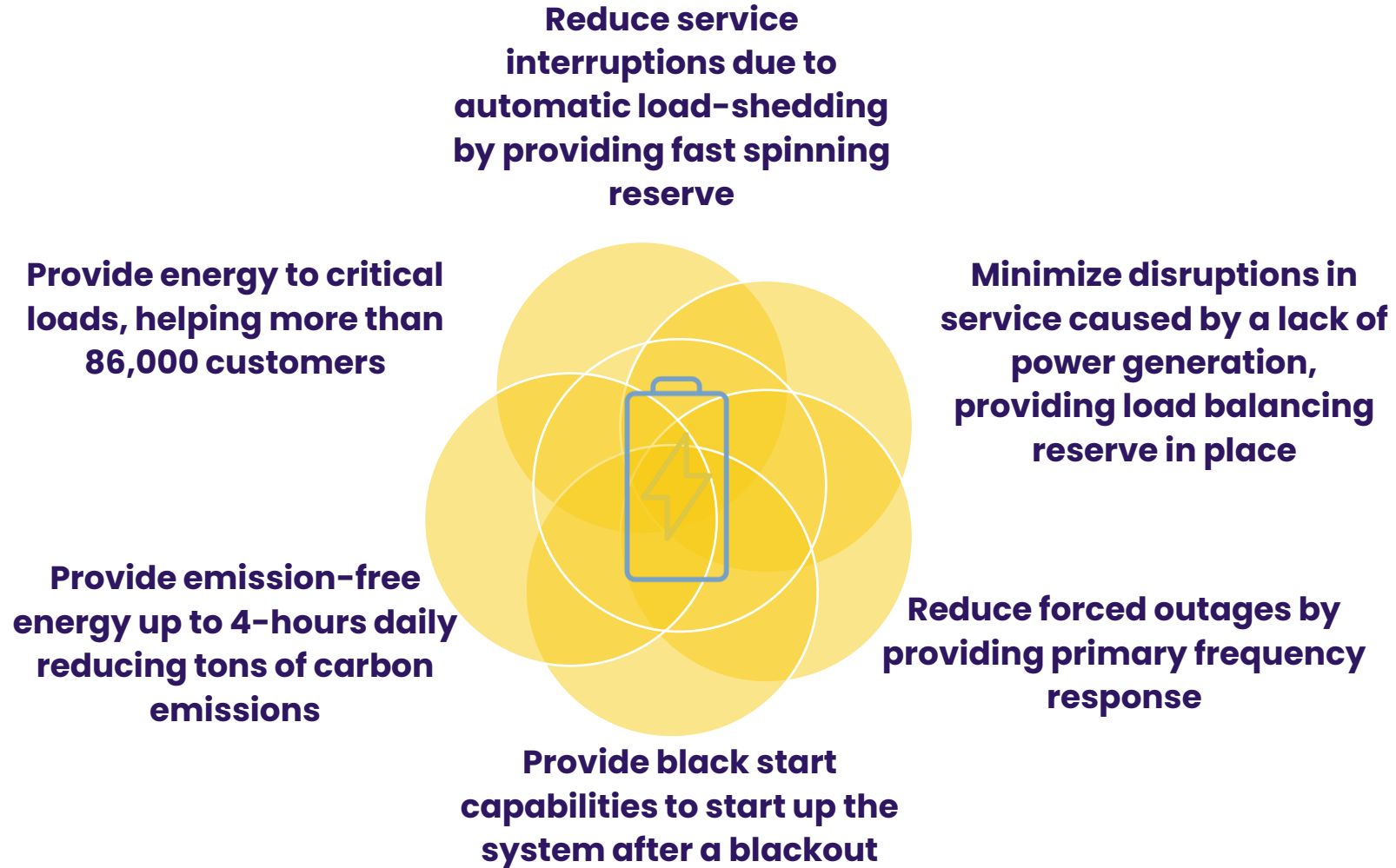
# BESSs PROJECT DESCRIPTION

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# BESSs PROJECT OBJECTIVE

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# BESSs PROJECT OBJECTIVE

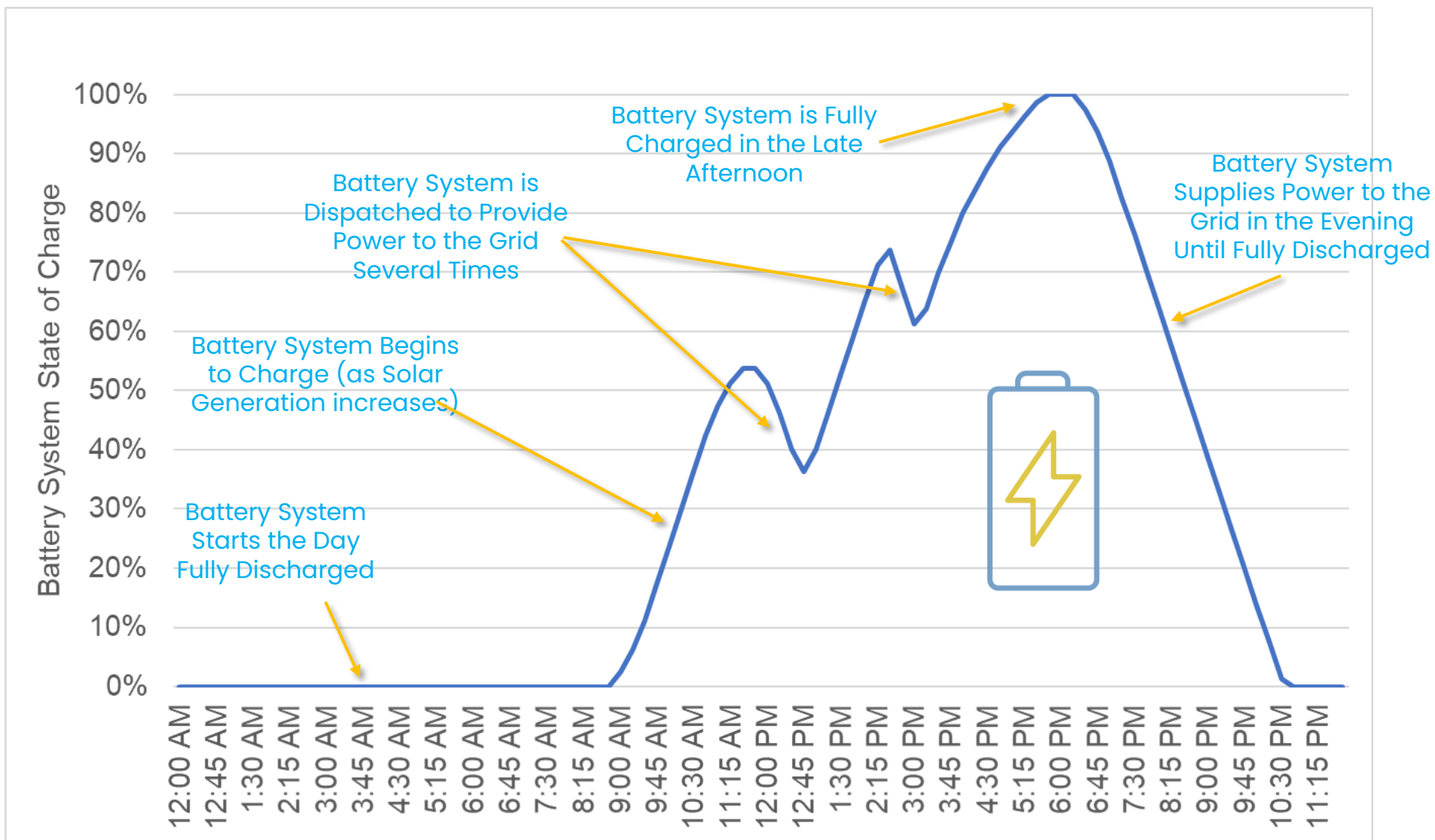


# BESSs PROJECT OBJECTIVE

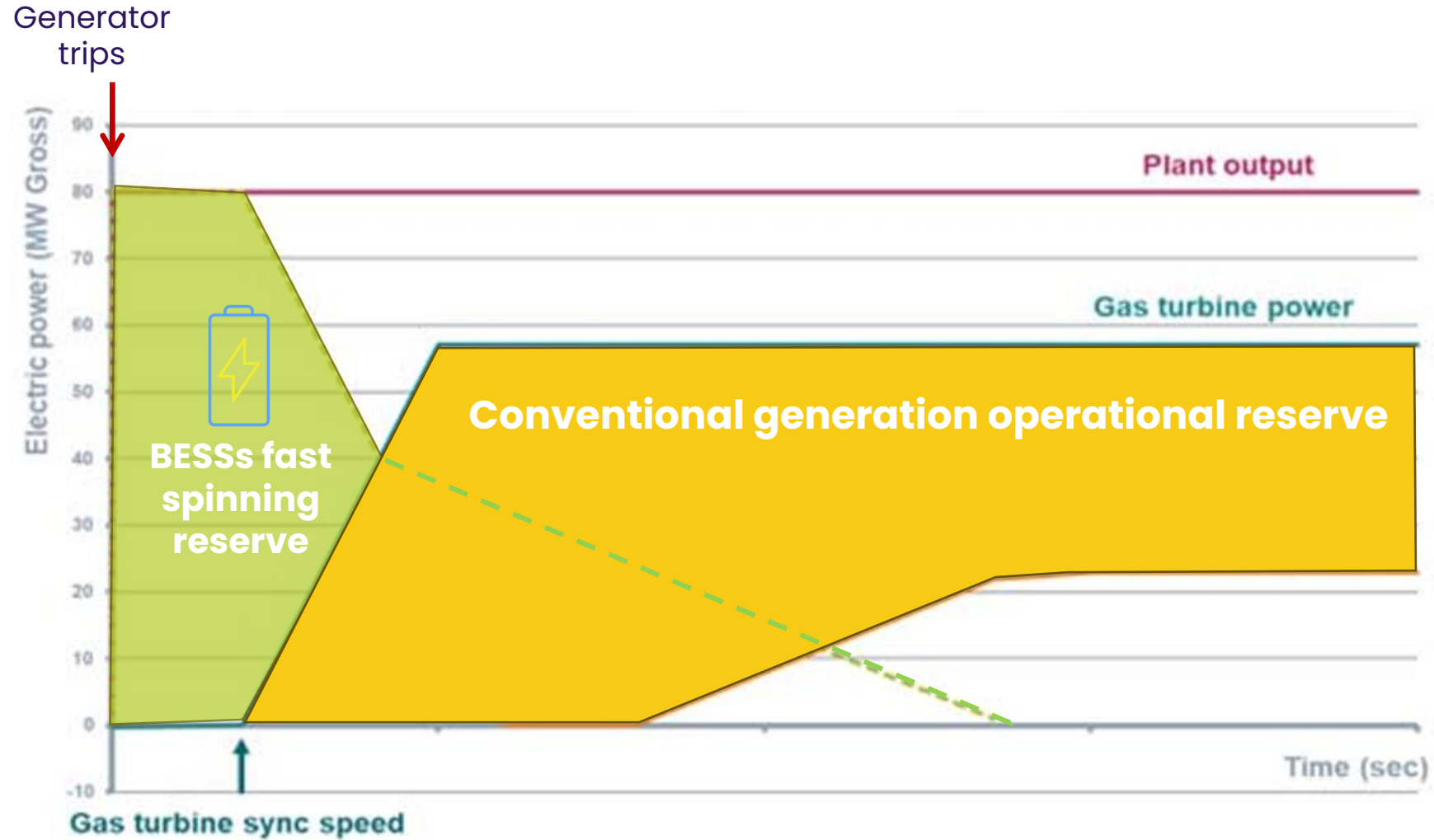


SERVICE	DESCRIPTION
Fast spinning reserve	Instantaneous reserve
Energy storage	Energy storage during excess of renewable production hours
Supply capacity	Uses storage to meet peak-load
Frequency regulation	Inject or absorbs power to follow a regulation signal
Resiliency	Sustain critical loads during grid outages
Black start	Helps to restore system after a blackout
Voltage support	Inserts or absorbs reactive power to maintain voltage within required ranges on distribution or transmission system

# EXAMPLE OF BESSs PROJECT OBJECTIVE

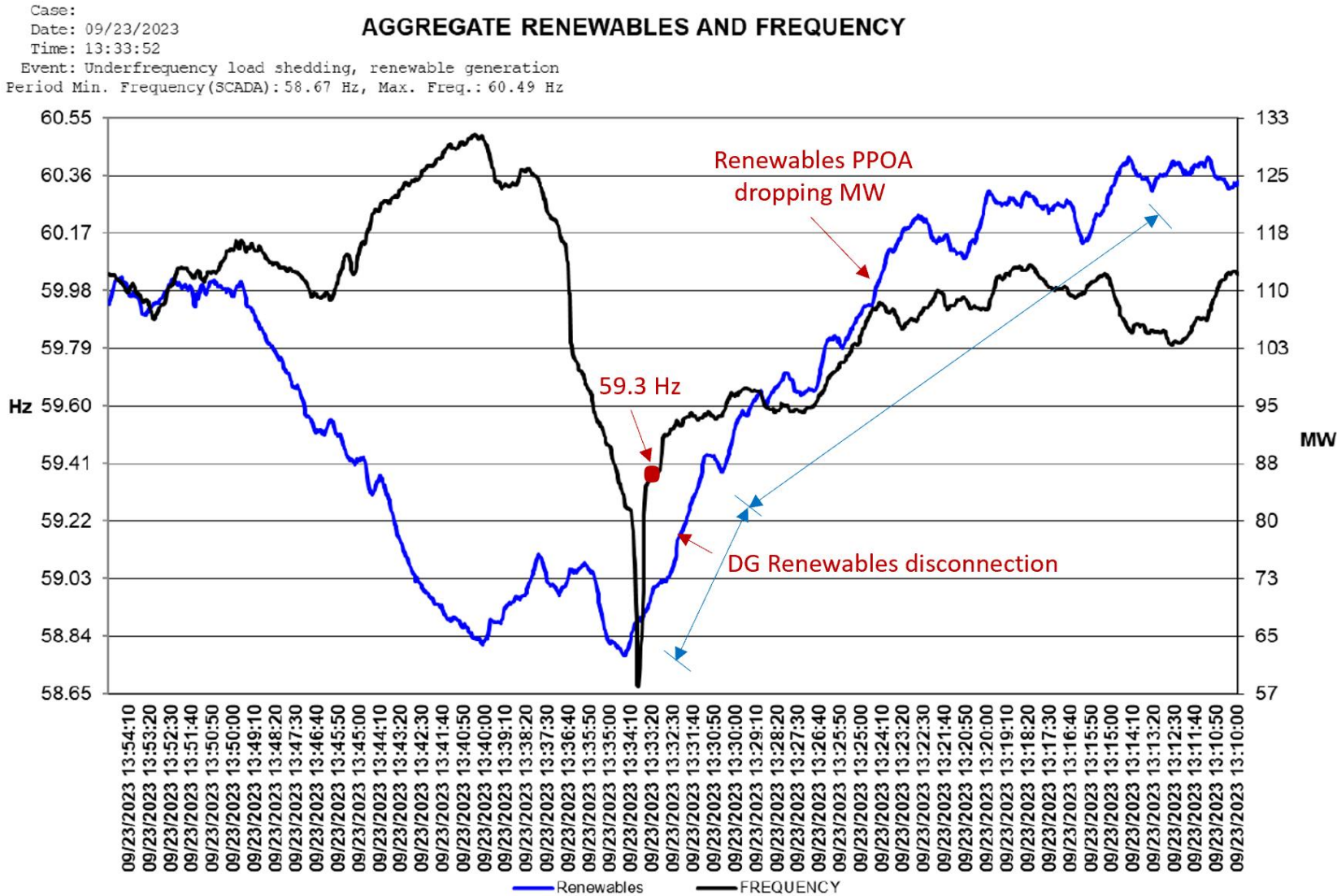


# PROJECT OBJECTIVE: FAST SPINNING RESERVE





# PROJECT OBJECTIVE: PREVENT AUTOMATIC LOAD-SHEDDING

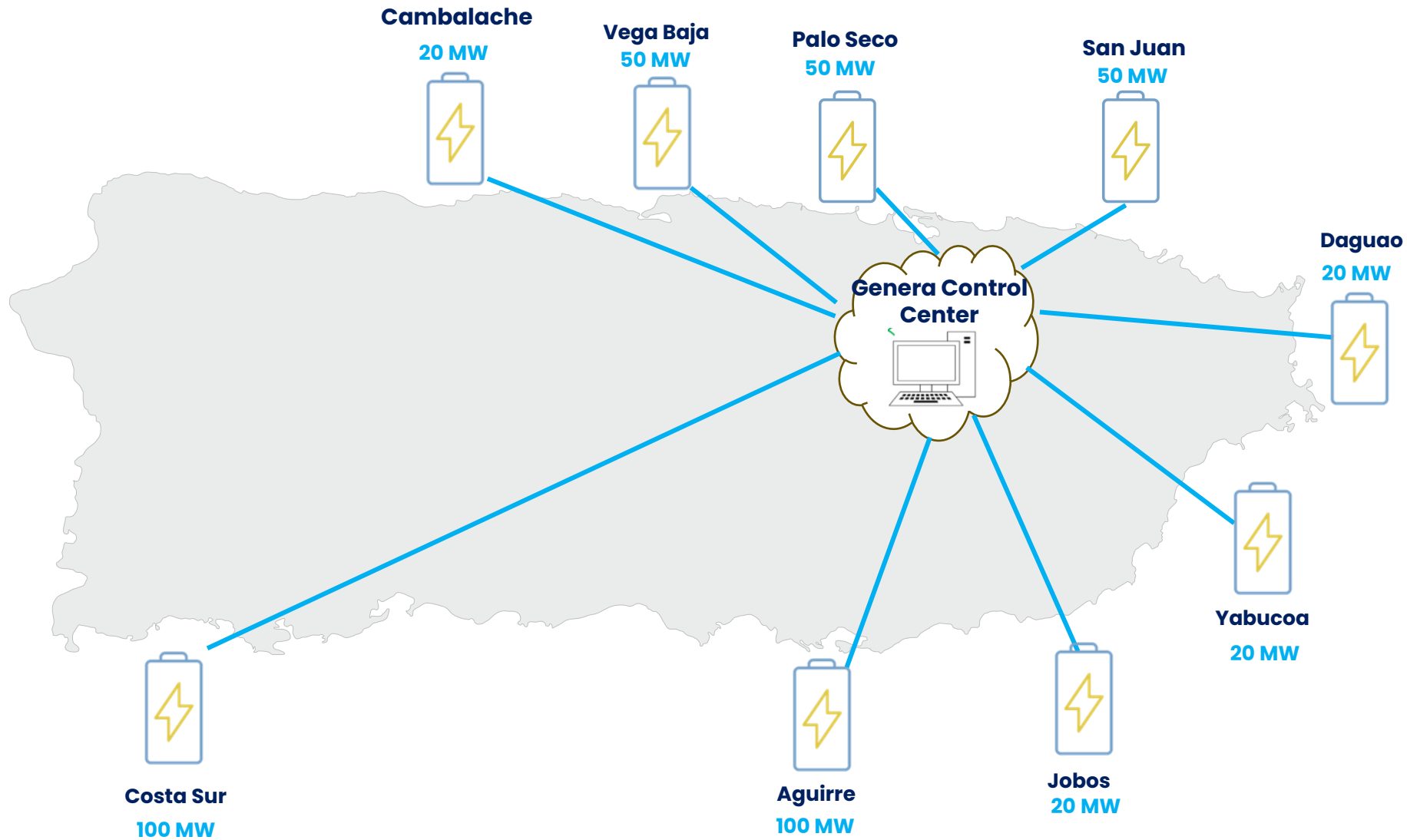


Automatic load-shedding event **real situation:**

- September 23, 2023 at 13:33:52
- Starting 13:15 – renewables PPOA drop 45+ MW
- Frequency drop slowly 59.3 Hz
- Frequency suddenly dropped just after frequency crossed 59.3 Hz
- DG settings disconnect several PVs at 59.3 Hz
- Load-shedding at 13:33



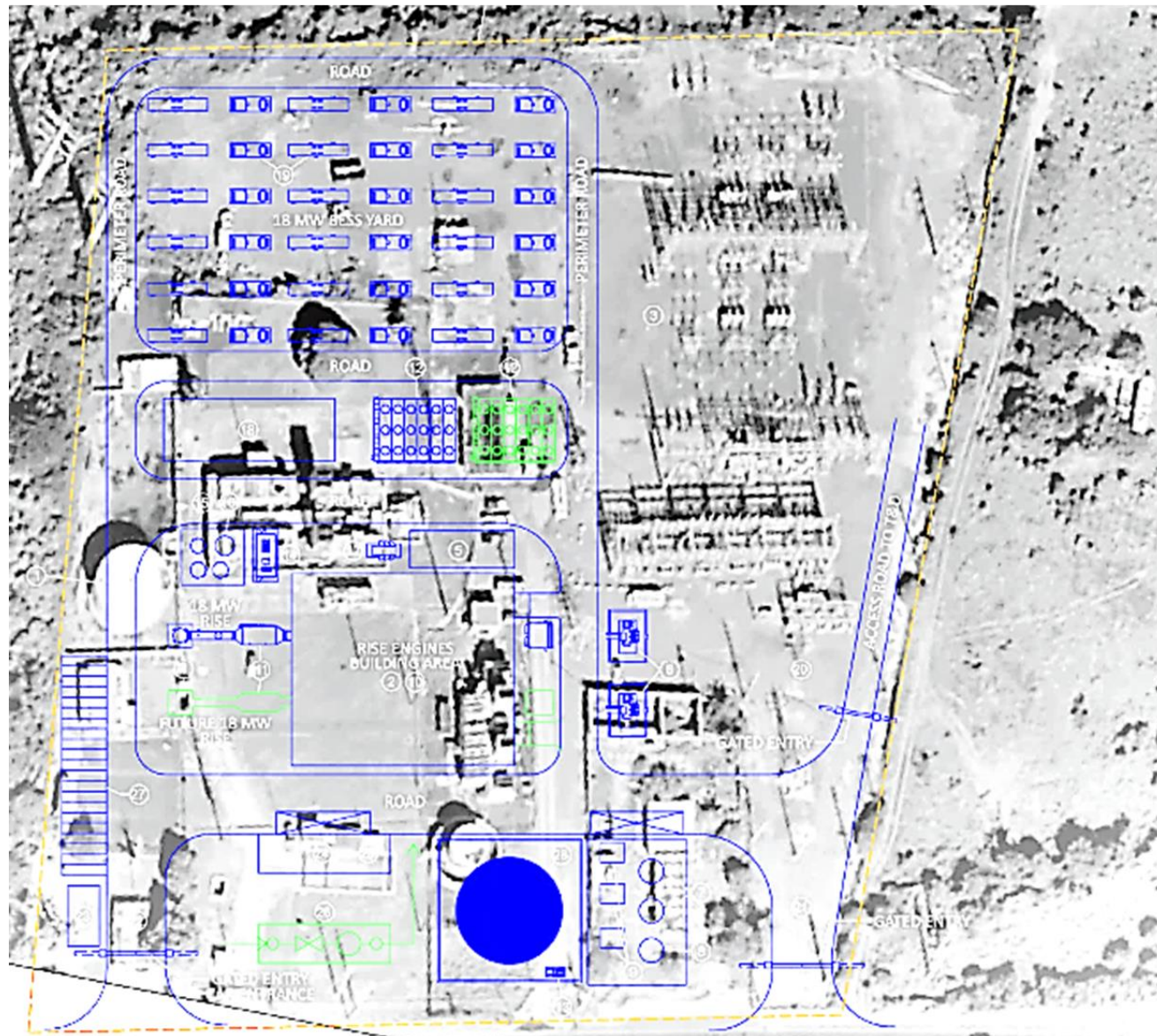
# PROPOSED LOCATIONS AND CAPACITY



**Total  
430MW**



# BESS AND PEAKER CO-LOCATED CONFIGURATION EXAMPLE



1	EXISTING TANK (FUEL OIL)
2	RICE ENGINES
3	EXISTING SWITCH YARD
4	STACK
5	ELECTRICAL PDC
6	GSU
7	LNG VAPORIZERS
8	LNG PUMP
9	LNG STORAGE TANKS
10	AIR EQUIPMENT
11	SCR
12	FIN FAN COOLERS
13	FUEL OIL TRANSFER SKID
14	LUBE OIL/UREA PUMPS
15	LUBE OIL TANKS
16	UREA TANK
17	EMERGENCY DIESEL GENERATOR
18	OFFICES, KITCHEN & TOILETS
19	18 MW BESS YARD
20	LNG TRUCK UNLOADING AREA
21	TRUCK EXIT
22	TRUCK ENTRANCE
23	GUARD HOUSE
24	LFO AREA
25	SHELTER FUEL OIL METERING
26	FUTURE PIPELINE RECEIVING
27	PARKING
28	LFO TANK

## Jobos Station Reconfiguration 2x16.7 MW RICE with 18 MW BESS

Blue = FEMA Phase  
Green = Possible Future Phase







**Stakeholder and public participation are encouraged by Genera. For any questions or comments regarding this presentation, please contact us at [info@genera-pr.com](mailto:info@genera-pr.com).**

