



Monthly Generation Performance Report

August 2023

Introduction

As part of the Transmission and Distribution System Operation and Maintenance Agreement (OMA), LUMA serves as both the operator of the electric grid and as the island's System Operator.

As the Operator of the electric grid, LUMA oversees and maintains the transmission and distribution system that is critical to delivering energy to over 1.5 million Puerto Rican customers.

As the System Operator, LUMA monitors the performance of GeneraPR and other private generators' generation units, implements dispatch of available units, and plans and maintains adequate generation reserve levels to meet customer's energy demands.

While LUMA does not generate energy, LUMA's responsibility as the System Operator includes measuring the performance of the island's generation fleet. This report summarizes generation performance, identifies trends, compares facility performance, and provides a high-level picture of the entire generation portfolio.



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Executive Summary – August Performance

Overview

The Maximum Peak Demand for August 2023 is approximately 3254 MW.

There are no units scheduled to be taken offline for repair in August. Costa Sur 5 is in an outage and expected back by October 7. San Juan 7 and Aguirre 1 are both currently in outages and do not have a return date.

Looking back on this month, there were only a couple of times customers lost power due to unanticipated breakdowns from San Juan CC 6 and the FEMA Units.

Major Events

In August, the electric system experienced 3 load shed events due to generation shortfall, and 4 generation events that caused underfrequency load shed to prevent a frequency decay.

System Reserves

In August, the hourly reserve levels averaged 669 MW, with 441 hours during the month having less than 750 MW in reserves (equal to 59% of the time.)

Without the additional 150 MW of generation from the Palo Seco FEMA units, the electric system would have experienced 7 additional load shed events due to generation shortfall this month.

The forecast for September 2023 shows higher reserve levels to the same month last year (September 2022), with 1,409 MW average reserves forecasted versus 686 MW seen for the same month last year.

The System Availability for the month of August was 60%.

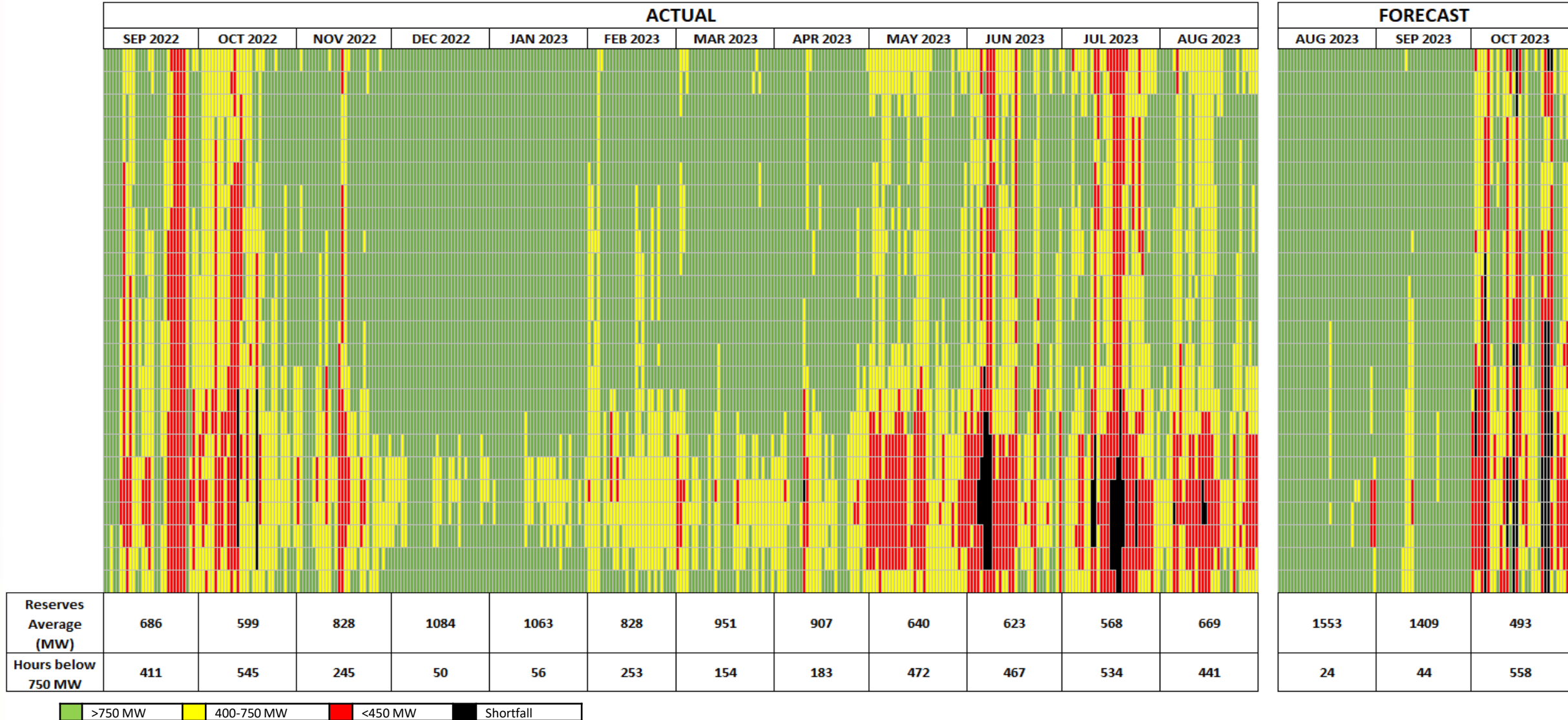
- PREPA – 52%
- AES – 88%
- EcoEléctrica – 96%



System Reserves

System Reserves is the amount of generating capacity available to meet peak or abnormally high demands for power and to generate power during scheduled or unscheduled outages.

Target: ▲ Reserves >750MW per the System Operation Principles

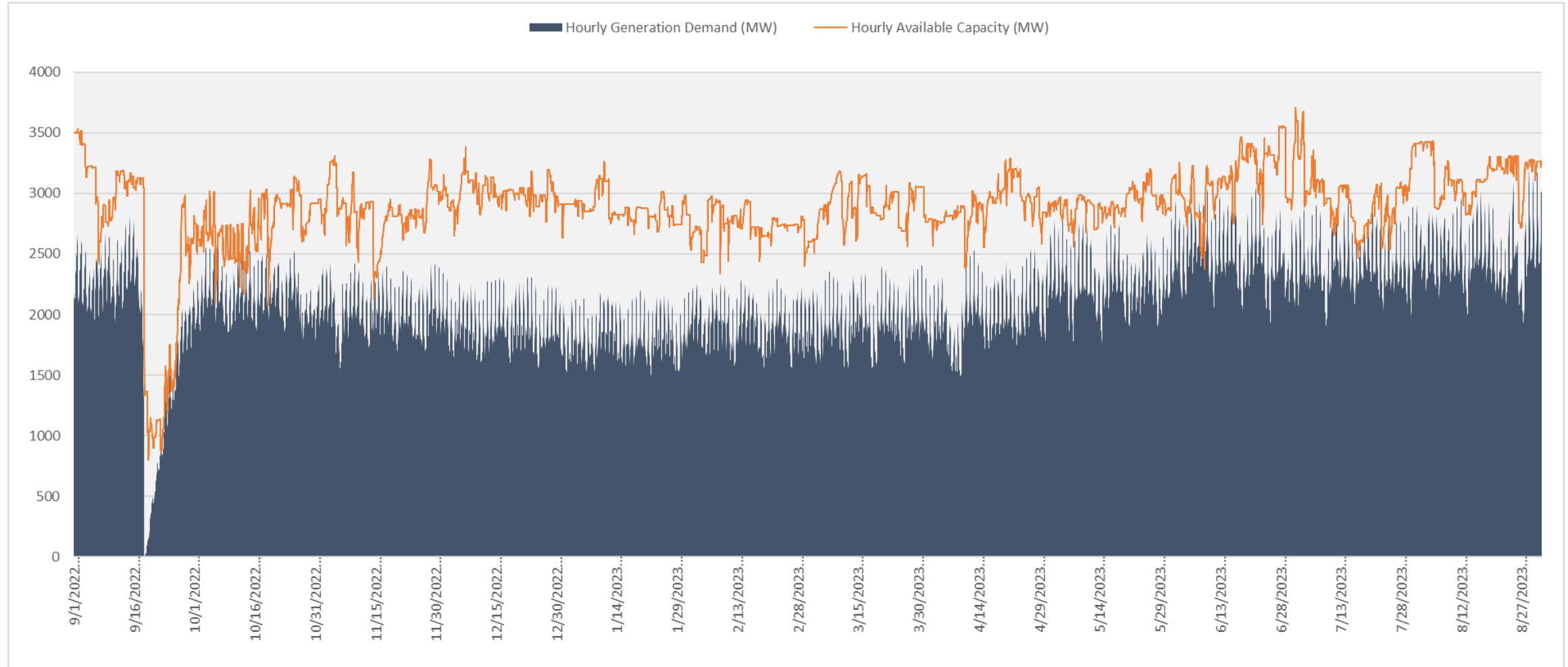


*Refer to Glossary of Terms on page 22 for a list of definitions and formulas.

System Availability

The System Availability is the maximum expected output that generating units can supply to system load, adjusted for scheduled or unscheduled outages. In this graph, the availability is being compared with the total generation required to meet demand to visualize the gap between the two lines (the gap represents the reserves level).

Target: ▲ A bigger gap between availability and generation demand means a better chance of recovery in emergency events due to adequate reserves.



- The dip in availability and generation in September is due to the passing of Hurricane Fiona.

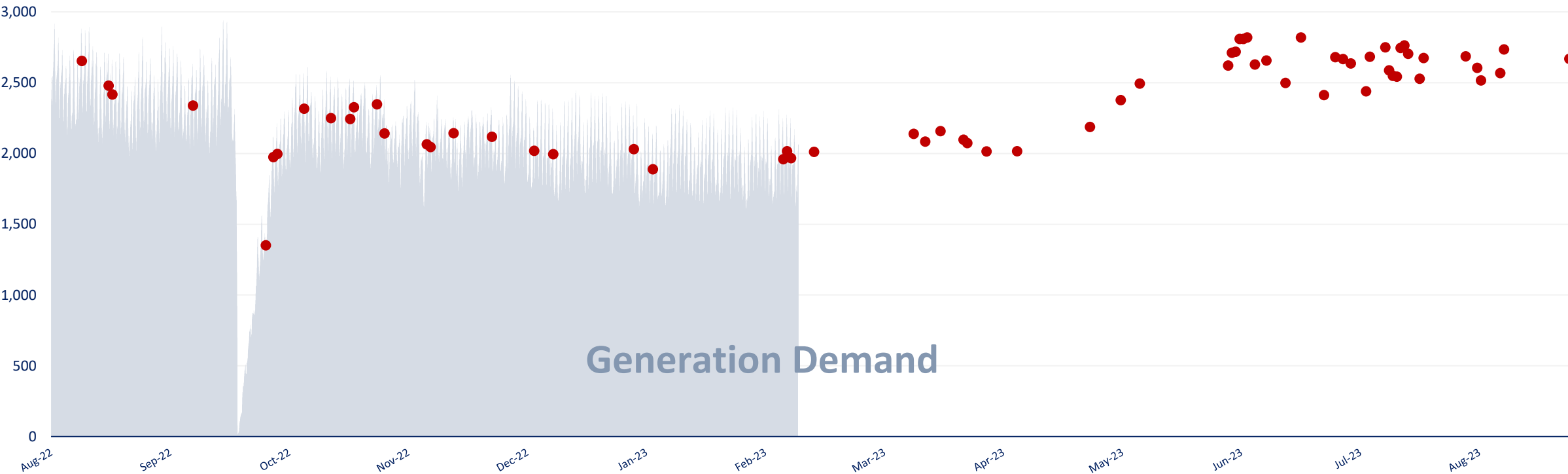


Load Shed Events

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.

Total Load Shed Events: 84



August (August 1, 2023 – August 31, 2023)	Total Events	Average Customers Affected	Average Duration (min)
Generation Shortfall Events	3	8,166	35
Unit Performance Load Shed Events	4	92,802	13

Rolling 12 Months (August 1, 2022 - August 31, 2023)	Total Events	Average Customers Affected	Average Duration (min)
Generation Shortfall Events	23	97,790	191
Unit Performance Load Shed Events	61	102,658	31

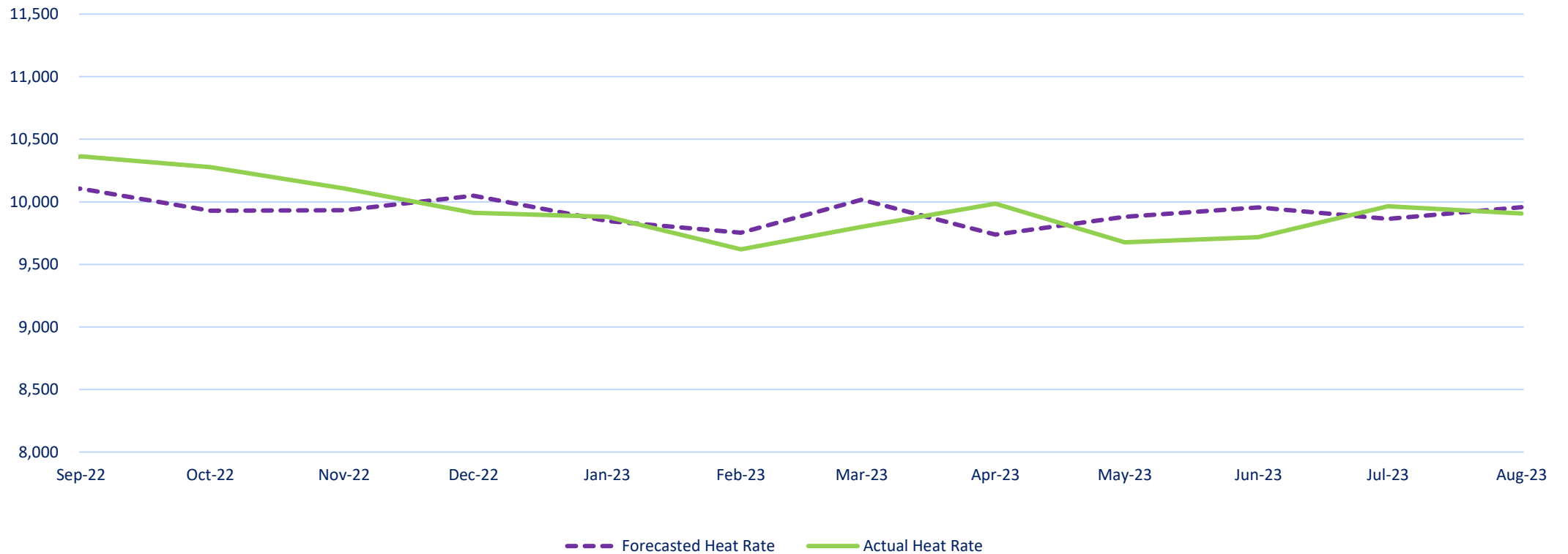
*Refer to Glossary of Terms on page 22 for a list of definitions and formulas.

System Heat Rate

The System Heat Rate measures the efficiency of the system to convert fuel into electricity. System Heat Rate will vary depending on the available generation units and required resources to satisfy electrical demand. It is calculated as energy consumed (MMBtu) / energy produced (MWh). The forecasted Heat Rate is determined by the last forecast calculated for the Fuel Clause Adjustment Factor.

Target: ▼ Lower heat rates represent higher efficiency.

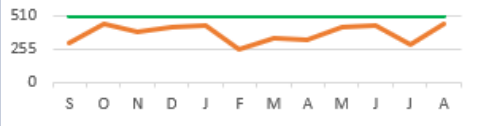


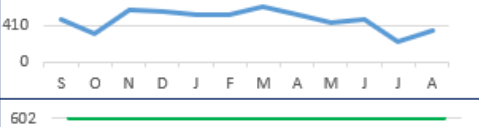


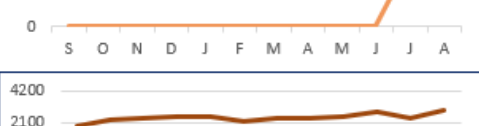

Forecasted vs Actual Heat Rate



Available Capacity – Baseload Units

Available Capacity is the maximum output that a unit can generate at any given time. The Availability Rate indicates the percent of available capacity out of the total nameplate capacity. Variables in the chart below are shown in MW (gross) representing an average over the month.

Target: ▲ A higher availability indicates the plant is able to produce power closer to its nameplate capacity.

Available Capacity (MW) and Availability Rate (AR)		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	
AES Nameplate Cap: 508		MW	302	452	391	426	438	256	333	323	425	435	285	449
	AR	59%	89%	77%	84%	86%	50%	66%	64%	84%	86%	56%	88%	
EcoElectrica Nameplate Cap: 550		MW	395	452	550	550	550	550	315	380	550	544	552	530
	AR	72%	82%	100%	100%	100%	100%	57%	69%	100%	99%	100%	96%	
PREPA Aguirre Nameplate Cap: 900		MW	175	180	107	350	128	0	243	307	84	321	274	343
	AR	19%	20%	12%	39%	14%	0%	27%	34%	9%	36%	30%	38%	
PREPA Costa Sur Nameplate Cap: 820		MW	477	324	586	568	532	524	616	536	442	479	221	347
	AR	58%	40%	71%	69%	65%	64%	75%	65%	54%	58%	27%	42%	
PREPA Palo Seco Nameplate Cap: 602		MW	146	452	391	426	438	256	333	323	425	435	285	449
	AR	24%	75%	65%	71%	73%	43%	55%	54%	71%	72%	47%	75%	
PREPA San Juan Nameplate Cap: 840		MW	403	427	385	167	445	662	614	571	571	638	700	659
	AR	48%	51%	46%	20%	53%	79%	73%	68%	68%	76%	83%	78%	
FEMA Palo Seco Nameplate Cap: 150		MW	0	0	0	0	0	0	0	0	0	149	145	
	AR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	99%	97%	
Total Baseload Nameplate Cap: 4370		MW	1898	2287	2410	2488	2531	2249	2455	2441	2497	2853	2467	2923
	AR	45%	54%	57%	59%	60%	53%	58%	58%	59%	68%	56%	67%	

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

Available Capacity – Peaker Units

Available Capacity is the maximum output that a unit can generate at any given time. The Availability Rate indicates the percent of available capacity out of the total nameplate capacity. Variables in the chart below are shown in MW representing an average over the month.

Target: ▲ A higher availability indicates the plant is able to produce power closer to its nameplate capacity.


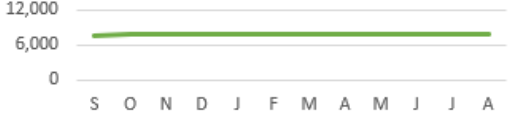


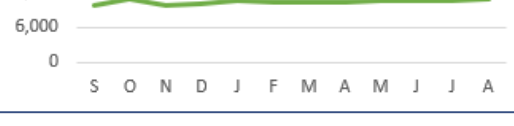

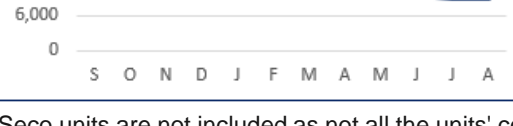
Available Capacity (MW) and Availability Rate (AR)		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
PREPA Aguirre Combined Cycle Nameplate Cap: 592	<div>MW</div>	171	202	166	65	0	81	95	137	190	193	191	199
	<div>AR</div>	29%	34%	28%	11%	0%	14%	16%	23%	32%	33%	32%	34%
PREPA Cambalache Nameplate Cap: 248	<div>MW</div>	146	152	146	156	151	136	136	113	155	146	152	142
	<div>AR</div>	59%	62%	59%	63%	61%	55%	55%	46%	63%	59%	61%	57%
PREPA Mayaguez Nameplate Cap: 220	<div>MW</div>	37	37	29	37	38	38	33	40	37	35	28	29
	<div>AR</div>	17%	17%	13%	17%	17%	17%	15%	18%	17%	16%	13%	13%
PREPA Palo Seco (Inc. Mobile-Pack) Nameplate Cap: 207	<div>MW</div>	148	175	177	170	177	177	178	178	165	162	175	192
	<div>AR</div>	71%	84%	85%	82%	85%	86%	86%	86%	80%	78%	85%	93%
Other Peakers Nameplate Cap: 264	<div>MW</div>	68	68	71	73	69	76	78	59	57	55	71	69
	<div>AR</div>	26%	26%	27%	28%	26%	29%	30%	22%	22%	21%	27%	26%
Total Peakers Nameplate Cap: 1531	<div>MW</div>	569	634	589	501	435	508	520	527	604	591	617	631
	<div>AR</div>	37%	41%	38%	33%	28%	33%	34%	34%	39%	39%	40%	41%

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

Heat Rate – Baseload Units

Heat Rate measures the efficiency of a power plant to convert fuel into electricity. It is calculated as energy consumed (MMBtu) / energy produced (MWh).

Target: ▼ Lower heat rates represent higher efficiency.

Heat Rate (MMBtu/MWh)		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
AES		9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800
EcoElectrica		7,683	7,932	7,932	7,932	7,932	7,945	7,945	7,945	7,945	7,945	7,945	7,945
PREPA Aguirre		10,935	11,486	12,016	10,957	10,699	-	11,230	11,075	12,205	10,741	11,494	11,061
PREPA Costa Sur		10,749	10,724	10,736	10,845	10,909	11,408	10,995	11,249	11,281	11,095	12,327	10,955
PREPA Palo Seco		9,865	10,960	9,876	10,131	10,483	10,363	10,223	10,229	10,614	10,474	10,573	10,785
PREPA San Juan		10,271	11,417	11,404	11,603	10,559	9,869	8,345	8,751	8,308	8,566	8,729	8,772
Total Baseload		9,846	10,156	10,049	9,982	9,931	9,866	9,761	9,860	9,662	9,626	8,987	8,951

- The FEMA Palo Seco units are not included as not all the units' consumption is included in the Genera Fuel Report

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

Heat Rate – Peaker Units

Heat Rate measures the efficiency of a power plant to convert fuel into electricity. It is calculated as energy consumed (MMBtu) / energy produced (MWh).

Target: ▼ Lower heat rates represent higher efficiency.

Heat Rate (MMBtu/MWh)		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
PREPA Aguirre Combined Cycle		13,170	12,150	13,145	15,978	-	15,272	13,680	15,461	15,437	15,129	14,561	15,243
PREPA Cambalache		12,481	12,646	13,185	14,794	14,509	13,971	13,264	14,206	12,887	13,005	12,504	12,965
PREPA Mayaguez		10,728	13,418	10,919	10,413	10,816	10,934	10,355	11,417	11,234	11,046	10,970	11,256
PREPA Palo Seco (Inc. Mobile Pack)		12,234	11,818	11,481	11,719	11,341	11,719	11,964	11,499	11,908	12,143	11,493	11,967
Other Peakers		14,860	15,750	14,053	15,681	16,101	17,324	15,391	14,898	14,497	13,642	13,677	15,418
Total Peakers		12,421	12,587	12,438	12,628	12,332	13,085	12,746	13,479	13,499	13,220	12,690	13,109

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

Generation and Capacity Factor – Baseload Units

Generation indicates the average amount of energy each plant produced per month, in MW (gross). The Capacity Factor measures what percentage of the nameplate capacity was used to produce energy during that time period.

Target: ▲ Higher Capacity Factor, and a Generation closer to the nameplate capacity will represent a better utilization of the units.

Average Generation (MW) and Capacity Factor		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	
AES Nameplate Cap: 508		MW	266	452	390	414	414	253	314	317	426	425	281	449
	CF	52%	89%	77%	82%	82%	50%	62%	62%	84%	84%	55%	88%	
EcoElectrica Nameplate Cap: 550		MW	309	373	416	411	380	404	261	326	421	430	449	426
	CF	56%	68%	76%	75%	69%	73%	47%	59%	77%	78%	82%	78%	
PREPA Aguirre Nameplate Cap: 900		MW	155	145	83	250	87	0	191	233	74	245	231	258
	CF	17%	16%	9%	28%	10%	0%	21%	26%	8%	27%	26%	29%	
PREPA Costa Sur Nameplate Cap: 820		MW	400	299	503	471	441	429	473	456	431	437	214	324
	CF	49%	37%	61%	57%	54%	52%	58%	56%	53%	53%	26%	39%	
PREPA Palo Seco Nameplate Cap: 602		MW	114	149	152	258	239	261	241	231	295	207	259	130
	CF	19%	25%	25%	43%	40%	43%	40%	38%	49%	34%	43%	22%	
PREPA San Juan Nameplate Cap: 840		MW	353	404	365	141	293	432	363	324	371	417	470	446
	CF	42%	48%	43%	17%	35%	51%	43%	39%	44%	50%	56%	53%	
FEMA Palo Seco Nameplate Cap: 150		MW	0	0	0	0	0	0	0	0	0	0	149	146
	CF	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	99%	97%	
Total Baseload Nameplate Cap: 4370		MW	1597	1822	1910	1945	1854	1778	1842	1886	2019	2161	2053	2178
	CF	38%	43%	45%	46%	44%	42%	44%	45%	48%	51%	47%	50%	

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

Generation and Capacity Factor – Peaker Units

Generation indicates the average amount of energy each plant produced per month (MW). The Capacity Factor measures what percentage of the nameplate capacity was used to produce energy during that time period.

Target: ▲ Higher Capacity Factor, and a Generation closer to the nameplate capacity will represent a better utilization of the units.

Average Generation (MW) and Capacity Factor		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
PREPA Aguirre Combined Cycle Nameplate Cap: 592	<div><div>MW</div><div>CF</div></div>	80	149	76	5	0	23	28	34	103	89	112	83
		14%	25%	13%	1%	0%	4%	5%	6%	17%	15%	19%	14%
PREPA Cambalache Nameplate Cap: 247.5	<div><div>MW</div><div>CF</div></div>	63	53	22	10	7	18	21	19	44	44	83	69
		25%	21%	9%	4%	3%	7%	8%	8%	18%	18%	33%	28%
PREPA Mayaguez Nameplate Cap: 220	<div><div>MW</div><div>CF</div></div>	53	46	51	18	8	23	17	26	55	56	88	64
		24%	21%	23%	8%	4%	10%	8%	12%	25%	26%	40%	29%
PREPA Palo Seco (Inc. Mobile-Pack) Nameplate Cap: 207	<div><div>MW</div><div>CF</div></div>	39	62	21	4	8	17	17	16	37	40	55	70
		19%	30%	10%	2%	4%	8%	8%	7%	18%	19%	26%	34%
Other Peakers (PREPA) Nameplate Cap: 264	<div><div>MW</div><div>CF</div></div>	14	23	16	2	1	2	7	3	10	11	22	13
		5%	9%	6%	1%	0%	1%	3%	1%	4%	4%	8%	5%
Total Peakers Nameplate Cap: 1530.5	<div><div>MW</div><div>CF</div></div>	249	332	186	39	24	83	90	98	248	241	359	299
		16%	22%	12%	3%	2%	5%	6%	6%	16%	16%	23%	20%

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

Planned Outage Hours – Baseload Units

Planned Outage Hours represents the shutdown of a generating unit or facility for inspection or maintenance, in accordance with an advance schedule; represented in hours. This scoreboard compares the scheduled outage hours with the actual duration of the outage.

Target: ▼ A smaller gap between actuals and planned hours represents a more accurate planification.









	Planned Outage Hours (SEP 2022 - AUG 2023)	Planned Outage Hours	Completed Outage Hours	Notes for In-Progress Planned Outages	Expected Return-to- Service Date
AES		672	667		
EcoElectrica		1248	1142		
PREPA Aguirre		1248	1151		
PREPA Costa Sur		2928	0		
PREPA Palo Seco		0	72		
PREPA San Juan		4512	3582		
FEMA Palo Seco		0	0		
Total Baseload		10608	6614		

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

Maintenance Outage Hours – Baseload Units

Maintenance Outage Hours represent the shutdown of a generating unit or facility for nonemergency reasons or conditions which need repair outside of the advance schedule; represented in hours per unit.

Target: ▼ Less maintenance hours represents more available capacity in the system to meet demand.

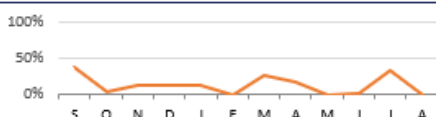


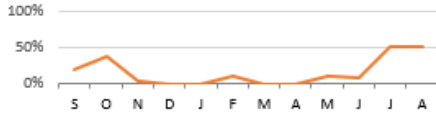
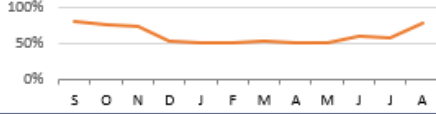
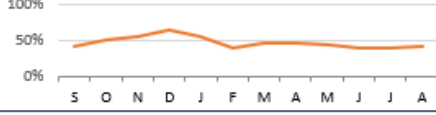


Maintenance Outage Hours		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
AES		0	0	0	0	0	24	0	0	0	0	0	0
EcoElectrica		0	3	0	0	0	0	24	0	0	0	0	0
PREPA Aguirre		0	0	0	0	0	0	44	0	0	0	0	0
PREPA Costa Sur		0	0	0	90	0	0	0	0	0	35	0	0
PREPA Palo Seco		71	18	0	0	0	0	0	0	0	0	0	0
PREPA San Juan		0	19	137	421	0	2	39	37	0	0	0	0
FEMA Palo Seco		0	0	0	0	0	0	0	0	0	0	11	0
Total Baseload		71	40	137	511	0	26	107	37	0	35	11	0

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

Forced Outage Hours and Rate – Baseload Units

Forced Outage Hours represent the shutdown of a generating unit or facility for emergency reasons or a condition in which the generating equipment is unavailable for load due to an unanticipated breakdown; represented in hours per unit. The Forced Outage Rate represents the percentage of time the unit was in a Forced Outage condition out of the total time the unit was expected to be available.

Target: ▼ Less forced outage hours and a smaller outage rate represents more available capacity in the system to meet demand.







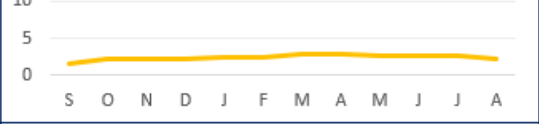









Forced Outage Hours and Outage Rate		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	
AES		Hrs	543	36	175	178	173	0	384	249	0	25	505	0
		%	38%	2%	12%	12%	12%	0%	27%	17%	0%	2%	34%	0%
EcoElectrica		Hrs	118	211	0	4	0	0	30	5	0	13	0	72
		%	5%	10%	0%	0%	0%	0%	2%	0%	0%	1%	0%	3%
PREPA Aguirre		Hrs	899	1055	1180	720	815	720	768	778	1166	823	855	800
		%	67%	71%	82%	48%	75%	94%	56%	54%	78%	57%	57%	54%
PREPA Costa Sur		Hrs	268	553	46	0	0	153	0	0	139	116	771	743
		%	19%	37%	3%	0%	0%	11%	0%	0%	9%	8%	52%	50%
PREPA Palo Seco		Hrs	2198	2250	2120	1572	1537	1395	1598	1498	1525	1751	1704	2293
		%	80%	77%	74%	53%	52%	52%	54%	52%	51%	61%	57%	77%
PREPA San Juan		Hrs	2432	3000	3071	2930	3174	2063	2449	2342	2421	2196	2328	2489
		%	42%	51%	55%	64%	55%	40%	46%	47%	45%	40%	39%	42%
FEMA Palo Seco		Hrs	0	0	0	0	0	0	0	0	0	0	76	0
		%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Total Baseload		Hrs	6458	7105	6592	5405	5699	4330	5228	4872	5251	4923	6240	6399
		%	43%	45%	44%	35%	36%	31%	33%	32%	34%	33%	30%	31%

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

Renewables Capacity Factor - Solar

The Capacity Factor measures the actual production of electricity over the theoretical maximum output (nameplate capacity). For Renewable projects, the Capacity Factor is expected to be lower due to the solar and wind cycles.

Target: ▲ A higher Capacity Factor represents a better utilization of the maximum capacity the project is able to produce.

Average Production (MW) and Capacity Factor			Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
AES Ilumina		MW	3	4	4	3	4	4	4	4	4	4	4	4
Nameplate Cap: 20		CF	16%	19%	18%	17%	19%	21%	22%	22%	21%	21%	20%	20%
Windmar Cantera Martínó		MW	0.3	0.5	0.4	0.5	0.5	0.5	0.6	0.5	0.5	0.4	0.5	0.5
Nameplate Cap: 2.1		CF	15%	22%	21%	23%	22%	26%	29%	24%	24%	21%	23%	22%
San Fermín		MW	1	2	2	2	2	3	3	3	3	3	3	3
Nameplate Cap: 20		CF	6%	8%	10%	12%	11%	13%	14%	14%	13%	14%	13%	13%
Horizon Energy		MW	2	2	2	2	2	2	3	3	3	3	3	2
Nameplate Cap: 10		CF	17%	23%	22%	23%	24%	25%	28%	28%	28%	26%	27%	23%
Oriana Energy		MW	8	9	9	9	10	11	10	11	11	11	11	10
Nameplate Cap: 45		CF	17%	19%	20%	20%	21%	24%	23%	25%	25%	24%	24%	21%
Windmar Coto Laurel		MW	1	2	2	2	2	2	2	2	2	2	2	2
Nameplate Cap: 10		CF	14%	21%	20%	22%	20%	22%	22%	20%	21%	21%	23%	22%
Fonroche Humacao		MW	5	7	7	7	7	8	8	9	8	9	8	8
Nameplate Cap: 40		CF	14%	18%	17%	18%	18%	21%	19%	22%	21%	22%	21%	19%
Total Solar		MW	21	26	26	27	28	31	31	33	32	32	31	29
Nameplate Cap: 147		CF	14%	18%	18%	18%	19%	21%	21%	22%	22%	22%	21%	20%

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

Renewables Capacity Factor – Wind and Landfill

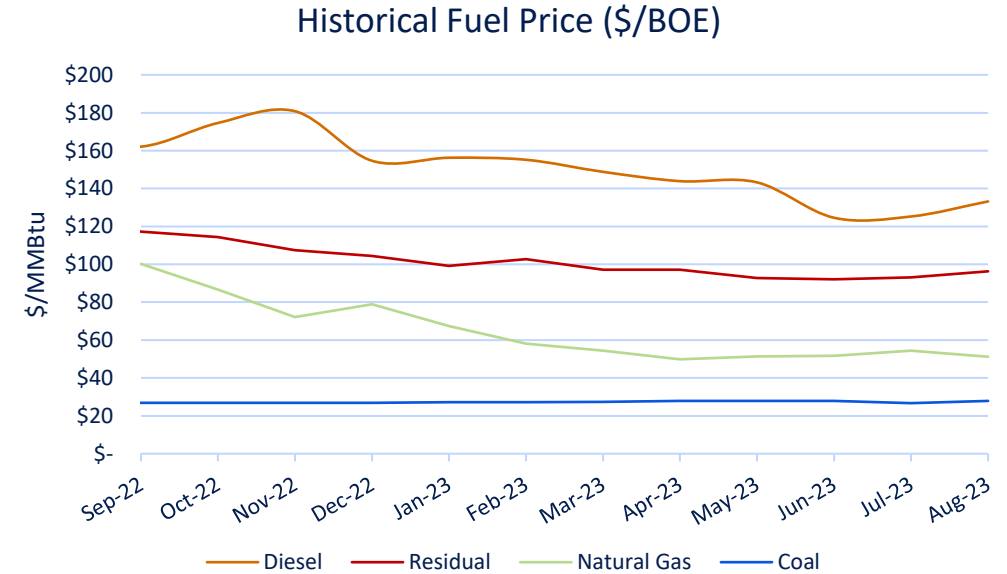
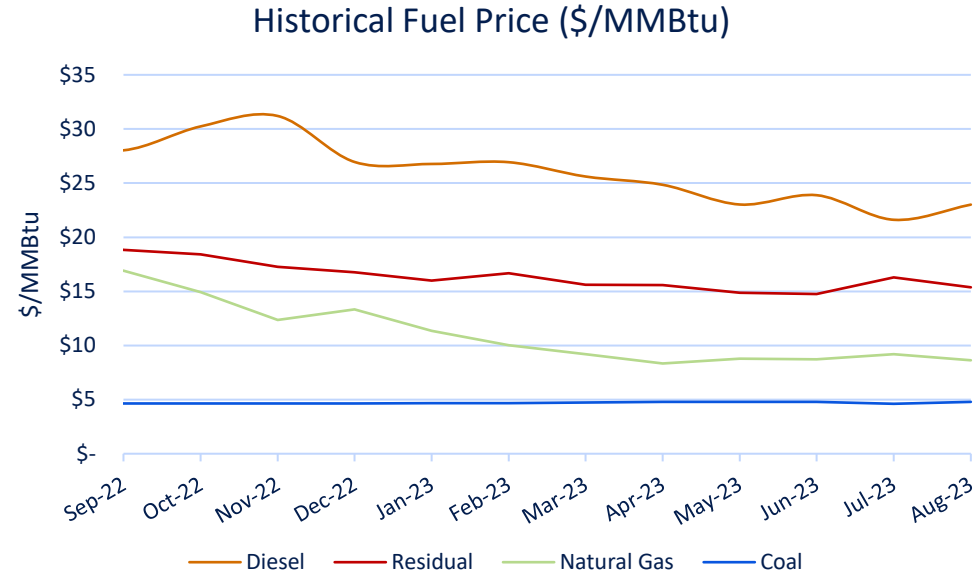
The Capacity Factor measures the actual production of electricity over the theoretical maximum output (nameplate capacity). For Renewable projects, the Capacity Factor is expected to be lower due to the solar and wind cycles.

Target: ▲ A higher Capacity Factor represents a better utilization of the maximum capacity the project is able to produce.

Average Production (MW) and Capacity Factor		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	
Pattern Santa Isabel		MW	7	10	10	11	14	18	14	13	11	12	20	14
Nameplate Cap: 75	S O N D J F M A M J J A	CF	9%	13%	13%	14%	19%	24%	19%	18%	15%	15%	27%	19%
Landfill Gas Fajardo		MW	0.4	0.1	0.2	0.4	0.3	0.5	0.5	0.4	0.7	0.5	0.5	0.4
Nameplate Cap: 2.4	S O N D J F M A M J J A	CF	16%	6%	9%	18%	12%	20%	22%	15%	28%	22%	21%	16%
Landfill Gas Toa Baja		MW	0.7	0.9	0.6	0.5	0.6	0.8	0.6	0.8	0.6	0.9	1.3	0.9
Nameplate Cap: 2.4	S O N D J F M A M J J A	CF	31%	36%	26%	21%	24%	32%	27%	32%	24%	39%	55%	36%
Total Wind and Landfill		MW	8	11	11	12	15	19	15	14	12	13	22	16
Nameplate Cap: 80	S O N D J F M A M J J A	CF	10%	14%	14%	14%	19%	24%	19%	18%	15%	16%	27%	20%

Fuel Prices

Fuel Price shows the prices paid for fuel used by PREPA and private generators, both in terms of MMBtus and Barrel of Oil Equivalent (BOE). The Fuel Price is divided by Fuel Type to better illustrate the contribution to the total Fuel Price for the month.



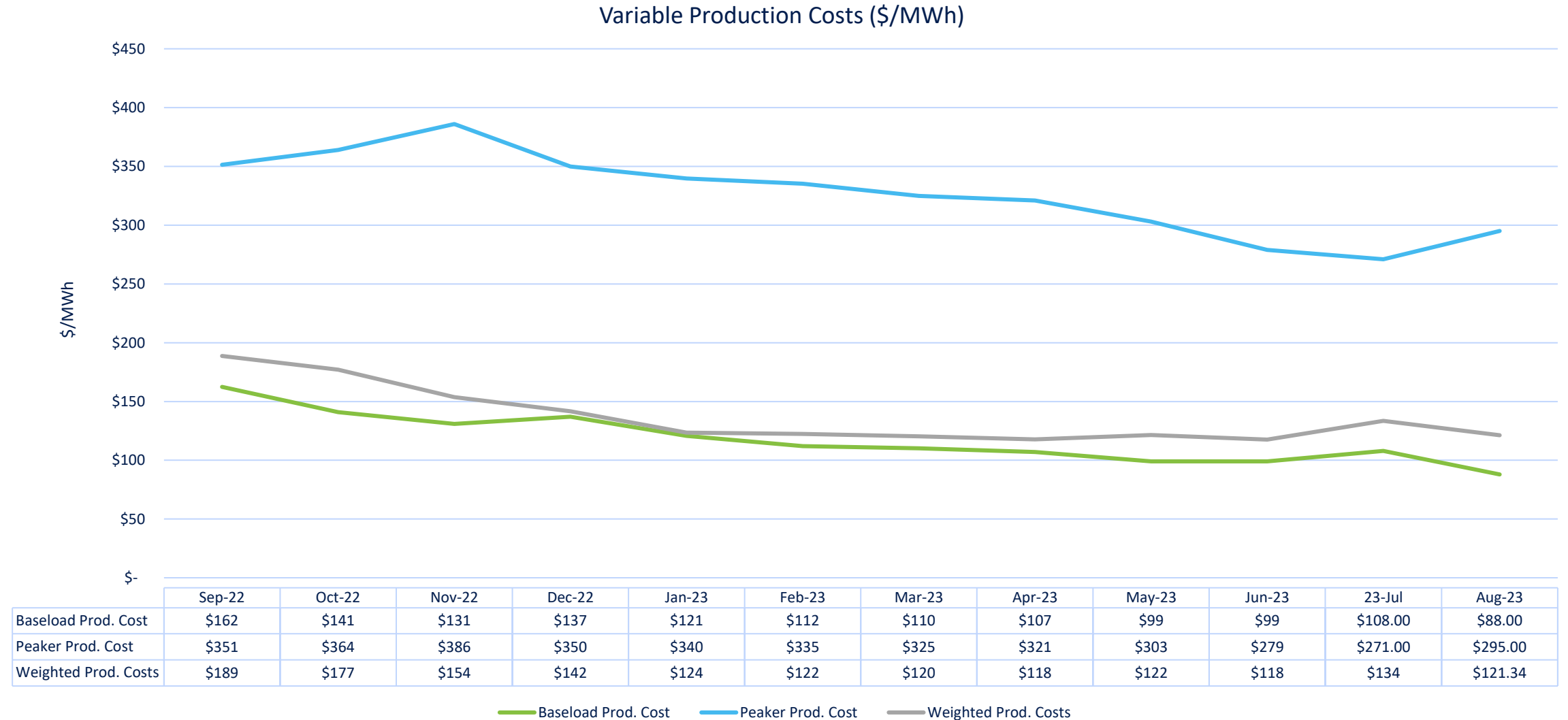
\$/MMBtu	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
Diesel	28.03	30.23	31.20	26.95	26.77	26.93	25.60	24.84	23.02	23.88	21.61	23.01
Residual	18.84	18.41	17.26	16.75	15.98	16.67	15.62	15.57	14.86	14.75	16.29	15.37
Natural Gas	16.90	14.94	12.35	13.32	11.36	10.02	9.19	8.34	8.77	8.73	9.18	8.62
Coal	4.63	4.63	4.63	4.62	4.68	4.68	4.73	4.80	4.80	4.80	4.60	4.79

\$/BOE	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23
Diesel	162.18	174.68	180.89	154.70	156.31	155.24	148.87	143.93	143.30	124.61	125.28	133.24
Residual	117.24	114.41	107.37	104.42	99.14	102.69	97.22	97.19	92.75	92.01	93.14	96.34
Natural Gas	100.24	86.67	72.11	78.82	67.47	58.05	54.41	49.88	51.27	51.62	54.32	51.23
Coal	26.83	26.83	26.83	26.83	27.14	27.16	27.43	27.86	27.86	27.86	26.68	27.78

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

Variable Production Costs

Variable Production Costs are predominantly fuel costs and reflect the cost to produce one MWh of energy. In the graph, the cost is shown separately for Baseload units and Peaker units. The weighted average cost indicates the cost per MWh of energy produced for the System Portfolio.



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

Glossary of Terms

Term	Definition	Formula
Heat Rate	Measures the efficiency of a power plant to convert fuel into electricity. It is the amount of energy used by a power plant to generate one kilowatt-hour (kWh) of electricity. The more efficient the generator is, the lower the heat rate.	MMBtu consumption by all units in the station during a specific period / MWh produced by the same units in the same period
Reserves	Amount of generating capacity available to meet peak or abnormally high demands for power and to generate power during scheduled or unscheduled outages.	Available Capacity (MW) during the reported period minus the Actual Generation (MW) during the same period
Available Capacity	The maximum output, commonly expressed in megawatts (MW), that generating equipment can supply to system load, adjusted for scheduled or unscheduled outages.	N/A – value is provided for each unit
Availability Rate	The ratio of the maximum output that can be supplied to system load for the period of time considered to the nameplate capacity.	Average available capacity for a specific period (MW) / nameplate capacity
Production	The amount of electric energy produced.	N/A – value is provided for each unit
Capacity Factor	The ratio of the electrical energy produced by a generating unit for the period of time considered to the nameplate capacity.	The average energy produced by all units in the plant during a specific period (MWh) / Nameplate capacity for the plant
Planned Outage Hours	The shutdown of a generating unit or facility for inspection or maintenance, in accordance with an advance schedule; represented in hours per unit (Equivalent Planned Outage Hours). Planned Hours – hours provided in the Generation Outage Schedule for the following 90-day outlook. Actual Hours – number of hours a unit was out of service due to a planned outage.	N/A – values is provided for each unit
Maintenance Outage Hours	The shutdown of a generating unit or facility for nonemergency reasons or conditions which need repair outside of the advance schedule; represented in hours per unit.	N/A – value is provided for each unit
Forced Outage Hours	The shutdown of a generating unit or facility for emergency reasons or a condition in which the generating equipment is unavailable for load due to unanticipated breakdown; represented in hours per unit.	N/A – value is provided for each unit
Forced Outage Rate	The ratio of the forced outages hours to the hours the unit was anticipated to be available for the reporting period.	Forced Outage Hours / Period Hours (excluding planned and unplanned outage hours)
Nameplate Capacity	The maximum rated output of a generator, prime mover, or other electric power production equipment under specific conditions designated by the manufacturer.	N/A – value is provided for each unit
Generation Shortfall Events	An event in which customer demand exceeds available supply levels and 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.	N/A – Value is all events which occur in a specified time frame
Unit Performance Load Shed Events	An event in which a generating unit has an unanticipated trip and causes customers to be automatically disconnected from the grid to prevent potential damage to the system.	N/A – Value is all events which occur in a specified time frame

Plant and Unit List – Baseload and Peaker Units

BASELOAD UNITS

Plant	Units	System Reserves	System Availability	System Heat Rate	All Metrics for Baseload Units	All Metrics for Peaker Units	Renewables Capacity Factor
San Juan	CT 5	X	X	X	X		
	STM 5	X	X	X	X		
	CT 6	X	X	X	X		
	STM 6	X	X	X	X		
	7	X	X	X	X		
	8	X	X	X	X		
	9	X	X	X	X		
	10	X	X	X	X		
Costa Sur	5	X	X	X	X		
	6	X	X	X	X		
Aguirre	1	X	X	X	X		
	2	X	X	X	X		
Palo Seco	1	X	X	X	X		
	2	X	X	X	X		
	3	X	X	X	X		
	4	X	X	X	X		
AES	AES 1	X	X	X	X		
	AES 2	X	X	X	X		
EcoEléctrica	ECO 1	X	X	X	X		
	ECO 2	X	X	X	X		
	STM 1	X	X	X	X		
FEMA Palo Seco	GT 1	X	X		X		
	GT 2	X	X		X		
	GT 4	X	X		X		
	GT 5	X	X		X		
	GT 6	X	X		X		
	GT 7	X	X		X		

PEAKER UNITS

Plant	Units	System Reserves	System Availability	System Heat Rate	All Metrics for Baseload Units	All Metrics for Peaker Units	Renewables Capacity Factor
Cambalache	1	X	X	X		X	
	2	X	X	X		X	
	3	X	X	X		X	
Mayaguez	1A	X	X	X		X	
	1B	X	X	X		X	
	2A	X	X	X		X	
	2B	X	X	X		X	
	3A	X	X	X		X	
	3B	X	X	X		X	
	4A	X	X	X		X	
	4B	X	X	X		X	
	1-1	X	X	X		X	
	1-2	X	X	X		X	
Palo Seco (Inc. Mobile-Pack)	2-1	X	X	X		X	
	2-2	X	X	X		X	
	3-1	X	X	X		X	
	3-2	X	X	X		X	
	MP 1	X	X	X		X	
	MP 2	X	X	X		X	
	MP 3	X	X	X		X	
	I-1	X	X	X		X	
	I-2	X	X	X		X	
Aguirre CC	I-3	X	X	X		X	
	I-4	X	X	X		X	
	ST-1	X	X	X		X	
	II-1	X	X	X		X	
	II-2	X	X	X		X	
	II-3	X	X	X		X	
	II-4	X	X	X		X	
	ST-2	X	X	X		X	

PEAKER UNITS

Plant	Units	System Reserves	System Availability	System Heat Rate	All Metrics for Baseload Units	All Metrics for Peaker Units	Renewables Capacity Factor
Other Peakers	Daguao 1-1	X	X	X		X	
	Daguao 1-2	X	X	X		X	
	Aguirre 2-1	X	X	X		X	
	Aguirre 2-2	X	X	X		X	
	Costa Sur 1-1	X	X	X		X	
	Costa Sur 1-2	X	X	X		X	
	Jobos 1-1	X	X	X		X	
	Jobos 1-2	X	X	X		X	
	Yabucoa 1-1	X	X	X		X	
	Yabucoa 1-2	X	X	X		X	
	Vega Baja 1-1	X	X	X		X	
	Vega Baja 1-2	X	X	X		X	
	Vieques 1	X	X	X		X	
	Vieques 2	X	X	X		X	
	Culebra 1	X	X	X		X	
	Culebra 2	X	X	X		X	
	Culebra 3	X	X	X		X	

Plant and Unit List – Renewable Projects

SOLAR PROJECTS

Projects	System Reserves	System Availability	System Heat Rate	All Metrics for Baseload Units	All Metrics for Peaker Units	Renewables Capacity Factor
AES Ilumina						X
Cantera Martinó						X
San Fermín						X
Horizon Energy						X
Oriana Energy						X
Coto Laurel						X
Humacao						X

WIND AND LANDFILL PROJECTS

Projects	System Reserves	System Availability	System Heat Rate	All Metrics for Baseload Units	All Metrics for Peaker Units	Renewables Capacity Factor
Pattern Santa Isabel						X
Landfill Gas Fajardo						X
Landfill Gas Toa Baja						X

HYDRO PLANTS

Projects	System Reserves	System Availability	System Heat Rate	All Metrics for Baseload Units	All Metrics for Peaker Units	Renewables Capacity Factor
Caonillas 1-1						
Caonillas 1-2						
Caonillas 2-1						
Dos Bocas 1						
Dos Bocas 2						
Dos Bocas 3						
Garzas 1-1						
Garzas 1-2						
Garzas 2-1						
Patillas 1-1						
Patillas 1-2						
Rio Blanco 1-1						
Rio Blanco 1-2						
Toro Negro 1-1						
Toro Negro 1-2						
Toro Negro 1-3						
Toro Negro 1-4						
Toro Negro 2-1						
Yauco 1-1						
Yauco 2-1						
Yauco 2-2						