



Monthly Generation Performance Report

May 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 the Puerto Rico Electric Power Authority (PREPA) 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 – May Performance

Overview

San Juan 9 has not completed the environmental maintenance due March 31, and the estimated date of return has been pushed back to June 15. Starting April 29, Aguirre 2 was in a forced outage until May 22 to repair a leak in the main steam pipe causing a reduction in system capacity of 350MW.

The demand is expected to start increase in June and reached 3000MW during peak hours.

The emergency generation project is expected to put online an additional 150MW in Palo Seco.

Major Events

In May, the electric system experienced no load shed events due to generation shortfall, and 2 generation events that caused underfrequency load shed to prevent a frequency decay.

System Reserves

In May, the hourly reserve levels averaged 640 MW, with 472 hours during the month having less than 750 MW in reserves (equal to 63% of the time.)

The forecast for June 2023 shows lower reserve levels to the same month last year (June 2022), with 659 MW average reserves forecasted versus 673 MW seen for the same month last year.

The System Availability for the month of May was 54%.

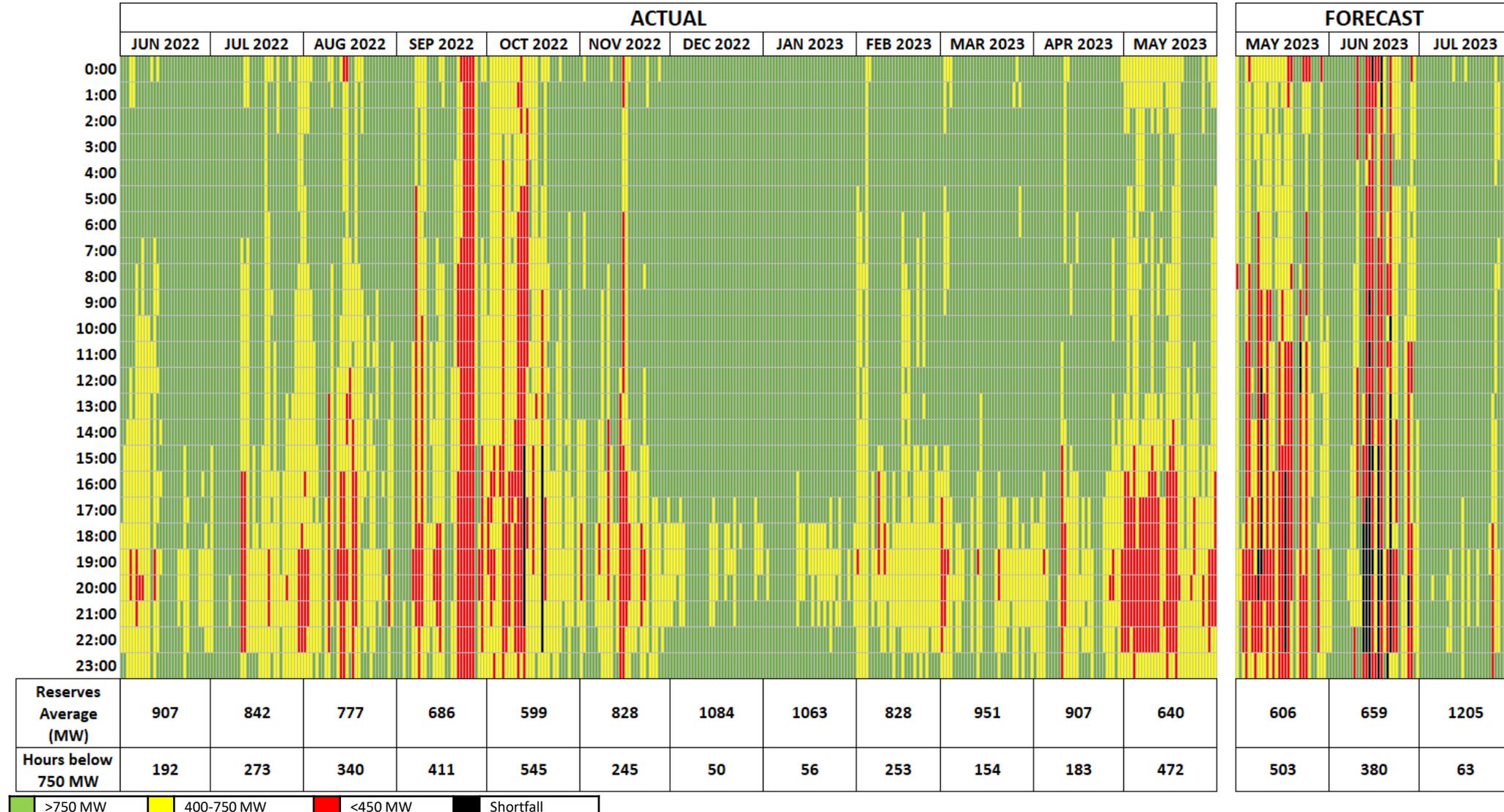
- PREPA – 45%
- AES – 84%
- EcoEléctrica – 100%



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

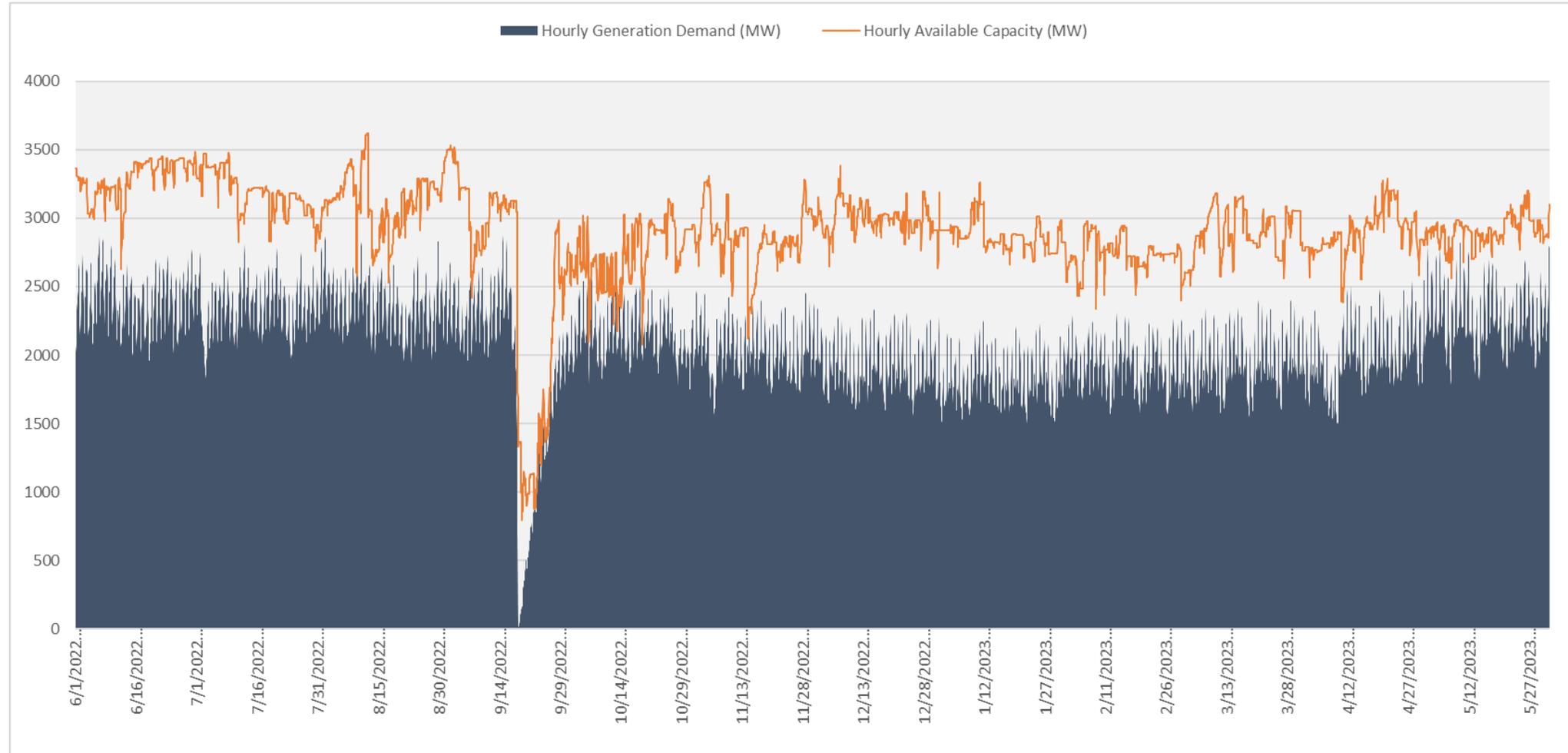


*Refer to Glossary of Terms on page 21 for a list of definitions and formulas.

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.

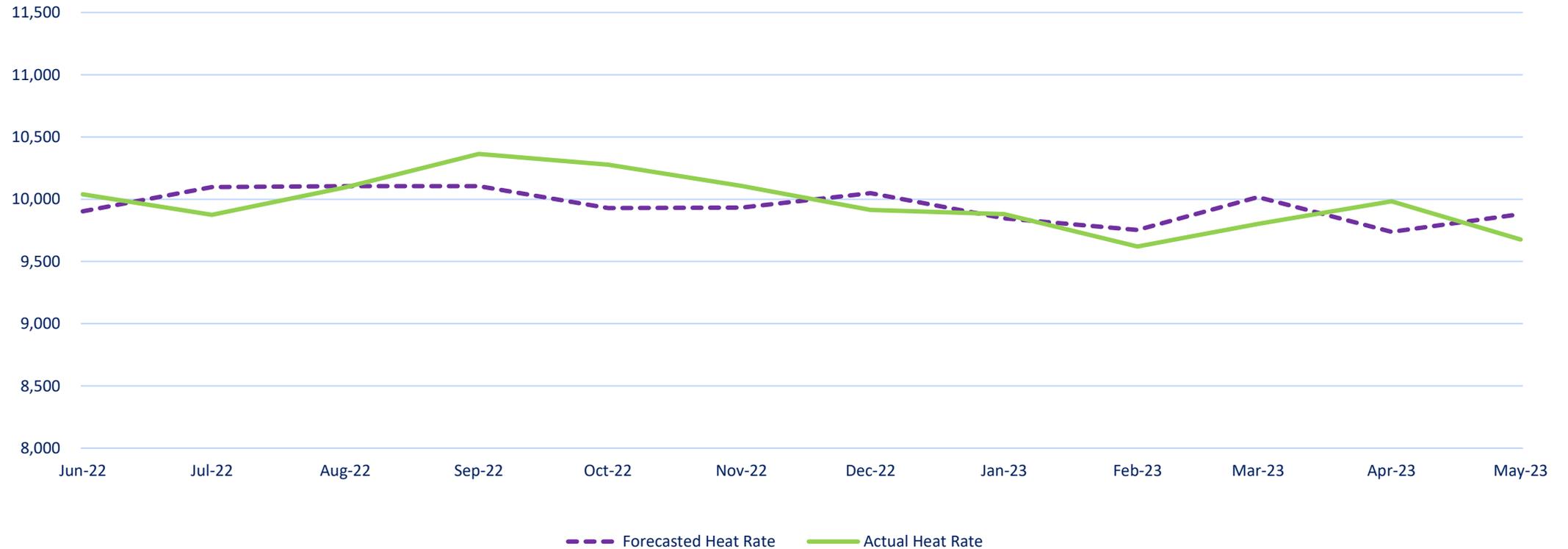


System Heat Rate

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



*Refer to Glossary of Terms on page 21 for a list of definitions and formulas.

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)		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
AES Nameplate Cap: 508		MW 490	298	321	302	452	391	426	438	256	333	323	425
	AR 97%	59%	63%	59%	89%	77%	84%	86%	50%	66%	64%	84%	
EcoElectrica Nameplate Cap: 550		MW 550	550	547	395	452	550	550	550	550	315	380	550
	AR 100%	100%	99%	72%	82%	100%	100%	100%	100%	57%	69%	100%	
PREPA Aguirre Nameplate Cap: 900		MW 328	327	249	175	180	107	350	128	0	243	307	84
	AR 36%	36%	28%	19%	20%	12%	39%	14%	0%	27%	34%	9%	
PREPA Costa Sur Nameplate Cap: 820		MW 587	599	598	477	324	586	568	532	524	616	536	442
	AR 72%	73%	73%	58%	40%	71%	69%	65%	64%	75%	65%	54%	
PREPA Palo Seco Nameplate Cap: 602		MW 366	298	321	302	452	391	426	438	256	333	323	425
	AR 61%	50%	53%	50%	75%	65%	71%	73%	43%	55%	54%	71%	
PREPA San Juan Nameplate Cap: 840		MW 283	394	454	403	427	385	167	445	662	614	571	571
	AR 34%	47%	54%	48%	51%	46%	20%	53%	79%	73%	68%	68%	
Total Baseload Nameplate Cap: 4220		MW 2604	2467	2490	2054	2287	2410	2488	2531	2249	2455	2441	2497
	AR 62%	58%	59%	49%	54%	57%	59%	60%	53%	58%	58%	59%	

*Refer to Glossary of Terms on page 21 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)		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
PREPA Aguirre Combined Cycle Nameplate Cap: 592		MW 278	MW 201	MW 236	MW 171	MW 202	MW 166	MW 65	MW 0	MW 81	MW 95	MW 137	MW 190
	AR	47%	34%	40%	29%	34%	28%	11%	0%	14%	16%	23%	32%
PREPA Cambalache Nameplate Cap: 248		MW 118	MW 143	MW 134	MW 146	MW 152	MW 146	MW 156	MW 151	MW 136	MW 136	MW 113	MW 155
	AR	48%	58%	54%	59%	62%	59%	63%	61%	55%	55%	46%	63%
PREPA Mayaguez Nameplate Cap: 220		MW 40	MW 38	MW 38	MW 37	MW 37	MW 29	MW 37	MW 38	MW 38	MW 33	MW 40	MW 37
	AR	18%	17%	17%	17%	17%	13%	17%	17%	17%	15%	18%	17%
PREPA Palo Seco (Inc. Mobile-Pack) Nameplate Cap: 207		MW 155	MW 153	MW 122	MW 148	MW 175	MW 177	MW 170	MW 177	MW 177	MW 178	MW 178	MW 165
	AR	75%	74%	59%	71%	84%	85%	82%	85%	86%	86%	86%	80%
Other Peakers Nameplate Cap: 264		MW 67	MW 91	MW 89	MW 68	MW 68	MW 71	MW 73	MW 69	MW 76	MW 78	MW 59	MW 57
	AR	25%	34%	34%	26%	26%	27%	28%	26%	29%	30%	22%	22%
Total Peakers Nameplate Cap: 1531		MW 658	MW 626	MW 618	MW 569	MW 634	MW 589	MW 501	MW 435	MW 508	MW 520	MW 527	MW 604
	AR	43%	41%	40%	37%	41%	38%	33%	28%	33%	34%	34%	39%

*Refer to Glossary of Terms on page 21 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)		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
AES		9,766	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800
EcoElectrica		7,692	7,683	7,683	7,683	7,932	7,932	7,932	7,932	7,945	7,945	7,945	7,945
PREPA Aguirre		10,362	10,366	10,847	10,935	11,486	12,016	10,957	10,699	-	11,230	11,075	12,205
PREPA Costa Sur		10,362	10,447	10,620	10,749	10,724	10,736	10,845	10,909	11,408	10,995	11,249	11,281
PREPA Palo Seco		9,839	9,738	10,249	9,865	10,960	9,876	10,131	10,483	10,363	10,223	10,229	10,614
PREPA San Juan		10,768	10,102	9,662	10,271	11,417	11,404	11,603	10,559	9,869	8,345	8,751	8,308
Total Baseload		9,705	9,633	9,712	9,846	10,156	10,049	9,982	9,931	9,866	9,761	9,860	9,662

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Heat Rate – Peaker Units

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Target: ▼ Lower heat rates represent higher efficiency.

Heat Rate (MMBtu/MWh)		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
PREPA Aguirre Combined Cycle		13,796	11,602	12,169	13,170	12,150	13,145	15,978	-	15,272	13,680	15,461	15,437
PREPA Cambalache		13,117	13,001	12,530	12,481	12,646	13,185	14,794	14,509	13,971	13,264	14,206	12,887
PREPA Mayaguez		10,557	10,552	10,406	10,728	13,418	10,919	10,413	10,816	10,934	10,355	11,417	11,234
PREPA Palo Seco (Inc. Mobile Pack)		15,226	19,157	15,922	12,234	11,818	11,481	11,719	11,341	11,719	11,964	11,499	11,908
Other Peakers		15,888	13,496	15,487	14,860	15,750	14,053	15,681	16,101	17,324	15,391	14,898	14,497
Total Peakers		13,306	11,936	12,319	12,421	12,587	12,438	12,628	12,332	13,085	12,746	13,479	13,499

*Refer to Glossary of Terms on page 21 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		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	
AES Nameplate Cap: 508		MW	488	296	318	266	452	390	414	414	253	314	317	426
	CF	96%	58%	63%	52%	89%	77%	82%	82%	50%	62%	62%	84%	
EcoElectrica Nameplate Cap: 550		MW	428	433	428	309	373	416	411	380	404	261	326	421
	CF	78%	79%	78%	56%	68%	76%	75%	69%	73%	47%	59%	77%	
PREPA Aguirre Nameplate Cap: 900		MW	287	281	231	155	145	83	250	87	0	191	233	74
	CF	32%	31%	26%	17%	16%	9%	28%	10%	0%	21%	26%	8%	
PREPA Costa Sur Nameplate Cap: 820		MW	495	473	498	400	299	503	471	441	429	473	456	431
	CF	60%	58%	61%	49%	37%	61%	57%	54%	52%	58%	56%	53%	
PREPA Palo Seco Nameplate Cap: 602		MW	305	277	275	114	149	152	258	239	261	241	231	295
	CF	51%	46%	46%	19%	25%	25%	43%	40%	43%	40%	38%	49%	
PREPA San Juan Nameplate Cap: 840		MW	262	374	419	353	404	365	141	293	432	363	324	371
	CF	31%	45%	50%	42%	48%	43%	17%	35%	51%	43%	39%	44%	
Total Baseload Nameplate Cap: 4220		MW	2265	2134	2169	1597	1822	1910	1945	1854	1778	1842	1886	2019
	CF	54%	51%	51%	38%	43%	45%	46%	44%	42%	44%	45%	48%	

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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.

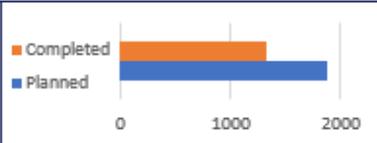
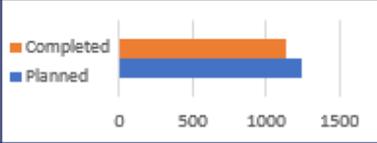
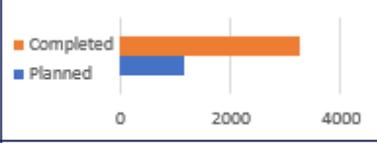
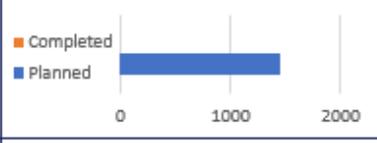
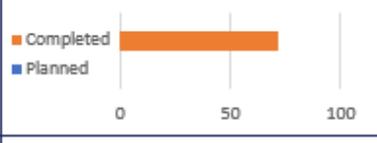
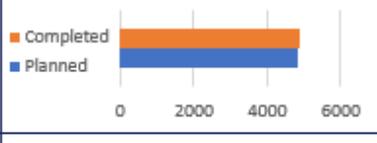
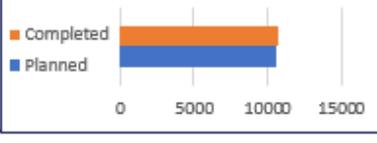
Average Generation (MW) and Capacity Factor		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
PREPA Aguirre Combined Cycle Nameplate Cap: 592		MW 92	MW 100	MW 113	MW 80	MW 149	MW 76	MW 5	MW 0	MW 23	MW 28	MW 34	MW 103
		CF 15%	CF 17%	CF 19%	CF 14%	CF 25%	CF 13%	CF 1%	CF 0%	CF 4%	CF 5%	CF 6%	CF 17%
PREPA Cambalache Nameplate Cap: 247.5		MW 17	MW 16	MW 35	MW 63	MW 53	MW 22	MW 10	MW 7	MW 18	MW 21	MW 19	MW 44
		CF 7%	CF 6%	CF 14%	CF 25%	CF 21%	CF 9%	CF 4%	CF 3%	CF 7%	CF 8%	CF 8%	CF 18%
PREPA Mayaguez Nameplate Cap: 220		MW 22	MW 26	MW 29	MW 53	MW 46	MW 51	MW 18	MW 8	MW 23	MW 17	MW 26	MW 55
		CF 10%	CF 12%	CF 13%	CF 24%	CF 21%	CF 23%	CF 8%	CF 4%	CF 10%	CF 8%	CF 12%	CF 25%
PREPA Palo Seco (Inc. Mobile-Pack) Nameplate Cap: 207		MW 5	MW 7	MW 7	MW 39	MW 62	MW 21	MW 4	MW 8	MW 17	MW 17	MW 16	MW 37
		CF 2%	CF 3%	CF 3%	CF 19%	CF 30%	CF 10%	CF 2%	CF 4%	CF 8%	CF 8%	CF 7%	CF 18%
Other Peakers (PREPA) Nameplate Cap: 264		MW 4	MW 3	MW 12	MW 14	MW 23	MW 16	MW 2	MW 1	MW 2	MW 7	MW 3	MW 10
		CF 2%	CF 1%	CF 5%	CF 5%	CF 9%	CF 6%	CF 1%	CF 0%	CF 1%	CF 3%	CF 1%	CF 4%
Total Peakers Nameplate Cap: 1530.5		MW 140	MW 151	MW 196	MW 249	MW 332	MW 186	MW 39	MW 24	MW 83	MW 90	MW 98	MW 248
		CF 9%	CF 10%	CF 13%	CF 16%	CF 22%	CF 12%	CF 3%	CF 2%	CF 5%	CF 6%	CF 6%	CF 16%

*Refer to Glossary of Terms on page 21 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 (JUN 2022 - MAY 2023)	Planned Outage Hours	Completed Outage Hours	Notes for In-Progress Planned Outages	Expected Return-to- Service Date
AES		1872	1323		
EcoElectrica		1248	1142		
PREPA Aguirre		1176	3262		
PREPA Costa Sur		1464	0		
PREPA Palo Seco		0	72		
PREPA San Juan		4824	4888	San Juan 9 - Out since 2/19/23 (Environmental Maintenance)	San Juan 9 - 6/15/23
Total Baseload		10584	10687		

*Refer to Glossary of Terms on page 21 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.

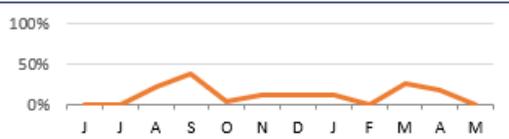
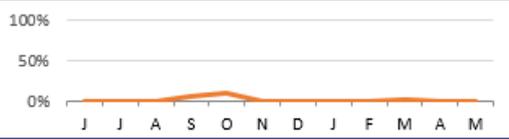
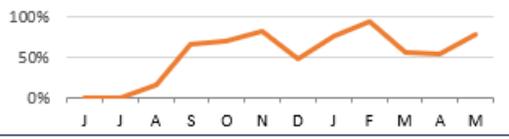
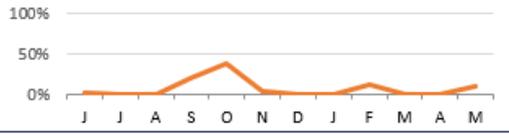
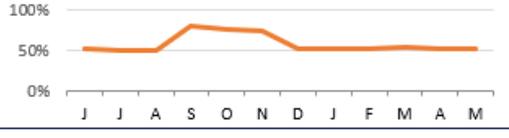
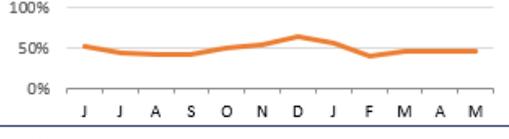
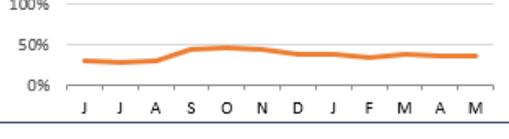
Maintenance Outage Hours		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
AES		0	0	0	0	0	0	0	0	24	0	0	0
EcoElectrica		0	0	0	0	3	0	0	0	0	24	0	0
PREPA Aguirre		0	0	43	0	0	0	0	0	0	44	0	0
PREPA Costa Sur		3	0	37	0	0	0	90	0	0	0	0	0
PREPA Palo Seco		0	21	9	71	18	0	0	0	0	0	0	0
PREPA San Juan		0	98	15	0	19	137	421	0	2	39	37	0
Total Baseload		3	119	104	71	40	137	511	0	26	107	37	0

*Refer to Glossary of Terms on page 21 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		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	
AES		Hrs	0	0	281	543	36	175	178	173	0	384	249	0
	%	0%	0%	21%	38%	2%	12%	12%	12%	0%	27%	17%	0%	
EcoElectrica		Hrs	0	0	7	118	211	0	4	0	0	30	5	0
	%	0%	0%	0%	5%	10%	0%	0%	0%	0%	2%	0%	0%	
PREPA Aguirre		Hrs	0	0	130	899	1055	1180	720	815	720	768	778	1166
	%	0%	0%	16%	67%	71%	82%	48%	75%	94%	56%	54%	78%	
PREPA Costa Sur		Hrs	14	0	2	268	553	46	0	153	0	0	139	
	%	1%	0%	0%	19%	37%	3%	0%	0%	11%	0%	0%	9%	
PREPA Palo Seco		Hrs	1482	1492	1507	2198	2250	2120	1572	1537	1395	1598	1498	1525
	%	51%	50%	51%	80%	77%	74%	53%	52%	52%	54%	52%	51%	
PREPA San Juan		Hrs	2196	2574	2530	2432	3000	3071	2930	3174	2063	2449	2342	2421
	%	53%	44%	43%	42%	51%	55%	64%	55%	40%	46%	47%	45%	
Total Baseload		Hrs	3691	4066	4455	6458	7105	6592	5405	5699	4330	5228	4872	5251
	%	29%	29%	30%	43%	46%	44%	38%	38%	34%	37%	35%	35%	

*Refer to Glossary of Terms on page 21 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												
		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	
AES Ilumina		MW	4	4	4	3	4	4	3	4	4	4	4	
		CF	22%	21%	21%	16%	19%	18%	17%	19%	21%	22%	22%	21%
Windmar Cantera Martinó		MW	0.6	0.4	0.4	0.3	0.5	0.4	0.5	0.5	0.6	0.5	0.5	
		CF	27%	20%	17%	15%	22%	21%	23%	22%	26%	29%	24%	24%
San Fermín		MW	3	1	2	1	2	2	2	3	3	3	3	
		CF	17%	7%	10%	6%	8%	10%	12%	11%	13%	14%	14%	13%
Horizon Energy		MW	3	2	3	2	2	2	2	2	3	3	3	
		CF	27%	25%	27%	17%	23%	22%	23%	24%	25%	28%	28%	28%
Oriana Energy		MW	11	10	10	8	9	9	9	10	11	10	11	11
		CF	24%	23%	23%	17%	19%	20%	20%	21%	24%	23%	25%	25%
Windmar Coto Laurel		MW	2	2	2	1	2	2	2	2	2	2	2	
		CF	23%	21%	21%	14%	21%	20%	22%	20%	22%	22%	20%	21%
Fonroche Humacao		MW	8	7	8	5	7	7	7	7	8	8	9	8
		CF	20%	19%	20%	14%	18%	17%	18%	18%	21%	19%	22%	21%
Total Solar		MW	32	28	30	21	26	26	27	28	31	31	33	32
		CF	22%	19%	20%	14%	18%	18%	18%	19%	21%	21%	22%	22%

*Refer to Glossary of Terms on page 21 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.

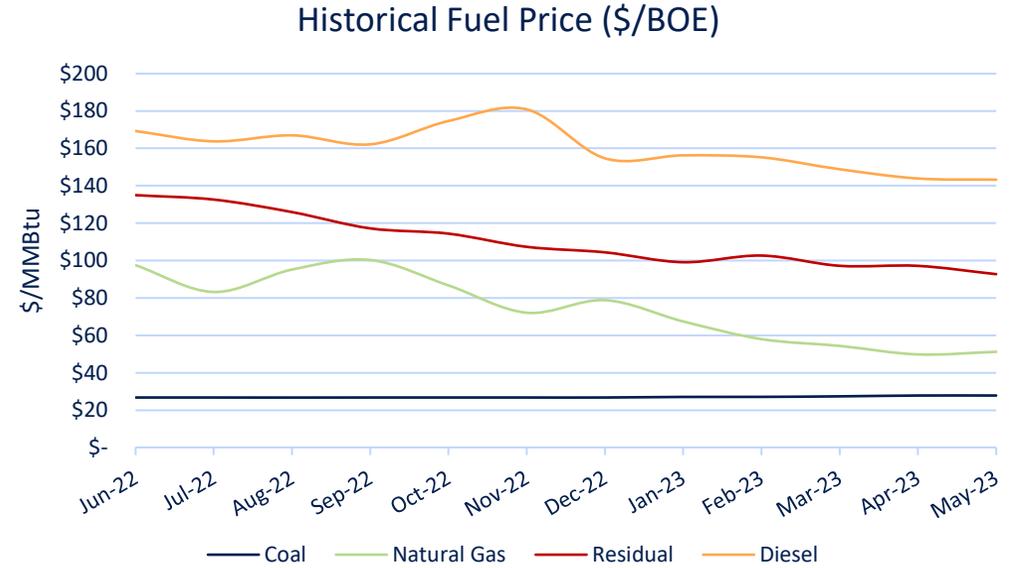
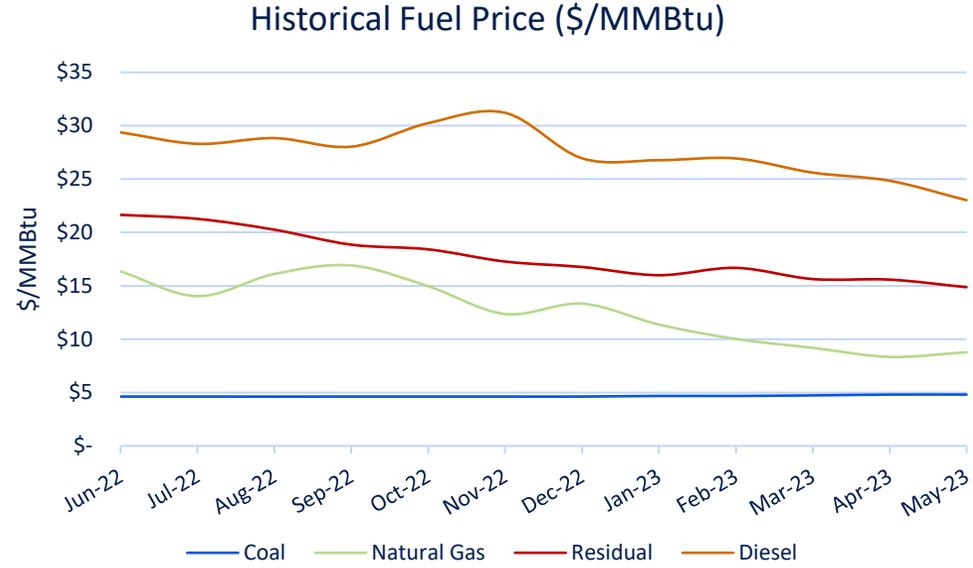
Target: ▲ A higher Capacity Factor represents a better utilization of the maximum capacity the project is able to produce.

Average Production (MW) and Capacity Factor		Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
Pattern Santa Isabel Nameplate Cap: 75		MW 24	26	18	7	10	10	11	14	18	14	13	11
		CF 32%	35%	25%	9%	13%	13%	14%	19%	24%	19%	18%	15%
Landfill Gas Fajardo Nameplate Cap: 2.4		MW 0.8	0.3	0.6	0.4	0.1	0.2	0.4	0.3	0.5	0.5	0.4	0.7
		CF 33%	14%	25%	16%	6%	9%	18%	12%	20%	22%	15%	28%
Landfill Gas Toa Baja Nameplate Cap: 2.4		MW 1.6	0.8	1.5	0.7	0.9	0.6	0.5	0.6	0.8	0.6	0.8	0.6
		CF 65%	33%	62%	31%	36%	26%	21%	24%	32%	27%	32%	24%
Total Wind and Landfill Nameplate Cap: 80		MW 26	27	20	8	11	11	12	15	19	15	14	12
		CF 33%	34%	26%	10%	14%	14%	14%	19%	24%	19%	18%	15%

*Refer to Glossary of Terms on page 21 for a list of definitions and formulas.

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.



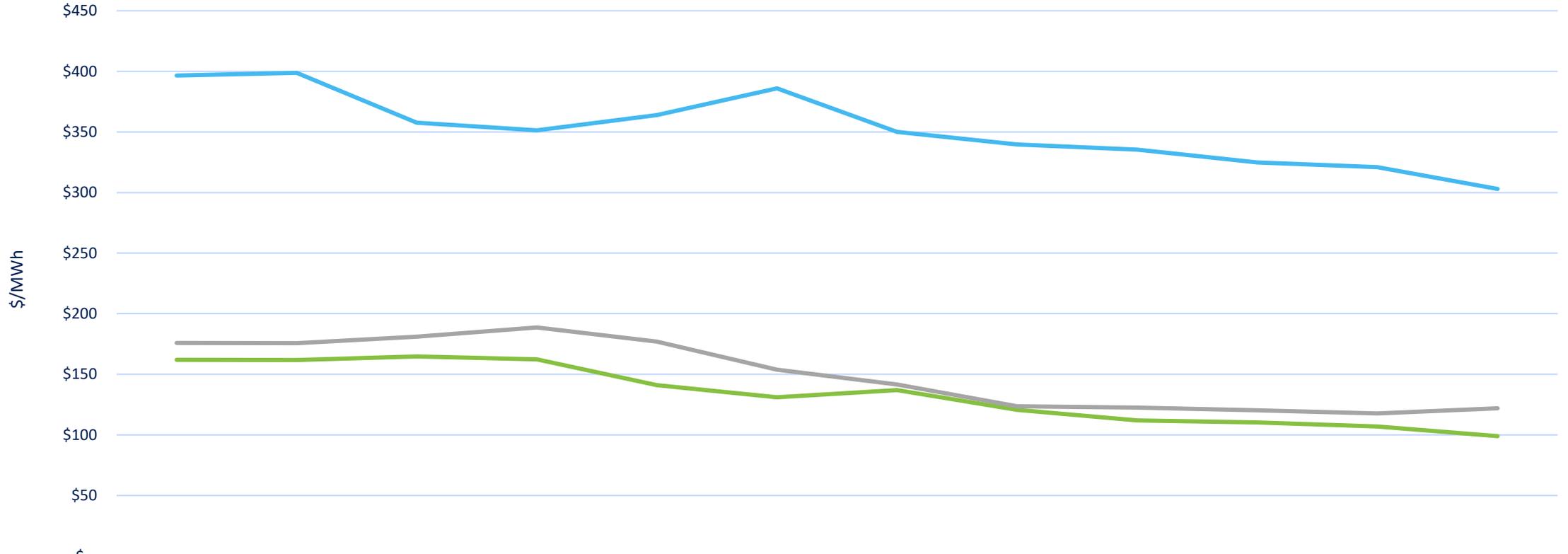
	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
\$/MMBtu												
Diesel	29.37	28.30	28.83	28.03	30.23	31.20	26.95	26.77	26.93	25.60	24.84	23.02
Residual	21.64	21.27	20.25	18.84	18.41	17.26	16.75	15.98	16.67	15.62	15.57	14.86
Natural Gas	16.35	14.02	16.10	16.90	14.94	12.35	13.32	11.36	10.02	9.19	8.34	8.77
Coal	4.63	4.62	4.62	4.63	4.63	4.63	4.62	4.68	4.68	4.73	4.80	4.80
\$/BOE												
Diesel	169.30	163.78	167.00	162.18	174.68	180.89	154.70	156.31	155.24	148.87	143.93	143.30
Residual	135.01	132.64	125.96	117.24	114.41	107.37	104.42	99.14	102.69	97.22	97.19	92.75
Natural Gas	97.47	83.18	95.16	100.24	86.67	72.11	78.82	67.47	58.05	54.41	49.88	51.27
Coal	26.83	26.83	26.81	26.83	26.83	26.83	26.83	27.14	27.16	27.43	27.86	27.86

*Refer to Glossary of Terms on page 21 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.

Variable Production Costs (\$/MWh)



	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23
Baseload Prod. Cost	\$162	\$162	\$165	\$162	\$141	\$131	\$137	\$121	\$112	\$110	\$107	\$99
Peaker Prod. Cost	\$397	\$399	\$358	\$351	\$364	\$386	\$350	\$340	\$335	\$325	\$321	\$303
Weighted Prod. Costs	\$176	\$176	\$181	\$189	\$177	\$154	\$142	\$124	\$122	\$120	\$118	\$122

— Baseload Prod. Cost — Peaker Prod. Cost — Weighted Prod. Costs

*Refer to Glossary of Terms on page 21 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

Plant and Unit List – Baseload and Peaker Units

BASELOAD UNITS

PEAKER UNITS

PEAKER UNITS

Plant	Units	System Reserves	System Availability	System Heat Rate	All Metrics for Baseload Units	All Metrics for Peaker Units	Renewables Capacity Factor	Plant	Units	System Reserves	System Availability	System Heat Rate	All Metrics for Baseload Units	All Metrics for Peaker Units	Renewables Capacity Factor	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			Cambalache	1	X	X	X		X		Other Peakers	Daguao 1-1	X	X	X		X	
	STM 5	X	X	X	X				2	X	X	X		X			Daguao 1-2	X	X	X		X	
	CT 6	X	X	X	X				3	X	X	X		X			Aguirre 2-1	X	X	X		X	
	STM 6	X	X	X	X				1A	X	X	X		X			Aguirre 2-2	X	X	X		X	
	7	X	X	X	X				1B	X	X	X		X			Costa Sur 1-1	X	X	X		X	
	8	X	X	X	X				2A	X	X	X		X			Costa Sur 1-2	X	X	X		X	
	9	X	X	X	X				2B	X	X	X		X			Jobos 1-1	X	X	X		X	
Costa Sur	10	X	X	X	X			3A	X	X	X		X		Jobos 1-2		X	X	X		X		
	5	X	X	X	X			3B	X	X	X		X		Yabucoa 1-1		X	X	X		X		
	6	X	X	X	X			4A	X	X	X		X		Yabucoa 1-2		X	X	X		X		
Aguirre	1	X	X	X	X			4B	X	X	X		X		Vega Baja 1-1		X	X	X		X		
	2	X	X	X	X			1-1	X	X	X		X		Vega Baja 1-2		X	X	X		X		
Palo Seco	1	X	X	X	X			1-2	X	X	X		X		Vieques 1		X	X	X		X		
	2	X	X	X	X			2-1	X	X	X		X		Vieques 2		X	X	X		X		
	3	X	X	X	X			2-2	X	X	X		X		Culebra 1		X	X	X		X		
	4	X	X	X	X			3-1	X	X	X		X		Culebra 2		X	X	X		X		
AES	AES 1	X	X	X	X			3-2	X	X	X		X		Culebra 3		X	X	X		X		
	AES 2	X	X	X	X			MP 1	X	X	X		X										
								MP 2	X	X	X		X										
EcoEléctrica	ECO 1	X	X	X	X			MP 3	X	X	X		X										
	ECO 2	X	X	X	X			I-1	X	X	X		X										
	STM 1	X	X	X	X			I-2	X	X	X		X										
								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											

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 Martínó						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						