ROI no. 1

El Negociado evalúa la confidencialidad del contenido de las próximas 3 páginas que componen esta parte del anejo (ROI no. 1).
Las mismas han sido eliminadas.

ROI nos. 2, 3 and 4

ROI nos 2-4

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
1	EM	1001	San Juan Power Plant	Units 5 Cooling Tower Replacement	The actual system is highly deteriorated. The new system will provide a suitable source of cooling water to keep the unit's components in their design temperature level during full load operation. Both reliability and availability to the unit will increase since less load limitations due high temperature will occur.	July 1, 2022	10 years
1.1	EM	1001	San Juan Power Plant	Units 6 Cooling Tower Replacement	The actual system is highly deteriorated. The new system will provide a suitable source of cooling water to keep the unit's components in their design temperature level during full load operation. Both reliability and availability to the unit will increase since less load limitations due high temperature will occur.	July 1, 2022	10 years
2	EM	1002	San Juan Power Plant	Units 5 New High-Pressure Pumps	The HP pumps provide water to the boiler for the steam generation. One pump is required for full load operation and the second is for back up. Currently, both pumps show wear and poor performance so the availability decrease since the unit should be limited or retire from service for a limited pump overhaul. The new pumps will highly increase the availability since the maintenance outages will decrease.	December 1, 2023	10 years
2.1	EM	1002	San Juan Power Plant	Units 6 New High-Pressure Pumps	The HP pumps provide water to the boiler for the steam generation. One pump is required for full load operation and the second is for back up. Currently, both pumps show wear and poor performance so the availability decrease since the unit should be limited or retire from service for a limited pump overhaul. The new pumps will highly increase the availability since the maintenance outages will decrease.	December 1, 2023	10 years
3	EM	1003	San Juan	Units 5 Condenser	The condenser is the key component where the exhaust steam from the turbine is cooled and condensed to be reused in the cycle. Their sea water boxes exhibit	July 1, 2022	5 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
			Power Plant	Repair and Coating Application	corrosion and often occur leakages so the unit should be retiring from service. Once they are properly coated to avoid corrosion, the availability will increase since no outages will be required to repair further leakages.		
3.1	EM	1003	San Juan Power Plant	Units 6 Condenser Repair and Coating Application	The condenser is the key component where the exhaust steam from the turbine is cooled and condensed to be reused in the cycle. Their sea water boxes exhibit corrosion and often occur leakages so the unit should be retiring from service. Once they are properly coated to avoid corrosion, the availability will increase since no outages will be required to repair further leakages.	July 1, 2022	5 years
4	EM	1004	San Juan Power Plant	Units 5 High Pressure Bleed Valve, Low Pressure Bleed Valve and Heat Injection Steam Valve	In start-ups and transient operations, these valves should work properly to avoid unit trips. The actual ones often fail in their operation due to wear in their mayor components so the unit start up should be delayed to partially fix the problem. The replacement of the valves will increase the availability since these delays will be avoided.	July 1, 2022	5 years
4.1	EM	1004	San Juan Power Plant	Units 6 High Pressure Bleed Valve, Low Pressure	In start-ups and transient operations, these valves should work properly to avoid unit trips. The actual ones often fail in their operation due to wear in their mayor components so the unit start up should be delayed to partially fix the problem. The replacement of the valves will increase the availability since these delays will be avoided.	July 1, 2022	5 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
				Bleed Valve and Heat Injection Steam Valve			
5	EM	1005	San Juan Power Plant	Units 5 and 6 Black Start Emergency Generator Upgrade	The replacement of the control system of the black start generator will give the feasibility to start the units after blackouts events. This will increase their availability and reliability during electric system disturbances.	July 1, 2022	10 years
6	EM	1006	San Juan Power Plant	Units 5 Replacement of Outlet Valves and Elbow Condenser	This replacement will assure the availability of the unit since the actual ones are highly corroded and exhibit several leaks which damage the equipment around them. Without this improvement, the unit shall be retired from service at least three times this year to perform provisional repairs in these elbows.	July 1, 2022	5 years
6.1	EM	1006	San Juan Power Plant	Units 6 Replacement of Outlet Valves and Elbow Condenser	This replacement will assure the availability of the unit since the actual ones are highly corroded and exhibit several leaks which damage the equipment around them. Without this improvement, the unit shall be retired from service at least three times this year to perform provisional repairs in these elbows.	July 1, 2022	5 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
7	EM	1007	San Juan Power Plant	Unit 7 Air Preheater Maintenance and Replacement	Currently, the unit is limited to 70MW because the air heaters are clogged and corroded. This condition limits the air and flue gas flow and thus the boiler's firing rate along with its steam generation capacity. This replacement will increase the availability of the unit from 70MW to 100 MW because the boiler will be able to be operated at its maximum firing rate without limitations.	July 27, 2023	7 years
8	EM	1008	San Juan Power Plant	Repairs to Nautilus Water Treatment System	With this improvement, the water treatment process time will decrease so the boiler can be water washed faster during the environmental outages. This whole process will shorten the environmental outage time thus the unit availability will increase.	October 1, 2022	5 years
9	EM	1009	San Juan Power Plant	Cooling Tower Unit 10 Repair Works	The cooling water is necessary to keep the generator and oil temperature in the turbine and auxiliary equipment in their appropriate level. Along with the refurbishing of the boiler and turbine, the unit will be available to provide 100MW to the electric grid.	January 15, 2023	10 years
10	EM	1010	San Juan Power Plant	Replacement of Two Uninterruptible Power Supply Systems for Units 7 and 8	The Uninterruptible Power Supply (UPS) provide 120 volts power to the unit's controls and field instrumentation. With frequency disturbances in the electric grid, both units 7 and 8 often trips since their UPS are not working properly although the maintenance that they receive. The new equipment will guarantee a constant 120v supply thus the availability of both units will significantly increase by this concept.	January 16, 2023	10 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
11	EM	1011	San Juan Power Plant	Units 7-10 New Raw Water Tank	The raw water tank provides water to the demineralized water plant. This plant produces the water for the unit's thermodynamic cycle. Since the tank condition is compromised, the eventual loss of the generating units is high. After the repair, both availability and reliability will increase in all the units.	July 1, 2023	10 years
12	EM	1012	San Juan Power Plant	Structural Repairs Fuel Service Tank 10	Both fuel service tanks (9 & 10) used for units 9 & 10, are highly deteriorated. After the repair of tank 10, the tank 9 will be empty to inspect and repair. The repair of the tank 10 will assure the availability of units 10 & 9 (200MW total).	July 2, 2023	10 years
13	EM	1013	San Juan Power Plant	Unit 5 SCR - Ammonium Procurement	This contract will permit the use of unit 5 as a base load. The total availability will be 200MW	March 1, 2022	1 year (terms of contract)
14	EM	1014	San Juan Power Plant	Units 5 Heavy Equipment Rental Services	The cranes will be used for the repair of unit 5. The unit will be available for full load after the commissioning (220 MW total)	July 1, 2022	1 year (terms of contract)
14.1	EM	1014	San Juan Power Plant	Units 10 Heavy Equipment Rental Services	The cranes will be used for the repair of unit 10. The unit will be available for full load after the commissioning (100 MW total)	July 1, 2022	1 year (terms of contract)

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
14.2	EM	1014	San Juan Power Plant	Units 6-8 Heavy Equipment Rental Services	The cranes will be used for the repair of unit 7 & 8. The units will be available for full load after the commissioning (200 MW total)	July 1, 2022	1 year (terms of contract)
15	EM	1015	San Juan Power Plant	Water Treatment and Technical Assistance Cooling Water System	The CT maintenance contract will guarantee a proper water chemistry parameter in the cooling towers. This will prevent calcium deposition in the different cooler of the operating units so a load limitation will be avoided (combined limitation can be as high as 100 MW for the whole plant).	March 1, 2022	1 year (terms of contract)
16	DN	1016	San Juan Power Plant	Unit 10 Rehabilitation	After the commissioning of this project, unit 10 will be available for full load (100MW)	July 1, 2022	5 years
17	DN	1017	San Juan Power Plant	Steam Rotor Replacement Unit 5 & CT Repairs	After the commissioning of this project, unit 5 will be available for full load (220MW)	July 1, 2022	5 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
18	DN	1018	San Juan Power Plant	LTSA SJ5	The project will assure the inspection and maintenance programs for the operating unit to keeps its full availability.	March 1, 2022	2 years
19	DN	1019	San Juan Power Plant	LTSA SJ6	The project will assure the inspection and maintenance programs for the operating unit to keeps its full availability.	March 1, 2022	2 years
20	DN	1020	San Juan Power Plant	Control System Upgrade units 5 & 6	The upgrade of the control will permit a reliable operation of units 5 and 6 without trips caused by lack of communication of the server with the HMI.	July 1, 2022	10 years
21	DN	1021	San Juan Power Plant	Unit 8 Rehabilitation (Turbine)	After the commissioning of this project, unit 8 will be available for full load (100MW)	January 31, 2023	6 years
22	DN	1022	San Juan Power Plant	Unit 7 Rehabilitation (Turbine)	After the commissioning of this project, unit 7 will be available for full load (100MW)	July 1, 2023	6 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
23	DN	1023	San Juan Power Plant	Unit 6 - Major Overhaul (Steam Turbine Replacement and CT Repairs)	After the commissioning of this project, unit 6 will be available for full load (220MW)	January 31, 2024	6 years
24	OB	1024	San Juan Power Plant	Installation of Modules D&E HRSG Unit 5	The replacement of the tube modules will avoid unit trips (5 trips in 2020) caused by tube leaks in the HRSG. This will increase the net availability of the unit for 2022.	July 1, 2022	7 years
25	OB	1025	San Juan Power Plant	Replacement of the Online Condenser Cleaner Unit 5	The system will provide a continuous condenser cleaning process so the maintenance outage hours due to this activity will be reduced to a third of the actual one.	July 1, 2023	10 years
26	OB	1026	San Juan Power Plant	Unit 6 - Major Overhaul	After the commissioning of this project, unit 6 will be available for full load (220MW)	January 31, 2024	6 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
27	OB	1027	San Juan Power Plant	Unit 7 - Major Outage - Boiler Sections Replacement and Repairs & Auxiliary Equipment Inspection Work	After the commissioning of this project, unit 7 will be available for full load (100MW) since the boiler will be available for maximum continuous firing rate.	July 1, 2023	6 years
28	OB	1028	San Juan Power Plant	Unit 8 - Major Outage - Boiler Sections Replacement and Repairs & Auxiliary Equipment Repairs	After the commissioning of this project, unit 8 will be available for full load (100MW) since the boiler will be available for maximum continuous firing rate.	January 31, 2023	6 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
29	EM	2029	Aguirre Power Plant	Unit 1 South Wall Boiler Tubing Replacement and Boilers Repairs	The replacement will prevent extensive forced outages in this unit due to water tubes leaks (7 forced outages in 2021). Also, the replacement will allow a maximum continuous firing rate in the boiler without pressure de-rating. Total availability will significantly increase after the installation and commissioning.	July 31, 2022	6 years
30	EM	2030	Aguirre Power Plant	Unit 1 Air and Gas Duct Pre-Heaters Repair Works	The refurbish of the air preheaters and the installation of new seals will remove the actual limitation of 330MW. The unit will be available for 450 MW (total gain of 120MW)	July 31, 2022	6 years
31	EM	2031	Aguirre Power Plant	Replacement of Load Center 1-4 Condenser Circulating Water Pump	The load center will provide reliability for the operating units since the actual one is highly corroded. A failure in the load center can cause the trip of the condenser circulating water pumps and thus the operating units.	July 1, 2023	10 years
32	EM	2032	Aguirre Power Plant	Sea Water Intake Structural	Although the availability seems to remain unaltered in this project, the reliability increase considerably since the structure is highly corroded and a failure can lead a unit trip. This project guarantees the actual availability of the units of AG steam plant.	December 1, 2022	10 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
				Repairs Work			
33	EM	2033	Aguirre Power Plant	Rehabilitation Fuel Tank Farm Liners	The project does not add availability to the units. Nevertheless, environmental penalties will be avoided from this issue.	July 31, 2022	6 years
34	EM	2034	Aguirre Power Plant	Two New Condenser Discharge Water Pumps Motors	Currently there are two rented portable pumps which contract expire in three months. After summer 2022, the units will be limited to 350 MW since three pumps are required to provide enough cooling water for the condensers. The project will avoid those limitations.	June 1, 2022	10 years
35	EM	2035	Aguirre Power Plant	Two New BCWP Motors	The goal with the spare motors is to reduce the outages or limitations downtime caused by failures of these equipment's. Typically, a motor can be refurbished in 2-3 months including the procurement process. With the spare motors the time will be reduced up to 4 days depending on the installation process. The unit availability will increase significantly with this strategy.	December 1, 2022	10 years
36	EM	2036	Aguirre Combined Cycle	Procurement of Stages 1, 2, 3 Turbine Rotor Bucket Set, Aguirre	The rotor repair will assure a 50 MW availability for either unit 1-1 or 1-2. It also gives the flexibility to repair the next spare turbine without and extended outage risk.	December 1, 2022	3 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
				Combined Cycle			
37	EM	2037	Aguirre Combined Cycle	New Water Condensate Tank for the Aguirre Combined Cycle	The condensate tank store demi water for the steam turbines of the combined cycles. The actual condensate tank is highly corroded and is well beyond of its useful life. The project will guarantee the availability of both steam turbines (200 MW total).	December 1, 2022	10 years
38	EM	2038	Aguirre Combined Cycle	Major inspection Unit 1-3	The unit will be available for 50 MW after the repair process. Currently, the unit is expired regarding its operating hours	December 1, 2022	3 years
39	EM	2039	Aguirre Combined Cycle	Hot Gas Path Inspection and repairs Work Units 2-4 and stand by transformer	The unit will be available for 50 MW after the repair process. Currently, the unit is expired regarding its operating hours	December 1, 2022	3 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
40	EM	2040	Aguirre Combined Cycle	Hot Gas Path Inspection Work Units 1-1 and 1-2	The units will be available for 50 MW (each one) after the repair process. Currently, the unit is expired regarding its operating hours	December 1, 2022	3 years
41	DN	2041	Aguirre Power Plant	Inner Barrel Bundle	The spare barrel assembly will be used as back up in case of failure of a Boiler Feed Pump. With the spare pump, outage downtime will be significantly reduced and thus, the availability will increase.	February 1, 2023	5 years
42	DN	2042	Aguirre Power Plant	Unit 1 - Major Inspection (Replacement Turbogenerator)	After the repair process, the unit will be available for full load operation (450 MW).	December 1, 2022	6 years
43	DN	2043	Aguirre Power Plant	Unit 2 Excitation System	The new system will increase the reliability and extend service life with replacement parts and service availability.	December 1, 2022	10 years
44	OB	2044	Aguirre Power Plant	Purchase and Installation	The breakers exceed their useful life. With the replacement, the unit will be available for full load operation.	December 1, 2022	10 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
				Breakers 480 V			
45	OB	2045	Aguirre Power Plant	Design Fire Pump for Aguirre Power Complex	The project will add reliability to the powerplant facilities. That leads to less unit's downtime outages periods in fire emergencies.	December 1, 2022	10 years
46	OB	3046	Costa Sur Power Plant	Travelling Screens Replacement	The actual travelling screens exceed their useful life and must be replaced. A damaged travelling screen won't allow the use of the Condenser Circulating Water Pump so a limitation of 50-100MW will occur. The project will assure the continuous operation of the unit with full load availability.	March 1, 2023	7 years
47	EM	3047	Costa Sur Power Plant	Procurement and Replacement of Regulator Valves for Boiler Feed Water Units 5 & 6	The valves often fail, and the unit should be retired from service to replace the internal parts. The manufacturer recommends the replacement of the valve since the materials and performance are upgraded. The unit will then be operated with full load availability with a minimum of outages due to this issue.	March 1, 2023	7 years
48	EM	3048	Costa Sur	Low Pressure	This repair will increase the availability by 15 MW. Also, it will bring reliability since this heater shows a considerable number of plugged tubes.	June 1, 2023	10 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
			Power Plant	Water Heater 3 Repair Work			
49	EM	3049	Costa Sur Power Plant	Procurement of Water Heater 5 (Deaerator) Spare Pump	This pump will give the flexibility to start a maintenance program to refurbish the deaerator pumps without any unit limitation. Typically, the unit is limited to 350 MW when a pump is out of service. The pumps overhaul is necessary to keep the full load operation of the units.	February 28, 2022	10 years
50	EM	3050	Costa Sur Power Plant	Procurement of Air-Preheaters Baskets, Unit 5	The replacement will add 50MW to the unit's availability.	March 1, 2023	7 years
51	EM	3051	Costa Sur Power Plant	Replacement of Air-Preheaters Baskets, Unit 5	The replacement will add 50MW to the unit's availability.	March 1, 2023	7 years
52	EM	3052	Costa Sur Power Plant	Procurement of Condenser Circulating	The goal with the spare motors is to reduce the outages or limitations downtime caused by failures of these equipment. Typically, a motor can be refurbished in 2-3 months including the procurement process. With the spare motors the time will be	December 1, 2022	10 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
				Water Pump (CCWP) and Boiler Circulating Water Pump (BCWP) Spare Motors for Units 5 and 6	reduced up to 4 days depending on the installation process. The unit availability will increase significantly with this strategy.		
53	EM	3053	Costa Sur Power Plant	Procurement of Induced Draft Fan (IDF) and Forced Draft Fan (FDF) Spare Motors for Units 5 and 6	The goal with the spare motors is to reduce the outages or limitations downtime caused by failures of these equipment. Typically, a motor can be refurbished in 2-3 months including the procurement process. With the spare motors the time will be reduced up to 4 days depending on the installation process. The unit availability will increase significantly with this strategy.	December 1, 2022	10 years
54	EM	3054	Costa Sur Power Plant	Procurement of Condensate Pump (CP)	The goal with the spare motors is to reduce the outages or limitations downtime caused by failures of these equipment. Typically, a motor can be refurbished in 2-3 months including the procurement process. With the spare motors the time will be	December 1, 2022	10 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
				Motor for Units 5 and 6	reduced up to 4 days depending on the installation process. The unit availability will increase significantly with this strategy.		
55	EM	3055	Costa Sur Power Plant	Replacement of Unit 5 Electric Load Center	The project will add reliability to the operating unit since the actual load center exceed its useful life.	December 1, 2022	10 years
56	EM	3056	Costa Sur Power Plant	Replacement of Excitation System Units 5 and 6	The actual excitation system is obsolete, and their spare parts are not available in the market. A failure in this equipment will lead to an unavailability of 410 MW. The goal of this project is avoiding this event.	March 1, 2023	7 years
57	EM	3057	Costa Sur Power Plant	Replacement of 4160 V Electric Cable Normal Transformer 5A, 5B	The actual cables are highly deteriorated and can fail in transient conditions. The replacement is strongly recommended to avoid and failure and subsequent outage for a temporary repair. The cable is programmed to be changed in October 2022. The availability of the unit does not increase but it will be guaranteed with this replacement.	March 1, 2023	7 years
58	OB	3058	Costa Sur Power Plant	CS 5Major Inspection Unit 5 - HP/IP/LP	The refurbish of the turbine will add 30MW to the unit's availability since losses due to the steam path wear will be eliminated. In the other hand, the reliability will increase since the actual turbine exhibits high vibrations due to excessive operating hours.	March 1, 2023	7 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
				Turbine Rotor Replacement			
59	OB	3059	Costa Sur Power Plant	CS 5 Major Outage Unit 5 - Boiler Sections Replacement and Repairs & Auxiliary Equipment Repairs	The boiler's repair will increase the unit's availability by 30 MW since the boiler will be able to provide steam at its maximum continuous rate (MCR)	March 1, 2023	7 years
60	OB	3060	Costa Sur Power Plant	Water Heater 6 Replacement Work	The high-pressure heater unavailability represents 10%of load reduction in the operating unit (41MW). After the installation of the Heater, the unit will return to full capacity operation.	June 1, 2024	7 years
61	OB	3061	Costa Sur Power Plant	Caustic Soda and Acid tanks replacement works	The tank is highly corroded, and their useful life is exceeded. Since these substances (caustic Ash and Sulfuric Acid) are used in the Demi Water Plant, the project will assure a reliable and constant demi water production for the operating units. This will lead to a better availability since the units shall not be limited or retired from service by lack of demi water.	March 1, 2023	7 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
62	DN	3062	Costa Sur Power Plant	Unit 6 - HP/IP/LP Inspection (Failure)	Since the unit was out of service, this repair will lead to a 410 MW availability of the unit.	January 1, 2022	7 years
63	DN	3063	Costa Sur Power Plant	BFWP Inner Barrel Bundle	The spare barrel assembly will be used as back up in case of failure of a Boiler Feed Pump. On 2021, both units 5 and 6 had prolonged outages and limitations for this reason (loss of BFP). With the spare pump, outage downtime will be significantly reduced and thus, the availability will increase.	December 1, 2022	10 years
64	DN	3064	Costa Sur Power Plant	Unit 6 LP-B Repair Work (Failure)	Since the unit was out of service, this repair will lead to a 410 MW availability of the unit.	January 1, 2022	7 years
65	DN	3065	Costa Sur Power Plant	Unit 6 LP-B Installation Work (Failure)	Since the unit was out of service, this repair will lead to a 410 MW availability of the unit.	January 1, 2022	7 years
66	DN	3066	Costa Sur Power Plant	AGC - Replacement Project	The new RTUs will receive the signal from SCADA to control the unit response to electrical frequency changes. The unit will be properly dispatched at its more economical load according to its heat rate.	March 1, 2023	7 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
67	DN	3067	Costa Sur Power Plant	Fuel Igniters Replacement Work	The ignitor System is obsolete and most of them do not work properly. That leads to extended periods of unit limitations (hours/days) to return the system functionality. The new system will allow the operator to put in service the burners when they are required. Both reliability and availability will be attained.	March 1, 2023	7 years
68	DN	3068	Costa Sur Power Plant	Upgrade to Foxboro Simulation System	The project will be completed with a regular training program to develops the operator's skills. This will increase the reliability and availability of the operating units since less trips due to human error factor will occur.	March 1, 2023	7 years
69	EM	4069	Palo Seco Steam Plant	PS 3 Procurement and Delivery of Water Wall Boiler Tubes and Economizer Unit PS3	The new pressure part will allow the boiler to be used at rated pressure and MCR. Less forced outages will overcome due to tubes failures in the economizer (over 80% of tube failures occurs in this area).	May 1, 2023	7 years
70	EM	4070	Palo Seco Steam Plant	PS 3 Low Pressure Turbine Rotor Refurbished, Unit 3	The rotor is required for the major overhaul of unit 3. After its replacement, the unit will be available for full load (216MW).	May 1, 2023	7 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
71	EM	4071	Palo Seco Steam Plant	Fuel Tanks Level Measurement System	This system will allow the proper measurement of the fuel level for an accurate control of the fuel supply. The system does not add availability to the plant.	May 1, 2023	7 years
72	EM	4072	Palo Seco Steam Plant	Water Retention Tank Num. 3	The condensate tank store demi water for the steam turbines of the units 3 and 4. The actual condensate tank is highly corroded and is well beyond of its useful life. The project will guarantee the availability of both steam turbines (432 MW total).	July 1, 2023	7 years
73	EM	4073	Palo Seco Steam Plant	Unit PS 4 Refractory, Insulation, scaffolding and Painting Application Works	The scaffolds are widely used in all the operating unit during an outage. The installation of a scaffold in the boiler allow to make an effective water wash and the repair of the components. Thus, the boiler will return ready to keep the MCR.	March 15, 2022	1 year (terms of contract)
74	EM	4074	Palo Seco Steam Plant	Contract, on request, for Crane Services PS4	The cranes will be used for the repair of unit 4. The unit will be available for full load after the commissioning (216 MW total)	March 15, 2022	1 year (terms of contract)

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
75	EM	4075	Palo Seco Steam Plant	Procurement Turning Gear System, Units 3 and 4	The existing Turning gear mechanism shows wear in its internal parts. The project adds an indirect availability in the way that on a trip, the units will be brought to turning gear speed thus turbine rotor bow problems will be avoided, and the turbine can be returned to speed after the trip cause is solved.	December 1, 2022	10 years
76	EM	4076	Palo Seco Steam Plant	New Water Condensate 1-2 Tank	The condensate tank store demi water for the steam turbines of units 3 and 4. The actual condensate tank is highly corroded and is well beyond of its useful life. The project will guarantee the availability of both steam turbines (432 MW total).	July 1, 2023	7 years
77	DN	4077	Palo Seco Steam Plant	Mega-Gens Environmental Commissioning	The project will add 81 MW to the generation fleet.	December 1, 2022	7 years
78	DN	4078	Palo Seco Steam Plant	Upgrade OSI DCS	The upgrade will eliminate several wiring and configuration problems in the GIS so much fewer electric disturbances will occur in the switchyard.	December 1, 2022	7 years
79	DN	4079	Palo Seco Steam Plant	Upgrade to Mark VI e	This upgrade will add reliability to the units since the turbine control will be enhanced and the communication with the RTU for the frequency control will be more effective.	December 1, 2022	7 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
80	OB	4080	Palo Seco Steam Plant	Unit 4, Superheater Header Num. 5 Material, and Installation	The replacement of the pressure part will allow the operation of the boiler at its rated pressure and MCR. This represents an increment of 20 MW in its availability.	July 1, 2023	7 years
81	OB	4081	Palo Seco Steam Plant	Unit PS3 - Major Outage - Boiler Sections Replacement and Repairs; MPT, Generator and turbine Repair & Auxiliary Equipment Inspection Work	After the repair process, the unit will be available for full load operation (216 MW).	May 1, 2023	7 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
82	EM	5082	Hydro gas Turbine Peakers	Procurement of Spare Generator Breakers for Frame 5000 Hitachi Gas Turbines	The breakers exceed its useful life and at least three units are not available since the breakers are damaged. Thus, 63 MW will be returned to the generation fleet	March 1, 2023	4 years
83	EM	5083	Hydro gas Turbine Peakers	Procurement of Turbo-Compressors for Frame 5000 Gas Turbines	With this project, the downtime of an outage will be reduced since the time to refurbish the rotor will be avoided. That leads in an increment of the total availability and a proper maintenance program for the picking units.	March 1, 2023	4 years
84	EM	5084	Hydro gas Turbine Peakers	Procurement of Spare Speed Reduction Gear for Frame 5000 Gas Turbines	With this project, the downtime of an outage will be reduced since the time to refurbish the speed reducer will be avoided. That leads in an increment of the total availability and a proper maintenance program for the picking units.	March 1, 2023	4 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
85	EM	5085	Hydro gas Turbine Peakers	New Spare Three Exhaust Plenums for Frame 5000 Gas Turbines	At least three units are load limited because of high temperatures in the exhaust area. These parts will add 45 MW to the generation fleet.	March 1, 2023	4 years
86	EM	5086	Hydro gas Turbine Peakers	Procurement of Three Exhaust Gas Diffusion Ducts for Frame 5000 Gas Turbines	With this project, five frame 5000 units, which are not available, will be refurbished to add 63 MW to the generation fleet.	March 1, 2023	4 years
87	OB	5087	Hydro gas Turbine Peakers	Major Outage Turbo - compressor (CT) 15 units	With this project, five frame 5000 units, which are not available, will be refurbished to add 105 MW to the generation fleet.	March 1, 2023	4 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
88	DN	6088	Cambalache	Unit 1 Rehabilitation	The rehabilitation of the unit will add 81 MW to the generation fleet.	June 1, 2023	3 years
89	DN	6089	Cambalache	Control System Power Plant Maintenance -Generator and Technical Services	This project adds reliability to the operating units. The units are often not available since a failure of one of the components so this contract will assure a minimum downtime for the required repair.	December 1, 2022	3 years
90	DN	6090	Cambalache	Automatic Voltage Regulator & SFC Upgrade for 2 Units	The upgrade of the control will permit a reliable operation of the units without trips caused by lack of communication or poor control of the excitation voltage	December 1, 2022	3 years
91	DN	6091	Cambalache	LTSA Units Camb 1	The project will assure the inspection and maintenance programs for the operating unit to keep its full availability (81 MW).	June 1, 2023	3 years
91	DN	6091	Cambalache	LTSA Units Camb 2	The project will assure the inspection and maintenance programs for the operating unit to keep its full availability (81 MW).	December 1, 2022	3 years

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
91	DN	6091	Cambalache	LTSA Units Camb 3	The project will assure the inspection and maintenance programs for the operating unit to keep its full availability (81 MW).	December 1, 2022	3 years
92	DN	7092	Mayaguez	Unit 1A, 1B and 4A Rehabilitation	The three units will be available for full operation (27 MW each/81 MW total) at the end of the project	July 30, 2022	8, 500 hours
93	EM	8093	All Power Plants	Stamp R - Mechanical Repair Works for Boilers and Turbo-Generators Contract	Stam R is required in all the jobs performed in the boilers and high energy lines. The maintenance program includes the installation of several pressure parts in the boilers of the fleet so the project will assure a proper installation in accordance with the regulatory agencies.	May 1, 2022	1 year (terms of contract)
94	EM	8094	All Power Plants	Hydro-blasting Service for Condenser	The condenser is the key component where the exhaust steam from the turbine is cooled and condensed to be reused in the cycle. A clogged condenser leads to economics losses in the operating unit and is the main reason for most of the units' limitations. The project will guarantee a suitable maintenance program to clean the condenser in the generation fleet to keep the availability of all the units.	May 1, 2022	1 year (terms of contract)

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
95	EM	8095	All Power Plants	Hydro-blasting Service for Boilers	In a boiler, the ash will develop an undesirable layer that will affect the heat exchange between the flue gases and the boiler tubes. The boiler will be less efficient, and the availability will be reduced since the boiler won't be able to reach its MCR with a suitable firing rate.	May 1, 2022	1 year (terms of contract)
96	EM	8096	All Power Plants	Interior Dry-Cleaning Service for Boilers	In a boiler, the ash will develop an undesirable layer that will affect the heat exchange between the flue gases and the boiler tubes. The boiler will be less efficient, and the availability will be reduced since the boiler won't be able to reach its MCR with a suitable firing rate.	May 1, 2022	1 year (terms of contract)
97	EM	8097	All Power Plants	Electrical and Instrumentation works in power plants	The project will add availability since most of the maintenance tasks are for equipment which are directly related to the thermodynamic cycle of the operating units. That includes electrical connection of pumps and fans, wiring of auxiliary equipment, automatic controls wiring and analysis, etc.	May 1, 2022	1 year (terms of contract)
98	EM	8098	All Power Plants	Procurement Acid for all power plants	The acid is necessary for the cleaning process of the cationic resin of the demi plant. It is also used in the water polishers of some operating units. A constant supply of acid will assure the continuity of the operation without force outages due to lack of demi water.	May 1, 2022	1 year (terms of contract)
99	EM	8099	All Power Plants	Refractory, Insulation, stack, and Painting	Proper insulation is necessary to increase the heat rate of the operating units since it avoids heat losses through the boiler enclosures and walls. Moreover, well insulated boiler will allow its MCR at the design parameters.	May 1, 2022	1 year (terms of contract)

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
				Application Works			
100	EM	8100	All Power Plants	Scaffolding Inside and outside Boilers Works	The scaffolds are widely used in all the operating unit during an outage. The installation of a scaffold in the boiler allow to make an effective water wash and the repair of the components. Thus, the boiler will return ready to keep the MCR.	May 1, 2022	1 year (terms of contract)
101	EM	8101	All Power Plants	Waste Management Services Contract for Power Plants	This project will provide continuity to the handling of industrial waste from the water treatment plants. Although the project does not add availability, the fact is that the water treatment plant is part of the thermodynamic cycle, and an outage of this plant will conduct to an outage of the operating units.	May 1, 2022	1 year (terms of contract)
102	EM	8102	All Power Plants	Non-Destructive Examinations and Inspection Services	The inspection program is mandatory to keep the equipment inspections in accordance with the regulatory agencies and to avoid retirement from service by this issue.	May 1, 2022	1 year (terms of contract)
103	EM	8103	All Power Plants	Inspection and Maintenance	The project does not have a direct impact to increase the fleet availability. However, the proper maintenance should be done to these elevators to guarantee the availability of the units since they are used during the maintenance outages.	May 1, 2022	1 year (terms of contract)

No.	Type	SOW	Facility Name	Project Name	ROI no. 2 If and how the expenditure will help to bring back the availability	ROI no. 3 When the unit will be available	ROI no. 4 Expected duration of unit after expenditure
				Cargo Elevator			
104	OB	8104	All Power Plants	Coating Application Boiler Structures and Chimneys All Power Plants	The project does not have a direct impact to increase the fleet availability. However, the proper maintenance should be done to these structures to guarantee the availability of the units.	May 1, 2022	1 year (terms of contract)

ROI no. 5

Puerto Rico Electric Power Authority

Generation Directorate

Current Status of PREPA Generation Fleet

REV: February 14 , 2022

Power Station	Unit	Capacity (MW)	Available Capacity	Condition	Date of last major maintenance	Date of last major maintenance	Person in charge of attending	NME (Million)	FY 2021-22 Available Budget	FY22	FY23	Currents Status / Action Plan / Comments
PREPA's Base Generation												
San Juan	CT 5	160	0	Not Available	Now		Eng. Victor Ortiz Plant Manager	$45.00	$38.00	$45.00		Major overhaul begining January 15, 2022 until jun16 2022; Approximate cost $45 millions including LTSA (Long Term Services Agreement).
	STM 5	60	0	NotAvailable		Apr-11						Major overhaulbegining January 15, 2022 until june 16 2022.. Verifying delivery of steam turbine parts is a critical path.
	CT 6	160	158	Available				$33.00			$33.00	Major overhaul; Proposed date: February 2023; Approximate cost $33 millions.
	STM 6	60	47	Available	Sep-13	Jun-10						Generator Rotor Inspection October 27, 2021; Generator Instrumentation Problems (field ground). Forecast unit online January 30, 2022. Major overhaul Proposed date: February 2023.
	7	100	0	Not Available	Aug-08	Aug-08		$18.00			$18.00	Boiler Fauilure feb 12 2022; Valve inspection and repair finish january 5 2022; Turbine rotors have expired hours for major repair (over 70K hours). Approximate repair cost $5 millions. Boilers Repairs ($10 millions) needed. Major inspection date to be determined. Unit in limited use (8%) according to EPA MATS (Mercury and Air Toxic Standards). Total Outage cost aproximate $18 millions.
	8	100	0	Not available	Nov-10	Nov-10		$18.00			$18.00	Boiler pipe breakage problems, steam leaks and feedwater heater #6 problems. Limited use unit (8%) according to EPA (MATS). Boiler air leaks. Approximate cost of boiler repairs and auxiliary equipment, $18 millions including new boiler piping.
	9	100	100	Available	Nov-19	Aug-12		$2.00			$2.00	Unit have problem with excitation system on december 30 2021; Luma working from january 2 to january 3 2022. Unit Star up january 4 2022. Programmmed outage finished: 7 days (October 28 - November 3, 2021): coolers replacement, BFP 9-1 and 9-2 inspection, condenser cleaner, etc. DEMI (Demineralized) water production problems. Temporary water production plant of the Central (RO) faces operational problems. In the process of completing the installation of a new permanent DEMI plant.
	10	100	0	Not available	Sep-09	Sep-09		$17.00		$17.00		Low pressure turbine fault. Unit not available since the end of 2015. Returning the unit to service entails an approximate investment of $17 millions and an estimated duration of the works, 6 months. Forecast Unit Online July 30, 2022.
Palo Seco	1	85	0	Not available	Apr-08	Apr-08	Eng. Antonio Kalil Plant Manager	$10.00			$10.00	Limited use unit EPA (MATS). Boiler air leaks, requires replacement of boiler piping. Generator has major stator failure and requires turbine work.
	2	85	0	Not available				$15.00			$15.00	Limited used unit EPA (MATS). Faulty unit generator; the unit's Main Power Transformer is used as an output transformer for new MPA FT-8.
	3	216	216	Available	Nov-09	Nov-09		$9.00			$9.00	Several Forced Outage between October 31 - December 16, 2021: Economizer (boiler) tubes failure, condenser tubes failure, front standard problems. Forecast Unit return online for December 17, 2021. It is required to purchase boiler tube and economizer panels for approximately $5 millions and repair auxiliary equipments, for fiscal year 2022-2023.
	4	216	0	Not Available	May-09	Jun-19		$3.00	$3.00	$3.00		Environmental outage beginind january 23 2022 until march 12 2022; Work will be carried out on the boiler and replacement of the air pre-heater baskets. Unit online BFP 4-1 repair finished December 12. Forced outage last month due to oil leak through control wiring and high pressure differential on the air preheaters. Unit return to service on Sunday, October 10, 2021. Work will be carried out on the boiler and replacement of the air pre-heater baskets.
Aguirre Steam Plant	1	450	350	Available	Feb-12	Dec-08	Eng. Alexis Cruz Plant Manager	$20.70	$16.00	$19.00	$1.70	Boiler air in leakages. Major repair rescheduled for March 2022, after the entry of Palo Seco 4. Major works, environmental outages, boiler tubes replacement and turbine rotors replacement for an approximate $19 millions.
	2	450	330	Available	Mar-10	Dec-19		$2.35			$2.35	Unit return online October 27, 2021; programmed outage to correct feed water control valve issues. In addition, correct boiler air in leakages and air preheaters cleaning. This action eliminated actual limitation. Unit outage begining on October 11 until October 27, 2021. Beginnig the procurement process to repair the Excitation System next year.
Costa Sur	5	410	200	Available	Jul-13	Jul-13	Eng. Miguel Beauchamp Plant Manager	$21.80	$2.80	$2.80	$19.00	Unit limited to 200 mw for BFP problems until march 10 2022. Forced Outage November 30 - December 5, 2021. BFP 5-1 and BFP 5-2 motors failure. Main steam piping failure on September 13, 2021. Unit return service on Wednesday, October 6, 2021. Major outage (boiler, environmental maintenance and replacement of turbine rotors) scheduled for October 2022. Approximate cost $19 millions.
	6	410	410	Aavailable	Sep-12	Feb-21		$6.70	$3.00	$5.00	$1.70	Unit online january 5 2022. Last summer Low pressure turbine failure (LP turbine failure) after major unit repair including these rotors for $20 millions. Rotors were shipped to the US workshop by ship during the week of September 20-27. Findings report and repairs beggining october and finished on December 2, 2021. Rotor shippied to Puerto Rico on December 6, 2021. Unit on test December 30 2021; Turbine balance works from januart 1 to january 7 , 2022 an approximate cost of replacement of damaged parts of $5 millions.
Total PREPA Base Generation		**3162**	**1811**	**57.27%**				**$221.55**	**$62.80**	**$91.80**	**$129.75**	**Available**

Puerto Rico Electric Power Authority

Generation Directorate

Current Status of PREPA Generation Fleet

REV: February 14 , 2022

Power Station	Unit	Capacity (MW)	Available Capacity	Condition	Date of last major maintenance	Date of last major maintenance	Person in charge of attending	NME (Million)	FY 2021-22 Available Budget	FY22	FY23	Currents Status / Action Plan / Comments
PREPA's Reserve Generation Fleet												
Aguirre Combined Cycle	I-1	50	49	Available CC		(4,000)	Eng. William Rios Mera Plant Manager	$1.00	$1.00	$1.00		Hot gas path inspection $1 millions, April 2022.
	I-2	50	45	Available SC		(2,841)		$1.00	$1.00	$1.00		Inlet filters clogged. Hot gas path inspection scheduled for June 2022.
	I-3	50	49	Available		(11,392)		$2.50	$1.00	$2.50		Major inpection scheduled for february 2022. $2.5 millions
	I-4	50	48	Available		(1,574)		$2.00			$2.00	PT Repair; Minor outage October 20 - return unit online for November 5
	ST-1	96	0	Not available				$2.00	$1.00	$1.00	$1.00	Unit off line October 19; water line repair to cooling tower; condenser fouling and air in leakages.
	II-1	50	0	Not available				$2.00			$2.00	MPT 2-1, 2-2 failure.
	II-2	50	0	Not available				$2.00			$2.00	MPT 2-1, 2-2 failure. Start up tests.
	II-3	50	50	Available		(1,307)		$1.00			$1.00	Repair coolers fan radiators
	II-4	50	0	Not available		(3,637)		$1.70			$1.70	Stand by Transformer fail. Hot gas path inspection and spare rotor $1.7 millions.
	ST-2	96	0	Not available				$2.00			$2.00	MPT 2-1, 2-2 failure. Start up tests.
Total Aguirre CC		**592**	**241**	**40.71%**				**$17.20**	**$4.00**	**$5.50**	**$11.70**	**Availability**
DAGUAO	1-1	21	19	Available			Eng. Jaime Umpierre Hidro Gas Head Division	$2.00	$1.00	$2.00		Mayor Outage Repair planned february 2022
	1-2	21	17	Available				$2.00	$1.00	$2.00		Generator Ground Inspection from dec 20 2021; Mayor Outage Repair for 2022
AGUIRRE	2-1	21	0	Not available				$4.00			$4.00	Unit requires major turbine repair and a complete generator assembly.
	2-2	21	0	Not available				$2.00	$1.00	$2.00		Mayor Outage Repair
PALO SECO	1-1	21	19	Available				$2.00	$1.00	$2.00		Mayor Outage Repair 2022
	1-2	21	0	Not available				$2.30			$2.30	Mayor Outage Repair and Generator breaker replacement
	2-1	21	21	Available				$2.00	$1.00	$2.00		Mayor Outage Repair 2022
	MPA 1	27		Not available				$0.10	$0.10	$0.10		Environmental air permit. Contract awarded to perform environmental acceptance tests. Waiting for EPA approval of emission testing.
	MPA 2	27		Not available				$0.10	$0.10	$0.10		Environmental air permit. Contract awarded to perform environmental acceptance tests. Waiting for EPA approval of emission testing.
	MPA 3	27		Not available				$0.10	$0.10	$0.10		Environmental air permit. Contract awarded to perform environmental acceptance tests. Waiting for EPA approval of emission testing.
COSTA SUR	1-1	21		Not available				$2.00	$2.00	$2.00		Unit reached full speed not load with excitation. Phasing tests schedule for January 15 2022. Mayor Outage Repair
	1-2	21		Not available				$4.00			$4.00	Turbocompressor replacement. Mayor Outage Repair
JOBOS	1-1	21	21	Available				$2.00	$1.00	$2.00		Mayor Outage Repair 2022
	1-2	21	20	Available				$2.00	$1.00	$2.00		Due for major inspection (August 2020) and speed reduction gearbox replacement.
YABUCOA	1-1	21		Not available				$2.00	$1.00	$2.00		Alignment process. Startup testing scheduled for October 8.
	1-2	21	20	Available				$2.00	$1.00	$2.00		Alignment process. Startup testing scheduled for October 22.
VEGA BAJA	1-1	21		Not available				$2.10	$0.00	$2.10		Voltage regulator repair unit expected in service on October 15, 2021
	1-2	21		Not available				$4.00			$4.00	Turbocompressor major failure.
Total 18 Peaking Units		**396**	**137**	**34.60%**				**$36.70**	**$11.30**	**$22.40**	**$14.30**	**Availability**
MAYAGÜEZ	1A	27.5		Not available			Eng. Jaime Umpierre Hidro Gas Head Division Eng. Waldo Córdoba Plant Manager	$18.00	$8.00	$18.00		Gas generator and power turbine (1B) in critical condition. Repair Cost estimate $18 millions for both units 1A an 1B. Mayor outage programmed February 2022.
	1B	27.5		Not available								
	2A	27.5	27	Available								
	2B	27.5	27	Available								
	3A	27.5	25	Available								
	3B	27.5	25	Available								
	4A	27.5	25	Available				$0.80	$0.80	$0.80		Combustor casing crack failure. First stage nozzle issues. Repair cost estimate $800 K. Unit online february 5 2022
	4B	27.5	25	Available								
Total Mayagüez		**220**	**154**					**$18.80**	**$8.80**	**$18.80**	**$0.00**	
CAMBALACHE	1	82.5		Not available			Eng. Herminio Arroyo Plant Manager	$20.00	$0.00	$18.00	$2.00	Unit out of service since 2011; Combustion turbine failure; Proposal $18 millions and six months.
	2	82.5	76	Available				$8.90	$4.00	$6.90	$2.00	LTSA with GE ; New Automatic Voltaje Regulator; Control System and Maintenance Services HTS
	3	82.5	75	Available				$8.90	$4.00	$6.90	$2.00	LTSA with GE ; New Automatic Voltaje Regulator; Control System and Maintenance Services HTS
Total Cambalache		**247.5**	**151**					**$37.80**	**$8.00**	**$31.80**	**$6.00**	
VIEQUES	1	3	3	Available			Eng. Jaime Umpierre Hidro Gas Head Division					
	2	3	3	Available								Troubleshooting control system issues.
Culebra	1	2	2	Available								
	2	2	2	Available								
	3	2	2	Available								
Total Vieques and Culebra		**12**	**12**									
Total Peaking & Emergency Units		**1,467.5**	**695.0**	**47.36%**				**$110.50**	**$32.10**	**$78.50**	**$32.00**	**Availability**

Puerto Rico Electric Power Authority

Generation Directorate

Current Status of PREPA Generation Fleet

REV: February 14 , 2022

Power Station	Unit	Capacity (MW)	Available Capacity	Condition	Date of last major maintenance	Date of last major maintenance	Person in charge of attending	NME (Million)	FY 2021-22 Available Budget	FY22	FY23	Currents Status / Action Plan / Comments
HYDROELECTRICS												
Toro Negro	1-1	1.5	1.5	Available								
Toro Negro	1-2	1.5	1.1	Available								
Toro Negro	1-3	1.5	1	Available								
Toro Negro	1-4	4	0	Not available								
Toro Negro	2	2	0	Not available								Turbine inlet main valve replacement. Phasing test pending.
Yauco	1	25	0	Not available				$8.00	$2.00	$4.00	$4.00	Pending turbine and generator major overhaul. Federal restoration funding allocation for $8 millions.
Yauco	2-1	4.5	2	Available								Unit out of Service December 31 2021 General Inspection ; Limited pending relay protection system modifications.
Yauco	2-2	4.5	4	Available			Eng. Jaime					
Garzas	1-1	3.6	3.6	Available			Umpierre					
Garzas	1-2	3.6		Not available			Hidro Gas					Generator bearing repair. Expected in-service on October 2021.
Garzas	2	5		Not available			Head Division					Transmission line failure due to Hurricane María. Federal restoration funding approved.
Caonillas	1-1	9		Not available				$5.00		$1.00	$4.00	Station flooding failure due to Hurricane María. In preparation of specifications and bid process documents. Federal restoration funding allocation for $5 millions.
Caonillas	1-2	9		Not available								
Caonillas	2	3.6		Not available								Pending major restoration budget approvals.
Dos Bocas	1	5		Not available								Restored generator in coordination for transportation to site.
Dos Bocas	2	5	5	Available								
Dos Bocas	3	5	5	Available								
Patillas	1-1	0.8		Not available								Downstream flow risk concerns.
Patillas	1-2	0.6		Not available								Downstream flow risk concerns.
Río Blanco	1	2.5		Not available								Penstock major failure. Federal restoration funding approved.
Río Blanco	2	2.5		Not available								Penstock major failure. Federal restoration funding approved.
Total Hydro		99.7	23.2	**23.27%**				**$13.00**	**$2.00**	**$5.00**	**$8.00**	
Total NME (Necessary Maintenance Expenses)								**$345.05**	**$96.90**	**$175.30**	**$169.75**	

PROGRAMA DE CONSERVACIÓN
CALDERAS Y TURBO-GENERADORES

Preparado por: _____

Ing. Ferdinand Correa Méndez
Administrador de Generación

Revisado por: _____

Ing. Jorge L. Cotto Pérez
Director, Interino, Generación

Aprobado por: _____

Ing. Josué Colón Ortiz
Director Ejecutivo

Aprobado por: _____

Ing. Mary C. Zapata Acosta
Subdirectora Ejecutiva de Operaciones

UNID.	CAP MV	FECHA DE LA ÚLTIMA CONSERVACIÓN											
		MANT.	CALDERA/CT INSP. *	L.Q.	LIM. PROX. AMB.	GEN	VALVULAS DE TURBINA PRINC	RECAL	INTER	CONTR	TURB. ALTA	TURB. INT.	TURB. BAJA
SJ CT 5	160	31-Aug-14	5-Feb-15	N/A	N/A	1-Jun-14	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SJ Vap 5	60	N/A	N/A	N/A	N/A	31-Aug-14	31-Aug-14	31-Aug-14	31-Aug-14	31-Aug-14	1-Apr-11	1-Apr-11	1-Apr-11
SJ CT 6	160	7-Sep-13	5-Feb-15	N/A	N/A	1-Feb-16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SJ Vap 6	60	N/A	N/A	N/A	N/A	7-Jan-13	1-Sep-08	1-Sep-08	1-Sep-08	1-Sep-08	Jun-10	Jun-10	Jun-10
SJ 7	100	02-Aug-08	05-Feb-15	01-Mar-13	30-Mar-23	2-Aug-08	2-Aug-08	2-Aug-08	2-Aug-08	2-Aug-08	Sep-11	2-Aug-08	2-Aug-08	2-Aug-08
SJ 8	100	18-Nov-10	05-Feb-15	01-Aug-10	16-Dec-22	18-Nov-10	30-Oct-13	30-Oct-13	30-Oct-13	30-Oct-13	18-Nov-10	18-Nov-10	18-Nov-10
SJ 9	100	15-Nov-19	15-Nov-19	01-Jul-11	12-Dec-22	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12
SJ 10	100	28-Sep-09	05-Feb-15	28-Sep-09	09-Apr-17	28-Sep-09	10-Oct-15	28-Sep-09	28-Sep-09	10-Oct-15	28-Sep-09	28-Sep-09	28-Sep-09
PS 3	216	6-Nov-09	23-Oct-14	6-Mar-09	1-Jan-23	6-Nov-09	29-Sep-15	29-Sep-15	6-Nov-09	6-Nov-09	6-Nov-09	6-Nov-09	29-Sep-15
PS 4	216	13-May-09	23-Oct-14	1-Nov-08	3-Aug-22	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19
CS 5	410	3-Jul-13	25-Sep-14	3-Jul-13	3-Feb-22	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13
CS 6	410	Sep-12	25-Sep-14	1-Oct-09	3-Aug-22	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21
AG 1	450	27-Feb-12	10-Feb-15	Feb-12	1-Oct-22	27-Feb-12	27-Feb-12	27-Feb-12	27-Feb-12	27-Feb-12	27-Feb-12	27-Feb-12	23-Dec-08
AG 2	450	1-Mar-10	10-Feb-15	13-May-12	8-Mar-23	22-May-06	17-Dec-13	17-Dec-13	17-Dec-13	17-Dec-13	1-Dec-19	1-Dec-19	1-Dec-19
CC Vap I	96	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CC Vap II	96	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Eco CT 1	165												
Eco CT 2	165												
Eco Vap	200												
AES 1	227												
AES 2	227												

CONS. PROGRM, UNIDADES DE VAPOR		188	596	830	830	830	830	0	0	0	550	510	510	726	626	766	766	726	726	100	0	0	380	380	830
MANT. Y SALIDAS FORZ. UNIDADES DE VAP.		380	276	247	247	247	412	578	578	578	468	476	476	477	499	468	468	477	477	614	636	636	553	553	454
LIMITACIONES, UNIDADES DE VAPOR		415	23	21	21	21	21	29	521	29	23	24	24	22	23	21	21	22	22	28	29	29	25	25	21
DISPONIBILIDAD DE U. DE VAPOR		1909	1998	1794	1794	1794	1629	2285	1793	2285	1850	1882	1967	1753	1876	1637	1637	1668	1668	2150	2227	2227	1934	1934	1588
% DE DISP. DE UNIDADES DE VAPOR		66	69	62	62	62	56	79	62	79	64	65	66	59	62	57	57	58	58	74	77	77	67	67	55
CONS. PROGR. AL **CICLO COMBINADO**		146	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246
MANT. DIAR., FORZ. Y LIMIT. C.C.		261	87	87	87	87	14	14	14	14	14	14	14	87	87	87	87	87	87	87	87	87	87	87	87
DISPONIBILIDAD CICLO COMBINADO		185	260	260	260	260	332	332	332	332	332	332	332	260	260	260	260	260	260	260	260	260	260	260	260
MANTENIMIENTO A **TURBINAS DE GAS**		24	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
MANT. DIAR., FORZ. Y LIMIT. TURB. GAS		341	118	118	118	118	61	61	61	61	61	61	61	141	141	141	141	141	141	141	141	141	141	141	141
DISPONIBILIDAD TURBINAS DE GAS		246	353	353	353	353	410	410	410	410	410	410	410	330	330	330	330	330	330	330	330	330	330	330	330
MANTENIMIENTO - **CAMBALACHE**		0	82	82	164	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
MANT.DIAR., FORZ. Y LIMIT. TURB. CAMB		0	41	41	0	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
DISPONIBILIDAD **CAMBALACHE**		165	42	42	1	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
MANTENIMIENTO **HIDROELECTRICAS**		30	75	75	75	75	75	25	25	25	25	25	25	75	75	75	75	75	75	25	25	25	25	25	25
MANT. DIAR., FORZ. Y LIMIT. HIDRO		42	6	6	6	6	6	19	19	19	19	19	19	6	6	6	6	6	6	19	19	19	19	19	19
DISPONIBILIDAD HIDROELECTRICAS		28	19	19	19	19	19	56	56	56	56	56	56	19	19	19	19	19	19	56	56	56	56	56	56
DISPONIBILIDAD AEE	**(MW)**	2532	2671	2467	2426	2467	2431	3124	2633	3124	2690	2722	2807	2402	2526	2287	2287	2317	2317	2837	2914	2914	2621	2621	2275
	(%)	58%	61%	57%	56%	57%	56%	72%	61%	72%	62%	63%	63%	54%	56%	53%	53%	53%	53%	65%	67%	67%	60%	60%	52%
MANTENIMIENTO - **ECOELÉCTRICA**		0	0	0	0	0	0	0	0	0	530	0	0	0	0	0	0	0	0	0	0	0	530	0	0
MANT.DIAR., FORZ. Y LIMIT. TURB. ECOELEC.		73	16	16	16	16	16	16	16	16	0	16	16	16	16	16	16	16	16	16	16	16	0	16	16
DISPONIBILIDAD **ECOELÉCTRICA**		457	514	514	514	514	514	514	514	514	0	514	514	514	514	514	514	514	514	514	514	514	0	514	514
MANTENIMIENTO - **AES**		0	227	0	0	0	0	227	227	0	227	227	0	0	227	227	0	0	227	227	0	0	0	0	0
MANT.DIAR., FORZ. Y LIMIT. TURB. AES		126	11	23	23	23	23	11	11	23	11	11	23	23	11	11	23	23	11	11	23	23	23	23	23
DISPONIBILIDAD **AES**		328	216	431	431	431	431	216	216	431	216	216	431	431	216	216	431	431	216	216	431	431	431	431	431
DISPONIBILIDAD TOTAL	**(MW)**	3317	3400	3412	3371	3412	3377	3854	3363	4070	2906	3451	3752	3348	3255	3016	3232	3263	3047	3567	3859	3859	3053	3567	3220
PICO ESTIMADO	**(MW)**	2389	2408	2510	2692	2830	2786	2871	3034	3002	2863	2708	2669	2389	2408	2510	2692	2830	2786	2871	3034	3002	2863	2708	2669
PICO REAL	**(MW)**	2412	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RESERVA TOTAL DEL SISTEMAS	**(MW)**	905	753	757	521	468	512	737	652	900	229	682	586	909	753	619	575	468	512	737	868	900	229	898	586
% DE DISPONIBILIDAD TOTAL		62.22	63.79	64.01	63.24	64.01	63.34	72.30	63.08	76.35	54.51	64.74	69.28	61.81	59.60	56.58	60.63	61.21	57.16	66.91	72.40	72.40	57.26	66.91	60.41

* **R**: REPORTE DE INSPECCION **MANT:** MANTENIMIENTO **INSP**: INSPECCION **NS**: NO HA ESTADO EN SERVICIO DESDE AMBIENTAL

C: CERTIFICACION **LQ:** LAVADO QUIMICO **LIM. PROX. AMB.:** FECHA LIMITE PROXIMA SALIDA AMBIENTAL

LEYENDA	
PROGRESO ACTUAL	
CONSERV. PROGRAMADA	
SALIDA FORZADA	
USO LIMITADO	

NOTA:

Las cifras RESALTADAS son reales, no son estimadas.

Datos Anual

Sistema Eléctrico	Integrado	AEE	Eco	AES
Proyectado Sistema Eléctrico (MW) :	3,754	2,833	504	418
Proyectado Sistema Eléctrico (%) :	70.6%	65%	95%	92%
Sistema Eléctrico - Actual Año Natural (MW) :*	3,167	2,261	501	405
Sistema Eléctrico - Actual Año Natural (%) :*	58%	51%	95%	89%

Notas: 1. Datos Anuales de Disponibilidad hasta 31-Diciembre-2021.

Fecha de Revisión: 8-Feb-22

PROGRAMA DE CONSERVACIÓN
CALDERAS Y TURBO-GENERADORES

Preparado por: _____

Ing. Ferdinand Correa Méndez
Administrador de Generación

Revisado por: _____

Ing. Jorge L. Cotto Pérez
Director, Interino, Generación

Aprobado por: _____

Ing. Josué Colón Ortiz
Director Ejecutivo

Aprobado por: _____

Ing. Mary C. Zapata Acosta
Subdirectora Ejecutiva de Operaciones

UNID.	CAP MV	FECHA DE LA ÚLTIMA CONSERVACIÓN												2023												2024											
		MANT.	CALDERA/CT INSP. *	L.Q.	LIM. PROX. AMB.	GEN	VALVULAS DE TURBINA PRINC	RECAL	INTER	CONTR	TURB. ALTA	TURB. INT.	TURB. BAJA	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC
SJ CT 5	160	31-Aug-14	5-Feb-15	N/A	N/A	1-Jun-14	N/A	N/A	N/A	N/A	N/A	N/A	N/A											Annual Maint.														
SJ Vap 5	60	N/A	N/A	N/A	N/A	31-Aug-14	31-Aug-14	31-Aug-14	31-Aug-14	31-Aug-14	1-Apr-11	1-Apr-11	1-Apr-11																									
SJ CT 6	160	7-Sep-13	5-Feb-15	N/A	N/A	1-Feb-16	N/A	N/A	N/A	N/A	N/A	N/A	N/A									Major Maint.															
SJ Vap 6	60	N/A	N/A	N/A	N/A	7-Jan-13	1-Sep-08	1-Sep-08	1-Sep-08	1-Sep-08	Jun-10	Jun-10	Jun-10																									
SJ 7	100	02-Aug-08	05-Feb-15	01-Mar-13	30-Mar-23	2-Aug-08	2-Aug-08	2-Aug-08	2-Aug-08	2-Aug-08	Sep-11	2-Aug-08	2-Aug-08	2-Aug-08								Major (NG Conversion & Env. Mar. 30, 2023															
SJ 8	100	18-Nov-10	05-Feb-15	01-Aug-10	16-Dec-22	18-Nov-10	30-Oct-13	30-Oct-13	30-Oct-13	30-Oct-13	18-Nov-10	18-Nov-10	18-Nov-10	Env. Dec. 16, 2022																			Major & Env.& Conversion Jun. 7, 2024		
SJ 9	100	15-Nov-19	15-Nov-19	01-Jul-11	12-Dec-22	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12	4-Aug-12		Major (NG Conversion & Env. Mar. 30, 2023																				Env. Aug. 30, 2024			
SJ 10	100	28-Sep-09	05-Feb-15	28-Sep-09	09-Apr-17	28-Sep-09	10-Oct-15	28-Sep-09	28-Sep-09	10-Oct-15	28-Sep-09	28-Sep-09	28-Sep-09														Env. Jan. 1, 2024										
PS 3	216	6-Nov-09	23-Oct-14	6-Mar-09	1-Jan-23	6-Nov-09	29-Sep-15	29-Sep-15	6-Nov-09	6-Nov-09	6-Nov-09	6-Nov-09	29-Sep-15					Major Maint. Mar. 2023														Env. Oct. 1, 2024					
PS 4	216	13-May-09	23-Oct-14	1-Nov-08	3-Aug-22	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19							Env. Sep. 15, 2023															Env. Dec. 15, 2024		
CS 5	410	3-Jul-13	25-Sep-14	3-Jul-13	3-Feb-22	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13	3-Jul-13			Major & Env. Oct. 10, 2022											Env. Jul 28, 2024										
CS 6	410	Sep-12	25-Sep-14	1-Oct-09	3-Aug-22	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21	3-Feb-21							Env. July 7, 2023														Env. Nov 15, 2024			
AG 1	450	27-Feb-12	10-Feb-15	Feb-12	1-Oct-22	27-Feb-12	27-Feb-12	27-Feb-12	27-Feb-12	27-Feb-12	27-Feb-12	27-Feb-12	23-Dec-08											Env. Dec. 2023													
AG 2	450	1-Mar-10	10-Feb-15	13-May-12	8-Mar-23	22-May-06	17-Dec-13	17-Dec-13	17-Dec-13	17-Dec-13	1-Dec-19	1-Dec-19	1-Dec-19					Env. Mar. 8, 2023														Env. Sep. 21, 2024				
CC Vap I	96	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A																							
CC Vap II	96	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A																							
Eco CT 1	165																																			
Eco CT 2	165																			Annual Maint.																
Eco Vap	200																																			
AES 1	227													Annual Maint.												Annual Maint.										
AES 2	227																		Annual Maint.												Annual Maint.					

* **R**: REPORTE DE INSPECCION **MANT:** MANTENIMIENTO **INSP**: INSPECCION **NS**: NO HA ESTADO EN SERVICIO DESDE AMBIENTAL

C: CERTIFICACION **LQ:** LAVADO QUIMICO **LIM. PROX. AMB.:** FECHA LIMITE PROXIMA SALIDA AMBIENTAL

LEYENDA	
PROGRESO ACTUAL	
CONSERV. PROGRAMADA	
SALIDA FORZADA	
USO LIMITADO	

NOTA:

Las cifras RESALTADAS son reales, no son estimadas.

Datos Anual

Sistema Eléctrico	Integrado	AEE	Eco	AES
Proyectado Sistema Eléctrico (MW) :	3,754	2,833	504	418
Proyectado Sistema Eléctrico (%) :	70.6%	65%	95%	92%
*Sistema Eléctrico - Actual Año Natural (MW)**:	3,167	2,261	501	405
*Sistema Eléctrico - Actual Año Natural (%)**:	58%	51%	95%	89%

Notas: 1. Datos Anuales de Disponibilidad hasta 31-Diciembre-2021.

Fecha de Revisión: 8-Feb-22

Para garantizar la confiabilidad, en caso de salidas forzadas el programa pudiera sufrir cambios.

		ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC
CONS. PROGRM, UNIDADES DE VAPOR		188	626	766	766	726	726	100	0	0	280	280	730	830	380	380	510	510	100	100	100	100	666	666	626
MANT. Y SALIDAS FORZ. UNIDADES DE VAP.		380	272	255	255	260	433	558	578	578	522	522	432	454	553	553	524	524	614	614	614	614	490	490	499
LIMITACIONES, UNIDADES DE VAPOR		415	23	21	21	22	22	28	521	29	26	26	22	21	25	25	24	24	28	28	28	28	22	22	23
DISPONIBILIDAD DE U. DE VAPOR		1909	1971	1850	1850	1884	1711	2206	1793	2285	2063	2063	1793	1673	2065	1934	1834	1834	2150	2150	2150	2150	1714	1714	1745
% DE DISP. DE UNIDADES DE VAPOR		66	68	64	64	65	59	76	62	79	71	71	60	56	68	67	63	63	74	74	74	74	59	59	60
CONS. PROGR. AL **CICLO COMBINADO**		146	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246
MANT. DIAR., FORZ. Y LIMIT. C.C.		261	87	87	87	87	14	14	14	14	14	14	14	87	87	87	87	87	87	87	87	87	87	87	87
DISPONIBILIDAD CICLO COMBINADO		185	260	260	260	260	332	332	332	332	332	332	332	260	260	260	260	260	260	260	260	260	260	260	260
MANTENIMIENTO A **TURBINAS DE GAS**		24	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
MANT. DIAR., FORZ. Y LIMIT. TURB. GAS		341	118	118	118	118	61	61	61	61	61	61	61	141	141	141	141	141	141	141	141	141	141	141	141
DISPONIBILIDAD TURBINAS DE GAS		246	353	353	353	353	410	410	410	410	410	410	410	330	330	330	330	330	330	330	330	330	330	330	330
MANTENIMIENTO - **CAMBALACHE**		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MANT.DIAR., FORZ. Y LIMIT. TURB. CAMB		0	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
DISPONIBILIDAD **CAMBALACHE**		165	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
MANTENIMIENTO **HIDROELECTRICAS**		30	75	75	75	75	75	25	25	25	25	25	25	75	75	75	75	75	75	25	25	25	25	25	25
MANT. DIAR., FORZ. Y LIMIT. HIDRO		42	6	6	6	6	6	19	19	19	19	19	19	6	6	6	6	6	6	19	19	19	19	19	19
DISPONIBILIDAD HIDROELECTRICAS		28	19	19	19	19	19	56	56	56	56	56	56	19	19	19	19	19	19	56	56	56	56	56	56
DISPONIBILIDAD AEE	**(MW)**	2532	2686	2564	2564	2599	2555	3087	2674	3166	2944	2944	2674	2363	2756	2625	2525	2525	2841	2878	2878	2878	2442	2442	2473
	(%)	58%	62%	59%	59%	60%	59%	71%	62%	73%	68%	68%	60%	53%	62%	60%	58%	58%	65%	66%	66%	66%	56%	56%	57%
MANTENIMIENTO - **ECOELÉCTRICA**		0	0	0	0	0	0	0	0	0	530	0	0	0	0	0	0	0	0	0	0	0	530	0	0
MANT.DIAR., FORZ. Y LIMIT. TURB. ECOELEC.		73	16	16	16	16	16	16	16	16	0	16	16	16	16	16	16	16	16	16	16	16	0	16	16
DISPONIBILIDAD **ECOELÉCTRICA**		457	514	514	514	514	514	514	514	514	0	514	514	514	514	514	514	514	514	514	514	514	0	514	514
MANTENIMIENTO - **AES**		0	0	0	0	0	227	227	0	0	0	0	0	0	227	227	0	0	227	227	0	0	0	0	0
MANT.DIAR., FORZ. Y LIMIT. TURB. AES		126	23	23	23	23	11	11	23	23	23	23	23	23	11	11	23	23	11	11	23	23	23	23	23
DISPONIBILIDAD **AES**		328	431	431	431	431	216	216	431	431	431	431	431	431	216	216	431	431	216	216	431	431	431	431	431
DISPONIBILIDAD TOTAL	**(MW)**	3317	3631	3509	3509	3544	3284	3816	3619	4111	3376	3890	3619	3309	3486	3355	3470	3470	3570	3608	3823	3823	2874	3388	3418
PICO ESTIMADO	**(MW)**	2389	2408	2510	2692	2830	2786	2871	3034	3002	2863	2708	2669	2389	2408	2510	2692	2830	2786	2871	3034	3002	2863	2708	2669
PICO REAL	**(MW)**	2412	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RESERVA TOTAL DEL SISTEMAS	**(MW)**	905	1215	1113	830	692	840	870	845	877	61	729	800	883	1000	897	830	692	840	870	845	877	61	729	800
% DE DISPONIBILIDAD TOTAL		62.22	68.12	65.83	65.83	66.48	61.61	71.59	67.90	77.12	63.32	72.97	66.83	61.10	63.82	62.93	65.10	65.10	66.97	67.68	71.72	71.72	53.90	63.55	64.13