



Autoridad de  
Energía Eléctrica

# 2020 Fiscal Plan for the Puerto Rico Electric Power Authority

As certified by the Financial Oversight and Management  
Board for Puerto Rico on June 29, 2020



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- The amount and timing of receipt of any distributions from the Federal Emergency Management Agency and private insurance companies to repair damage caused by Hurricanes María and Irma, earthquakes, and the COVID-19 pandemic;
- The amount and timing of receipt of any amounts allocated to Puerto Rico and provided under the Community Disaster Loans Program;
- The amount and timing of any additional amounts appropriated by the United States government to address the impacts of the COVID-19 pandemic;
- The amount and timing of receipt of any additional amounts appropriated by the United States government to address the funding gap described herein;

- The timeline for completion of the work being done by the Puerto Rico Electric Power Authority (“PREPA”) to repair PREPA’s electric system and infrastructure and the impact of any future developments or issues related to PREPA’s electric system and infrastructure on Puerto Rico’s economic growth;
- The impact of the COVID-19 pandemic on the financial, social, economic, and demographic condition of Puerto Rico;
- The impact of the measures described herein on outmigration; and
- The impact of the resolution of any pending litigation in the Title III cases

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# List of Acronyms and Key Terms

AAFAF	Puerto Rico Fiscal Agency and Financial Advisory Authority
Act 120-2018	Puerto Rico Electric Power System Transformation Act
Act 17-2019	Puerto Rico Energy Public Policy Act
Act 211-2018	Act for the Implementation of the Puerto Rico Public Service Regulatory Board Reorganization Plan
Act 57-2014	Puerto Rico Energy Transformation and RELIEF Act
BBA	Bipartisan Budget Act of 2018
CDBG	Community Development Block Grant
CDBG-DR	Community Development Block Grant Disaster Recovery
CILT	Contribution in Lieu of Taxes
COR3	Central Office of Recovery, Reconstruction, and Resiliency
COVID-19	Coronavirus Disease 2019
DER	Distributed Energy Resource
DG	Distributed Generation
EE	Energy Efficiency
EPA	Environmental Protection Agency
ERS	Employee Retirement System
FAASt	FEMA Advanced Award Strategy Initiative
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FOMB	Financial Oversight and Management Board for Puerto Rico
GNP	Gross National Product
GWh	Gigawatt-hour
HUD	Department of Housing and Urban Development
IPP	Independent Power Producer
IRP	Integrated Resource Plan
KWh	Kilowatt-hour
LNG	Liquified Natural Gas
MATS	Mercury & Air Toxics Standards
MWh	Megawatt-hour
NME	Necessary Maintenance Expenses
NYSE	New York Stock Exchange
O&M	Operations and Maintenance
OIPC	Oficina Independiente de Protección al Consumidor
P3A	Puerto Rico Public-Private Partnerships Authority
PMO	Project Management Office
PPA	Power Purchase Agreement
PPOA	Power Purchase and Operating Agreement
PREB	Puerto Rico Energy Bureau
PREPA	Puerto Rico Electric Power Authority
PRM	Planning Reserve Margin
PROMESA	Puerto Rico Oversight, Management, and Economic Stability Act (2016)
PW	Project Worksheet
PV	Photovoltaics
RFP	Request for Proposal
RFQ	Request for Quotation
RPS	Renewable Portfolio Standard
RSA	Restructuring Support Agreement
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index

SOQs	Statements of Qualifications
T&D	Transmission and Distribution
TDOMA	T&D O&M Agreement
TWh	Terawatt-hour
US DOE	United States Department of Energy
WTI	West Texas Intermediate

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## 1.1 Executive Summary

**The 2020 Fiscal Plan lays out a path for the operational and financial reorganization of the Puerto Rico Electric Power Authority (PREPA) and the transformation of Puerto Rico’s energy system.**

**Puerto Rico’s energy system lags national standards due to decades of operational and financial mismanagement.** Delayed capital projects keep the system vulnerable and increase rates. Lack of long-term planning results in PREPA’s system being technologically outdated and operationally inefficient. Delays in vegetation management and routine maintenance make the system unreliable every day — 35 to 45% of all service outages have been caused by tree trimming conditions.<sup>1</sup> Macroeconomic challenges, including a declining population and stagnant economy further negatively affect PREPA’s financial condition. Puerto Rico’s ratepayers spend a higher share of income on an electricity service that falls in the bottom quartile of peer utilities in terms of reliability.

**PREPA’s operational shortcomings and failure to adjust rates to cover its rising costs led to the accumulation of significant legacy debt and pension obligations.** As of May 2017, PREPA held approximately \$9 billion in debt obligations, while PREPA’s current unfunded pension liability exceeds \$4.9 billion, of which \$3.8 billion is unfunded.<sup>2</sup> These liabilities led PREPA to seek a restructuring of its legacy obligations through a voluntary petition under Title III of the Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA).

**After filing for Title III protection, Hurricanes Irma and Maria devastated the electricity grid.** More recently, key generation assets were damaged by a 6.4 magnitude earthquake. The ongoing COVID-19 pandemic has further delayed much needed system maintenance and improvements and has adversely impacted collections.

**Puerto Rico’s energy system requires a comprehensive transformation to deliver the safe, reliable, and affordable service that the Island’s citizens and businesses deserve.** The 2020 Fiscal Plan lays out a set of actions to accelerate progress on this transformation, including improving operations, modernizing the transmission and distribution system, upgrading the generation fleet, restructuring legacy obligations, and transitioning to the private operation of its transmission and distribution operations as well as existing generation assets. When fully implemented, the 2020 Fiscal Plan will set Puerto Rico on a trajectory to achieve a safe, reliable, affordable, resilient, modern electric grid, improving the quality of life of its citizens and enabling the economic activity.

During FY2020, PREPA made progress on several initiatives:

- Successfully supporting the selection of an O&M operator – LUMA Energy, LLC (“LUMA”) – for the Transmission and Distribution (T&D) system;
- Completing the conversion of the San Juan Power Plant Units 5 and 6 to natural gas;
- Reducing customer call wait times through call center outsourcing and increasing customer accessibility to e-billing platforms;
- Developing an integrated transformation and distribution system modernization plan (T&D road map) and revised Integrated Resource Plan (IRP).<sup>3</sup>

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<sup>1</sup> “In Re: Review of Rates of the Puerto Rico Electric Power Authority.” 33. Revised November 23, 2016. <https://energia.pr.gov/wp-content/uploads/2016/11/Expert-Report-Revenue-Requirements-Fisher-and-Horowitz-Revised-20161123.pdf>

<sup>2</sup> Based on independent actuarial study conducted in 2019 and assuming a rate of return of 4.5%.

<sup>3</sup> The “T&D road map” includes a combination of recommendations used by PREPA to implement recommended capital investments to modernize PREPA’s T&D system. The road map includes documentation of near-term plans, project management methods, engineering requirements, and practical considerations needed to implement proposed capital projects successfully.

**However, despite these efforts, much work remains to be done.** Achieving a comprehensive transformation of Puerto Rico’s energy system, reducing outage frequency and duration, achieving rate affordability, improving service reliability, customer satisfaction and ensuring system resiliency and preparedness against unforeseen events requires diligent implementation of the following key initiatives:

- **Improving operations:** Improve program management to ensure timely and on budget completion of key operational initiatives, including vegetation management and proactive maintenance programs.
- **Modernizing the transmission and distribution system:** Develop and execute a capital investment plan to modernize and strengthen the electrical grid.
- **Upgrading the generation fleet:** Implement the PREB-approved IRP to modernize generation resources and increase renewable energy generation.
- **Improving workforce and public safety:** Increase the use of technology in grid operations to improve workplace safety and protect the public against faulty infrastructure.
- **Transitioning the operation and management of PREPA’s electricity grid and generation assets to private operators:** Support ongoing efforts to transfer the responsibilities for operating and maintaining PREPA’s T&D and existing generation assets to professional and independent private operators. On June 22, the Public-Private Partnership Authority (P3A) announced the selection of LUMA as the new private T&D operator.
- **Restructuring legacy debt obligations:** Support ongoing efforts to restructure PREPA’s existing, unsustainable debt load and regain access to capital markets.
- **Pension Reform:** To balance rate affordability with PREPA’s pension obligations to its employees, PREPA must review the ERS funding policy and incorporate revisions into PREPA’s Title III plan of adjustment.

**The Fiscal Plan shows a surplus in FY2020, but a deficit in FY2021 that is largely due to the operator fee.** At the end of FY2020, PREPA expects a \$153 million surplus, driven by underspending in vegetation management and necessary maintenance expenses. Under the current PREB-approved rate case, the 2020 Fiscal Plan projects a deficit of \$132 million in FY2021, which is due to the front-end transition fee to the T&D operator, which is expected to be paid by the end of FY2021. PREPA is expected to pay this fee from cash on hand, and their current cash reserve is approximately \$510 million. For the remaining thirty years, the budget is balanced as the 2020 Fiscal Plan projections assume revenue requirement rates.

Over the next 30 years, the overall load in Puerto Rico’s electricity system is forecasted to decline as a result of a shrinking population and declining economic activity. However, the rate of decline is faster than overall consumption as customers leverage energy efficiency (EE) and distributed generation (DG) to reduce their reliance on the grid.

Pre-measure rates (without debt restructuring, pension reform or impact from operational initiatives) are expected to range between 27 and 30 c/kWh in real dollars between FY2021 to FY2025.<sup>4</sup> Post-measure rates (including an illustrative pension reform and operational measures but excluding debt) range between 20 and 22 c/kWh in real dollars over the same period. The transition from fossil fuel to renewable generation will increase costs over the thirty-year period in order to allow PREPA to meet the Renewable Portfolio Standards (RPS) mandated by Act 17-2019. In the long term, both pre-measure and post-measure rates could

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<sup>4</sup> FY2021 has been used as the base year to calculate values in real dollars.

climb to approximately 31 c/kWh in real dollars, equivalent to 48 to 49 c/kWh in nominal dollars, by FY2049.

**To successfully execute on the Fiscal Plan and ensure progress toward the transformation, PREPA must effectively manage several contingencies and risks.**

The COVID-19 pandemic is expected to impact PREPA's liquidity in the coming fiscal year, while earthquake damage will generate significant repair costs in excess of insurance recoveries. PREPA must also continue to maintain and prepare its system to withstand future hurricanes and other weather events. Other contingencies include successfully reaching a debt restructuring agreement and ensuring access to federal funding for reconstruction of damage from the hurricanes and earthquakes. Successful transformation will require that PREPA collaborate with, among others, the Oversight Board, the Puerto Rico Public-Private Partnerships Authority (P3A), the Puerto Rico Fiscal Agency and Financial Advisory Authority (AAFAF), the Puerto Rico Energy Bureau (PREB), the Central Office of Recovery, Reconstruction and Resiliency (COR3) and PREPA's customers.

The present fiscal plan, if implemented as required, will accelerate PREPA's trajectory toward a safe, resilient, and modern electric grid, providing reliable service to ratepayers and enabling economic growth on the island. Over the next five years and beyond, a sweeping transformation needs to take root in order for the people of Puerto Rico to access the safe, reliable, modern energy system they deserve.

# Chapter 2. Historical Context and Current Challenges

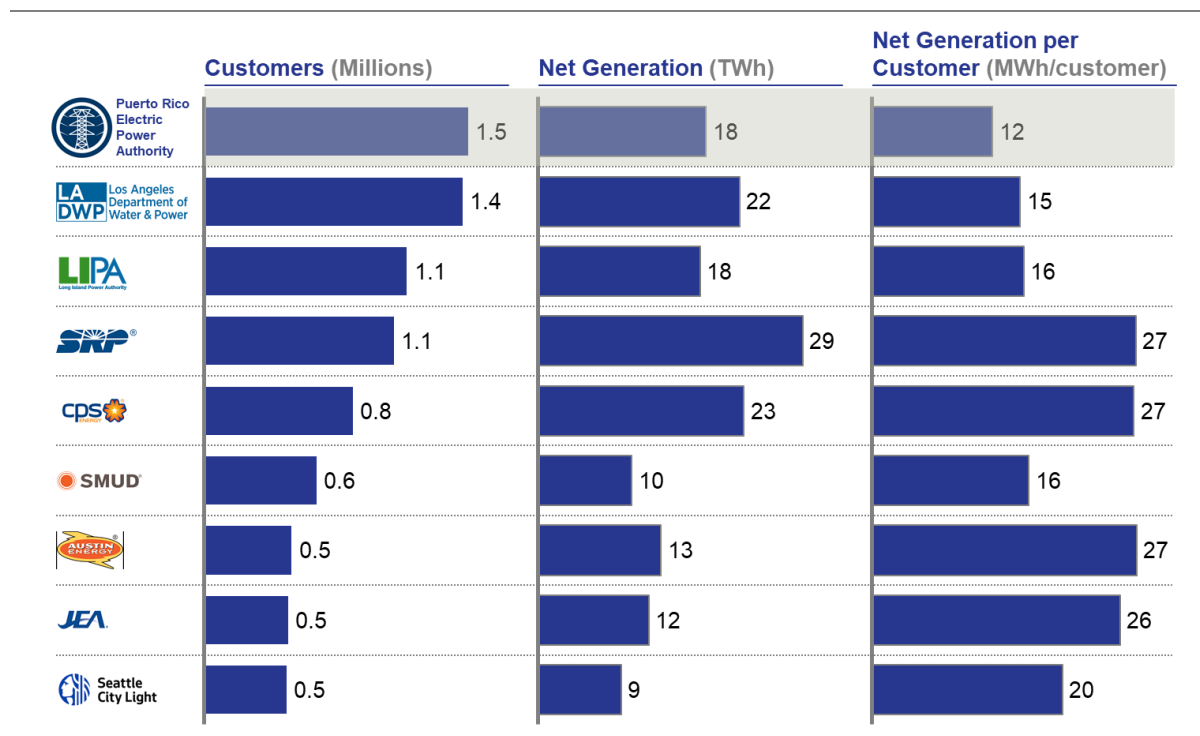
## 2.1 Key Facts about PREPA

The Puerto Rico Electric Power Authority (PREPA), formerly known as the Puerto Rico Water Resources Authority until 1979, was created through Act No. 83 on May 2, 1941 (PREPA’s Enabling Act). Throughout its history, PREPA has served as the sole retail energy service provider in Puerto Rico. Until 2014, PREPA was self-regulated and operated without an independent regulatory body to ensure accountability on long-term planning and rate setting. PREPA currently serves approximately 1.5 million customers and generates approximately \$3.5 billion in revenues from 18 terawatt-hours (TWh) of electric energy.<sup>5</sup> This is equivalent to an annual net generation of roughly 12 megawatt-hours (MWh) of energy per customer. The utility reached a maximum sustained load of 2,771 megawatts during FY2019.

### PREPA Compared to Similar Public Utilities

PREPA is one of the largest public power utilities in the U.S. by number of customers served, but has relatively low generation output and energy sales on a per customer basis (Exhibit 1).

EXHIBIT 1: KEY PREPA STATISTICS COMPARED TO PEERS<sup>6</sup>



PREPA’s reliability metrics have long fallen behind peer benchmarks. In 2019, the average duration of power outage (SAIDI) was over six times higher than the average peer utility, while the average frequency of outage (SAIFI) was over four times higher (Table 1).<sup>7</sup> Although PREPA has shown some improvement since 2017, these metrics, reported at the end of FY2019, still place PREPA in the bottom quartile of peer utilities. The frequent and extended outages faced by Puerto Rico’s citizens and businesses adversely impact quality of life and

<sup>5</sup> Monthly Report to PREPA’s Governing Board, June 2019 (interim unaudited financial results).

<sup>6</sup> Based on unaudited results from FERC as of 2018 and/or publicly available data in 2019, as well as publicly available reports. Utilities surveyed include: Los Angeles Department of Water and Power; Long Island Power Authority; Salt River Project; CPS Energy; Sacramento Municipal Utility District; Austin Energy; Jacksonville Electric Authority; Seattle City Light.

<sup>7</sup> PREPA KPI reports.

economic activity. In late May, as Puerto Ricans prepared for hurricane season, a cluster of thunderstorms led to 70,000 reported outages in one day as a result of heavy rains.<sup>8</sup>

TABLE 1: RELIABILITY METRICS BEFORE AND AFTER HURRICANE MARIA COMPARED TO PEER GROUP AVERAGE

Metric	PREPA FY2019	PREPA FY2017	Peer Group Average 2018 <sup>9</sup>
<b>System Average Interruption Duration Index (SAIDI)</b> Hours per year	10.6	14.2	1.7
<b>System Average Interruption Frequency Index (SAIFI)</b> Number of interruptions per year	4.3	4.8	1.1
<b>Customer Average Interruption Duration Index (CAIDI)</b> Hours per year	2.5	2.9	1.6

## 2.2 Historical Challenges Leading to the Transformation Mandate

PREPA is the sole electric power utility in Puerto Rico operating an exceptionally complex energy system.<sup>10</sup> Operating an electrical network on a mountainous, isolated, tropical island with dense vegetation is challenging as it requires significant maintenance of often remote transmission and distribution lines. Furthermore, the system cannot rely on access to a larger regional power grid for power generation like most parts of the mainland. Even in this context, Puerto Rico’s energy system lags national standards due to decades of operational and financial mismanagement. PREPA’s operational shortcoming and failure to adjust rates to cover its rising costs led to the accumulation of significant legacy debt and pension obligations. The Puerto Rico electricity system requires a comprehensive transformation to deliver the safe, reliable, and affordable service that customers should expect.

Several long-standing structural issues have led to PREPA’s current financial and operational position:

- **Political influence in decision making:** Historically, management decisions were subject to political influence, leading to high management turnover, discontinuity in capital investment plans, and an energy rate that is insufficient to cover day-to-day costs. As a result, residents have faced fluctuating rates and poor reliability due to aging infrastructure.
- **Lack of rate adjustments to cover costs:** PREPA has operated under a fiscal deficit since the early 2000s due to, among other things, failure to adjust rates consistently over time and the lack of proactive collection from delinquent customers, including government entities.
- **Macro-economic challenges.** PREPA has been impacted by macro-economic challenges faced by Puerto Rico in recent years. Puerto Rico’s economy began to deteriorate, experiencing a 20% decline in real GNP since 2007, while growing out-migration led to population decline of over 15% since 2004, shrinking PREPA’s revenue base. Consequently, energy sales fell by 22% since peaking in 2007 and operating revenues declined by 28% since FY2013.
- **Failing to manage the generation fleet mix and fuel costs.** PREPA’s heavy reliance on oil-based power generation in a system that passes fuel costs on to customers has

<sup>8</sup> “Battered Caribbean prepares for hurricanes amid pandemic,” Associated Press, May 29, 2020.

<sup>9</sup> Source: U.S. Energy Information Administration, Annual Electric Power Industry Report, released October 1, 2019.

<sup>10</sup> American Public Power Association, Public Power 2018 Statistical Report, (2018), 17, <https://www.publicpower.org/system/files/documents/2018-Public-Power-Statistical-Report-Updated.pdf>.

resulted in volatile rates, challenging the ability of customers to pay. PREPA's revenue collections rates have historically declined as customer rates increased due to volatile global oil prices. Between 2009 and 2014, PREPA's fuel-adjustment rider increased by around 45% when the oil price doubled from \$60 to \$120 per barrel.<sup>11,12</sup> The combined impact of lower sales and higher fuel prices contributed to high and volatile average customer rates ranging from 20 to 30 c/ kWh.

- **Unsustainable debt and pension obligations:** PREPA accumulated approximately \$9 billion in debt and nearly \$4 billion in unfunded pension liabilities, while rates were not increased to cover growing liabilities. Without debt restructuring, rate increases of 6 to 8 c/kWh would be required to adequately service the outstanding contracted debt, amounting to a total rate of approximately 30 to 40 c/kWh over the next two decades, depending on fuel prices.<sup>13</sup> Fully funding its pension liabilities would require PREPA to contribute \$251 million between FY2022 and FY2049. PREPA is currently undergoing debt restructuring under the Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA).
- **Underinvestment in grid maintenance and modernization:** Given insufficient revenues and rate increases, PREPA's management has reduced or eliminated altogether investments in maintenance and capital improvements. In recent years, capital investments in the T&D system were limited to the most urgent projects to avoid imminent system failure rather than to proactively improve the grid for the future. Consistent underspending on vegetation management and other maintenance have resulted in a T&D system susceptible to damage from hurricanes, earthquakes, and other unforeseen events. In FY2019, PREPA reported spending none of the budget allocated for vegetation management, even though lack of tree trimming was found to cause 35 to 45% of unplanned outages.<sup>14</sup> Consequently, Puerto Rico's residents face frequent service disruption and reliability metrics such as SAIDI and SAIFI, which indicate the duration and frequency of average power system interruptions, far exceed that of PREPA's mainland peer U.S. utilities (see Table 1).
- **Aging and inefficient generation fleet:** Failed efforts to diversify and upgrade generation resources have resulted in an aged and inefficient generation fleet. PREPA owns installed capacity of nearly 5,000 MW with an average age of 42 years, compared to a national average of 18 years.<sup>15,16</sup> Aging assets lead to operational challenges, including lower operational flexibility as a result of slower ramp-up, a higher likelihood of outages, increased costs per megawatt-hour generated, and limitations from environmental regulations. Average fuel cost for a PREPA-owned natural gas unit is \$82/MWh, while for a unit built in the past 10 years, the typical fuel cost is \$35/MWh.<sup>17</sup> PREPA's generation fleet is also susceptible to fuel cost volatility from global oil market prices. In FY2019, approximately 40% was oil-fired, compared to a US national average of about 4%, leaving Puerto Rico's citizens and businesses particularly vulnerable to changes in oil prices.<sup>18,19</sup>

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<sup>11</sup> PREPA, FY2009 Monthly Report (interim, unaudited financial results).

<sup>12</sup> PREPA, FY2014 Monthly Report (interim, unaudited financial results).

<sup>13</sup> Estimate based on calculations of unstructured legacy debt based on FY2019 load projections, as published in PREPA's June 2019 fiscal plan. After ten years, the cost declines.

<sup>14</sup> "In Re: Review of Rates of the Puerto Rico Electric Power Authority." 33. Revised November 23, 2016. <https://energia.pr.gov/wp-content/uploads/2016/11/Expert-Report-Revenue-Requirements-Fisher-and-Horowitz-Revised-20161123.pdf>

<sup>15</sup> Excludes IPP installed capacity of 961 MW; all renewable energy plants are independently owned and contracted through PPAs.

<sup>16</sup> US Congress, Exploring Energy Challenges and Opportunities, 4.

<sup>17</sup> FERC Form 1 Upstream Generation benchmark.

<sup>18</sup> U.S. Energy Information Administration, Puerto Rico: Profile Overview, last modified November 21, 2019, <https://www.eia.gov/state/?sid=RQ>.

<sup>19</sup> Siemens Industry, Puerto Rico Integrated Resource Plan 2018-2019, RPT-015-19, rev. 2 (Schenectady, June 7, 2019), 7-3, <http://energia.pr.gov/wp-content/uploads/2019/02/PREPA-Ex.-1.0-IRP-2019-PREPA-IRP-Report.pdf>.

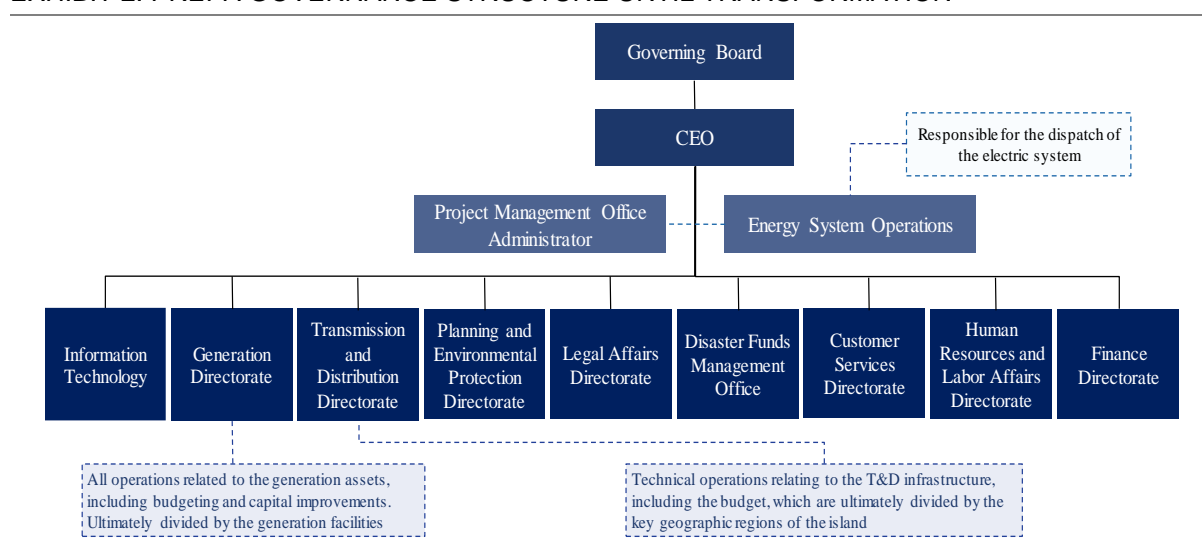
In light of these long-standing operational and financial challenges, the 2020 Fiscal Plan lays a path towards the full transformation of Puerto Rico’s energy sector. This transformation is described further in Chapter 3, “Transformation.”

## 2.3 Governance Structure

PREPA’s current governance structure reflects its role as the sole vertically integrated power utility in Puerto Rico. PREPA’s Enabling Act established PREPA as a government instrumentality subject to the control of its Governing Board. PREPA has also been subject to the oversight of the Financial Oversight and Management Board for Puerto Rico after the enactment of PROMESA in 2016. Further details on regulatory structure, including the role of the Puerto Rico Energy Bureau (PREB) can be found in Chapter 4, “Regulatory Structure.”

The Governing Board is charged with the power to appoint the Executive Director or Chief Executive Officer, as well as all other executive officers. To date, PREPA has nine directorates responsible for all operations relating to the utility’s generation and T&D assets (Exhibit 2). The PREPA Project Management Office and Office of Restructuring and Fiscal Affairs are responsible for developing the fiscal plan and implementing and reporting progress on initiatives to the PREPA Board of Directors and the Oversight Board. The Energy System Operations Office oversees the economic dispatch of the electric system.

EXHIBIT 2: PREPA GOVERNANCE STRUCTURE UNTIL TRANSFORMATION



PREPA’s Governing Board is composed of seven members (Exhibit 3).

1. Three members are appointed by the Governor of Puerto Rico, with the advice and consent of the Senate; these members are selected from a list of candidates prepared by a professional recruitment firm.
2. Three members are appointed by the Governor at his or her sole discretion, one of which must be independent and not an employee of any government entity.
3. One member is elected by PREPA’s customers to represent customer interests.

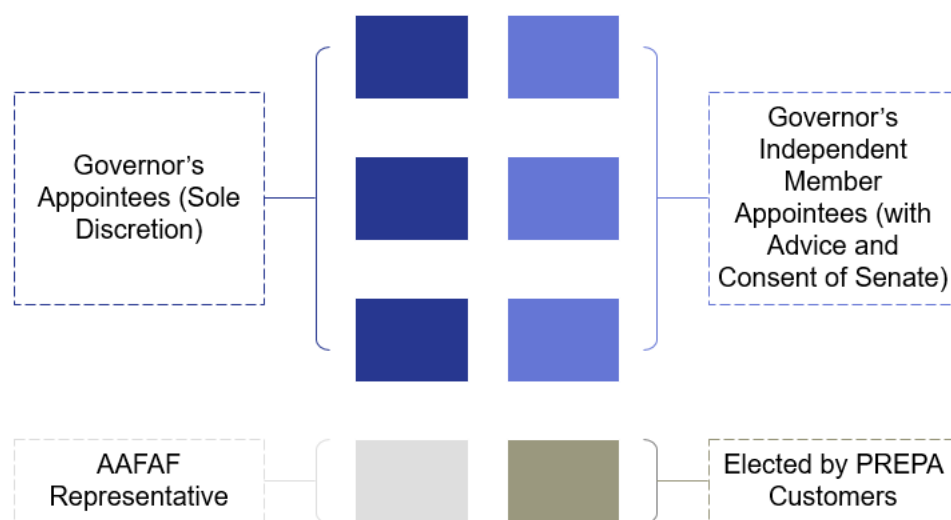
Additionally, Article 16 of Puerto Rico’s Fiscal Agency and Financial Advisory Authority’s (AAFAF) Enabling Act provides that AAFAF’s Executive Director is a member of the Board of Directors of any instrumentality of the Government of Puerto Rico that is designated as a covered territorial instrumentality under PROMESA while such designation is in effect. Given



PREPA’s designation as a covered territorial instrumentality, AAFAF’s Executive Director is also a member of PREPA’s Governing Board.<sup>20</sup>

Governing Board members appointed by the Governor with the advice and consent of the Senate serve staggered terms, while the members appointed at the Governor’s sole discretion are considered at-will employees – except for the independent member, who serves a term of five years. The customer interest representative also serves a term of five years.<sup>21</sup>

EXHIBIT 3: PREPA GOVERNING BOARD COMPOSITION



The current focus of the PREPA Governing Board is to support and implement the many transformational measures outlined in the 2020 Fiscal Plan, including:

1. Supporting the transfer of T&D and generation operating and maintenance responsibilities to professional private operators;
2. Supporting efforts to maximize federal funding allocations in order to invest in the repair and strengthening of energy assets;
3. Implementing short-term operational and managerial reforms that will enhance service quality, improve operational efficiency, enhance transparency and accountability, and reduce political intervention; and
4. Supporting efforts to restructure PREPA’s legacy debt and pension obligations.

## 2.4 Current State of T&D

Puerto Rico’s T&D system is composed of three major transmission loops that move electric generation from power plants concentrated along the southern coast to load centers concentrated in the northeast. The system’s dependence on north-south transmission creates operational inefficiencies and grid vulnerabilities. The impact of Hurricane Maria was particularly devastating for these north-south lines, which cut through dense, forested terrain.

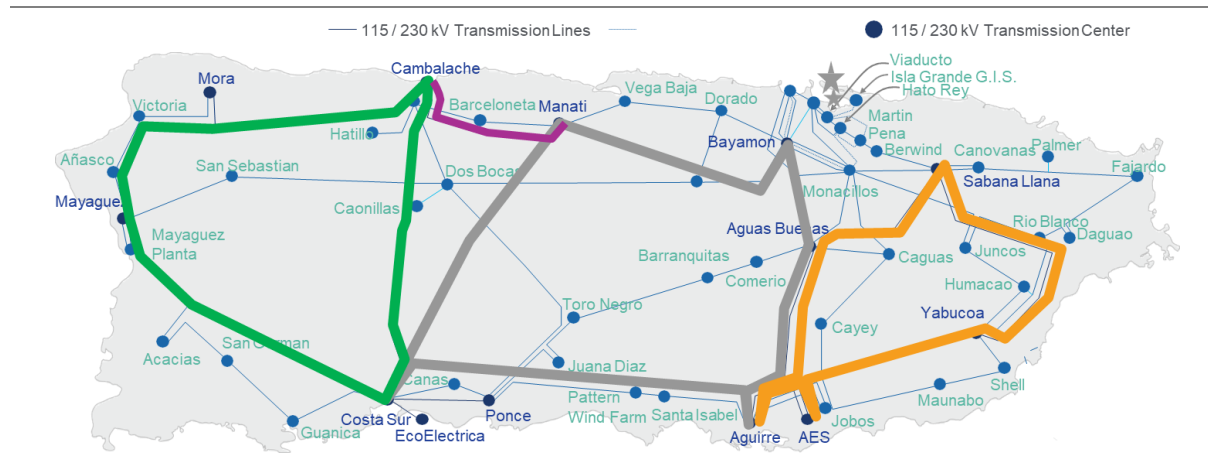
The system’s original transmission loop is the Central Loop, connecting Costa Sur, EcoEléctrica, and Aguirre power plants in the south with the San Juan power plant in the north

<sup>20</sup> Act 2-2017, as amended (3 L.P.R.A. § 9376).

<sup>21</sup> Section 4 of the PREPA Enabling Act (22 L.P.R.A. § 194).

via transmission centers at Aguas Buenas, Manatí, and Bayamón. The Western Loop, which entered service in 2002, connects Costa Sur and EcoEléctrica power plants in the south with PREPA's Mayaguez plant in the west and the Cambalache plant in the north. The Eastern Loop, which entered service in 2006, connects Aguirre and AES power plants in the south through transmission centers at Yabucoa in the east and Aguas Buenas and Sabana Llana in the north.

EXHIBIT 4: PREPA TRANSMISSION LOOPS



### Transmission Overview

PREPA's transmission system maintains 178 transmission centers operating at 230 kV, 115 kV, and 38 kV. These centers link 1,134 miles of transmission lines (230/115 kV) and 1,549 miles of sub-transmission lines (38 kV). Of these, 96% of the lines are overhead and the remaining 4% are underground. PREPA maintains approximately 44,000 transmission structures, divided across the three 230 kV loops in the west, east, and central parts of the island. The 115 kV lines serve all the major load centers, while the 38 kV sub-transmission system serves more remote interior regions, as well as most industrial and commercial customers.

### Distribution Overview

PREPA's distribution system serves around 1.5 million customers utilizing roughly 1,200 circuits. There are a total of 31,893 miles of distribution lines, including 16,806 miles of primary voltage lines and 15,087 miles of secondary lines and service drops. The system connects 61 115 kV substations, 279 38 kV substations, and 824 privately owned substations. There are approximately 298,000 distribution poles and approximately 213,000 service transformers. Most of PREPA's distribution system is comprised of overhead lines, with roughly 20% of underground lines located primarily in urban centers. Distribution poles are galvanized steel, concrete, and wood.

### Challenges to the Transmission and Distribution System

PREPA faces notable geographic challenges given that its primary load center is located in the north (San Juan Metro Area and Humacao Industrial District, approximately 70% of total load) while the majority of the most economic and efficient generation resources are in the south (approximately 70% of online generation capacity). The three 230 kV transmission loops that link generation from the south to demand in the north traverse mountainous and densely forested terrain, creating access limitations for repairs or reconstruction. In the aftermath of hurricanes Irma and Maria in 2017, recovery efforts were delayed by limited accessibility to these transmission lines. The extent of the hurricane damage was exacerbated by a failure to manage vegetation and execute routine maintenance – a report by the Government Accountability Office assessing the impact of the hurricanes on the electrical grid

found that “[PREPA] canceled its vegetation management program” prior to the hurricanes, thus “[contributing] to the destruction of the grid.”<sup>22</sup> PREPA’s T&D maintenance and management practices continue to fall short of industry standards, leading to higher costs and lower reliability for customers.

In order to address these challenges – by improving operational performance and customer service, supporting rigorous capital project execution to modernize the system, and ensuring ongoing fiscal balance and control – the P3A, in collaboration with PREPA and the Oversight Board, have selected an experienced and professional private operator to take on the responsibilities to operate and maintain PREPA’s T&D system. In addition, the capital investments for grid modernization outlined in the T&D road map will be instrumental to strengthening Puerto Rico’s electrical grid – further details are provided in Chapter 14, “Resilience Planning and Expenditures.”

## **2.5 Current State of Generation**

Electricity is supplied by PREPA-owned generation plants and procured from independent power producers (IPPs) under power purchase and operating agreements (PPOAs). Together, PREPA-owned power plants have 4,908 MW of installed generation capacity. However, approximately 40% of this capacity is usually out of service, often for extended periods of time, so, on average, around 3,000 MW of PREPA-owned generation capacity is available for dispatch. In addition to PREPA-owned assets, supply from IPPs consists of 961 MW from two conventional power plants and 254 MW from various renewable energy providers. Given PREPA’s frequent outages, the system often has to dispatch generation units with higher cost fuel. For example, the earthquake-related losses at Costa Sur’s natural gas generation (average fuel cost of \$82/MWh) were compensated by increasing generation in diesel units (average fuel cost of \$112/MWh).

About 45% of PREPA-owned generation resources are oil fired, compared to the national average of 4%.<sup>23</sup> Renewables generation makes up 4% of Puerto Rico’s generation capacity, while nationally the average is 15%. In FY2020, the San Juan Power Plant facility completed a conversion of Units 5 and 6 to burn natural gas, marking progress toward diversifying the generation fleet.

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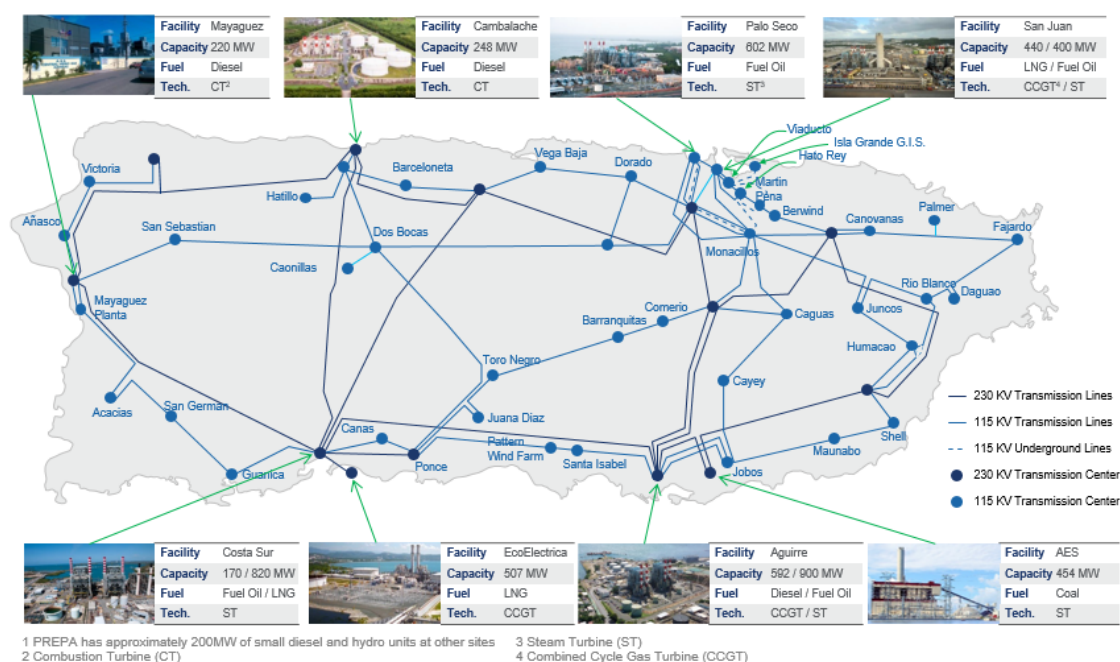
<sup>22</sup> “2017 Hurricane Season: Federal Support for Electricity Grid Restoration in the U.S. Virgin Islands and Puerto Rico,” U.S. Government Accountability Office. April 2019. <https://www.gao.gov/assets/700/698626.pdf>.

<sup>23</sup> Draft IRP, February 2019, <https://energia.pr.gov/wp-content/uploads/2019/02/PREPA-Ex.-1.0-IRP-2019-PREPA-IRP-Report.pdf>.

## EXHIBIT 5: PREPA GENERATION ASSETS

### Overview of Generation Assets and Power System

The majority of PREPA's generation is located at 6 sites, with 4 major facilities each containing more than 500MW of generating capacity<sup>1</sup>. Two other conventional generation sites (AES and EcoEléctrica) and all operating renewable power facilities (~250MW) are owned by third-parties.



### Challenges to the Generation System

As an island system, Puerto Rico's power grid is geographically isolated and thus Puerto Rico is unable to import additional power for purposes of load balancing, voltage control, and frequency control across the electric system. PREPA's baseload generation units are relatively large as a percentage of system peak load, such that a single unit outage can lead to an island-wide outage, as experienced in 2016 and 2018. To protect against this, generating units are required to spend significant operating hours at partial load in order to maintain reliability, reducing generation efficiency and increasing overall costs.

Most of PREPA's current generation fleet runs on old and outdated steam generation technology with long ramp times. This means that older plants (such as steam turbines) take longer to reach peak load and have limited operational flexibility to change load due to the fact that they have slower control systems and require more time to heat up. While these older steam plants are generally more economic due to lower-cost fuel, they are operationally limited by applicable federal mercury and air toxic standards (MATS) and the U.S. Environmental Protection Agency (EPA) Consent Decree.

Puerto Rico's few renewable energy facilities represent the system's cleanest generation resources and are designated "must run."<sup>24</sup> However, these facilities are, on average, some of the most expensive generation on the island, since, at the time of procurement, renewable generation capacity was priced much higher than the market price available today.

Puerto Rico's aging, inefficient, and unreliable generation fleet must be urgently replaced and modernized. The roadmap for this modernization is defined in the IRP, which outlines the actions and investment in new generation PREPA must make in order to reduce generation costs and achieve greater reliability and resiliency. In order to meet the Renewable Portfolio

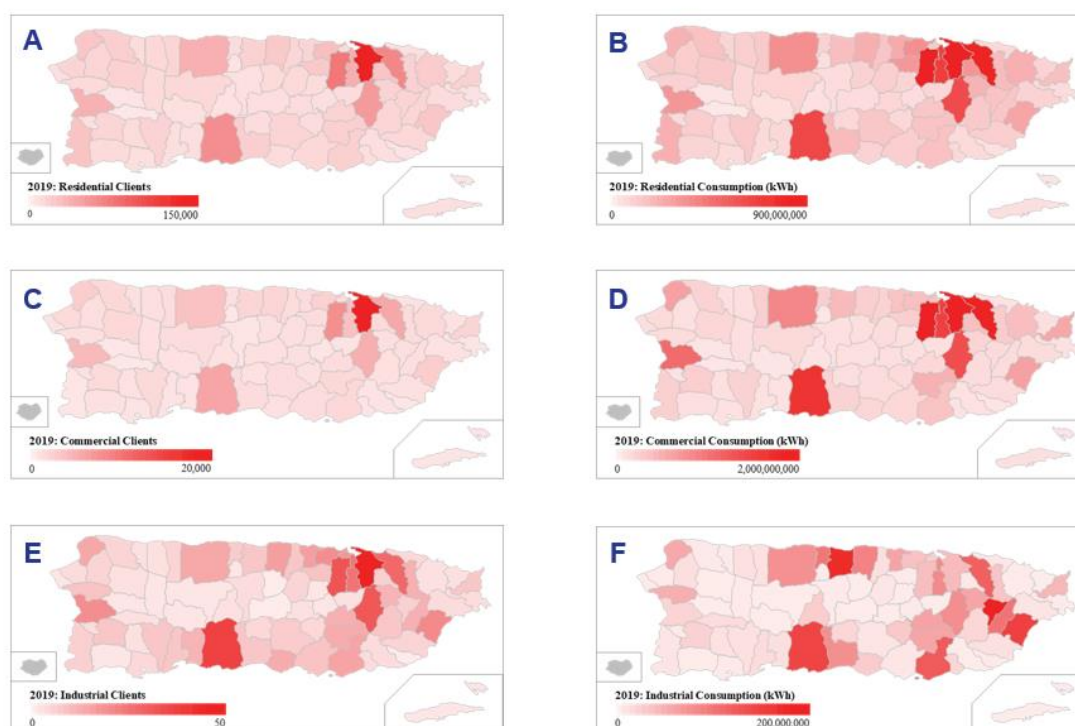
<sup>24</sup> "Must run" facilities require PREPA to pay for energy produced to the contracted capacity even if not needed to meet system demand.

Standards (RPS) mandated by Act 17-2918 (i.e., 25% generation from renewable sources by 2025; 100% by 2050), Puerto Rico must accelerate its development of renewable generation. For existing generation assets, transitioning to one or more private operator(s) will ensure the optimal operation and maintenance of these assets until they are retired and replaced by new and more efficient generation resources. Further detail is provided in Chapter 3, “Transformation.”

## 2.6 Customer Demographics and Affordability

PREPA currently serves approximately 1.5 million customers, of which 91% are residential, 9% are commercial, and less than 1% are industrial. Almost half of PREPA’s load is driven by commercial customers, who represented 49% of FY2020’s projected total demand of 16 TWh. This is followed by residential customers, who account for 36% of electricity demand, and industrial customer, at 13%.<sup>25</sup> The majority of PREPA’s residential and commercial customers are located in the San Juan metropolitan area (Exhibit 6A and 6C). Industrial customers, on the other hand, are spread across the island; they are primarily located in the San Juan metropolitan area, the Humacao district (southeast of San Juan), the north-central coast (Arecibo, Manatí and Vega Baja) and the municipality of Ponce (southern coast) (Exhibit 6E and 6F).

EXHIBIT 6: 2019 PREPA CUSTOMER COUNT AND CONSUMPTION BY MUNICIPALITY



A June 2020 survey of 374 Puerto Rico electricity customers found 96% of surveyed customers to be serviced by PREPA, while 4% utilized behind-the-meter generation. A slight majority of respondents (51.6%) indicated they were “satisfied” or “very satisfied” as compared to those who responded they were “unsatisfied” or “very unsatisfied” (47.3%) with their service provider. In contrast, the overall customer satisfaction score for the U.S. utility sector averaged 72% in 2019.<sup>26</sup> While just half of respondents were satisfied overall, the majority were dissatisfied by the cost and reliability of electricity service – 62% reported dissatisfaction with

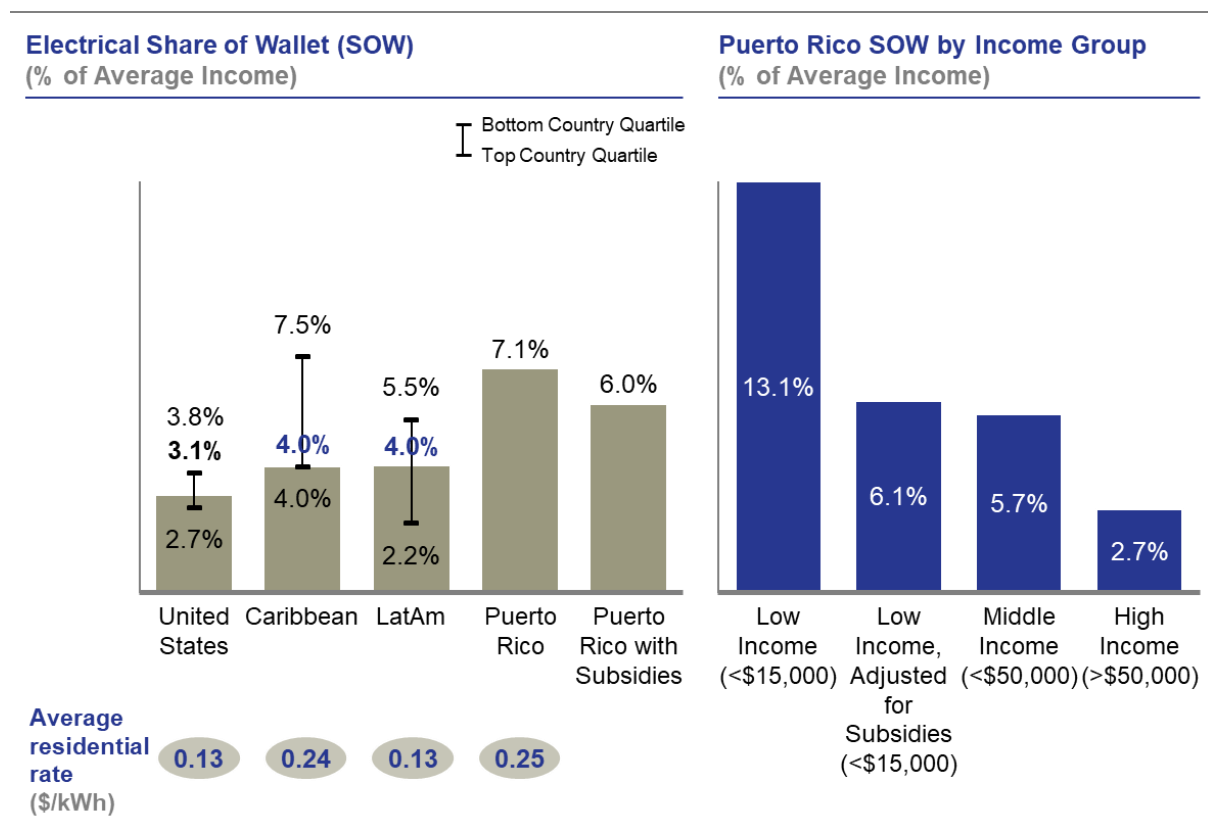
<sup>25</sup> Additional load is attributed to public lighting and agriculture.

<sup>26</sup> American Customer Satisfaction Index Energy Utilities Report, 2019-2020

the cost of electricity and 65% were dissatisfied with the reliability of electricity service (i.e., frequency and duration of outages). The average monthly bill reported was \$111, while the median bill was \$95. More than 50% said they would alter their consumption pattern if energy costs increased – 44% would consider moving to solar and investing in energy efficient appliances, while 23% would consider completely disconnecting from PREPA. For one-fifth of respondents, the electricity share of wallet (i.e., average electricity bill as share of monthly household income) is greater than 10%.

On average, Puerto Rico’s consumers pay more for electricity relative to their income than consumers in any U.S. state. For the average PREPA customer, based on 2015-2016 rates of 25 c/kWh, an electricity bill amounts to approximately 7% share of wallet, subsidies notwithstanding, which is significantly higher than that of U.S. mainland peers (range of 2.7 to 3.8%) and Latin American peers (range of 2.2 to 5.5%) (Exhibit 7).<sup>27</sup> Low-income customers are disproportionately affected by the current rate structure. Share of wallet for low-income ratepayers amounts to 13% before subsidies but adjusts to 6.1% after considering subsidies. For middle- and high-income customers, electricity bills amount to 5.7% and 2.7% of average incomes respectively.

EXHIBIT 7: PUERTO RICO ELECTRICAL SHARE OF WALLET COMPARED TO PEER REGIONS<sup>28</sup>,  
29, 30



<sup>27</sup> Share of wallet is defined as the percentage of per capita electric utility service expenditures relative to per capita income.  
<sup>28</sup> The Caribbean region includes Bahamas, Saint Kitts and Nevis, Trinidad and Tobago, Antigua and Barbuda, Barbados, Grenada, Saint Lucia, The Dominican Republic, Jamaica, Suriname, Guyana, and Haiti.  
<sup>29</sup> Average residential rate for 2015-16 comparison.  
<sup>30</sup> Sources: FRED US per capita Income 2016, World Bank World per capita income 2016, EIA world energy consumption 2016, Global Data and NREL Electricity Rates.

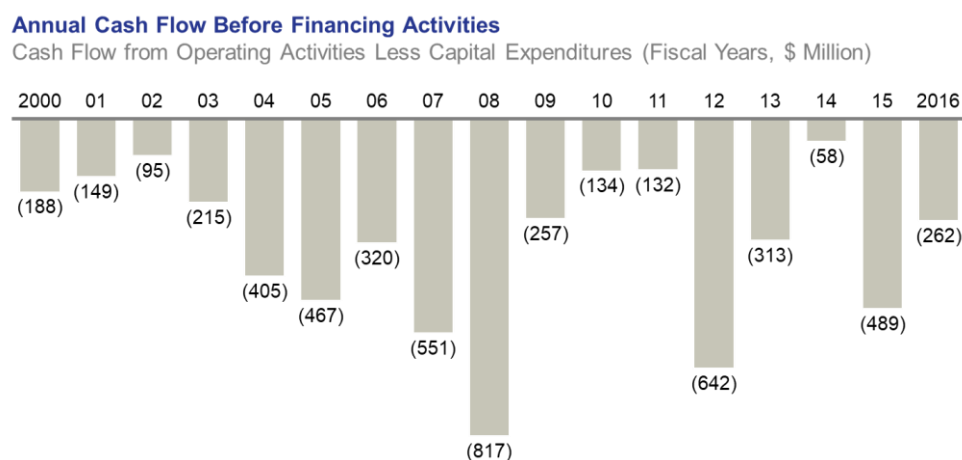
## 2.7 Overview of Historical Financial Performance<sup>31</sup>

PREPA’s persistent financial deficits are a result of, among other things, decades-long fiscal and operational mismanagement, and a historical resistance to adjust energy rates to a level that would ensure PREPA could cover its costs, and the capital investments required to modernize its energy system. PREPA has been operating under a structural financial deficit since 2004, which has worsened over time. To cut costs, PREPA stopped investing in system upgrades and systematically underfunded its pension plan, leading to an energy system that is prone to frequent and extended outages and voltage fluctuations.

Over the past decade, revenues have decreased due to out-migration and economic decline, as well as increased adoption of distributed generation and energy efficiency measures. As the revenue base contracted, higher rates led to an increase in outstanding collections and bad debt, causing customers to further invest in energy efficiency and reduce their reliance on the grid, all with an adverse impact on PREPA’s revenues. In response to these liquidity challenges, PREPA financed its fuel procurement through credit lines, which further contributed to PREPA’s unsustainable debt.

Historically, PREPA’s rates have been insufficient to cover operating costs, pension costs, and debt obligations. PREPA’s operating cash flow fell from a deficit of \$188 million in FY2000 to its worst point at over a \$800 million deficit during the Great Recession in FY2008, as PREPA relied on financing to make up for revenue shortfalls (Exhibit 8). By FY2014, PREPA’s financial condition had deteriorated to the point where it had to enter into forbearance agreements with creditors when it became apparent that there were insufficient funds to pay amounts due. On July 2, 2017, the FOMB filed a petition on PREPA’s behalf for relief under Title III of PROMESA before the U.S. District Court for the District of Puerto Rico.

EXHIBIT 8: PREPA HAS OPERATED UNDER A DEFICIT SINCE FY2000



From FY2014 to FY2017, PREPA’s annual operating results and one-time accounting adjustments depict an increasingly distressed financial situation. Between FY2014 and FY2015, the operating deficit increased from \$58 million to \$489 million, with the recognition of PREPA’s substantial net pension liability. As a result of changes in pension accounting assumptions and liability valuation, PREPA faced an additional \$1.6 billion in unfunded pension liability in FY2015. The ongoing recognition of net pension liability and accrued interest has ballooned PREPA’s negative net position to over 70% of balance sheet assets (Table 2Exhibit 9Error! Reference source not found.). Although operating expenses

<sup>31</sup> All reference years are fiscal years (i.e., July 1 to June 30); Figures presented are unconsolidated, showing PREPA only and excluding the irrigation division; fuel, tourism (hotel), and public lighting subsidies are shown as revenue reductions rather than expenses.

have declined in recent years, revenues have declined at a faster pace, resulting in growing deficit.

TABLE 2: PREPA FY2013 TO FY2019 STATEMENT OF NET POSITION

(\$ millions)	FY2013	FY2014	FY2015	FY2016	Preliminary, subject to material change		
					FY2017	FY2018	FY2019
<b>Operating revenues</b>	4,843	4,469	3,865	2,995	3,298	2,882	3,479
<b>Operating expenses</b>							
Fuel	(2,604)	(2,345)	(1,887)	(1,215)	(1,218)	(1,200)	(1,404)
Purchased power	(756)	(808)	(790)	(687)	(729)	(534)	(678)
O&M	(785)	(752)	(1,129)	(1,241)	(1,394)	(620)	(628)
Depreciation	(345)	(342)	(382)	(517)	(519)	(363)	(365)
<b>Total operating expenses</b>	<b>(4,489)</b>	<b>(4,246)</b>	<b>(4,189)</b>	<b>(3,661)</b>	<b>(3,860)</b>	<b>(2,717)</b>	<b>(3,075)</b>
<b>Operating income/(loss)</b>	<b>354</b>	<b>223</b>	<b>(323)</b>	<b>(666)</b>	<b>(562)</b>	<b>164</b>	<b>404</b>
Interest expense, net	(361)	(410)	(424)	(430)	(446)	(471)	(461)
Impairment loss on GDB deposits			(145)				
<b>(Loss)/gain before CILT and other</b>	<b>(7)</b>	<b>(187)</b>	<b>(892)</b>	<b>(1,096)</b>	<b>(1,008)</b>	<b>(307)</b>	<b>(57)</b>
CILT and other subsidies	(298)	(278)	(273)	(172)	(178)	(87)	(93)
Contributed capital	32	45	21	8	7	1	3
<b>Change in net position</b>	<b>(272)</b>	<b>(420)</b>	<b>(1,144)</b>	<b>(1,260)</b>	<b>(1,178)</b>	<b>(393)</b>	<b>(147)</b>
Net position at beginning of year	(575)	(847)	(1,267)	(3,578)	(4,962)	(6,141)	(6,534)
Change in pension accounting cost			(1,644)				
Net effect of the 2015 restatement			477				
<b>Net position at end of year</b>	<b>(847)</b>	<b>(1,267)</b>	<b>(3,578)</b>	<b>(4,838)</b>	<b>(6,141)</b>	<b>(6,534)</b>	<b>(6,681)</b>

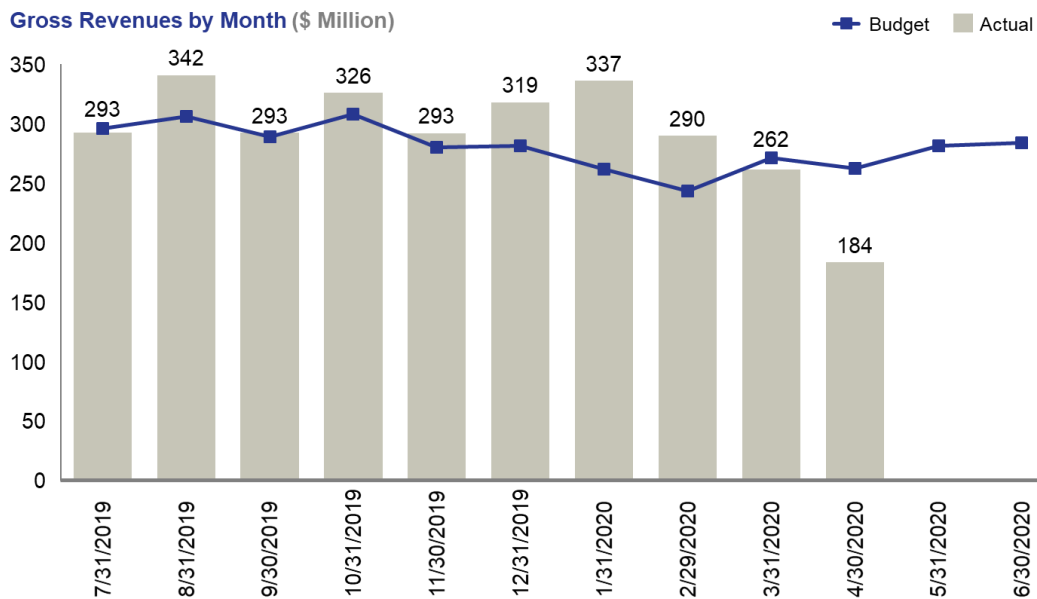
Since filing for bankruptcy in June 2017, PREPA has made progress toward stabilizing its cash flow by improving reporting and implementing internal communications, integration, and payment controls. However, this fiscal stability comes with significant tradeoffs. PREPA has only partially paid for existing pension and legacy debt obligations, and delayed funding for most of its capital investment requirements. In the past two years, significant underspend on NME and vegetation management have resulted in surpluses improving PREPA's liquidity position – however, the improvements will not be sustained as the lack of adequate grid maintenance puts PREPA's grid at risk.



### 2.7.1 Overview of FY2020 Revenue Budget to Actual<sup>32</sup>

During the first two quarters of FY2020, PREPA’s monthly gross revenues were approximately 6% above projections, driven primarily by higher than budgeted energy sales due to actual electricity demand being 4% higher than projected. However, lockdown and other social distancing measures implemented in response to the COVID-19 pandemic will likely have a negative impact on total electricity demand for the remainder of FY2020, as shown by the month-over-month declines in revenues in March and April (Exhibit 9).

EXHIBIT 9: FY2020 GROSS REVENUES PER MONTH



Key variances in PREPA’s year-to-date budget to actual through Q3 FY2020 include: (1) higher than budgeted fuel costs due to higher than expected generation requirements, fuel prices, and diesel dispatch; and (2) underspending on maintenance and vegetation management outsourcing.

The most significant negative variance in PREPA’s year-to-date performance against budget through Q3 is due to fuel costs. PREPA faced higher than projected fuel prices and the loss of Costa Sur generation capacity due to earthquake damage. In addition, delays over the past fiscal year in completing the natural gas conversion of San Juan Units 5 and 6 led to lost savings in fuel cost. Due to substantial swings in the global oil market, Q4 fuel costs are expected to be lower than prior period run rates. PREPA observed minor positive variances in labor expense line items due to ongoing retirements and lack of sufficient replacement hiring. Underspending on maintenance to date reflects a combination of project execution delays that PREPA has been working to address and resolve in the final quarter of FY2020.

<sup>32</sup> Gross revenues include revenues collected from customers for consumption, whereas consolidated revenues include revenues collected from customers for consumption, revenue for other income sources, and other adjustments (bad debt expense, CILT and subsidies, etc.)

EXHIBIT 10: FY2020 BUDGETED AND ACTUAL INCOME AND EXPENDITURE

(\$ Millions)	FY2020 Budget Q3 YTD	FY2020 Q3 Actual YTD	FY2020 Estimated
<b>Gross Revenue</b>	\$ 2,537	\$ 2,754	\$ 3,511
Other Income	8	30	32
Bad Debt Expense	(46)	(47)	(62)
CILT & Subsidies Reduction	(233)	(213)	(292)
RSA Settlement Charge	119	-	-
<b>Total Revenue</b>	<b>2,384</b>	<b>2,524</b>	<b>3,189</b>
<b>Operating Expenses</b>			
Fuel	881	1,192	1,405
Purchased Power - Conventional	495	488	666
Purchased Power - Renewables	63	51	71
<b>Total Fuel &amp; Purchase Power Expense</b>	<b>1,439</b>	<b>1,731</b>	<b>2,142</b>
Salaries & Wages	156	150	207
Pension & Benefits	94	83	118
Overtime Pay	40	42	57
Overtime Benefits	5	4	6
<b>Total Labor Operating Expense</b>	<b>296</b>	<b>279</b>	<b>388</b>
<b>Total Non-Labor Expense</b>	<b>335</b>	<b>232</b>	<b>343</b>
<b>Total Maintenance Expense</b>	<b>166</b>	<b>108</b>	<b>163</b>
Federal Funding Cost Share	7	-	-
<b>Total Expenses</b>	<b>2,243</b>	<b>2,350</b>	<b>3,037</b>
<b>BALANCE</b>	<b>\$ 141</b>	<b>\$ 174</b>	<b>\$ 153</b>

## 2.8 Adverse Effects of FY2020 Major Catastrophic Events

Most of PREPA’s difficulties reflect years of operational and financial mismanagement. However, even after filing for Title III protection, PREPA’s operational and fiscal condition has been further affected by a series of catastrophic events. In September 2017, Hurricanes Irma and María caused substantial damages to PREPA’s T&D infrastructure across the entire island. In January 2020, a magnitude 6.4 earthquake located near Puerto Rico’s southwestern coast caused significant damage to PREPA’s Costa Sur power plant and left most of Puerto Rico without electric service for hours. The effects of the earthquake were quickly followed by the emergence of the COVID-19 pandemic. The enforcement of strict social distancing measures has had a negative effect on PREPA’s collections and revenues, further weakening PREPA’s liquidity position.

The following sections summarize the effects of the earthquakes and COVID-19 on PREPA’s financial and operational health. Further discussion of the impact of these two events, as well as PREPA’s response, can be found in Chapter 8, “Resilience and Resource Planning”.

### 2.8.1 Impact of 2019-2020 Earthquakes

From December 28, 2019 to January 15, 2020, Puerto Rico experienced over 300 magnitude 3 or higher earthquakes, 10 of which reached or exceeded magnitude 5.<sup>33</sup> The strongest earthquake took place on January 7, 2020, reaching a peak magnitude of 6.4. This earthquake inflicted significant damage on the Costa Sur power plant, an 820 MW natural gas facility. PREPA required several hours to reestablish service, underscoring the system’s lack of quick restart capabilities and vulnerability to sudden loss of generation units.

Repairs of Costa Sur’s Unit 5 repairs are ongoing and expected to be completed by mid-August 2020, with an estimated repair cost of \$25.2 million. The damage assessment to Unit 6 is ongoing and the repairs are expected to be completed by Q4 2021. As a result, PREPA had to

<sup>33</sup> “As Aftershocks Continue in Puerto Rico, USGS Supports Quake Recovery,” U.S. Geological Survey, January 17, 2020, <https://www.usgs.gov/news/aftershocks-continue-puerto-rico-usgs-supports-quake-recovery>.

rely on fuel oil and diesel generation capacity to compensate for the lost natural gas-fired generation at Costa Sur. In the immediate aftermath of the earthquakes, PREPA was forced to delay planned maintenance and improvement projects in order to maintain sufficient generation to meet peak demand. While the risk of rolling black-outs due to generation capacity shortages has decreased, the system remains vulnerable to further unforeseen events.

### *2.8.2 Impact of COVID-19*

Starting March 16, 2020, Puerto Rico enacted social distancing measures to cope with the spread of COVID-19 under Executive Order 2020-023. The public health and economic impact of COVID-19 have had a ripple effect on the power sector. Social distancing and lockdown measures required PREPA to halt all non-essential work, including vegetation management and maintenance projects, and led to a decline in generation levels and customer sales. By late March, average daily collections had dropped by 50%, forcing PREPA to implement strict financial controls in order to preserve liquidity.<sup>34</sup> Since then, average daily collections have recovered to approximately 90% of forecasted levels.

As the COVID-19 pandemic evolves, ongoing evaluation will be critical for PREPA management's ability to be prepared for unexpected changes in forecasts. An assessment of PREPA's response to the COVID-19 pandemic should also inform PREPA's emergency and contingency plans in order to better and more effectively respond to future unforeseen events.

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<sup>34</sup> Several factors influenced the decision by customers to not pay the utility bills, chief among them, the enactment of Act 39-2020, which, among others, prohibited the disconnection of electricity services due to non-payment.

# Chapter 3. Transformation

## 3.1 Introduction to the Energy Sector Transformation

On January 22, 2018, in the aftermath of Hurricane Maria, the Government of Puerto Rico outlined a vision for the transformation of the energy sector. The vision states the need for customer-centric, safe, reliable, resilient, and cost-efficient electric power service that meets environmental, regulatory, and statutory requirements. Today, the Government, in collaboration with the Oversight Board, is in the midst of transforming the aged and inefficient energy system into a modern, efficient, and sustainable sector by relying on diverse, experienced, and motivated private operators and service providers. The transformed energy sector will improve the every-day lives of Puerto Rico's citizens and allow all businesses to thrive as customers will experience fewer and shorter service outages and reduced costs associated to such outages, as a modernized system will no longer need to continually rely on expensive older oil-fired generation plants and back-up generators.

The transformation of the energy sector requires the completion of several interrelated workstreams, including:

1. Regulatory reform to ensure transparency and compliance with public policy objectives;
2. Improvement of existing PREPA operations and transfer of responsibilities for the operation and maintenance of PREPA's T&D system to a qualified, professional, and experienced private operator;<sup>35</sup>
3. Improvement of PREPA generation operations and transfer of the responsibilities for the operation and maintenance of PREPA's existing generation assets to one or more qualified, professional, and experienced private operators;
4. Modernization of PREPA's generation fleet through the implementation of the Integrated Resource Plan (IRP), including execution of competitive and transparent procurement processes for the development of privately owned generation assets that will increase the share of renewable generation in line with the Act 17 Renewable Portfolio Standards (RPS) targets;
5. Identification of funding for necessary grid resilience investments, including finalization and funding of the plan for system hardening and mitigation projects by federal authorities;
6. Effective deployment of capital investments for grid strengthening and modernization;
7. Restructuring legacy debt and pension obligations and exit from Title III bankruptcy under PROMESA.<sup>36</sup>

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<sup>35</sup> As required by PROMESA § 201(B)(1)(g) in order to enable achievement of fiscal target.

<sup>36</sup> As required by PROMESA § 201(B)(1)(E) in order to provide for a debt burden that is sustainable.

### 3.2 Energy Sector Transformation Vision, Objectives, and Framework

The Government of Puerto Rico’s vision to transform the power sector is based on the following objectives:

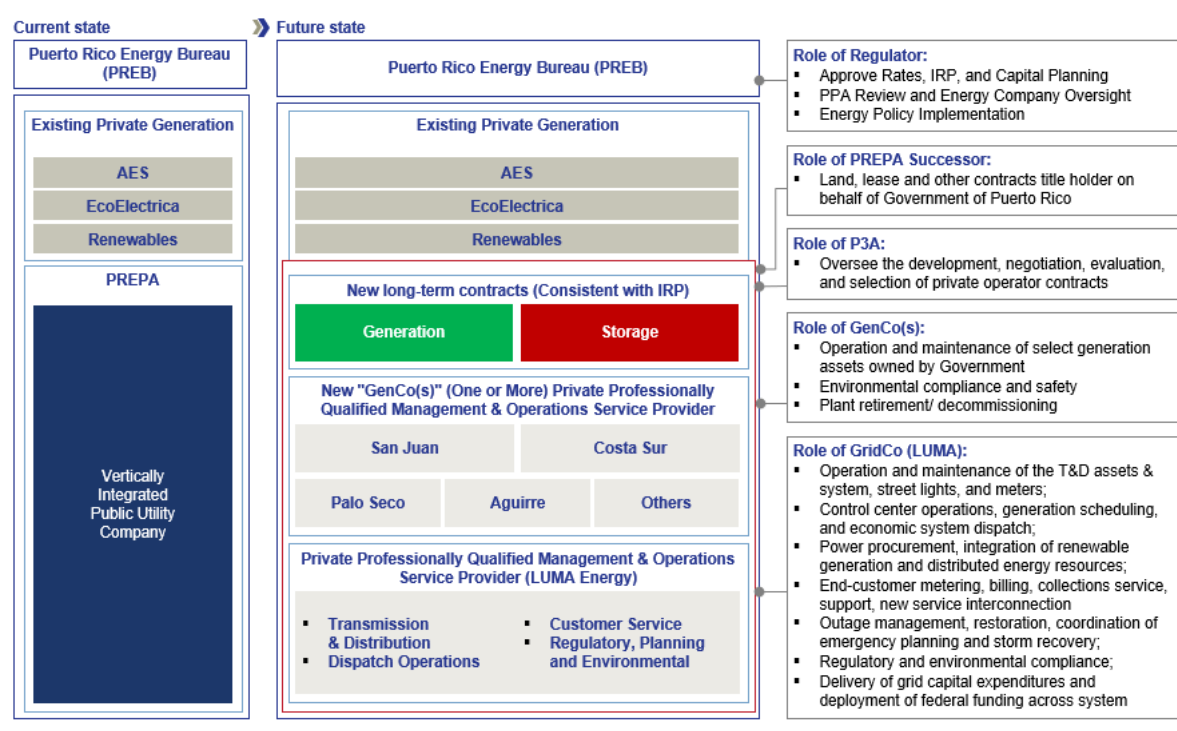
TABLE 3: TRANSFORMATION OBJECTIVES

<b>Transformation objectives<sup>37</sup></b>	
<b>Customer-centricity</b>	<ul style="list-style-type: none"> <li>■ Enable residents to choose how to best address their energy needs</li> <li>■ Empower consumers to become producers and consumers (i.e., “prosumers”)</li> <li>■ Increase customer engagement</li> </ul>
<b>Affordability</b>	<ul style="list-style-type: none"> <li>■ Ensure the cost of electricity service is affordable and sustainable for all customers</li> <li>■ Improve operational efficiency and fiscal prudence</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>■ Establish best-in-class reliability of electric service, which is essential for customer satisfaction and economic development</li> <li>■ Deliver best-in-class power quality</li> </ul>
<b>Resilience</b>	<ul style="list-style-type: none"> <li>■ Expand and develop structurally hardened infrastructure to adequately withstand catastrophic natural disasters (hurricanes, earthquakes, etc.) and other adverse events</li> <li>■ Continuously improve emergency preparedness capabilities</li> </ul>
<b>Sustainability</b>	<ul style="list-style-type: none"> <li>■ Train and engage workforce with a strong safety culture</li> <li>■ Establish transparent and fair regulatory framework</li> <li>■ Engage in environmental leadership and stewardship</li> </ul>

To achieve the vision and objectives outlined above, the Government established a legal framework requiring the unbundling and separation of T&D operations from generation operations, thereby prohibiting the continuation of PREPA’s existing vertically integrated monopoly structure. The target structure of Puerto Rico’s energy sector is illustrated in Exhibit 11 below, defining the expected roles of each of the energy sector participants.

<sup>37</sup> “2019 Fiscal Plan for the Puerto Rico Electric Power Authority,” as certified by the Financial Oversight and Management Board of Puerto Rico on June 27, 2019.

## EXHIBIT 11: ENERGY SECTOR TRANSFORMATION – CURRENT AND FUTURE STATE



### 3.2.1 Establishing the Framework for the Energy Sector Transformation

To achieve the vision and objectives outlined above, the Government has established a legal framework. This framework mandates the relevant government agencies, including PREPA, to execute the separation of PREPA's T&D and generation to improve operational management via private sector management, experience, and expertise, and effectively deliver electricity to Puerto Rico's residents. To establish the legal framework for such transformation, the Government of Puerto Rico took the following steps:

- **June 20, 2018** – Enactment of the Puerto Rico Electric System Transformation Act (Act 120-2018) to provide the legal authority and mechanisms for the sale, transfer or private operation and maintenance of PREPA's T&D and generation assets, services and functions through public-private partnerships.
- **April 11, 2019** – Enactment of the Puerto Rico Energy Policy Act (Act 17-2019), which establishes a regulatory framework to attract private investment and ensure independent, professional oversight of energy market participants. Moreover, Act 17-2019 specifically prohibits PREPA from continuing to operate as a vertical monopoly, mandating the unbundling of T&D and generation operations into separate and distinct entities.
- **June 22, 2020** – The Public-Private Partnerships Authority (P3A) announced the successful selection of LUMA Energy as the private operator for PREPA's T&D operations. Meanwhile, the processes for identifying and selecting one or more private operators for PREPA's existing generation assets is scheduled to begin in July 2020. An overview of the key milestones in the transition to private operators is shown below in Table 4.

TABLE 4: MILESTONES FOR T&D AND GENERATION TRANSFORMATION<sup>38</sup>

Area of Focus	Action Item	Responsible Party	Deadline
Transition to private operators	Select a winning proponent to manage and operate PREPA's T&D system	P3A/FOMB	Complete
	Prepare for and launch request for quote process (RFQ) for the selection of a proponent for PREPA's generation assets	P3A/FOMB	July 2020
	Prepare for and launch request for proposal process (RFP) for the selection of a proponent for PREPA's generation assets	P3A/FOMB	Q4 2020
	Select a winning proponent to manage and operate PREPA's existing generation assets	P3A/FOMB	Q2 2021
	Achieve full transition to private T&D operator	P3A/FOMB	In progress

### 3.3 T&D Transformation Overview

As the new private T&D operator and a critical part of the transformation, LUMA will be responsible for executing Puerto Rico's energy system modernization and assisting with the allocation of related federal funding. The operator's overall objective will be to address and correct many of the operational and infrastructure deficiencies that have plagued PREPA's service over the last decades, improve service quality and deliver safe, reliable service at just and reasonable prices. As such, LUMA is expected to deliver financial and operational performance improvements across the following five dimensions:<sup>39</sup>

- **Reduce costs by introducing experienced personnel.** A private operator would be incentivized to reduce PREPA's dependency on outsourced contracts by insourcing activities, empowering the local labor force, and potentially achieving economies of scale.
- **Upgrade technology.** While PREPA has limited access and experience with industry-standard technology, a private operator would be incentivized to deploy modern grid technologies, digital capabilities, and infrastructure to significantly enhance operational efficiency, thus lowering O&M costs and improving customer service over time through better asset utilization. The grid upgrades and modernization plans will improve service quality and bring the Puerto Rico energy system up to par with peer utilities on reliability and safety.
- **Improve processes and procedures.** A private operator would be incentivized to streamline and standardize critical management processes and improve operational efficiencies (e.g., processes such as procurement, contract management, maintenance). These efficiencies will also translate to best-in-class customer service to improve PREPA's responsiveness to customer needs.
- **Make decisions with limited political interference.** A private operator's decisions would be subject to independent regulatory oversight, but free of political interference. This would lead to the adoption of standard industry practice where experienced utility operators make operational decisions with oversight from an independent regulator (e.g., investment decisions made based on overall benefit to the system). This will in turn improve the operational management of the T&D system, leading to tangible improvements in reliability and quality of service.

<sup>38</sup> "Power Sector Reform," Commonwealth Fiscal Plan, as submitted to the Financial Oversight and Management Board of Puerto Rico (2020).

<sup>39</sup> Ibid.

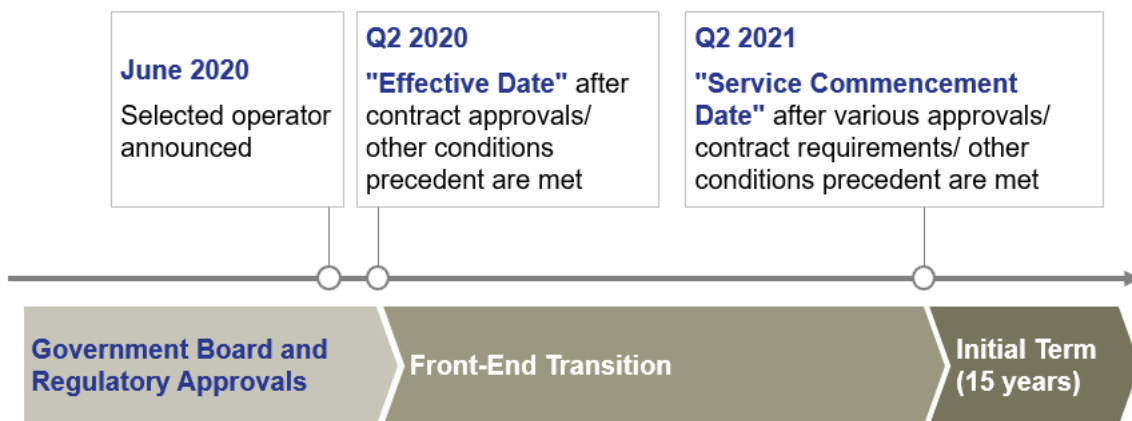
- Implement effective and efficient capital project delivery.** Private operator(s) would be incentivized to establish the tools and processes critical to improve PREPA's capital project management and to deliver the large grid and generation modernization program essential for transformation. This will also be key to effectively deploying the federal funding required for grid modernization improvements, which in turn will strengthen grid resilience. If FEMA approves a project and the operator delivers under cost, then PREPA is able to retain funds under the 428 program to deploy additional projects and deliver more grid improvements with less funding and limit any need to charge additional costs to ratepayers.

### 3.3.1 Transformation Process and Next Steps

The P3A conducted the T&D RFP process in order to select a qualified O&M service provider for the T&D system. The process followed an objective and transparent set of bidding and evaluation procedures, with full engagement from the Oversight Board throughout. Evaluation of eligible bids was performed by the partnership committee, in accordance with legal requirements under the P3 statute, Act 29-2009, as amended.

LUMA Energy was announced as the selected O&M services provider on June 22, 2020, after approval from the Oversight Board, PREPA's Governing Board, the P3A Board, and PREB and a 15-year contract between PREPA, the P3A and LUMA was signed, enabling the front-end transition period work to commence (Exhibit 12).

EXHIBIT 12: KEY MILESTONES IN T&D OPERATOR TRANSITION PROCESS<sup>40</sup>



The front-end transition process will take several quarters, placing the service commencement date in the second half of 2021. In order for the transition to be successful, PREPA must collaborate with the private operator (LUMA) on all aspects of operational and financial management for Puerto Rico's T&D system. After achieving contractual milestones for transition of T&D operations to the private operator, the responsibilities for all aspects of the operation and maintenance of PREPA's T&D system, including billing and other customer service functions, will be transferred to the private operator. These services and responsibilities include day to day operations and maintenance of the T&D system, long-term planning, generation dispatch, asset management, operation and maintenance, community and media relations, reporting and record keeping, and finance and accounting, among others. Emergency response and customer service responsibilities, including billing, outage reporting, and connections, will also be the responsibility of the private operator.

<sup>40</sup> Dates shown here are illustrative and subject to change.



The operator is also expected to prepare a new rate case during the front-end transition period. Contract oversight and compliance responsibilities will be the ongoing responsibility of PREB and the P3 Authority, each within their respective areas of authority and responsibility. Further discussion about Puerto Rico’s energy system regulatory landscape can be found in Chapter 4, “Regulatory Structure.”

### 3.4 Generation Transformation Overview

The transition from vertically integrated to multiple party, privately owned generation will play an integral role in boosting generation efficiency and productivity. This will increase the reliability of electricity service in support of economic growth. Today, PREPA’s lowest cost generation is procured from two private generators, and future new generation capacity will be owned and operated by private entities. Remaining PREPA generation asset operations will be transferred to one or more third parties to operate and subsequently retired, in accordance with the IRP and Act 17-2019. To improve the flexibility, reliability, resiliency, and efficiency of Puerto Rico’s energy supply, the transformation will include:

- **Renegotiations of existing power purchase and operating agreements:** The approved contract renegotiation of the EcoEléctrica PPOA and ongoing renegotiations of renewable PPOAs are expected to lower the future cost of generation.
- **Replacement and modernization of the generation fleet:** Puerto Rico’s aging, inefficient, and unreliable generation fleet must be urgently replaced and modernized in order to reduce outages and generation costs. The road map for this modernization is the proposed IRP, which outlines the actions and investment in new generation PREPA must make to reduce generation costs and achieve greater reliability and resiliency. These investments include increasing the share of renewable generation, which will reduce reliance on the volatile oil market and set Puerto Rico on a path to compliance with Renewable Portfolio Standards (RPS) outlined in Act 17-2019. In addition, increased flexibility and reliability will result from the deployment of energy storage, distributed generation, and minigrid/microgrid technologies.
- **Transition to private operator(s) for PREPA’s legacy generation assets:** A private operator will be able to ensure optimal operation and maintenance of these assets until they are retired and replaced by new and more efficient generation sources. As a result, PREPA-owned generation resources would see enhanced reliability and efficiency.

#### 3.4.1 Generation Transformation Process Overview

The Government of Puerto Rico, through the P3A, and in collaboration with the Oversight Board is working on a two-pronged approach to transform power generation on the island. The approach differentiates between existing PREPA-owned generation assets and new power generation. The operation of existing PREPA-owned generation assets will be transitioned to private operation via an O&M contract structure, similar to the T&D transaction, while the development of new generation would be undertaken under a competitive procurement process for new compliant generation capacity to be obtained via power purchase agreements.

To transform the PREPA-owned power generation operations, the P3A, in collaboration with the Oversight Board, will conduct a competitive process to identify, qualify, and select one or more private operators to operate PREPA’s legacy generation assets. These assets will be retired when sufficient new capacity has been brought online in accordance with the IRP. The competitive process will follow a similar phased approach as the T&D transaction, including but not limited to the following:

- **Phase I:** Transaction preparation

- Preparation and issuance of market sounding materials (Completed)
- Establishment of partnership committee pursuant to P3 Act
- Preparation of materials for interested proponent diligence, including a data room
- Drafting and issuance of RFQ documentation, including qualification requirements and proposed transaction structure
- **Phase II: Request for quote (RFQ)**
  - Public release of RFQ documentation
  - Question & Answer (Q&A) period
  - Formal notification to qualified proponents
- **Phase III: Request for proposal (RFP)**
  - Preparation and release of RFP documentation to shortlisted participants
  - Detailed due diligence by participants
  - Release and negotiation of transaction documents
  - RFP proposal submissions by participants
  - Selection of selected proponent by P3 Partnership Committee
- **Phase IV: Closing**
  - Obtain necessary regulatory and governmental approvals
  - Meet closing conditions

A preliminary target date for the selection of the Generation O&M proponent to manage PREPA legacy generation assets is Q2 2021 (Exhibit 13).

EXHIBIT 13: PROPOSED KEY MILESTONES FOR GENERATION OPERATOR(S) RFP



### 3.4.2 New Generation Capacity

Future new power generation capacity will be owned and operated by private entities and will meet modern operational, efficiency, environmental, and renewable standards. The next step in the generation transformation is to initiate procurement processes for new generation capacity in accordance with PREPA's IRP. Under Act 57 and Act 17, PREPA is required to adopt an IRP for a 20-year planning period, which is revised every three years and approved by PREB. The IRP analyzes PREPA's forecasted load and outlines the path towards the future electricity supply, which will include a greater share of renewables (**Error! Reference source not found.**).

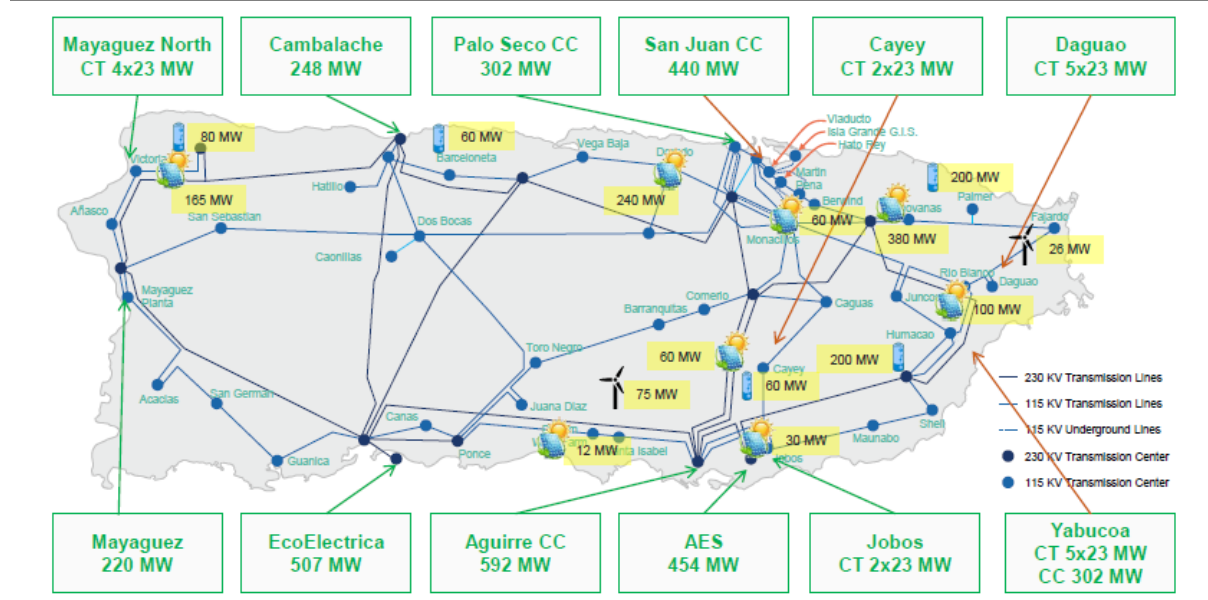
Currently PREPA is awaiting approval by PREB on a Proposed IRP, which will guide Puerto Rico as it moves toward a future of increased reliance on renewable sources of energy and improved energy efficiency. Based on scenario analysis, the plan lays out a path to managing

variable future costs of generation and storage resources. If approved and implemented, the IRP will enable PREPA to pursue a rapid uptake of renewable and energy storage systems while preserving options for procuring natural gas generation as necessary in order to meet electrical demand at all times in an efficient, environmentally responsible way over the next twenty years.

In order to achieve a more resilient generation system, the Proposed IRP recommends the adoption of three modifications to the current grid over the next twenty years (Exhibit 14):

1. **Increasing share of renewable supply** – including the additions of new solar PV generation, energy storage, natural-gas-fueled generation and supply infrastructure, and retiring or converting all existing coal and heavy fuel oil generation;
2. **Enhancing grid resilience** – including capital investment to the transmission and distribution system to support the greater resilience including minigrid and microgrid operations;
3. **Enabling customer choice** – including changes to the system to support the incorporation of rooftop PV and the recommended energy efficiency and demand response programs, allowing the customer to play a meaningful role in Puerto Rico’s electricity grid.

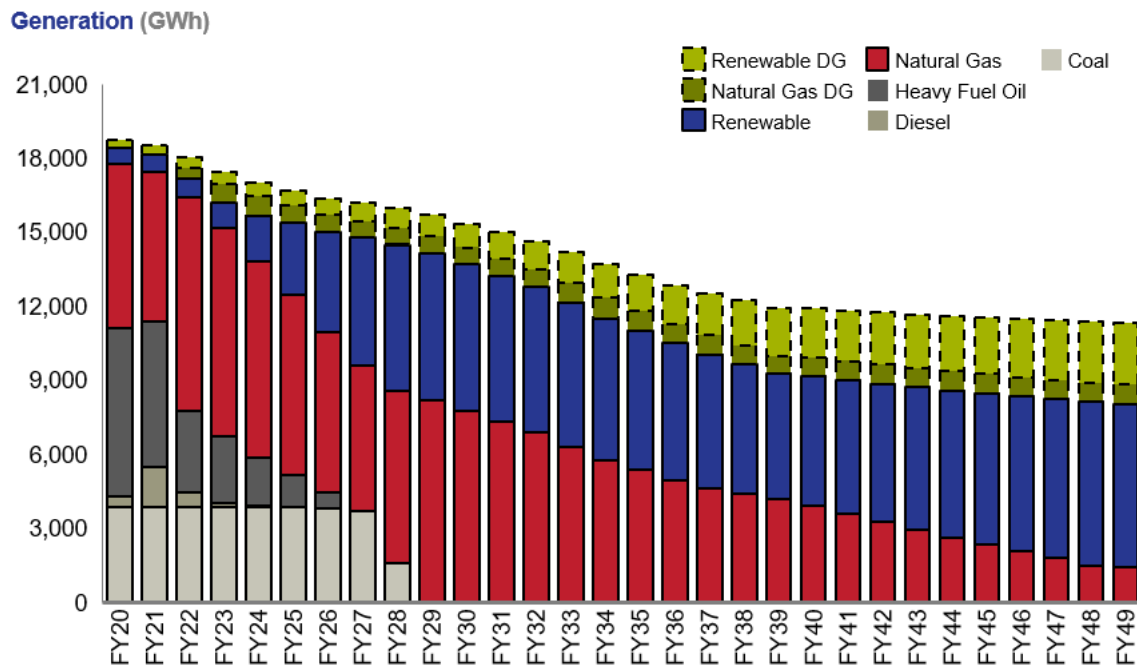
EXHIBIT 14: IRP ENERGY SYSTEM MODERNIZATION SCENARIO



Increasing Puerto Rico’s renewable generation supply will allow PREPA to work toward the RPS, and PREPA has been actively engaging in contract and RFP processes to expand its renewable PPOA portfolio. Currently, Puerto Rico generates a little over 2% of its electricity from renewable sources, while the RPS targets 40% electricity supply from renewables by 2025 and 100% by 2050.<sup>41</sup> The future generation mix forecasted by PREPA is expected to reach the RPS goal of 100% renewable generation (i.e., total renewable generation as a proportion of total sales) by FY2050 (Exhibit 15).

41 “Puerto Rico Territory Energy Profile,” U.S. Energy Information Administration.

EXHIBIT 15: PROJECTED GENERATION MIX



# Chapter 4. Regulatory Structure

## 4.1 Overview of Regulatory Structure and Key Legislation

### Historical Context

For much of its history, PREPA was structured as a self-regulated monopoly without a strong, independent third-party regulator. The successful transformation of Puerto Rico's energy sector into a safe, reliable, affordable, modern system depends on the presence and active involvement of a rational, politically independent, and professionally supported regulator. The utility industry has long recognized that an independent regulator is critical to oversee the performance of energy service providers and protect the interests of consumers. The regulator plays a vital role in ensuring that rates charged by the utility are just and reasonable, targets for quality of service and efficiency improvement are met, and capital spending programs are implemented on time and on budget.

The Puerto Rico Energy Bureau (PREB) was established in 2014 pursuant to Act 57-2014, known as the Puerto Rico Energy Transformation and RELIEF Act, as an independent and specialized regulatory body to promote and enable transparent implementation of the energy transformation. Act 57-2014 also established standards and procedures for PREB to assess and approve electricity rates, requiring that rates be "just and reasonable, as well as consistent with sound fiscal and operational practices which result in a reliable service at the lowest reasonable cost."<sup>42</sup>

As Puerto Rico's energy sector is transformed into a vibrant, modern system, PREB will be responsible for promoting prudent investments by utilities, increase quality of service to customers, and ensure industry trends and technological advancements are appropriately incorporated into Puerto Rico's energy system.<sup>43</sup> To that end, PREB's regulatory oversight will directly impact the utility and have significant influence on Puerto Rico's energy sector. To fully achieve its purpose, PREB should remain financially independent from the Government and its decisions, and its determinations should be free from any political influence or interference.

Recently, a number of legislative acts have strengthened the regulatory framework and empowered PREB with greater authority and independent administrative budget, setting forth ambitious goals for private sector operation and revitalization of the energy sector.

### Act 17-2019

Act 17-2019 established a comprehensive energy policy that sets forth aspirations for the transformation of Puerto Rico's electric sector and establishing regulatory guidelines for the realization of these goals. Key tenets and requirements of the act include:

- **Unbundling:** The act requires the unbundling of the electric system through the transfer of operation and maintenance responsibilities of PREPA's T&D and generation assets to private operators and prohibiting the continuation of PREPA's existing vertically integrated monopoly.
- **System modernization and renewable energy:** Along with promoting grid resiliency through the development of microgrids for critical loads and facilities, the act strongly promotes renewable energy and distributed generation. It updates the RPS (e.g., 40% by 2025, up from 20%), allows faster permitting and interconnection for residential

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<sup>42</sup> Act 57-2014.

<sup>43</sup> Ibid.

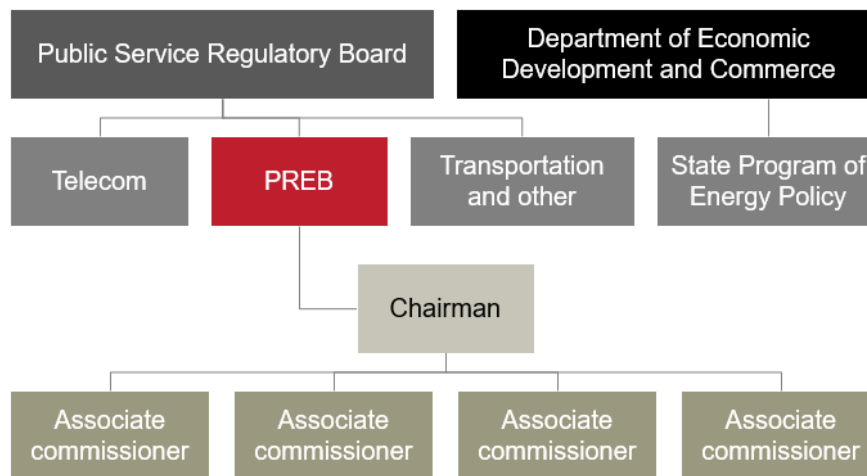
renewable projects, and mandates the elimination of coal-fired generation by January 1, 2028.

- Expanded PREB authority:** The act confirms PREB’s role as an independent, apolitical regulator and expands its authority to establish mechanisms for imposing incentives/penalties, exercise a high degree of scrutiny over maintenance of the electric network, require reports and use alternative mechanisms to tariff regulation based on service costs. The act also delineates PREB’s annual budget of \$20 million and makes it clear that this budget is not subject to executive or legislative approval. In addition, PREB is currently mandated to transition from its current employee structure to one with no less than 75% civil servant employees and no more than 25% trust employees. In the future, under the 2020 Commonwealth Fiscal Plan mandate, PREB must minimize the percentage of trust employees to 15% and ultimately 10% by FY2023.<sup>44</sup>

### PREB’s Organizational Structure

Although administratively located within the Public Service Regulatory Board (PSRB), PREB is a functionally independent entity (Exhibit 16). PREB is comprised of five commissioners and makes decisions with majority approval. Commissioners are appointed by the Governor with the advice and consent of the Senate and serve staggered terms.<sup>45</sup> Commissioners must meet certain requirements relating to professional education and experience to hold their position and can only be removed for just cause.

EXHIBIT 16: PREB REGULATORY STRUCTURE



## 4.2 Key Regulatory Issues

To be effective, PREB’s mandate as an independent regulator is to promote an efficient, reliable, resilient, and customer-responsive energy system. As such, the primary PREB’s primary responsibilities are (1) rate setting, (2) Integrated Resource Plan (IRP) approval and compliance, (3) protecting customers, and (4) ensuring workforce safety. For further details on PREB roles and responsibilities, please refer to Chapter 11, “Power Sector Reform” in the May 2020 Commonwealth Fiscal Plan.

<sup>44</sup> 2020 Commonwealth Fiscal Plan, Chapter 11, “Power Sector Reform.”

<sup>45</sup> PREB currently has four commissioners, including the Chairman, with one vacancy. Under Act 57-2014 the terms are: The Chairman shall hold office for six (6) years, two (2) commissioners for four (4) years; and two (2) commissioners for two (2) years. The successors of all commissioners shall be appointed for six (6) years.

PREB is responsible for the implementation of Puerto Rico’s energy public policy, more importantly:

- **Oversight** – exercise direct oversight responsibilities over any energy market participants (including the T&D operator, operators of existing generation assets and new independent power producers) to ensure full compliance with energy public policy goals.
- **Rates and Resource Planning** – responsible for reviewing and approving just and reasonable rates, ensuring expenditures in the energy system are prudent and consistent with energy public policy and ensure appropriate long-term resource planning through the periodical review of IRPs and other capital investment plans.
- **Renewable energy portfolio standards** – support investments in the system directed at reaching Puerto Rico’s Renewable Portfolio Standards of 40% by 2025, 60% by 2040, and 100% by 2050.
- **Net metering** – establish and periodically update Puerto Rico’s net metering program so that it promotes both the economical investment in renewable energy systems and ensures appropriate recovery of costs among customer classes
- **Wheeling and cost unbundling** – establish the rules and regulations for the unbundling of PREPA costs and proposal of new industry structure to introduce competition among generators to provide services, primarily, to large industrial customers
- **Contributions in lieu of taxes (CILT)** – ensure full compliance by PREPA and municipalities on the establishment of CILT-eligible consumption levels and the billing, collection, and payment of consumption by municipalities in excess of the CILT-eligible consumption levels. PREB is also required to submit to the Puerto Rico Legislature a study regarding potential alternatives for optimizing the value and benefits of the CILT structure to municipalities and to PREPA.

#### *4.2.1 Guiding Principles for Rate Design*

In order to achieve an optimal rate structure, PREB is required by applicable law to consider the following non-exhaustive set of guiding principles for rate design:<sup>46</sup>

- **Fiscal responsibility:** Rates are sufficient for long-run fiscal sustainability of electric utility operations, including covering operating costs, capital requirements, and other obligations.
- **Affordability:** Rate design process should account for customer socioeconomic factors (e.g., consideration of subsidies and other cost-allocation measures).
- **Cost causation/cost of service allocation:** Customer electricity rates are based on the cost of providing service to a specific type or class of customer, except where otherwise mandated by law (e.g., subsidies for low income, hotels, senior citizens).
- **Transparency:** Rate components and calculation methodology are clearly communicated (fixed monthly and volumetric consumption), providing customers with information on the costs covered by rate components.
- **Policy alignment:** Customer behavior is incentivized to be consistent with energy public policy (e.g., promote improvements in energy efficiency, reward customers for reliability benefits associated with customer-owned resource, encourage achieving renewable portfolio standards).

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<sup>46</sup> PREB’s authority to review rates and approve modifications or temporary adjustments are given by Act 57-2014.

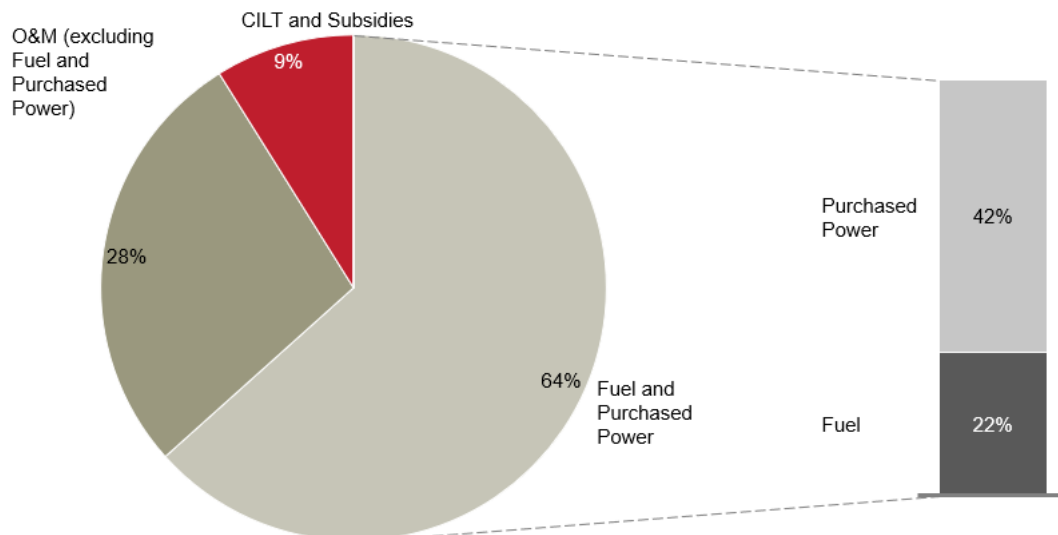
#### 4.2.2 PREPA's Current Rate Structure

PREPA has taken steps to significantly improve the transparency and affordability of its rate structure in recent years. In FY2017, PREB approved a permanent rate structure that PREPA implemented in FY2019, following delays due to the hurricanes and associated constraints. The revised structure greatly increased transparency by displaying on every customer bill a detailed breakdown of rate components, including the base rate to cover fixed costs, fuel and purchase power charges, subsidies for municipalities (i.e., CILT) and other statutory categories, as well as credits for the provisional rate.<sup>47</sup>

#### Overview of PREB-Approved Rates

The 2017 rate order establishing PREPA's new rate structure marked a meaningful step toward greater transparency by separating CILT and subsidy riders from the fuel and purchased power rate components. In FY2021, the projected rate components are 9% for CILT and other subsidies, 28% for base rate, including utility operating and maintenance costs, and 62% for power generation costs (Exhibit 17).

EXHIBIT 17: OVERALL RATE COMPOSITION



Although PREPA has made progress in recent years in improving the fiscal responsibility and transparency of its rate design, significant work remains for PREPA to achieve an optimal rate structure that covers its operational expenditure while minimizing cost for the customer and encouraging economic development. The regulatory reform that has been set in motion will allow Puerto Rico's electric system to better serve its customers reliably and cost effectively. As LUMA takes over current PREPA functions, rates must be reevaluated to be consistent with any changes in cost structure, while adhering to the guiding principles for rate design outlined above.

### 4.3 Overview of CILT Reform

The Government of Puerto Rico has made significant changes in the treatment of the Contribution in Lieu of Taxes (CILT) by enacting Act 57-2014 and Act 4-2016. Under the new

<sup>47</sup> As part of the rate structure revision, PREB authorized the elimination of the 11% gross-up fuel and purchased power adjustment charges and created direct cost recovery/pass-through rate riders in customer bills to cover CILT and subsidies.



rate structure, PREPA recovers the cost of CILT via the CILT and subsidies rider on customer bills. The CILT rider ensures greater transparency and accountability for customers and establishes incentives for improved municipal energy efficiency. Any additional reductions or amendments would require further legislation.

Actions taken to implement CILT reform include the following:

- **Transparent billing:** CILT costs are shown as a separate line item in customer bills.
- **New treatment of for-profit entities:** Removed for-profit entities from eligibility to receive an electric service credit from CILT.
- **Municipal consumption cap:** Established a total consumption (kWh) cap on the municipal CILT per municipality, which will be reduced by 15% over three fiscal years (5% each year).
- **Energy efficiency incentives:** Established a mechanism that promotes energy efficiency and additional savings above the mandated total consumption cap imposed on municipalities by Act 57-2014; municipalities would receive a payment from PREPA for the value of the difference between the mandatory total consumption cap and actual consumption, which would only be payable if all municipalities, in the aggregate, comply with their respective caps.

In FY2020, the CILT rider amounted to approximately 4% the average customer rate. In FY2017, the first year of the CILT consumption cap, municipalities' consumption in excess of the cap and at for-profit facilities was approximately \$20 million. In FY2019, this figure declined to \$18.5 million. The total cost of municipal consumption below the cap declined from \$82.9 million in FY2017 to \$74.9 million in FY2019. This suggests that recent reforms have had the effect of incentivizing municipalities to reduce their overall energy consumption. However, maximizing energy efficiency measures at the municipal level, as well as ensuring timely collections for amounts billed to municipalities requires further efforts to achieve.

Act 17-2019 required PREB to study “the implementation, effectiveness, cost-benefit, reasonableness, and economic impact of the contribution in lieu of taxes (CILT)” to determine the need for reform. Milestones for CILT reform are outlined below:<sup>48</sup>

- **September 30, 2020:** PREB must conduct a study and issue a recommendation to the legislature on optimal CILT structure
- **December 31, 2020:** PREB to develop a CILT process by which municipalities pay for electricity consumption not covered by CILT and are able to file complaints related to CILT.

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<sup>48</sup> 2020 Commonwealth Fiscal Plan, Chapter 11 “Power Sector Reform.”

## Chapter 5. Summary of Financial Projections

The following financial chapters of the 2020 Fiscal Plan present a near-term, five-year view and a long-term, thirty-year view of PREPA's financials. Pre-measure projections assume no meaningful progress in implementing operational and financial measures. Post-measure projections, on the other hand, include the impact of financial and operational measures, including increases to headcount in key areas, execution of critical maintenance projects, and implementation of key operational measures, such as vegetation management and call center support, the transition to private operators for both the T&D and existing generation assets, improvements in generation dispatch and low-cost fuel utilization and an illustrative pension reform scenario.<sup>49</sup> These projections are consistent with the macroeconomic assumptions underlying the 2020 Commonwealth Fiscal Plan. Both the pre-measure and post-measure projections assume full compliance with Act 17 and IRP resource planning mandates.

### 5.1 Overview of Revenue Rate Requirement

The pre-measure rate projections (i.e., prior to the implementation of financial and operational measures and the restructuring of legacy debt and pension obligations), reflect that customers would experience electricity rates between 27 and 30 c/kWh in real dollars between FY 2021 and FY2025, an increase of 5 to 8 c/kWh, when compared to FY2020 rates.<sup>50</sup>

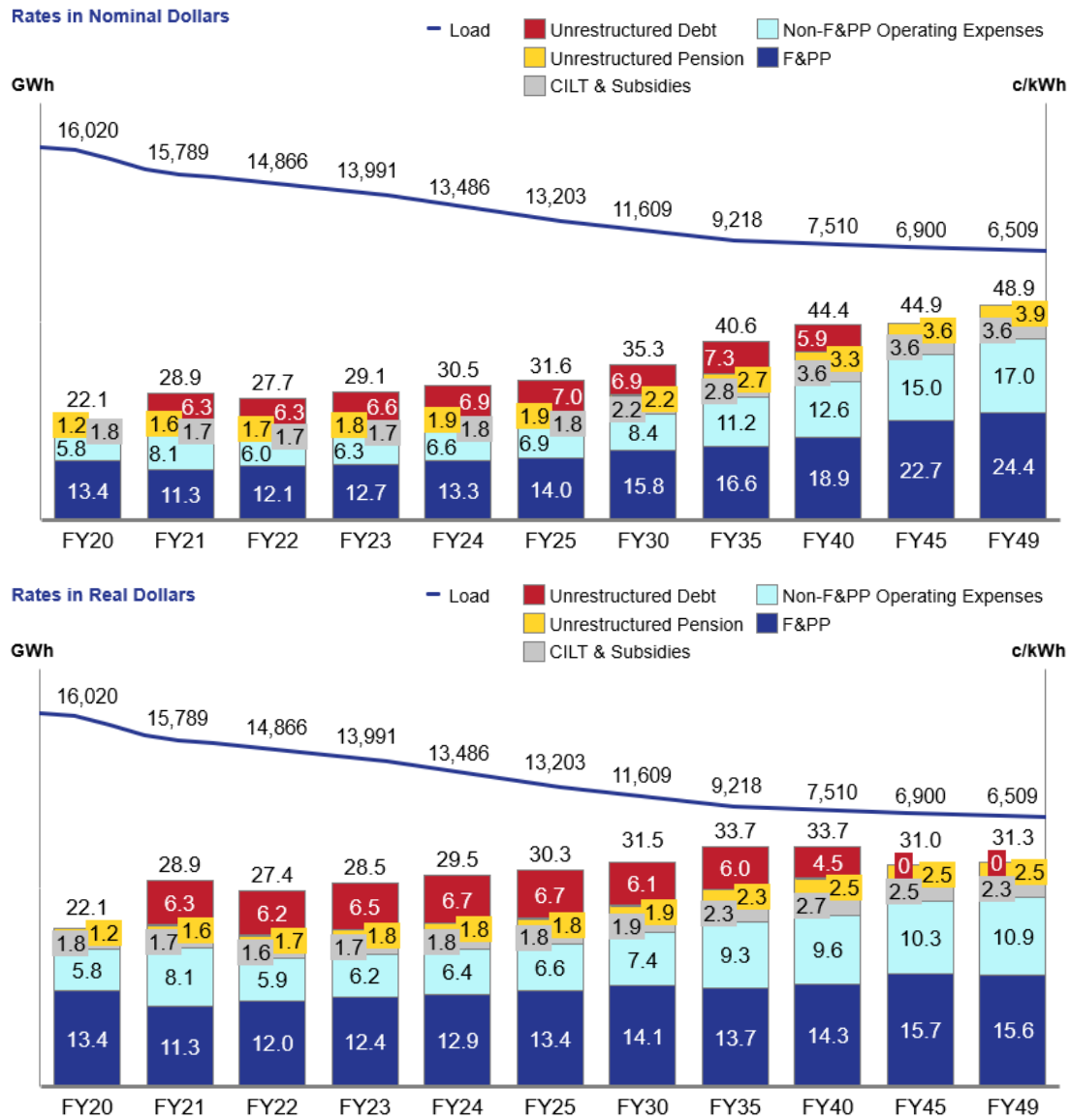
Over the next thirty years, pre-measure rates are expected to grow to approximately 31 c/kWh by FY2049 in real dollars (49 c/kWh in nominal dollars), largely driven by declining a declining demand and the effects of inflation in fuel and purchased power (F&PP), other operating expenses, and necessary maintenance expenses (NME) (Exhibit 18).

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<sup>49</sup> For further information on pension reform, refer to Section 9.3. As a result of the uncertain and unpredictable effects of COVID-19 on PREPA and its customers, the Oversight Board has requested and the court has granted a pause on the Title III process to assess and understand the implications of COVID-19. Accordingly, the post-measure rate projections do not assume a particular level of debt service.

<sup>50</sup> FY2021 has been used as the base year to calculate values in real dollars.

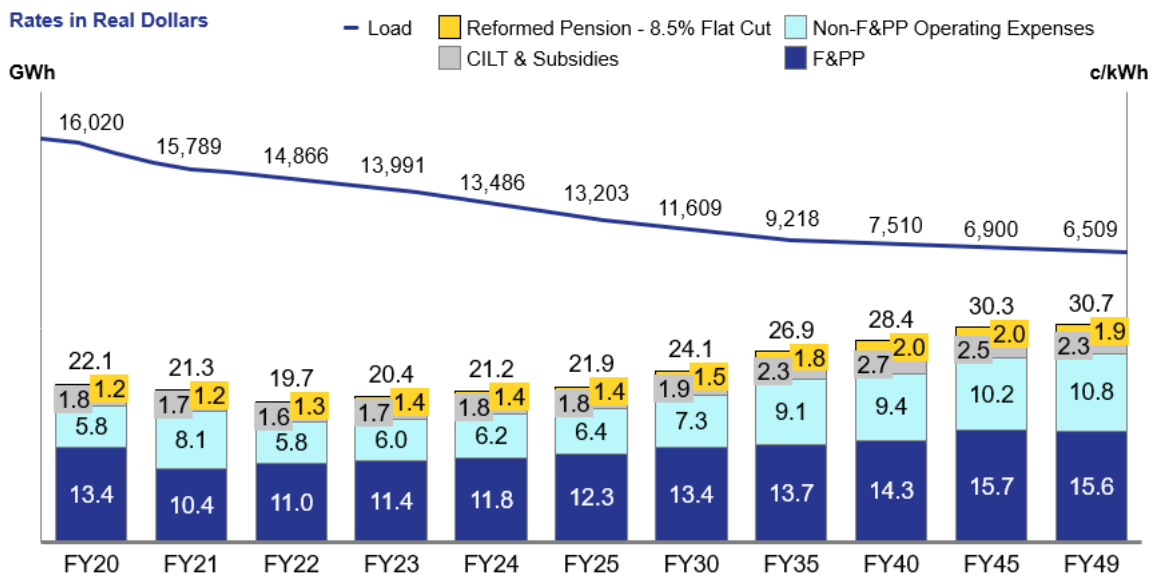
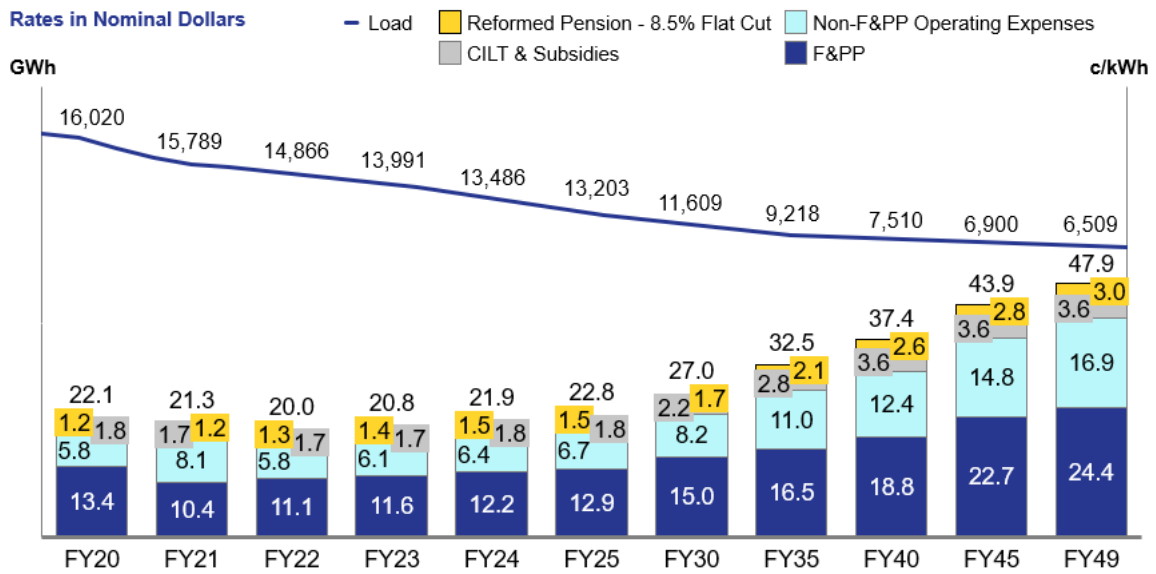
EXHIBIT 18: PRE-MEASURE REVENUE RATE REQUIRED INCLUDING FULL LEGACY DEBT AND PENSION (C/KWH)<sup>51</sup>



If PREPA successfully implements fiscal and operational measures (including pension reform), the post-measure revenue requirement rate projection reflects much lower rates in the medium-term from FY2022 to FY2040, ranging between 20 to 22 c/kWh in real dollars over the next five fiscal years (Exhibit 19). The decrease in rates, compared to the pre-measure projections, is driven by a reduction in pension related costs and the impact of savings on F&PP and operating costs as a result of the implementation of the measures outlined in the 2020 Fiscal Plan. Further reductions in operating costs may be achieved as LUMA improves operational performance and delivers the necessary investments to upgrade the system.

<sup>51</sup> No savings impact included from operational initiatives.

EXHIBIT 19: POST-MEASURE RATE WITH ILLUSTRATIVE PENSION REFORM AND EXCLUDING DEBT (C/KWH)<sup>52</sup>



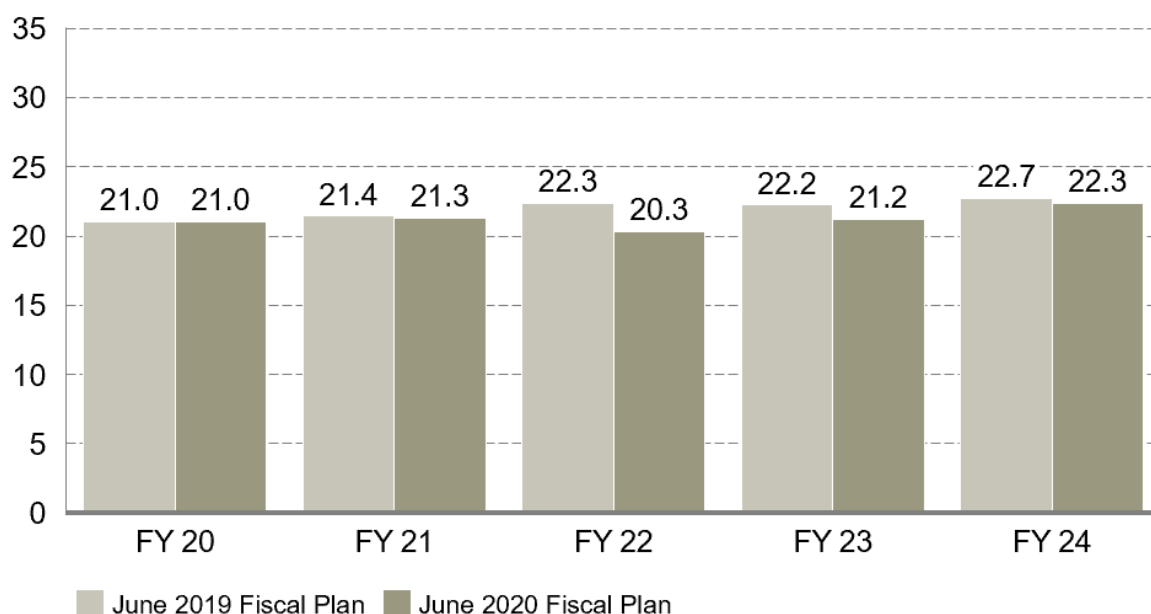
The 2020 Fiscal Plan post-measure rate projections for the next five fiscal years are 1 to 2 c/kWh lower when compared to the projections outlined in the 2019 Fiscal Plan (Exhibit 20).<sup>53</sup>

<sup>52</sup> Pension reform option is illustrative. Including impact from operational measures in FY2021. Additional savings may be realized upon transition to the operator.

<sup>53</sup> Excluding debt service costs.

EXHIBIT 20: RATE PROJECTION COMPARISON TO PRIOR FISCAL PLANS (C/KWH, NOMINAL DOLLARS)<sup>54</sup>

**Rate Comparison – by Fiscal Plan Year (c/kWh)**



## 5.2 FY2021 Baseline and Future Revenues and Expenses

### 5.2.1 Baseline Financial Projection for FY2021

Under the current PREB-approved rate case, the 2020 Fiscal Plan projects a deficit of approximately \$132 million in FY2021 (Exhibit 21). This deficit is largely driven by the inclusion of costs related to the front-end transition for the T&D operator, which PREPA is expected to fund from cash on hand. PREPA’s current cash reserve is approximately \$510 million.

The budget is balanced beyond FY2021, as the 2020 Fiscal Plan assumes revenue requirement rates. To ensure optimal funding of PREPA’s operating costs, LUMA is expected to prepare and submit a rate case to PREB during the front-end transition period.

The projected revenues and expenses for FY2021 include the recent impact of COVID-19 and fuel price declines, along with ongoing outages at Costa Sur, and the conversion of San Juan Units 5 and 6 to natural gas.

As discussed in Chapter 2, PREPA is expected to end FY2020 with a \$153 million surplus, driven largely by underspending on vegetation management and NME. However, the actual fuel costs incurred in FY2020 are higher than budgeted due to higher utilization of more expensive diesel generation after the shutdown of Costa Sur power plant due to earthquake damage.

<sup>54</sup> Rate projections exclude legacy obligations, including debt and pension.

EXHIBIT 21: FY2021 FINANCIAL PROJECTIONS<sup>55</sup>

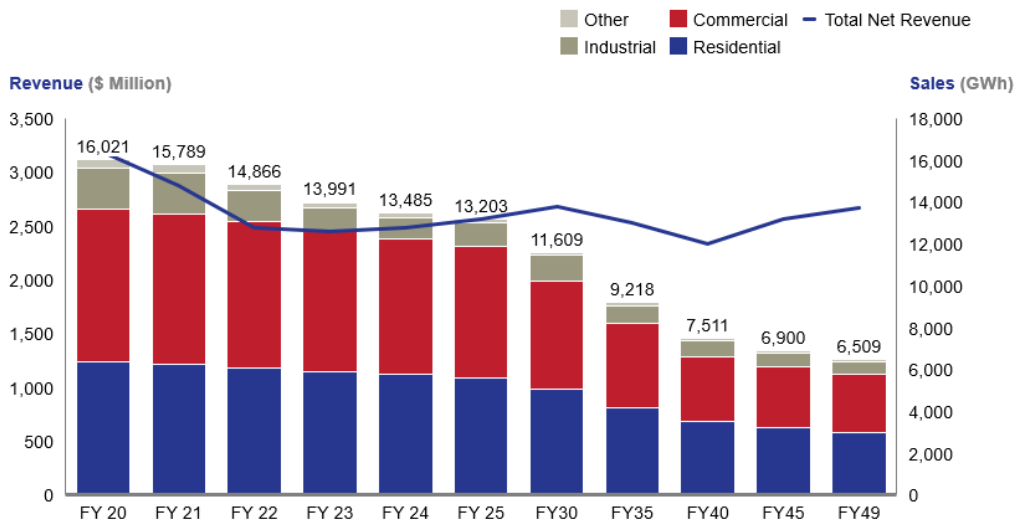
(\$ Millions)	<i>Preliminary and subject to material change</i>			
	FY2020 Budget	FY2020 Q3 YTD	FY2020 Estimated	FY2021 Projected
<b>Gross Revenue</b>	<b>\$3,350</b>	<b>\$2,754</b>	<b>\$3,511</b>	<b>\$3,040</b>
Other Income	\$10	\$30	\$32	\$29
Bad Debt Expense	(\$62)	(\$47)	(\$62)	(\$68)
CILT & Subsidies Reduction	(\$297)	(\$213)	(\$292)	(\$262)
<b>Total Revenue</b>	<b>\$3,001</b>	<b>\$2,524</b>	<b>\$3,189</b>	<b>\$2,739</b>
<b>Operating Expenses</b>				
Fuel	\$1,140	\$1,192	\$1,405	\$835
Purchased Power - Conventional	\$671	\$488	\$666	\$714
Purchased Power - Renewables	\$86	\$51	\$71	\$87
<b>Total Fuel and Purchased Power</b>	<b>\$1,897</b>	<b>\$1,731</b>	<b>\$2,142</b>	<b>\$1,635</b>
Salaries & Wages	\$214	\$150	\$207	\$215
Pension & Benefits	\$129	\$83	\$118	\$127
Overtime Pay	\$55	\$42	\$57	\$53
Overtime Benefits	\$7	\$4	\$6	\$6
<b>Total Labor Operating Expense</b>	<b>\$405</b>	<b>\$279</b>	<b>\$388</b>	<b>\$402</b>
<b>Total Non-Labor Expense</b>	<b>\$447</b>	<b>\$232</b>	<b>\$343</b>	<b>\$619</b>
<b>Total Maintenance Expense</b>	<b>\$223</b>	<b>\$108</b>	<b>\$163</b>	<b>\$215</b>
Federal Funding Cost Share	\$27	-	-	-
<b>Total Operating &amp; Maintenance Expenses</b>	<b>\$2,999</b>	<b>\$2,350</b>	<b>\$3,037</b>	<b>\$2,871</b>
<b>Balance</b>	<b>\$3</b>	<b>\$174</b>	<b>\$153</b>	<b>(\$132)</b>

### 5.2.2 Forecasted Revenues

In the coming years, PREPA's revenues are expected to follow a gradual decline in line with the projected decline in sales (Exhibit 22). Island-wide electric power consumption is anticipated to steadily decrease due to a shrinking population and weak macroeconomic projections. PREPA's electricity sales are furthermore expected to decline at a greater rate than overall consumption due to the combined effects of energy efficiency and distributed generation.

<sup>55</sup> Totals may vary slightly due to rounding.

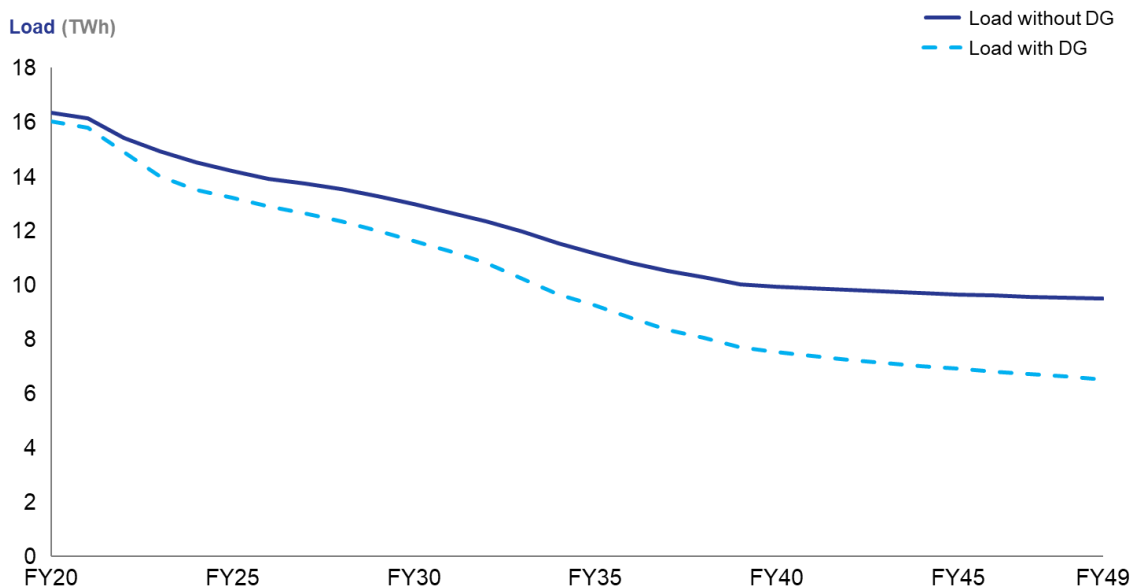
EXHIBIT 22: 30-YEAR SALES AND REVENUE PROJECTIONS



Overall load is expected to decline by about 40%, even before accounting for the projected shift to distributed generation, largely due to slower economic growth and declining population. In addition, policy incentives for energy efficiency and implementation of related programs further contribute to load reduction in the coming decades.

If distributed generation (i.e., load defection to behind-the-meter generation options) is taken into account, total load could decline by approximately 60% by FY2049 compared to today (Exhibit 23). Under this scenario, 3.5 TWh of total load is expected to transition to distributed generation sources by 2049. Both commercial and residential customers see significant movement to solar DG over the next 20 years – in a recent survey of PREPA customers, high electricity costs and low reliability were cited as reasons for pursuing behind-the-meter generation. Residential DG load increases by over six times between 2020 and 2035, while commercial DG increases by more than fourfold. Industrial customers are more likely to pursue cost-effective cogeneration – load from cogeneration is projected to increase 1.6 times by 2035. Further details are available in Chapter 6, “Revenue.”

EXHIBIT 23: 30-YEAR LOAD FORECAST LINE CHARTS WITH AND WITHOUT DG



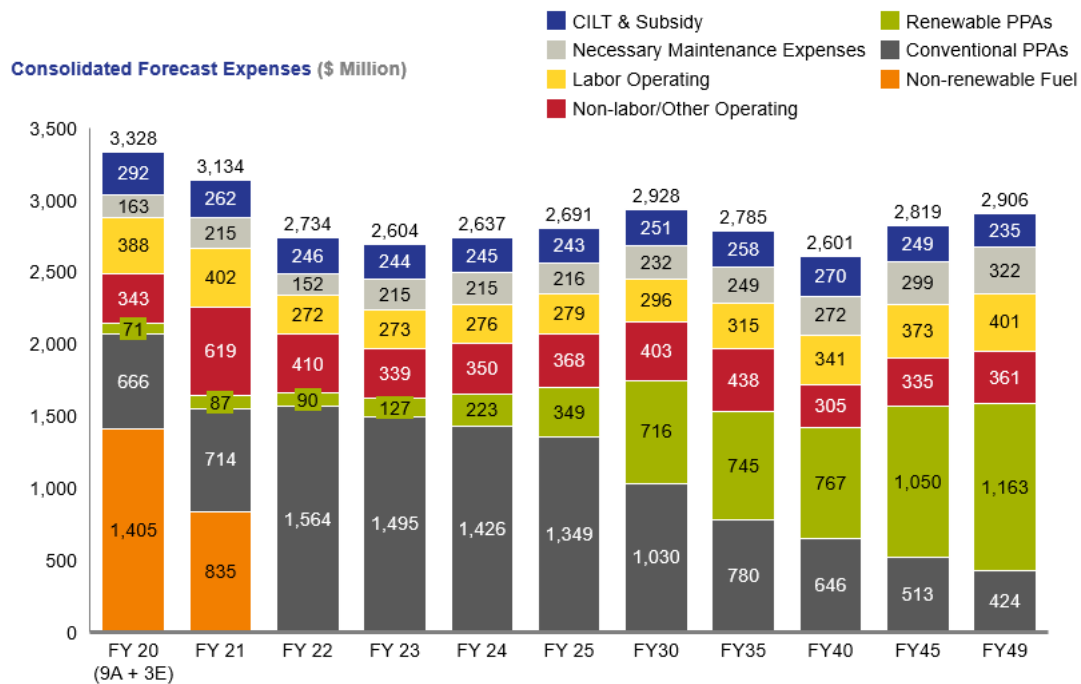
### 5.2.3 Forecasted Expenses

FY2021 is the last fiscal year in which expenses for GenCo and GridCo will be consolidated for reporting. From FY2022 onwards, after transition to private operators, the expenses will be split for the two entities.

Overall labor and non-labor operating costs are projected to increase with inflation. Specific items including Title III expenses and costs associated with the Oversight Board will decline after FY2022.

As the share of renewables increases in the coming years, the associated per-unit costs for F&PP decline initially, but are expected to increase after coal generation is phased out by FY2027 (Exhibit 24). Thereafter, costs decline as more renewable generation comes online, but increase after FY2040 as the system requires additional storage in order to achieve the 100% Renewable Portfolio Standard (RPS) target as mandated by Act 17-2019. Between FY2040 and FY2045, storage is expected to double, leading to higher F&PP costs in the outer years of the projections.

EXHIBIT 24: CONSOLIDATED FORECAST EXPENSES, EXCLUDING DEBT SERVICE (\$ MILLION)  
56



<sup>56</sup> Note: forecast period starts with FY2021, prior years based on interim unaudited results and projections for FY2020. Financial projections are shown on a consolidated basis under the current rate and organizational structure.

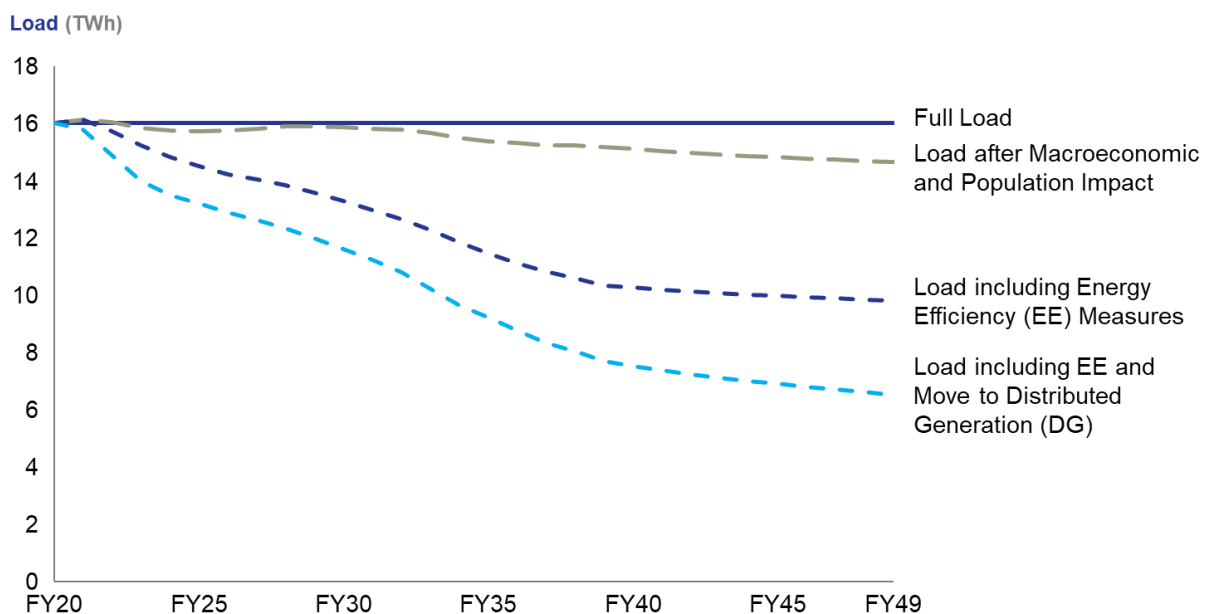


# Chapter 6. Revenue

## 6.1 Overview of Load Projections

PREPA’s electricity revenues are projected to decline in accordance with declining load in the coming years. The load decline is driven primarily by three factors: 1) declining population and a weaker macroeconomic forecast, 2) increased energy efficiency measures, and 3) greater adoption of distributed generation (Exhibit 25).

EXHIBIT 25: 30-YEAR LOAD FORECAST WITH THE INDIVIDUAL EFFECTS OF 3 DRIVERS CAUSING A REDUCTION IN LOAD



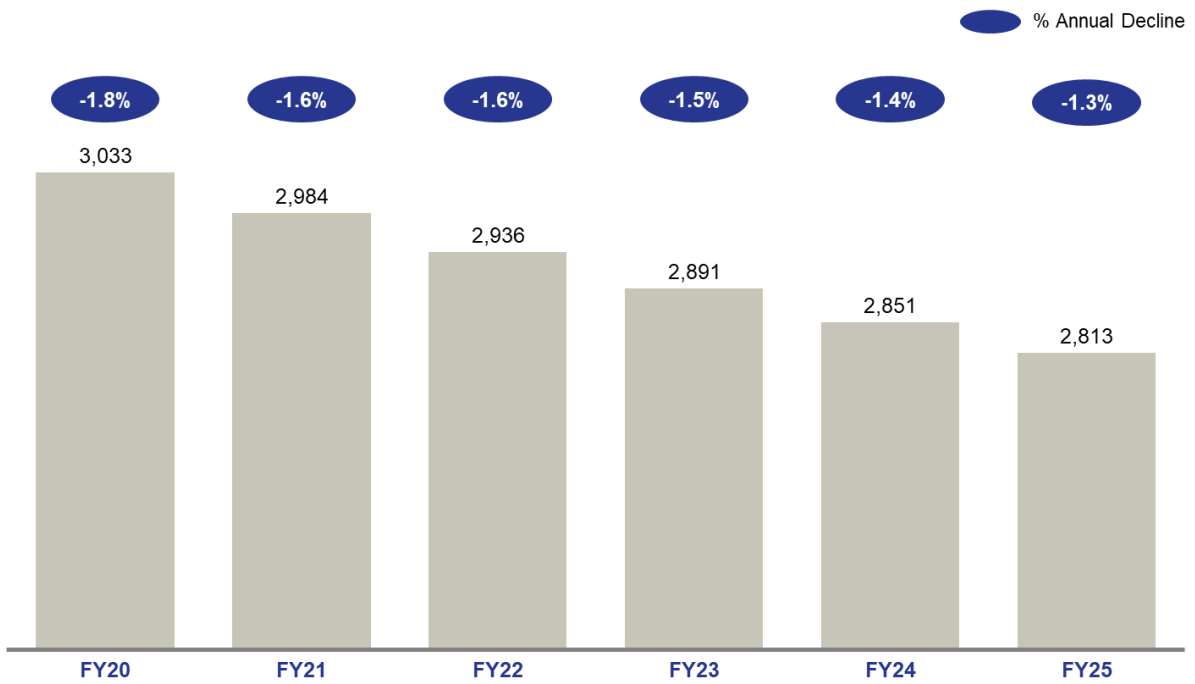
### 6.1.1 Macroeconomic and Demographic Drivers

The 2020 Fiscal Plan incorporates the macroeconomic and demographic projections developed for and presented in the 2020 Commonwealth Fiscal Plan certified by the FOMB on May 27, 2020.

The 2020 Certified Commonwealth Fiscal Plan population forecast observes an accelerated decline due to the combined effects of economic slowdown and natural disasters. The pace of decline is less severe than prior year’s assumptions. The COVID-19 pandemic has significantly dampened previous projections of economic rebound. Assumptions underlying the rebound were driven principally by federal funding for restoration, which would create short-term employment opportunities; however, overall trends now project substantial net outmigration (Exhibit 26). The macroeconomic projections include the combined effects of the COVID-19 pandemic, ongoing austerity, population decline, natural disaster recovery, and federal funding across all sectors of the Island’s economy.

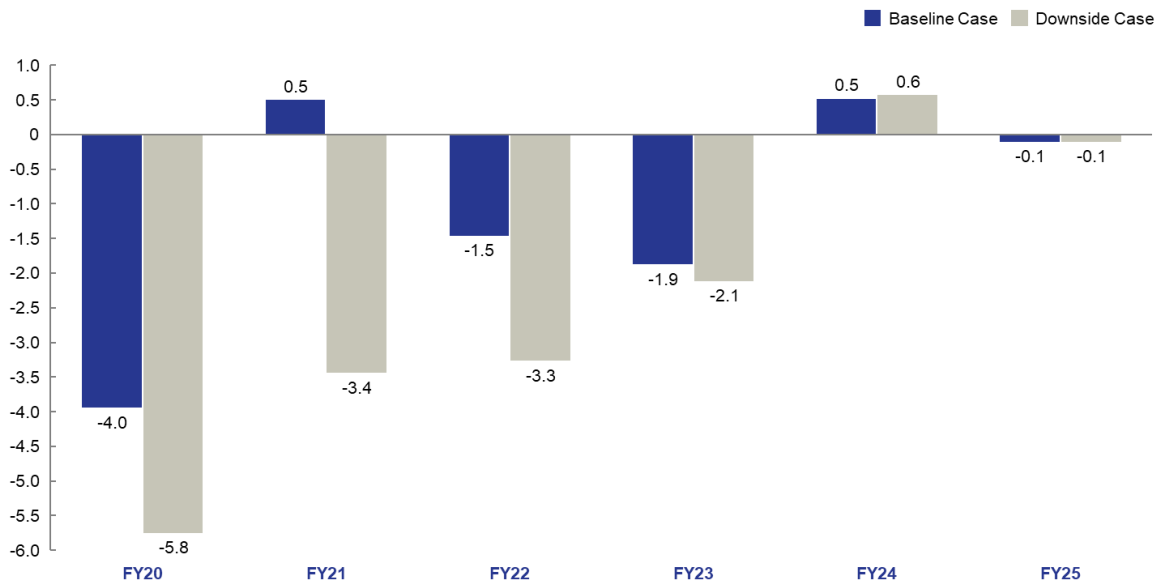
EXHIBIT 26: COMMONWEALTH OF PUERTO RICO POPULATION AND GNP PROJECTIONS

Annual population<sup>1</sup> (Thousands)



<sup>1</sup> For reference, the population was 3.10M, 3.09M, and 3.03M in FY18, FY19, and FY20, respectively

Real GNP Growth Rate (%)



6.1.2 Energy efficiency drivers

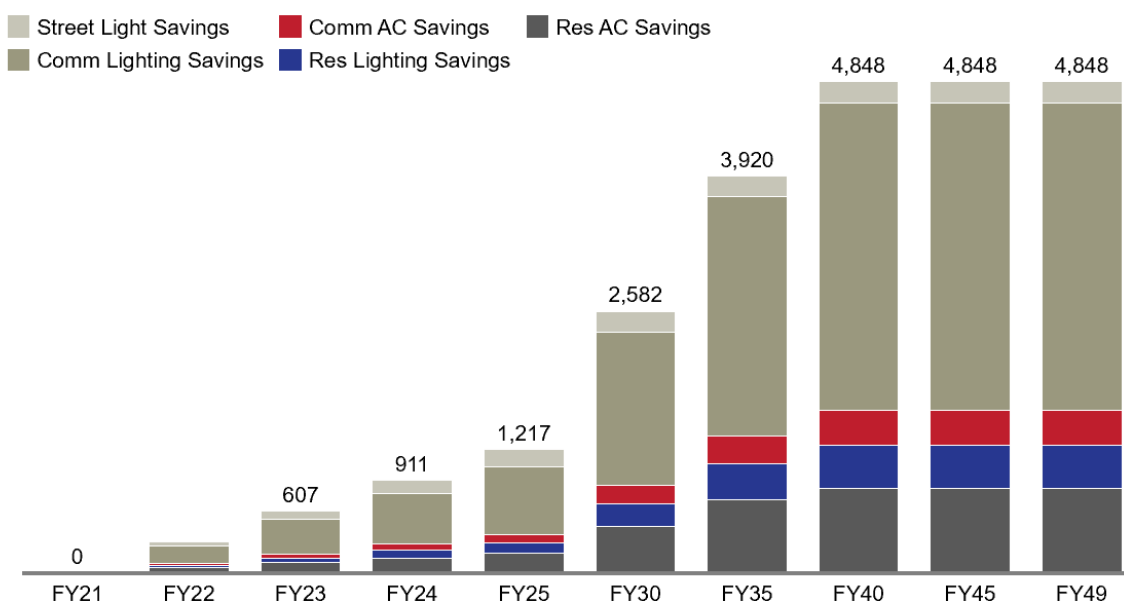
The FY2021 Fiscal Plan load forecast assumes that PREPA achieves the target set forth in Act 17, carried out by the energy efficiency programs listed below (Table 5). The projections assume an annual 2% energy efficiency improvement consistent with the PREB requested “Low EE” case in the PREPA IRP, which is compliant with the Act 17-2019 legislative mandate of 30% load reduction from energy efficiency by 2040.

TABLE 5: ENERGY EFFICIENCY PROGRAMS

EE Program	Description	Assumption	TRC <sup>57</sup>
<b>Residential A/C</b>	Incentivizes higher efficiency A/C systems in homes	Participation rates, energy savings, program costs based on comparable programs	3 – 5
<b>Residential Lighting</b>	Provides free LEDs to residential customers	Participation rates increase to 2.5% annually	4 – 6
<b>Commercial A/C</b>	Incentivizes high efficiency A/C systems in commercial buildings	A baseline average commercial A/C size is accurately assessed	1 – 2
<b>Commercial Lighting</b>	Incentivizes high efficiency lighting in commercial buildings	Annual kWh savings per participant based on comparable programs	3 – 4
<b>Public Street Lighting</b>	Full conversion to LED lamps	Public funding is available to support this program	n/a

The cumulative energy savings through implementing these programs is expected to be approximately 1,200 GWh in FY2025. The biggest contribution to the savings comes from lighting improvements in commercial buildings, followed by additional savings from conversion to LED lamps on streets and installation of higher efficiency A/C systems in homes.

EXHIBIT 27: CUMULATIVE ENERGY EFFICIENCY SAVINGS BY PROGRAM (GWH)



### 6.1.3 Distributed Generation (DG) drivers

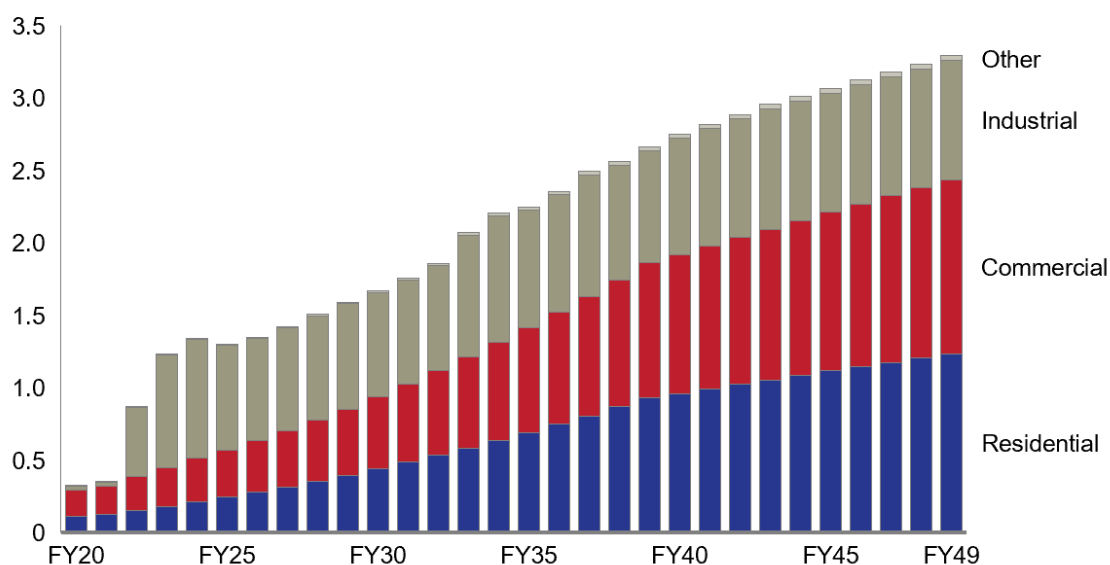
Deployment of distributed generation (i.e., rooftop solar and combined heat and power generation) is expected to grow and is projected based on the same methodology used for the IRP. The effect of DG is more significant in the later years of the 30-year projection.

<sup>57</sup> Total Resource Cost (TRC) estimates cost efficiency of energy efficiency programs. The TRC is calculated as the present value of the avoided energy cost (energy savings x average rate) to the present value of the program costs.

Based on analysis developed for the IRP, the levelized cost of load defection is higher than the cost of generation delivered to the customer, including the effect of losses until 2028, when AES Coal retires. After 2028, grid defection cost is significantly lower than the total rate even before applying charges for payment of legacy obligations. Therefore, the 2020 Fiscal Plan assumes that DG will continue to rise as a result of declining costs for DG technology and increasing electricity rates. As the transformation process advances, this trend is likely to continue, in parallel with distribution of the load.

The adoption of DG is expected across all customer classes. While commercial and residential customers are more likely to adopt rooftop solar generation, industrial customers are more likely to build combined heat and power generation.

EXHIBIT 28: 30-YEAR DISTRIBUTED GENERATION FORECAST BY CUSTOMER CLASS (TWH)

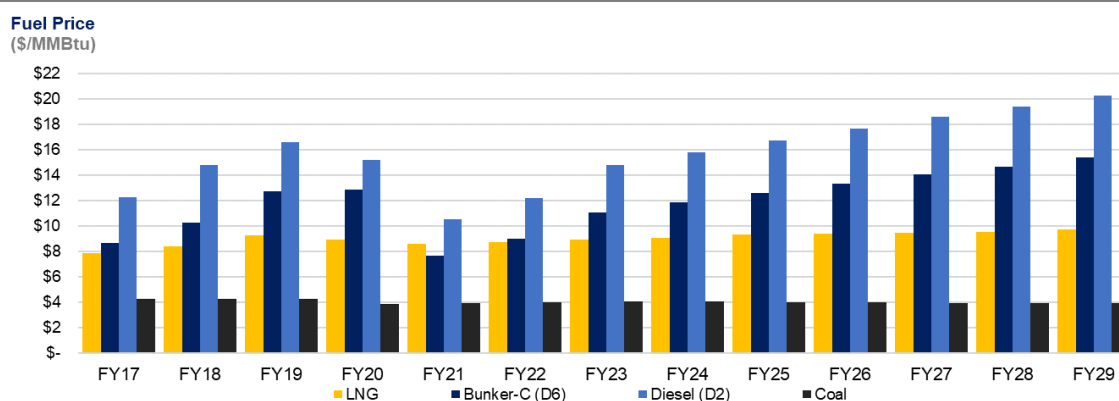


## 6.2 Other assumptions

### 6.2.1 Overview of Fuel and Purchased Power

Projections are based on fuel price forecasts using the IRP methodology for natural gas at the Henry Hub, crude oil (West Texas Intermediate or WTI), oil-derivate products of diesel (No. 2 fuel oil), and residual fuel oil (No. 6 fuel oil with 0.5% sulfur). The forecast has updated refined fuel prices for the near term based on financial futures pricing and current PREPA contract adders. Fuel prices are projected to remain depressed for the next fiscal year, as the oil market begins to rebalance and recover from the COVID-19 demand shock. Starting in FY2022 and continuing through FY2023, prices for crude oil and refined product are projected to return to longer run averages.

## EXHIBIT 29: FUEL PRICE FORECAST



Beyond F&PP costs, there were a few additional assumptions covered in the table below.

TABLE 6: ADDITIONAL ASSUMPTIONS

Input	Assumption
<b>Rate Structure</b>	The 2017 PREB-approved rate structure implemented on May 1, 2019 is assumed to remain in FY2021. The T&D operator is expected to prepare a new rate case during the front-end operator transition.
<b>Transformation</b>	The 2020 Fiscal Plan financial projections assume that the T&D operator begins transition during FY2021 and satisfies all conditions precedent to achieve the Service Commencement Date by Q2 2021. Unbundling or separation of Generation and T&D functions are completed by FY2022, and PREPA's legacy generation assets is taken over by one or more third party operators.
<b>Liquidity and Operations</b>	PREPA continues to monitor liquidity and the need for external funding for FY2021, along with various other funding needs. FY2022 and beyond are assumed to have adequate working capital from account funding and transaction closing in FY2021.
<b>Restoration / Rebuild Funding</b>	The timing of potential expenditure and disbursement is still uncertain and therefore omitted by the financial projections. Puerto Rico has requested a cost-share adjustment for future FEMA program amounts under the Stafford Act. The projections in this Fiscal Plan assume that Community Development Block Grant-Disaster Recovery (CDBG-DR) program funding will be available to cover any PREPA-related matching requirements under the Stafford Act.
<b>Consumer price elasticity</b>	Not included as an incremental load shed variable consistent with the IRP load forecast methodology; the impact of price elasticity is assumed to be realized in a combination of efficiency and self-generation measures.

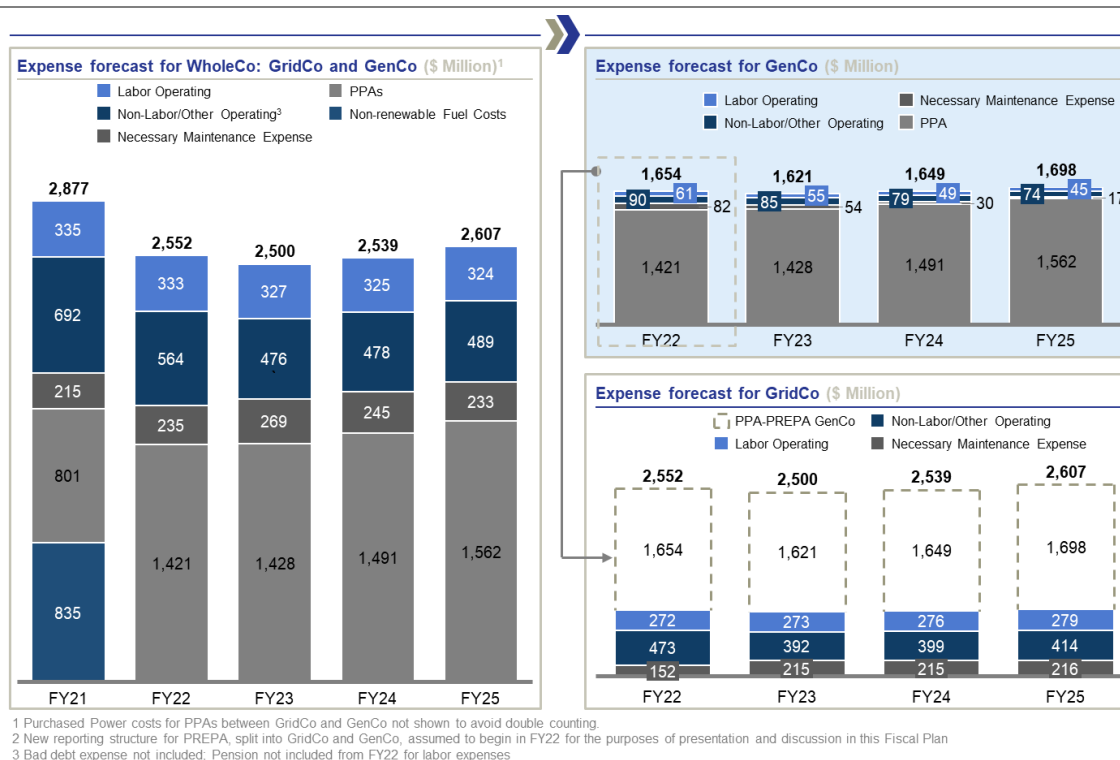
# Chapter 7. Expenses: GenCo and GridCo

## 7.1 Overview of PREPA GenCo and GridCo Expenses

During the forecast period, PREPA’s vertically integrated operations will be, as mandated by law, disaggregated into Generation and T&D utility functions – GenCo and GridCo, respectively. These entities will operate independently and at arm’s length using industry-standard commercial contracts to govern their interactions. Exhibit 30 shows the post-transaction expense split for the two entities.

Beginning in FY2022, after LUMA takes over the O&M of PREPA’s T&D, all revenues will be received by LUMA, which will in turn pay for all generation in form of PPOAs. For a period of time, PREPA will continue to operate and maintain existing generation assets until with one or more private operators have been selected to take over generation O&M responsibilities PREPA’s existing generation assets.

EXHIBIT 30: PRE- AND POST-TRANSACTION EXPENSE BREAKDOWN<sup>58</sup>



Assumptions for the GenCo and GridCo expense projections are provided in the table below, consistent with underlying assumptions for the revenue and load projections in the previous chapter.

TABLE 7: ASSUMPTIONS FOR GENCO AND GRIDCO EXPENSES

Input	General Assumptions
Labor Operating	■ Assumes growth in line with inflation over the forecast period

<sup>58</sup> PPAs between GridCo and GenCo are excluded to avoid double counting. New reporting structure for PREPA – split into GridCo and GenCo – is assumed to begin in FY2022 for the purposes of presentation and discussion in the 2020 Fiscal Plan. Bad debt expense is not included, and pension is not included from FY2022 for labor expenses.

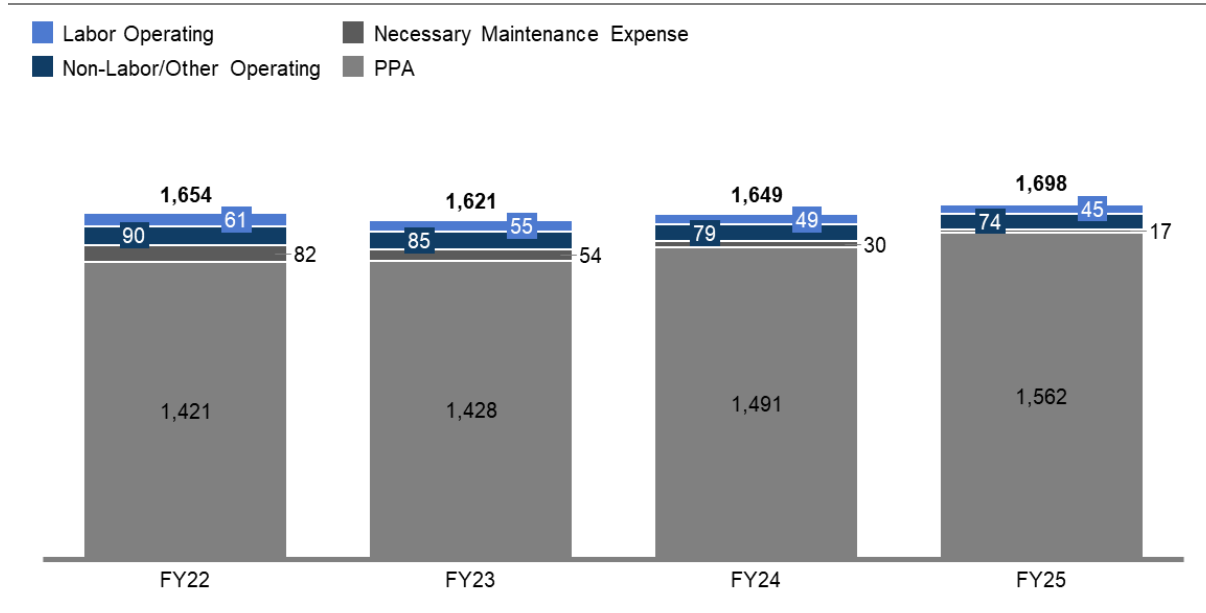
Input	General Assumptions
	<ul style="list-style-type: none"> <li>■ Benefits expense are based on historic spending levels and performance improvement measures such as medical plan reform</li> <li>■ Pension costs included are based on fully funded pension plans (\$251 million per year)</li> </ul>
<b>Non-Labor - Other Operating</b>	<ul style="list-style-type: none"> <li>■ FY2021 is based on budget itemized requests</li> <li>■ FY2022 and beyond is projected using historic spending levels with an inflation factor</li> <li>■ Cost of service includes T&amp;D operator management fee, starting in FY2021 and ending in FY2038</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>■ Based on historical budgeted amounts</li> <li>■ For GenCo, it is expected that the exit from Title III should result in a return to the capital markets to finance capital improvements and improved counterparty risk to attract private investment into the generation system.</li> <li>■ For GridCo, it is expected to require additional funds in future years above historical average annual expenditure to repair the system and improve reliability to acceptable levels, as envisioned in the T&amp;D roadmap.</li> <li>■ Federal funding is assumed to be available to cover a substantial amount of capital required for system rebuild and maintenance. Puerto Rico is requesting a cost-share adjustment for future FEMA program amounts under the Stafford Act. The projections in this Fiscal Plan assume that Community Development Block Grant-Disaster Recovery (CDBG-DR) funding will be available to cover any matching requirements under the Stafford Act.</li> </ul>

## 7.2 Overview of GenCo Expense Projections

GenCo expenses are projected to vary over the fiscal plan period as the future generation mix shifts. In FY2021, overall generation expenses are projected to decline by approximately 30% over the previous year, driven by an over 50% reduction in fuel costs for PREPA as a result of global oil price decline (Exhibit 31). Beyond FY2021, as PREPA transitions to private operator(s) for legacy generation assets, O&M and fuel costs will continue to decline through FY2025 and beyond. At the same time, a larger share of electricity is projected to come from conventional and renewable PPOAs.

The realization of overall generation cost reductions is driven by successful procurement of new generation capacity and economic dispatch. The latter is contingent on the execution of critical operational measures, including vegetation management and improvement in T&D grid infrastructure. PREPA began execution on these measures in FY2020 as part of fiscal plan implementation, but efforts have been affected by the January 2020 earthquakes and the COVID-19 pandemic.

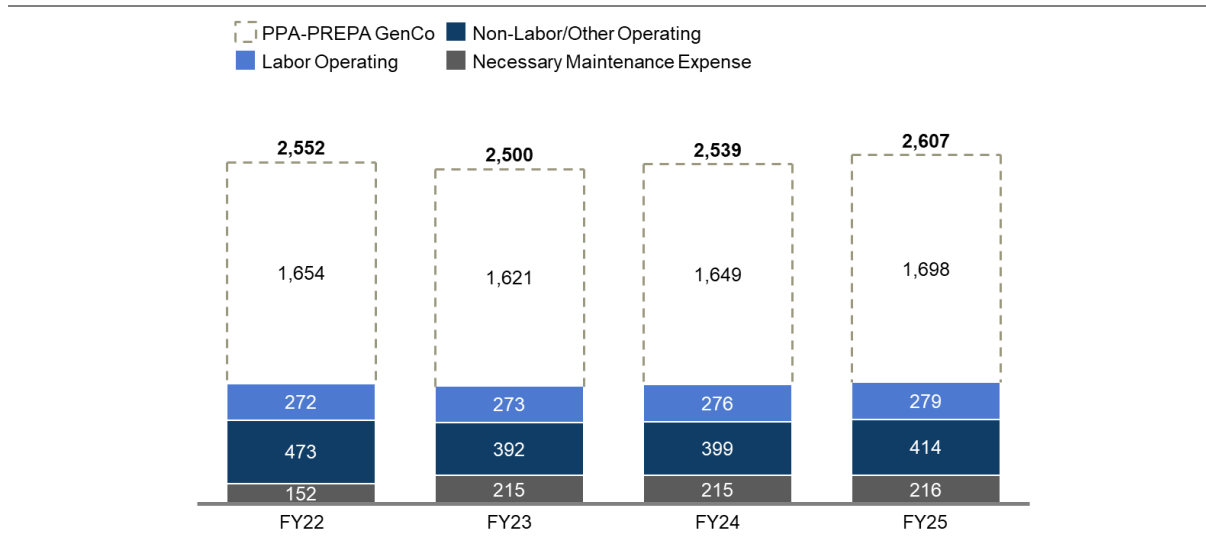
EXHIBIT 31: EXPENSE FORECAST FOR GENCO (\$ MILLION)<sup>59</sup>



### 7.3 Overview of GridCo Expense Projections

GridCo expenses are projected to vary over the 2020 Fiscal Plan period as the Title III process is completed and initiatives begin execution phase. Labor costs are projected to increase during the period to account for expected inflation, consistent with central government’s macroeconomic projections, and in order to retain a qualified workforce. Necessary maintenance expenses are projected to increase over the forecast period as work begins on the execution of grid modernization and strengthening projects outlined in the T&D roadmap. Meanwhile, non-labor costs are higher in FY2021 than in other years due to Title III restructuring costs and P3A transaction costs, which are expected to disappear upon PREPA’s exit from Title III.

EXHIBIT 32: 5-YEAR GRIDCO EXPENSE FORECAST EXCLUDING PENSION (\$ MILLION)<sup>60</sup>



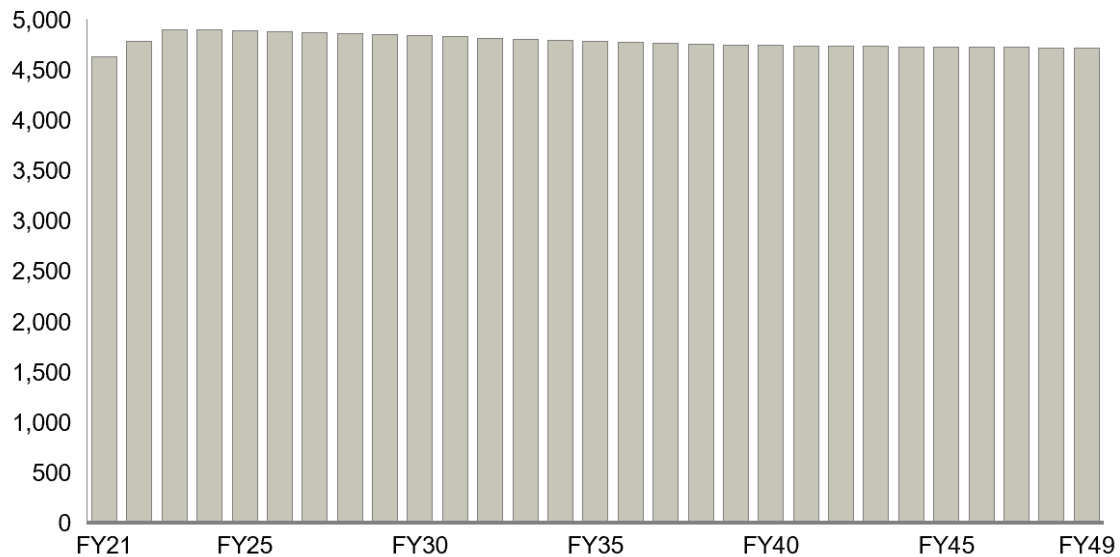
<sup>59</sup> Full transition to the private generation operator(s) is expected to take place by FY2022.

<sup>60</sup> Full transition to LUMA is expected to take place by FY2022.



GridCo headcount is expected to remain largely stable over the next 30 years, with slight decline after FY2022 due to natural retirements and labor movement. Current projections show a slight increase in the next few years from approximately 4,600 in FY2021 to 4,900 in FY2023, which ultimately stabilizes at approximately 4,700 employees by FY2049 due to long-term retirement trends (Exhibit 33).

EXHIBIT 33: 30-YEAR GRIDCO HEADCOUNT PROJECTIONS



The Fee schedule for the T&D Operator is divided into three fixed fees and one incentive fee:

- **Front-end transition fee** – paid monthly over the first 12 months;
- **Interim fee** – paid to the operator prior to the exit of Title III;
- **Fixed fee plus potential incentive** – annual fixed fee and potential performance-based payment to be paid following exit from Title III

The front-end transition fee is expected to be funded by PREPA’s cash on hand – PREPA’s reserves currently stand at approximately \$510 million.

## Chapter 8. Risks and System Resilience

Over the years, Puerto Rico’s energy system has faced significant infrastructure damage as a result of annual hurricanes and earthquakes. In the future, the frequency and impact of these events is expected increase as the risks from accelerating climate change are realized. In 2019, Puerto Rico announced a \$20 billion, ten-year plan to modernize and harden its grid.<sup>61</sup> However, recovery and resilience efforts have been stalled by further damage from natural disasters, slow execution of vegetation management and routine maintenance, as well as political and fiscal uncertainty. In order to achieve a safe, modern, and reliable energy system, resilience measures for both the T&D and generation system must be prioritized.

The ensuing sections address the risks posed to Puerto Rico’s electricity system by various events and the resilience with which PREPA has historically responded to the following: (1) climate change; (2) earthquakes; and (3) economic shocks (e.g., COVID-19). Potential actions to mitigate these risks are also considered.

### 8.1 Climate Risk

Puerto Rico is at high risk for the wide-ranging effects of climate change. Hurricanes, wildfire risk, heat stress, and coastal flooding are all risks to Puerto Rico and its electricity system. Current climate projections show that Puerto Rico can expect the following in the next 30 years: stable average wind speed, but higher intensity of maximum wind speeds, greater intensity of extreme precipitation events, and a rise in sea level of one to two feet, leading to coastal flooding and inundation risks, particularly in the populated areas of the northeastern part of the island (i.e., San Juan).

On September 2017 Hurricanes Irma and Maria affected PREPA’s already vulnerable grid, causing an island-wide blackout.<sup>62</sup> The transmission and distribution network suffered the most damage. Many researchers link the devastation of the 2017 Hurricanes Irma and Maria to climate change. In the future, devastating severe weather events like Hurricane Maria are likely to occur more frequently. One study concluded that a hurricane with similar scale of precipitation is nearly five times more likely to form now than during the 1950s, an increase due largely to the long-term effects of climate change.<sup>63</sup>

The operational impact of climate-related events is sizable. In the wake of Hurricanes Irma and Maria, over 2,700 transmission poles were damaged, and 92% of inspected substations were affected, with 41% suffering major damage.<sup>64</sup> The distribution system was not adequately maintained and upgraded to be able to withstand Category 4 storms and, as a result, 75% of circuits were damaged.<sup>65</sup> Some generation units also suffered significant damage.<sup>66</sup> In the aftermath of the hurricanes, Puerto Rico received \$3.2 billion in federal funding for assistance with electrical restoration on the island.<sup>67</sup>

Although it is difficult to estimate and quantify the size of climate risk on Puerto Rico’s electricity system infrastructure and operations, the increased intensity of individual wind and rain events are projected to necessitate higher costs of repair and lost demand on a per-event basis (Exhibit 34). Additional work remains to strengthen the infrastructure to prevent future

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<sup>61</sup> “Puerto Rico unveils \$20 billion plan to revamp island’s power grid,” Reuters, October 24, 2019.

<sup>62</sup> Puerto Rico Energy Resiliency Working Group, *Build Back Better*, 5.

<sup>63</sup> Keellings, D., & Hernández Ayala, J. J.(2019). Extreme rainfall associated with Hurricane Maria over Puerto Rico and its connections to climate variability and change. *Geophysical Research Letters*.

<sup>64</sup> PREPA Central Office for Recovery, Reconstruction and Resiliency, Energy System Modernization Plan, 3, 6.

<sup>65</sup> Puerto Rico Energy Resiliency Working Group, *Build Back Better*, 21.

<sup>66</sup> *Ibid*, *Build Back Better*, A-3, A-6, A-7.

<sup>67</sup> “2017 Hurricane Season: Federal Support for Electricity Grid Restoration in the U.S. Virgin Islands and Puerto Rico.” United States Governmental Accountability Office. April 2019.

adverse weather events from causing a similar scale of damage. Access to federal funding will be imperative to addressing these challenges – further detail is provided in Chapter 11, “Federal Funding.”

EXHIBIT 34: IMPACT OF CLIMATE EFFECTS ON NET PRESENT VALUE

Impact Level	Climate Effects	Description	Impact on NPV
	Damage from extreme wind	<ul style="list-style-type: none"> <li>Frequency of extreme wind days have <b>increased 28%</b> since 1980</li> <li>While average intensity has remained stable since 1980, <b>maximum wind speeds have increased</b></li> </ul>	↓
	Damage from extreme precipitation	<ul style="list-style-type: none"> <li>Projections suggest a 15-25% <b>decrease in extreme precipitation days</b></li> <li>Projected <b>increase in intensity</b> of extreme precipitation days suggest a shift toward <b>less frequent, more severe events</b> (i.e. hurricanes)</li> </ul>	↓
	Damage from coastal flooding	<ul style="list-style-type: none"> <li>Projected 1-2 ft sea level rise by 2050 expected to <b>increase risk of coastal inundation and flooding</b></li> <li><b>Greatest risk</b> posed to <b>Northeast</b> regions (i.e. San Juan)</li> </ul>	↓
	Wildfire risk	<ul style="list-style-type: none"> <li>Natural <b>forests</b> cover <b>significant share</b> of PR land mass</li> <li>Rising temperatures can <b>increase wildfire potential</b> and subsequent risk of <b>fire hazard</b> and <b>powerline damage</b></li> </ul>	↓
	Heat stress	<ul style="list-style-type: none"> <li>Higher average temperatures could <b>increase surges in demand for A/C (currently 27% of total energy demand for hot-humid climates)</b><sup>4</sup></li> <li><b>Heat waves</b> and <b>droughts, however</b> pose risks <b>to infrastructure</b></li> </ul>	↑
	Decreased transmission efficiency	<ul style="list-style-type: none"> <li><b>Energy loss</b> in transmission and distribution is <b>positively correlated with temperature</b></li> </ul>	↓

The impact from the hurricanes and other extreme wind and weather events is exacerbated by PREPA’s failure to adequately conduct routine maintenance and vegetation management practices. As a result of severe underspending on vegetation management, the system is vulnerable not only to devastating natural disasters, but also to commonplace disturbance. In 2018, a single tree reportedly fell on top of a main power line in Cayey, Puerto Rico, causing an outage that left nearly 900,000 customers without service.<sup>68</sup>

To date, PREPA has yet to begin implementation on any plans to improve system resilience and strengthen the energy system against future extreme weather events, which will only increase in frequency and magnitude.

**For future mitigation**, the current transformation includes numerous measures that will bolster PREPA’s ability to withstand extreme weather events, including extensive grid modernization investments, vegetation management, smart meter replacement, and increased investment in renewables and storage. In addition, PREPA must conduct a detailed review of the IRP and T&D roadmap to identify locations at high risk for coastal flooding as well as areas at high risk for infrastructure damage due to hurricanes and wildfires.

## 8.2 Earthquakes

The U.S. Geological Survey forecasts the yearly chance of a magnitude 5+ earthquake currently at over 99% and will remain at above 50% for the next three to ten years in Puerto Rico. Earthquakes can cause serious damage to infrastructure as well as damage to transmission lines as a result of trees falling over, unless properly managed.

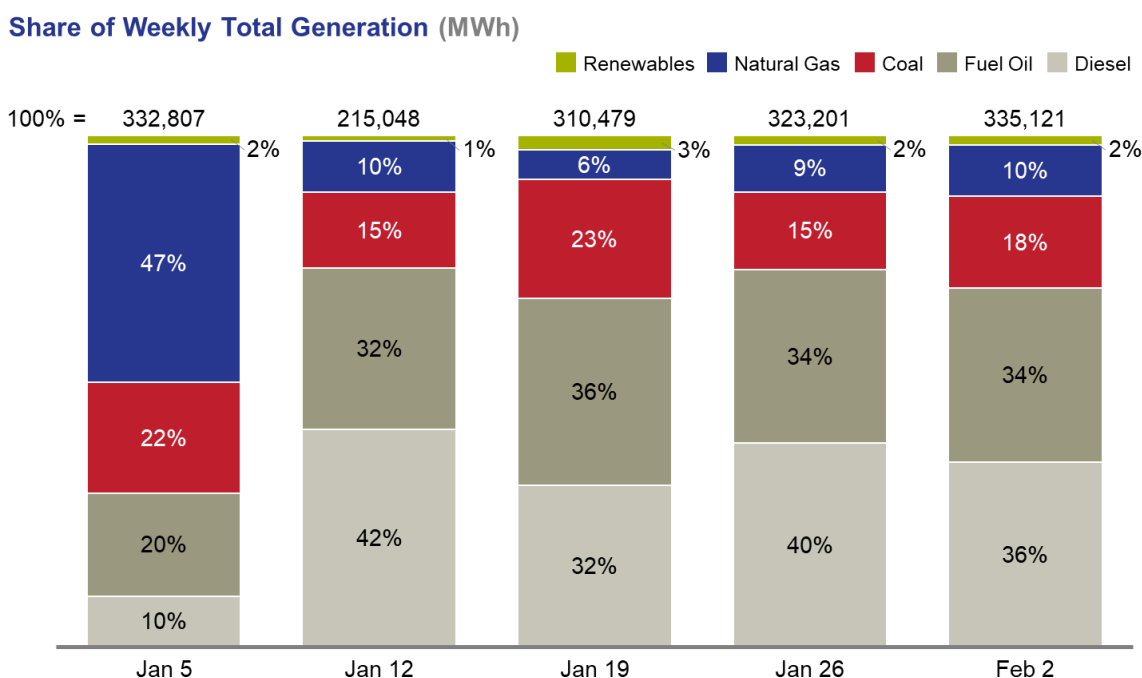
On January 7, 2020, a 6.4 magnitude earthquake struck the southwestern coast of the Island, causing significant damage to the Costa Sur Power Plant.<sup>69</sup> In the immediate aftermath of the earthquakes, about two-thirds of the island’s population was left without power for several

<sup>68</sup> “Puerto Rico: Single fallen tree on power line leaves 900k without power.” NBC News. April 12, 2018.

<sup>69</sup> “As Aftershocks Continue in Puerto Rico, USGS Supports Quake Recovery,” U.S. Geological Survey, January 17, 2020, <https://www.usgs.gov/news/aftershocks-continue-puerto-rico-usgs-supports-quake-recovery>.

days. The loss of Costa Sur’s natural gas generation capacity increased the system’s reliance on more costly oil-fired power plants. Older generation assets and diesel plants needed to be dispatched to balance the load.<sup>70</sup> PREPA’s failure to diversify the aging generation fleet exacerbated the operational impact of the Costa Sur power plant damage. Continued use of these aging generation sources creates several risks, including further increasing the generation system’s vulnerability to external shocks. Following the January 7 earthquake, share of total weekly generation from natural gas declined by about 60%, while share of generation from fuel oil increased by about 70%, and share from diesel jumped by around 275% (Exhibit 35).<sup>71</sup>

EXHIBIT 35: CHANGE IN FUEL MIX FOLLOWING EARTHQUAKE DAMAGE TO COSTA SUR POWER PLANT



The seismological reality means that earthquake resilience measures to strengthen system infrastructure are essential in protecting against service disruptions. For future mitigation, PREPA must diversify its generation resources, and further undertake operational measures and necessary maintenance projects, as well as investment in critical infrastructure modernization projects in order to strengthen the system and mitigate the damage from future earthquakes. PREPA must conduct a comprehensive risk assessment of its infrastructure to target structural enhancements required to limit damage from future earthquakes.

### 8.3 Economic Shocks (e.g., COVID-19)

The economic impact of COVID-19 measures has had a ripple effect on the power sector. On March 15, Puerto Rico enacted social distancing measures under Executive Order 2020-023 to manage the spread of the COVID-19 virus. After the curfew was implemented, generation levels declined, as did customer sales. In the four weeks immediately following the announcement of the curfew, total daily generation declined between 8 to 12% year-over-

<sup>70</sup> Internal PREPA analysis.

<sup>71</sup> Comparing four-week average between weeks ending January 12 and February 2 to pre-earthquake baseline of week ending January 5.

year.<sup>72</sup> After the initial four weeks, generation levels showed a gradual return to levels consistent with FY2019 averages.<sup>73</sup>

Following the curfew announcement, PREPA initially experienced a steep drop in collections. At its worst point, average daily rate collections fell to less than half of forecasted planned collections, threatening PREPA's cash position. However, by June 2020, PREPA's monthly cash end balance had returned to pre-COVID levels. PREPA's successful weathering of this potential liquidity crisis was a result of its long cash runway – from March 2019 through February 2020, PREPA maintained an average operating cash balance of \$350 million despite the disruption and damages caused by the January 2020 earthquakes.

Given the heightened liquidity risk posed by the ongoing COVID-19 pandemic and related measures, PREPA is closely monitoring cash balances, collections, customer consumption, and accounts payable to maintain a sustainable level of liquidity for ongoing operations. Management and advisors continue to analyze potential forecast scenarios to understand the various impacts of changes in collections, fuel costs, and other major expenses. PREPA is also continuing to work with other government agencies and large customers to accelerate receivables and delayed payment to non-critical vendors as the situation evolved.

To mitigate future disruptions under curfew or adverse economic conditions on the utility sector, PREPA could consider accelerating operational measures to increase remote control of the grid (e.g., distribution automation technologies, smart meter installation), in addition to pursuing measures to enhance system reliability and resilience. During an economic shock, declining collections would lead to lower cash balance, elevating the need for effective liquidity management in the short term. In the longer term, fiscal measures such as restructuring legacy debt obligations will insulate PREPA against future economic shocks.

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<sup>72</sup> Starting with Sunday March 15, 2020 and ending with Saturday April 11, 2020. Compares net generation for the same day and week with the prior year, starting with the first full week in January. For example, Sunday, January 5, 2020 compared with Sunday, January 6, 2019 and Monday, March 16, 2020 compared with Monday.

<sup>73</sup> Average system load was within 1% of FY2019 for the same four-week period, and slightly more than 1% higher than peak for the same period.

# Chapter 9. Operational Measures

## 9.1 Overview

The set of operational measures defined in previous PREPA fiscal plans is imperative for the transformation of Puerto Rico’s energy sector. Together, these measures span all aspects of the energy value chain – generation, transmission and distribution, and customer service – and address chronic issues in electric service reliability, safety, sustainability, and affordability.

Consistent with requirements set forth in PROMESA Section 201(b) and guidance provided by the FOMB, PREPA, as a covered entity, is required to identify and describe operational improvements to achieve fiscal targets and advance the energy sector transformation goals described in Chapter 3. PREPA broadly defines “operational measures” as groups of projects or activities that share a common theme and are targeted at revenue enhancement, expense savings and/or performance improvements. PREPA is working on multiple measures with its current organizational structure and resources, as it works with the P3A to achieve the Government’s vision for transformation of the T&D and generation functions before formal handover to a private operator. The T&D operator (LUMA Energy) is expected to add and/or amend operational measures during the transition process, based on their expertise.

During FY2020, PREPA and its project management office (PMO) made substantial progress on the 12 operational measures and 27 projects included in the 2019 Fiscal Plan for FY2020. Most notably amongst these measures was effectively supporting the procurement by the P3A of a T&D O&M service provider. The T&D operator (LUMA) is expected to begin working with various groups within PREPA on the requirements stipulated in the T&D O&M Agreement during early FY2021, with a target commencement date for the complete transfer of T&D operations from PREPA to LUMA in Q2 2021. Among the major responsibilities of LUMA during the transition will be reviewing and proposing new or revised operational measures.

## 9.2 Key Accomplishments for FY2020

Over the course of the past fiscal year, PREPA has made noticeable progress towards several key operational measures as part of the transformation. However, much work remains in completing other operational measures. Highlights of key accomplishments are presented below, followed by a more robust discussion of FY2021 milestones, timelines, and expected impact.

- **P3A Process for T&D operator:** The most critical milestone for PREPA’s energy system transformation is the transition to a world-class private O&M operator, selected through a competitive procurement process. During the last two fiscal years, PREPA’s management and advisory teams played significant roles in developing materials for and supporting administration of the RFP and bidder due diligence process. On June 22, the P3A announced its approval of contract for a private T&D operator, along with approvals from the Oversight Board, PREPA governing board and PREB. Progress reporting on implementation of this P3 will be covered by Front-End Transition Initiative during FY2021.
- **Expanded and fortified project management office (PMO):** During FY2020, the PREPA PMO undertook a substantial reorganization that included significant improvements in contract procurement and management processes and capabilities. Findings and recommendations from this reorganization, as well as recommendations from the prior Contract Management Improvement Study will be incorporated into the Front-End Transition measure with the new T&D system operator and will also be

expanded to all applicable PREPA Directorates as part of the new Procurement Modernization project in FY2021.

- **Natural gas conversion at San Juan Combined Cycle (SJCC) Power Plant:** In FY2020, PREPA successfully completed the land-based LNG import terminal and pipeline infrastructure in San Juan Harbor and conversion of the SJCC power plant to dual-fuel capability, after several delays. FOMB's expects that the project has the potential to save PREPA and its customers between \$180 to \$280 million during the 5-year term of the contract.<sup>74</sup>
- **Customer service improvements:** In FY2020, PREPA successfully outsourced call centers under a competitive process to handle the overflow from PREPA's internal operations, reducing average call wait times from a 20-30-minute average to 3-5 minutes. It also achieved over 20% of customer penetration on the e-billing platform and has invested a concerted effort to encourage its customers to convert to e-billing since mid-March. This effort, which must continue, also helps mitigate the impact on collections from COVID-19 mobility restrictions.

### 9.3 Overview of FY2021 Measures

PREPA has revised and established eight categories under which to report on-going and new expense savings, revenue enhancement, and performance improvement measures. After the operator transition, PREPA must continue to work on these measures in collaboration and coordination with LUMA as the new T&D system operator to enable to achievement of fiscal targets.

PREPA must implement these operational measures if the transformation objectives are to be met. Detailed descriptions and impact sizing for each project is presented below, along with an action plan depicting timeline and milestones for implementation.

#### 1. Power Purchase Agreements (PPA) Renegotiation:

PREPA has undertaken, and must continue to undertake, the renegotiation of its existing purchased power agreements, for both renewable and conventional generation, to further enable the achievement of fiscal targets and provide for the elimination of structural deficits. Ongoing PPA renegotiation could unlock short-term and long-term savings for new and existing contracts, for both conventional and renewable sources of energy.

**EcoEléctrica PPOA and Costa Sur Natural Gas Supply:** As of June 22, 2020, the Title III court has authorized PREPA to assume the amended contracts for the renegotiated EcoEléctrica PPOA and long-term natural gas supply agreement for Costa Sur (Naturgy). PREPA is expected to begin capturing savings from the renegotiated EcoEléctrica contract, which could lead to an annual savings of up to \$81 million over the next five years.

**AES PPOA Renegotiation:** To support further reductions in energy costs and achieve historical savings targets from the renegotiation of conventional PPOA's, PREPA must engage AES in order to achieve near-term savings in its current PPOA.

**Renewable PPOA Renegotiation:** Beginning in 2010, PREPA undertook a large-scale renewable procurement process to comply with legislative mandates to increase renewable power capacity in Puerto Rico. Over the course of several years, PREPA entered into 64 PPOAs for over 1,000 MW of renewable generation with average year-1 contract prices of 15-16 cents per kWh and 1-2% annual price escalation. By the beginning of FY2020, seven of these projects were operational with a total capacity of over 260 MW. To date, PREPA has announced it has

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<sup>74</sup> Expected savings is based on information provided by PREPA and market prices for commodities, at the date of approval of the fuel supply agreements.

reached commercial agreements with seven of nine operational projects, resulting in over 10% savings from original contract pricing, as well as 16 out of 19 shovel-ready projects. Contract renegotiations are expected to be completed by the end of FY2021.

TABLE 8: PPOA RENEGOTIATION ACTION PLAN

Projects	#	Milestones	Proposed Deadline
EcoEléctrica PPOA and Costa Sur Natural Gas Supply Renegotiation	1	Finalize negotiations and court motion on proposed contract	Completed
	2	Seek approval to execute the PPOAs with the PREPA Governing Board, PREB and FOMB	Completed
AES PPOA Renegotiation	1	PREPA engages AES on renegotiation of current PPOA	July 15, 2020
	2	Complete contract renegotiations and seek approval to execute the PPOA with the PREPA Governing Board, PREB and FOMB.	December 31, 2020
Renewable PPOA Renegotiation	1	Finalize negotiations and agree to new terms and conditions	Completed
	2	Seek approval to execute the agreements with the PREPA Governing Board, PREB and FOMB	In progress
	3	Submit court motion on the assumption of renegotiated PPOAs and the rejection of remaining agreements	September 30, 2020

## 2. Generation Capacity Upgrades and Maintenance:

PREPA currently operates an aging generation fleet that is heavily reliant on fossil fuel generation sources and limited in its operational flexibility. As part of the transformation, and until operation and maintenance responsibilities for generational assets are transferred to private operators, PREPA must urgently upgrade and maintain its legacy generation assets while diversifying the fleet towards lower cost, more sustainable fuel sources. In addition to achieving savings, these generation upgrades will contribute to improving service reliability and overall safety.

**Repair of San Juan Combined Cycle (SJCC) Power Plant:** Due to reliability issues after conversion to natural gas capacity, the SJCC Unit 6 is currently running on single cycle until repairs occur, scheduled for the end of July. Successful repair will unlock up to \$0.3 million net annual savings.

**Costa Sur Remediation:** Damage from the January 2020 earthquakes has necessitated repair work on Units 5 and 6 of the Costa Sur power plant to improve grid reliability. PREPA expects to complete Unit 5 repair by August 2020, while Unit 6 is currently undergoing damage assessment and is expected to be repaired by Q2 FY2021. The estimated cost for Unit 5 repair is \$25.2 million.

**Generation Plant Maintenance:** Given chronic delays in necessary maintenance projects, PREPA has undertaken a measure to execute on critical maintenance work for generation plants and implement performance improvement projects. Together, these projects will improve service reliability and are expected to generate approximately \$12 to 34 million in net annual savings.

TABLE 9: GENERATION UPGRADES ACTION PLAN

Projects	#	Milestones	Proposed Deadline
Repair of San Juan Combined Cycle (SJCC) Power Plant	1	Finish Unit 6 repair	July 31, 2020
Costa Sur Remediation	1	Finish Unit 5 repair	August 15, 2020
	2	Finish Unit 6 repair	November 30, 2020



Projects	#	Milestones	Proposed Deadline
Generation Plant Maintenance	1	Assess current plants performance and benchmark peers to set maintenance targets	August 31, 2020
	2	Formulate a detailed maintenance program and asses the need in contractors for execution	October 31, 2020
	3	Discuss planned program and resources needed for implementation with oversighting board	December 31, 2020
	4	Submit RFPs as needed	January 30, 2021
	5	Select contractors to execute maintenance program	February 28, 2021
	6	Commence maintenance program for improved plants performance	March 31, 2021

### 3. Fuel Supply:

In addition to the renegotiations of the PPOAs, PREPA must continue to proactively and periodically explore opportunities to improve fuel procurement and delivery terms. PREPA's existing supply contracts were signed during different fuel market conditions at higher cost than possible today. With two of its major supply contracts up for renewal before the end of 2021, PREPA must continue to work on improving existing and new contracts for its fuel supply by running competitive processes to obtain the best available market prices. By successfully improving its fuel procurement, PREPA can reduce operational expenses and pass on savings to ratepayers.

**Diesel Fuel Supply:** PREPA's existing Diesel Fuel Supply contract with Puma expires on November 20, 2020. In order to ensure transparency and achieve the best available price on the market, PREPA must run an RFP with suppliers in the first quarter of FY2021.

**Bunker-C Fuel Supply:** PREPA and Freepoint negotiated an amendment that would allow PREPA to obtain a fixed price per barrel for a volume of 250,000 barrels per month from June through December 2020. The amendment also extends the existing agreement with Freepoint until October 2021.

TABLE 10: FUEL SUPPLY ACTION PLAN

Projects	#	Milestones	Proposed Deadline
Diesel Fuel Supply	1	Begin a competitive process to award a new contract for diesel suppliers	July 15, 2020
	2	Provide bi-weekly updates to the Board on the progress of the process	First updated: July 15, 2020
	3	Finalize agreement with selected supplier and seek approval to execute the contracts with the PREPA Governing Board and FOMB	September 30, 2020
	4	Commence new contract	November 21, 2020
Bunker-C Fuel Supply	1	Launch a competitive process for supply post October 2021, including renegotiation with Freepoint	January 30, 2021
	2	Finalize agreement with supplier	May 31, 2021
	3	Seek approval to execute the contracts with the governing board and FOMB.	June 30, 2021

### 4. Customer Service Improvements:

Building on successful implementation of customer service improvements in FY2021, PREPA must continue to make progress on additional customer service projects to improve quality of service and reduce costs. These measures collectively strengthen PREPA's financial position

by safeguarding its revenues from theft and inefficiencies, while improving quality of PREPA’s customer service and digital interface.

**Damaged Meters Replacement:** The Damaged Meter Project aims to reduce losses, including from theft, and improve revenues from accounts currently underreporting due to damaged or missing meters. A full-scale replacement effort was launched in early March 2020 but has since been delayed as a result of the COVID-19 curfew. PREPA has ordered and received approximately 50,000 meters necessary to eliminate PREPA’s outstanding backlog of missing and damaged meters. PREPA expects to receive approximately 25,000 additional meters to complete the replacements. PREPA must complete the installation of all replacement meters by the end of FY2022. Meter replacement is expected to result in revenue improvements; however, the exact amount is to yet to be determined.

**Contribution in Lieu of Taxes (CILT) Reform:** PREPA has begun implementation of four key components to CILT reform: (1) Transparent billing; (2) New treatment of for-profit entities; (3) Municipal consumption cap; and (3) Energy efficiency incentives. (Further discussion CILT Reform can be found in Chapter 4, “Regulatory Structure.”) In FY2020, PREPA tracked and billed municipalities for disqualified consumption, including for-profit operations run by Puerto Rico municipalities and consumption in excess of the regulatory cap. Over this past fiscal year, PREPA engaged in discussions with mayors and developed procedures for disconnecting overdue municipal accounts. In FY2020, PREPA collected approximately \$2.5 million from municipalities out of approximately \$20.8 million subject to collection. As these measures continue to be implemented, CILT reform is expected to increase PREPA’s revenues.

**E-billing and Online Payment:** PREPA’s online billing and payment platform has been in place since late 2019 and is currently utilized by approximately 350,000 PREPA customers. With the elimination of extended hours at PREPA Customer Service offices in January and the closure of the offices in mid-March due to the COVID-19 mobility restrictions, PREPA has doubled down on efforts to encourage its customers to convert to e-billing. Based on the historical costs of printing, handling, and mailing paper invoices, PREPA saves an estimated 62¢ per month for each e-billing account. PREPA must achieve a target of 30% or 428,000 PREPA customers utilizing e-billing by the end of FY2021.

**Theft Reduction Activities:** In recent years, PREPA has begun reducing its Non-Technical Losses (NTL) under the Irregular Consumption of Electric Energy (ICEE) unit, a division within PREPA’s Customer Service responsible for investigating thousands of cases of potential theft each month. In FY2021, PREPA must begin reporting to FOMB on the number of potential and confirmed energy theft cases detected, confirmed, and addressed, and the cost savings from addressing confirmed cases of theft.

**Outsourced Call Center Reporting:** During FY2019 and FY2020, outsourced call centers were established under a competitive process to handle the overflow from PREPA’s internal operations. These additional centers started operating in August of 2019 and have substantially improved the customer service performance metrics – average call wait times fell from 20 to 30 minutes overall to three to five minutes.

TABLE 11: CUSTOMER SERVICE IMPROVEMENTS ACTION PLAN

Projects	#	Milestones	Proposed Deadline
Damaged Meters Replacement	1	Provide plan for installing all meters by end of FY2022	August 31, 2020
	2	Complete delivery of approximately 77,000 meters	September 30, 2020
	3	Complete installment of all meters	June 30, 2022
	1	Conduct a study and issue a recommendation to the Legislature on optimal CILT structure	September 30, 2020

Projects	#	Milestones	Proposed Deadline
Contribution in Lieu of Taxes (CILT) Reform	2	Develop a CILT process by which municipalities pay for electricity consumption not covered by CILT, and are able to file complaints related to CILT	December 31, 2020
E-billing / Online Payment	1	Plan a campaign to promote online billing and payment, identify high priority customer groups and set concrete targets	September 30, 2020
	2	Commence plan implementation, targeting first high priority customer groups	October 1, 2020
	3	Assess success and adjust activities moving forward in accordance	December 31, 2020
	4	Reaches target of 30% or 428k PREPA customers on e-billing	June 30, 2021
Theft Reduction Activities	1	Identify cases of energy theft, size and prioritize by potential cost savings	August 31, 2020
	2	Plan theft reduction efforts appropriate to the identified cases	September 30, 2020
	3	Investigate and commence theft reduction efforts	October 1, 2020
	4	Start reporting to the FOMB cases detected, amount of the claims, and enforcement status on a monthly basis	October 1, 2020
Outsource Call Centre Reporting	1	Establish enhanced reporting to evaluate the relative performance of both the PREPA and outsource call centers	July 1, 2020

## 5. Energy Grid Management and Modernization:

After limited progress in FY2019 and FY2020, PREPA must complete planning and commence execution for several key measures in FY2021 to modernize the grid and execute necessary maintenance work to improve grid resilience and flexibility. For too long, Puerto Rico's residents have suffered from aging infrastructure vulnerable to frequent and lengthy outages. These measures, if implemented, will create a step change in reliability and resilience of the grid.

**Study of Technical Losses:** The IRP estimates that technical losses, which lead to revenue losses, totaled 7.8% during FY2019 and are assumed to remain at that level during the 20-year IRP planning horizon. A Transmission Constraints Analysis developed by PREPA's technical consultants found a widespread lack of reliable load metering data from private substations, suggesting technical losses may be underestimated. Going forward, PREPA will validate an appropriate baseline, and develop a technical loss reduction program. Implementation must commence by February 2021.

**Vegetation Management:** One of PREPA's main historical challenges has been its lack of proactive and consistent vegetation management practices to counter the subtropical growth along the island's transmission and feeder system. Since at least 2015, PREPA has failed in efforts to execute a vegetation management program, leaving the grid vulnerable to natural disasters. In FY2021, PREPA is expected to expand vegetation management on a \$60 million annual budget that is much higher than the historical budget level or realized spending. In FY2019, PREPA spent none of its \$26 million budget and is projected to spend approximately \$6 million of its \$50 million budget in FY2020. PREPA must urgently accelerate its execution of vegetation management to ensure grid resiliency and reliability. The competitive process for additional contractors, if required, must be completed by the end of 2020 to execute work planned in FY 2021.

**Street Lighting:** During FY2020, PREPA procured third party contractors to support repair and replacement of damaged public lighting, along with PREPA crews from the different regions. PREPA has repaired 216,000 out of an estimated inventory of 489,000 existing streetlights. The streetlight repair project also includes the conversion of bulbs to LED lighting, which is expected to generate cost savings of 50% per light fixture. So far, 198,000

LED light bulbs have been installed, yielding a 12.8 MW savings compared against a halogen light bulb baseline. PREPA must finalize its street lighting repair plan and run a competitive process in the first quarter of FY2021. All pending repairs and additional conversions to LED bulbs must be completed by the end of the third quarter of FY2021.

**T&D Enhancement Projects:** During FY2020, PREPA and its consultants developed a T&D road map outlining a coordinated plan for implementing the recommended capital investments from PREPA studies, the COR3 Energy Grid Modernization Plan, PREPA IRP, and annual budget. The work required review and prioritization of over 5,000 recommended projects touching all aspects of the grid, including transmission, distribution, substation, grid modernization, generation, operations, and items identified from the Transmission Constraints Analysis. Accordingly, execution of the high priority projects must begin no later than April 30, 2021.

TABLE 12: ENERGY GRID MANAGEMENT AND MODERNIZATION ACTION PLAN

Projects	#	Milestones	Proposed Deadline
Study of Technical Losses	1	Develop a plan to address the lack of remote and reliable load metering data from private substations to provide an adequate input for the estimation of technical losses of the grid	September 30, 2020
	2	Develop a technical loss reduction program including implementation plan	December 31, 2020
	3	Discuss planned program and resources needed for implementation with oversighting board	January 15, 2021
	4	Commence implementation of the plan	February 1, 2021
Vegetation Management	1	Assess current contractor progress and extend agreement with good performing contractors	September 30, 2020
	2	Undergo a competitive process and sign contracts with additional contractors if needed	December 31, 2020
Street Lighting	1	Formulate streetlighting repair plan according to approved budget	July 31, 2020
	2	Undergo a competitive process to award contracts with contractors	September 30, 2020
	3	Seek approval with governing board and FOMB	October 31, 2020
	4	Commence implementation of the plan	November 30, 2020
	5	Complete any pending repairs and undertake additional conversion to higher efficiency LED bulbs in FY2021	March 31, 2021
T&D Enhancement Projects	1	Review and prioritize all recommended capital projects touching all aspects of the grid	July 31, 2020
	2	Formulate one T&D capital plan, including clear goals and sizable targets, detailed projects and needed resources	October 31, 2020
	3	Seek approval of the plan with governing board, PREB and FOMB.	November 1, 2020
	4	Starting with highest priority projects, create a detailed implementation plan including all resources needed for each project	December 31, 2020
	5	Undergo a competitive process to award contracts with relevant contractors	February 28, 2021
	6	Seek approval of the contracts with governing board, PREB and FOMB	March 15, 2021
	7	Begin execution of high priority projects, concurrently continue formulating implementation plans for lower priority projects	April 30, 2021

## 6. Personnel:

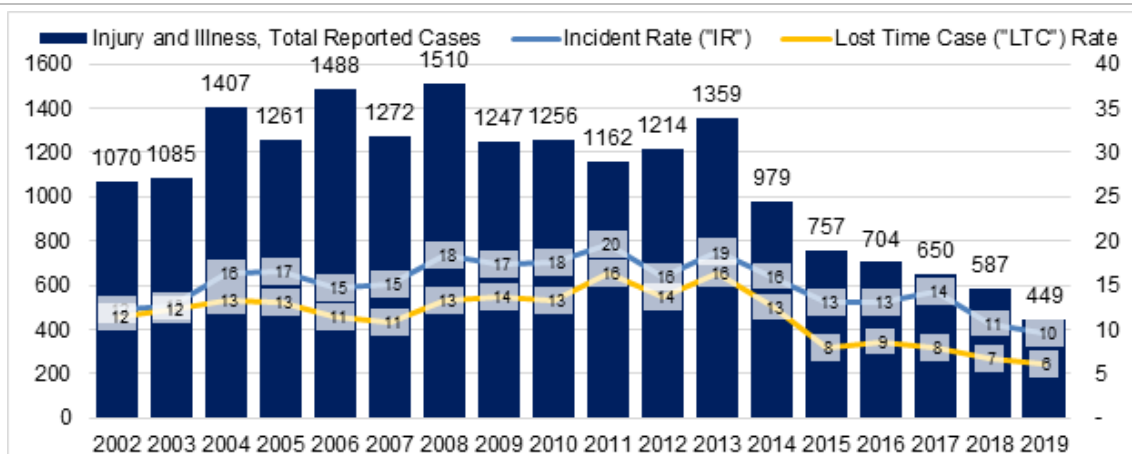
PREPA has historically struggled with personnel-related cost management, as well as hiring and retention issues. In recent years, PREPA has faced high overtime spending, high injury rates, and significant pension liabilities that have directly burdened PREPA’s rate offerings to consumers. Implementation of personnel-related measures will allow PREPA to operate more safely and efficiently.

**Overtime Reduction:** PREPA has faced an annual average overtime expense of \$60 million over last 10 fiscal years. During FY2019, PREPA introduced a monthly overtime report for senior management to track the drivers of overtime spending. Ultimately, PREPA must improve overtime management through more flexible work shifts and redistribution of personnel. In the first half of FY2020, PREPA’s overtime reporting and reduction activities reduced overtime spend by approximately \$8 million in year-over-year savings. During FY2021, PREPA must expand the project into a more comprehensive overtime reduction plan by the end of September 2020, as well as develop a digital tracking tool and updated overtime review policies by the end of December 2020.

**HR Procedures Reporting and Modernization:** As recommended by the Personnel Capacity Study, PREPA’s Human Resources Directorate will be reviewing and revising a number of policies and procedures and improving information technology to modernize its operation and more efficiently administer PREPA’s workforce. The HR policy revision and IT improvement are expected to commence in December 2020.

**Employee Injury Reporting and Safety:** PREPA has historically struggled to maintain acceptable safety standards and records. While PREPA has seen significant improvement on safety metrics over recent years, much work remains (Exhibit 36). In FY2021, PREPA must revise its employee safety and injury reporting in line with Occupational Safety and Health Administration (OSHA) standards and commence an injury reduction plan to address identified high-risk activities by October 2020.

EXHIBIT 36: EMPLOYEE SAFETY METRICS



### Pension Plan Reform:

An actuarial assessment based on asset experience through October 2019 and an assumed rate of return of 4.5% prospectively suggests that liabilities for PREPA’s Employee Retirement System (ERS) have grown to approximately \$4.9 billion, with \$3.8 billion of that amount still unfunded. In recent years, PREPA has contributed less than the amount determined by the system actuary to systemically bring the plan to full funding. The FY 2020 actuarially determined contribution was \$266 million, and yet PREPA’s total contributions are expected to be only \$71 million for FY 2020. In the 2020 Fiscal Plan, PREPA projects total contributions of approximately \$67 million in FY 2021, whereas the most recently available

estimate of the FY2021 actuarially determined contributions was approximately \$251 million. If PREPA makes no changes to its funding practice of recent years, the pension plan could be insolvent by 2026.

In order to progressively restore fiscal health to Puerto Rico while ensuring that adjustments to pension benefits occur in a manner that protects the economic well-being of all retirees, PREPA must undertake pension benefit reform. For example, if PREPA were to implement a plan revision in line with that for the Commonwealth, i.e., 8.5% flat cut over \$1,200 threshold, the resulting flat annual contribution would drop from \$251 million to \$187 million. A load-based funding option under the same revised plan design would result in a 1.79 c/kWh charge, down from the current 2.4 c/kWh charge (Exhibit 37).

EXHIBIT 37: COMPARISON OF FUNDING OPTIONS WITH AND WITHOUT FULL FUNDING IN FY2021<sup>75</sup>

<u>Baseline flat funding</u>	<u>4.5% assumed return</u>	
<u>Scenario</u>	<u>\$251M FY21 contribution</u>	<u>\$67M FY21 contribution</u>
Fully fund using load but no freeze or cut	\$240	\$251
Fully fund using load based on freeze + 8.5% flat cut over \$1,200	\$175	\$187

<u>Baseline c/kwh load</u>	<u>4.5% assumed return</u>	
<u>Scenario</u>	<u>\$251M FY21 contribution</u>	<u>\$67M FY21 contribution</u>
Fully fund using load but no freeze or cut	2.3	2.4
Fully fund using load based on freeze + 8.5% flat cut over \$1,200	1.68	1.79

To implement pension reform, PREPA must continue to review and potentially revise its pension funding policy by December 31, 2020 and incorporate any agreed funding policy changes by March 31, 2021. This necessary reform will allow PREPA to avoid pension insolvency, ensure retirees receive benefits, and deliver cost reduction to ratepayers.

TABLE 13: PERSONNEL PROJECTS ACTION PLAN

<b>Projects</b>	<b>#</b>	<b>Milestones</b>	<b>Proposed Deadline</b>
Overtime Reduction	1	Track historic overtime, identify recent drivers for increased overtime and set initial targets based on either internal or external benchmarks	July 31, 2020
	2	Build a comprehensive overtime reduction plan	September 30, 2020
	3	Develop digital tracking tool to identify and target key reasons for overtime	December 31, 2020
	4	Develop periodic cadence to ensure regular overtime review and implementation of policy changes	January 30, 2021
HR Procedures Reporting and Modernization	1	Review HR policies and procedures and conduct benchmarking analysis	August 15, 2020
	2	Formulate plan for HR information technology improvement	October 15, 2020
	3	Commence HR policies revision and IT improvement	December 15, 2020

<sup>75</sup> Contributions beginning in FY2022 in order to fully fund plan over 29 years if actual experience is consistent with all assumptions. For load-based funding option, demand projections are consistent with 2020 Fiscal Plan.

Projects	#	Milestones	Proposed Deadline
Employee Injury Reporting and Safety	1	Finalize process of digitizing safety reports	August 31, 2020
	2	Identify key activities with higher injury risk and formulate an injury reduction plan	September 30, 2020
	3	Commence the injury reduction plan and begin reporting employee injury numbers according to the OSHA standard	October 1, 2020

## 7. Working Capital:

The working capital projects aim to improve PREPA's liquidity monitoring and management through improving processes and reporting for accounts payable and receivable, enhancing bill collection and expedite bad debt reduction, and optimizing PREPA's real estate expenditure. By implementing these projects, PREPA can improve its cash position, and thus mitigate risks from unforeseen external shocks.

**AR/AP Cash Flow Reporting:** To improve liquidity management, PREPA will need to adopt improved processes and reporting for accounts receivables, accounts payable, cash flow forecasting, and liquidity monitoring. PREPA must benchmark best practices in liquidity management by the end of August 2020 and develop an oversight and management tool by the end of October 2020.

**Real Estate Optimization:** During FY2020, the real estate advisors to PREPA established a priority list of approximately 20 different real estate optimization projects for consideration involving excess properties and over-market priced leases. In FY2021, PREPA must meet a target of \$500,000 in annual rent savings through lease renegotiations or new leases.

**Collections Improvement and Bad Debt Reduction:** Historically, PREPA has faced persistent challenges in bill collection and bad debt issues. These challenges were intensified mid-March due to the COVID-19 mobility restrictions. During FY2021, PREPA must launch a comprehensive effort to benchmark best practices for improved collection and bad debt recovery by the end of the first quarter, and commence implementation of a plan to improve collections by the end of the second quarter, leveraging the tailwind of the e-billing adoption to improve the efficiency of collections and debt recovery.

TABLE 14: WORKING CAPITAL ACTION PLAN

Projects	#	Milestones	Proposed Deadline
AR/AP Cash Flow Reporting	1	Benchmark peer best practices for accounts receivables, accounts payable, cash flow forecasting, and liquidity monitoring	August 31, 2020
	2	Develop oversight and management tool to track and address current gaps	October 31, 2020
	3	Train relevant personnel to work with the tool, improving cash flow reporting on a regular basis	December 31, 2020
Real Estate Optimization	1	Identify potential leases for renegotiations and unused properties for sale	August 31, 2020
	2	Negotiate better leases terms for the relevant properties	October 31, 2020
	3	PREPA board of directors to deliberate on sale of unused property assets	October 31, 2020
Collections Improvement and Bad Debt Reduction	1	Benchmark peer best practices for improved collections and reduced bad debt	August 31, 2020
	2	Identify lowest customer groups by collection and formulate a details plan to address gaps	October 31, 2020
	3	Commence implementation of the plan	January 1, 2021

## 8. P3 Projects and T&D Front-End Transition Reporting:

Besides the above measures, PREPA must play an integral role in the front-end transition to the T&D operator in FY2021 in accordance with the milestones and requirements specified in the O&M agreement. In FY2021, PREPA must also progress on the P3 process for PREPA's legacy generation assets by working with the P3A to launch an RFP process by the end of July 2020.

TABLE 15: P3 PROJECTS AND T&D FRONT-END TRANSITION ACTION PLAN

Projects	#	Milestones	Proposed Deadline
Front End Transition to T&D Operator	1	Formation of teams and development of plans to prepare the organization for financial, operational, and legal transition to the new service provider (LUMA Energy)	September 30, 2020
	2	Clarify GridCo and P3 authority's responsibilities	January 15, 2021
	3	Identify and obtain government approvals and tax assurance required for Service Commencement Date	March 15, 2021
	4	Complete all other conditions and requirements before Service Commencement Date	June 15, 2021

## 9.4 Summary of Operational Measures

Over the course of the next fiscal year, PREPA must make significant progress on these operational measures, particularly on the operator transition, PPOA renegotiations, and grid maintenance and repair efforts. If these milestones are completed, PREPA will be well on its way to generating approximately \$130 to 160 million in net savings over FY2021, while also positioning itself for continued progress towards improved efficiency in the long-term.<sup>76</sup> These savings will help PREPA maintain fiscal sustainability (e.g., reducing potential financial shortfalls), and this additional financial bandwidth and liquidity cushion will help PREPA more effectively manage its fiscal situation in the future.

Once PREPA makes significant progress on these operational measures, customers will see real benefits which may include increased affordability, transparency, and quality of customer service. These benefits to customers – as well as the systematic improvements to PREPA itself – will help the people of Puerto Rico reap the rewards of a more modernized and effective energy system.

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<sup>76</sup> The savings estimate excludes vegetation management costs and savings from CILT and pension reform measures.



# Chapter 10. Debt Service

## 10.1 Overview of PREPA Debt

As of May 2017, PREPA held approximately \$9 billion in bonds and other debt obligations, along with an unsustainable repayment schedule. If fully paid – these obligations would correspond to a charge of 6 to 7 c/kWh in real terms over the next twenty years. PREPA’s unsustainable capital structure reflects decades of borrowing to fund operating deficits. In February 2014, three major credit-rating agencies downgraded Puerto Rico’s public debt to below investment grade. In late June 2015, the debt was downgraded a second time when it became clear that the island’s debts were unpayable.<sup>77</sup> Finally, in spring 2016, as the investment community viewed default on nearly all of Puerto Rico’s debt as a “virtual certainty,” PREPA lost access to credit markets – thus eliminating debt as a means of funding necessary capital spending and operating deficits.<sup>78,79</sup>

PROMESA, passed in 2016, introduced procedures for debt restructuring. In July 2017, in the interest of ensuring PREPA’s future financial sustainability, FOMB filed a voluntary petition on behalf of PREPA for protection under Title III of PROMESA in the US District Court. Since then, a group of PREPA creditors, the Oversight Board, the Government, and PREPA have been negotiating a consensual debt restructuring plan. However, as a result of the uncertain and unpredictable effects of COVID-19 on PREPA and its customers, the Oversight Board has requested and the court has granted a pause on the Title III process to assess and understand the implications of COVID-19.

PREPA has maintained a growing and unsustainable debt balance over the past decade. As long as PREPA remains in Title III, the utility will not have effective access to capital markets to fund critical grid modernization and improvement plans. Transformation of PREPA’s T&D system and debt restructuring is an imperative if PREPA is to exit Title III and begin building the infrastructure for a modern, resilient, and reliable energy system, while placing minimum burden on Puerto Rico’s ratepayers.

## 10.2 Implications of Unrestructured Debt for Rate Projections

Under the status quo, PREPA would need to repay approximately \$4.5 billion of legacy debt service obligations over the next five years, equivalent to approximately 6 to 7 c/kWh in real dollars (6 to 8 c/kWh in nominal dollars) (Exhibit 38).<sup>80</sup> In the longer term, PREPA’s estimated annual debt service obligation based on term out of all long-term financial liabilities at a 5% interest rate over 25 years is approximately \$657 million per year.

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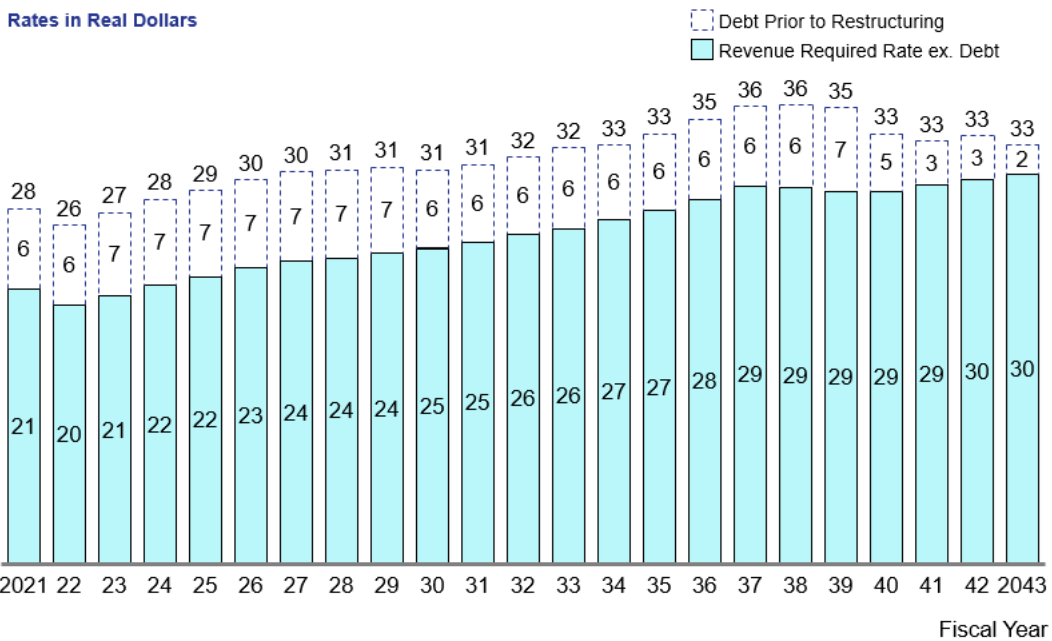
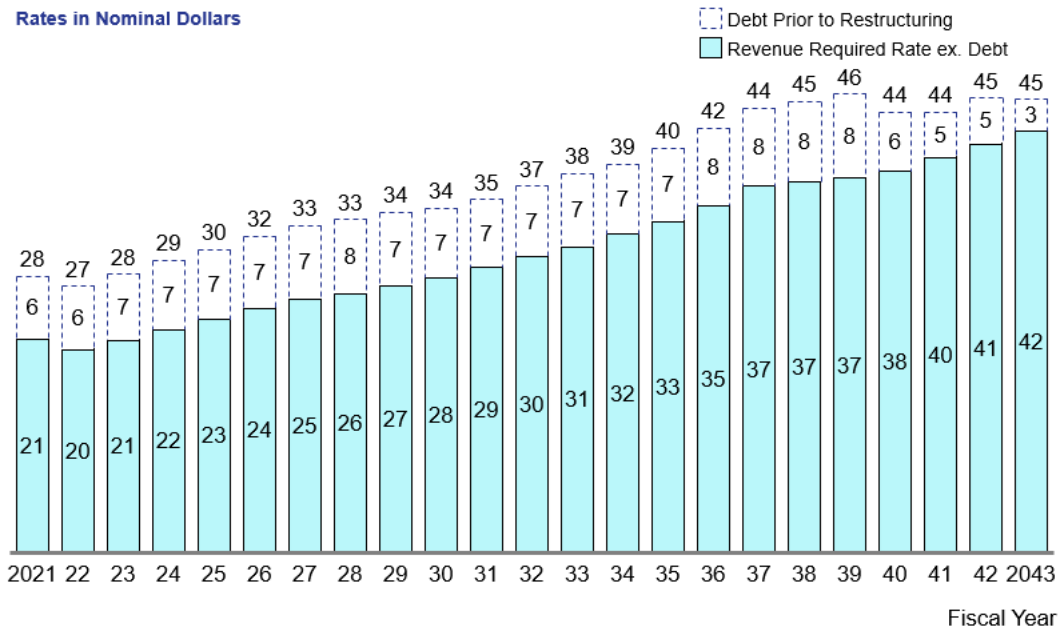
<sup>77</sup> D. Andrew Austin, *Puerto Rico’s Current Fiscal Challenges*, (US Library of Congress, Congressional Research Service, R44095, 2016), 4, <https://fas.org/sgp/crs/row/R44095.pdf>.

<sup>78</sup> “An obligation rated ‘CC’ is currently highly vulnerable to nonpayment. The ‘CC’ rating is used when a default has not yet occurred but S&P Global Ratings expect a default to be a virtual certainty, regardless of the anticipated time to default.”, “S&P Global Ratings Definitions,” S&P Global Ratings, last modified September 18, 2019, [https://www.standardandpoors.com/en\\_US/web/quest/article/-/view/sourceId/504352](https://www.standardandpoors.com/en_US/web/quest/article/-/view/sourceId/504352).

<sup>79</sup> D. Andrew Austin, *Puerto Rico’s Current Fiscal Challenges*, 4.

<sup>80</sup> FY2021 is used as base year to calculate rates in real dollars.

EXHIBIT 38: TOTAL RATES INCLUDING DEBT PRIOR TO RESTRUCTURING (C/KWH)



**10.3 Debt Sustainability Analysis**

The debt sustainability analysis (DSA) is intended to provide a framework for assessing PREPA’s long-term capacity to pay debt service.<sup>81</sup> Ultimately, PREPA’s debt levels need to align with the objective of recovering capital market access to fund ongoing and future infrastructure capital investment and/or refunding for savings, as well as ensuring affordable energy prices for the Commonwealth and its residents. The following debt sustainability analysis describes PREPA’s capacity to pay current and projected debt.

<sup>81</sup> PROMESA Section 201(b)(1)(I) mandates that the Fiscal Plan include a debt sustainability analysis.

The DSA matrix illustrates PREPA’s implied debt capacity at varying coupon levels and hypothetical levels of net revenue (Table 16). The DSA assumes a 30-year term and level debt service (i.e., 1.0 times coverage). For example, if the net revenues available for debt service are \$300 million for 30 years, assuming a coupon level of 5%, PREPA’s implied debt capacity would be \$4.6 billion. Given the range of implied debt capacity, restructuring is imperative to achieving a sustainable solution to PREPA’s debt obligations and paving the way to regaining its investment grade rating and ensuring a fiscally sustainable future for the Puerto Rico energy system.

TABLE 16: ILLUSTRATIVE SUSTAINABLE DEBT CAPACITY SIZING (\$ MILLION)

<b>Sensitivity Analysis – Implied Debt Capacity at 1.0x Coverage</b>						
<b>Illustrative Cash Flow Available</b>		<b>\$75</b>	<b>\$150</b>	<b>\$225</b>	<b>\$300</b>	<b>\$375</b>
<b>PV Rate %</b>	<b>4.0%</b>	\$1,297	\$2,594	\$3,891	\$5,188	\$6,485
	<b>5.0%</b>	\$1,153	\$2,306	\$3,459	\$4,612	\$5,765
	<b>6.0%</b>	\$1,032	\$2,065	\$3,097	\$4,129	\$5,162

# Chapter 11. Federal Funding

## 11.1 Overview

As a result of the severe damage inflicted on the T&D system by hurricanes Irma and Maria, as well as recent earthquakes, the Government of Puerto Rico developed a wide-ranging energy system rebuilding and modernization plan, known as the Grid Modernization Plan (GridMod Plan), published in July 2019. The GridMod Plan, which is one component of the integrated T&D road map, details the capital expenditures necessary for the optimal repair, rebuild, and reconstruction of Puerto Rico's energy sector public infrastructure. The GridMod Plan embraces technologies that performed well during the hurricanes and replaces technologies that failed, taking into consideration the island's geography, demographics, and population dispersion. One of the objectives of the GridMod Plan is to increase the system's ability to withstand and react to future hurricane events, preserve investments made by FEMA and other funders, and endow Puerto Rico with industry-standard electricity grid reliability and resilience to enhance sustainable economic development and job growth.

As a result of the 2017 hurricanes, PREPA qualified for federal funding support. PREPA, FEMA, and the Central Office of Recovery, Reconstruction, and Resiliency (COR3) have been working collaboratively for many months to adequately define the full realm of T&D reconstruction projects, size the cost estimates, and determine an efficient way of disbursing and utilizing pertinent federal funding to reconstruct the energy grid.

PREPA's main sources of federal funding are: 1) FEMA's Public Assistance Program; and 2) the federal housing and urban development (HUD) Community Development Block Grant – Disaster Recovery (CDBG-DR) Program. A brief description is included below; details of the funding procedures and amounts disbursed to date are provided in the following sections.

**FEMA's Public Assistance Program:** Under the Stafford Act, PREPA receives all FEMA funds through COR3, the officially designated grantee under the Stafford Act. COR3 is a division of the P3A and was created to ensure adequate management and use of federal funds for Puerto Rico's recovery and reconstruction. FEMA's Public Assistance Program addresses both emergency work (e.g., debris removal and emergency protective measures), and permanent work (e.g., reconstruction of the electricity grid to address damages resulting from the storms using permanent towers, poles, and related electric equipment and structures).

**HUD CDBG-DR Program:** The Puerto Rico Department of Housing (PRDOH) is the designated grantee of CDBG-DR funds, while PREPA is the subrecipient, meaning that funds are managed through the PRDOH.<sup>82</sup> Each CDBG-DR activity, including CDBG-MIT, must meet the following criteria: a) address a disaster-related impact (direct or indirect) in a presidentially declared disaster area; b) be a CDBG-DR eligible activity; and c) meet a CDBG-DR national objective. The national objectives include: i) benefit low-and moderate-income persons; ii) aid in the prevention or elimination of slums or blight, or; iii) meet community development needs having a particular urgency.<sup>83,84</sup>

### 11.1.1 Funding Received to Date

To date, a total of \$20.2 billion in CDBG-DR and CDBG-MIT funding has been apportioned for Puerto Rico, including approximately \$1.9 billion specifically designated for energy-related projects. PREPA, FEMA, and COR3 have been working collaboratively for many months to adequately define the full realm of T&D reconstruction projects, size cost estimates, and

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<sup>82</sup> As designated by the Governor on February 23, 2018.

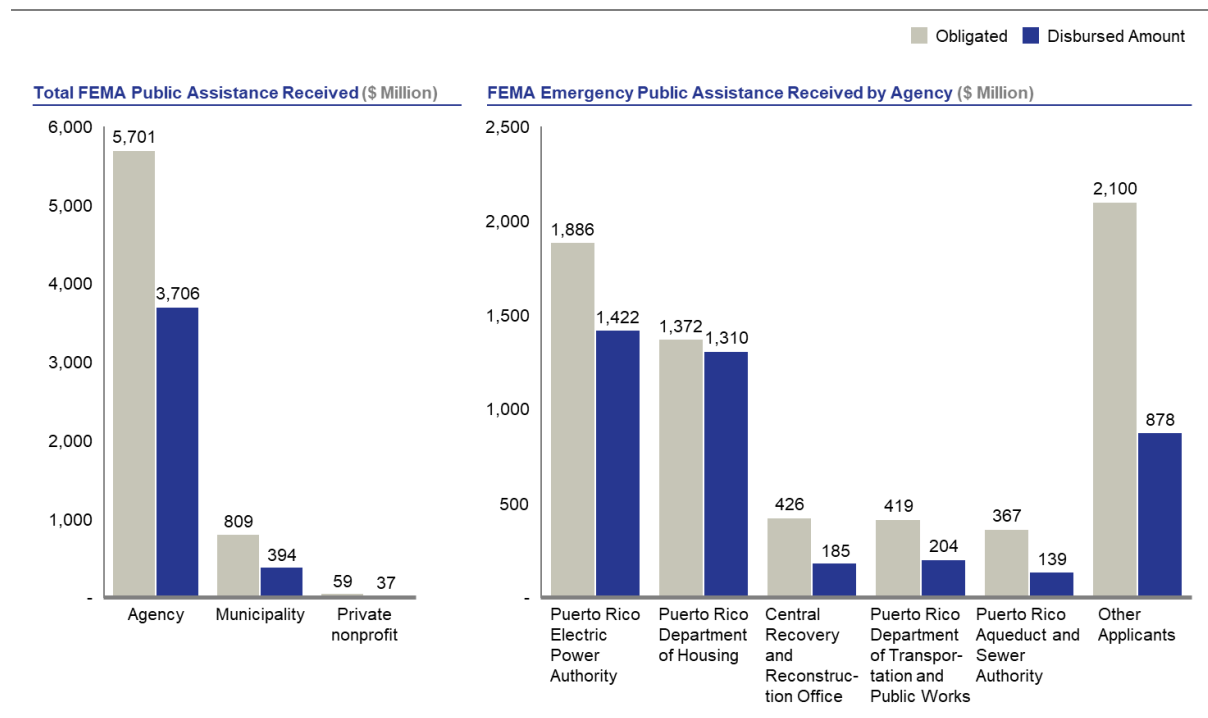
<sup>83</sup> Community Development Block Grant Mitigation (CDBG-MIT) Program.

<sup>84</sup> 24 C.F.R. § 570.208.

determine an efficient way of disbursing and utilizing the pertinent federal funding to reconstruct the energy grid. In its case, PREPA is required to meet a 10% cost share requirement for its FEMA-funded permanent work projects. PREPA plans to meet its cost share portion through the CDBG-DR and CDBG-MIT program funds, as they become available.<sup>85</sup> Access to CDBG funds, however, is subject to various HUD actions.<sup>86</sup> The current Fiscal Plan assumes CDBG funds will cover the cost share required for federal funding. If these funds are not available, PREPA must find savings elsewhere or adjust rates to cover the cost share obligation.

Through April 2020, PREPA has received \$1.42 billion in FEMA public assistance funds (Exhibit 39). Additionally, PREPA expects to receive a portion of the \$20.2 billion in post-hurricane assistance appropriated to Puerto Rico through HUD-approved CDBG-DR and CDBG-MIT grants to be used for matching or cost share purposes.<sup>87</sup>

EXHIBIT 39: FEMA PUBLIC ASSISTANCE RECEIVED BY AGENCY<sup>88</sup>



### 11.1.2 Further Projected Federal Funding Levels Across Sources

PREPA expects to reach an agreement with FEMA on a fixed cost estimate for all permanent repair and reconstruction work in the summer of 2020. PREPA has been actively working with FEMA on a cost estimate since 2018 in a collaborative effort to reach estimates for each asset classification. The FEMA CRC team has worked directly with PREPA’s Disaster Funding Management Office (DFMO) project formulation team to finalize all cost estimates. A final fixed cost estimate from FEMA has not yet been received. At the request of FEMA, PREPA’s

<sup>85</sup> COR3 sent a letter to the FOMB on December 4, 2018 confirming that the Government has set aside \$1 billion from the first and second appropriations (\$100 million and \$900 million, respectively) for use as non-federal matching funds.

<sup>86</sup> CDBG-DR funding is assumed to be available during the six (6) year time period and under the scheduling conditions provided for under Federal Register Vol. 83, No. 157.

<sup>87</sup> The use of CDBG-DR and CDBG-MIT funding to provide for the non-federal cost share requirement of projects is an acceptable use of funds. HUD has provisionally prohibited Puerto Rico from using CDBG-DR and CDBG-MIT funds for improvement or enhancement of electrical systems, including use for non-federal matching purposes, until HUD coordinates with other federal partners regarding federal funds to be available to PREPA. The date for HUD to withdraw or modify this prohibition is not known at this time.

<sup>88</sup> COR3 Transparency Portal as of March 31, 2020. Obligated amounts presented for PREPA exclude approximately \$180 million of de-obligated funds related to PW466 that are included in the COR3 portal.

DFMO prepared a two-year plan which represents an initial pass at various individual projects, rolled up by asset classification, that may be prioritized by PREPA. The two-year cumulative cost included in the estimate totals \$1.4 billion across five asset categories (T&D, distribution, DER and microgrids, technology, and other.) The costs in the two-year plan have been estimated by the PREPA DFMO team and not yet vetted by FEMA CRC professionals who are responsible for project costing and cost estimating.

As of May 2020, the procedures for PREPA's ability to draw down federal funds if a global settlement is reached and funds obligated in a global PW, are unknown. PREPA understands that both FEMA and COR3 are in the process of developing procedures and policies in this regard.

## **11.2 FEMA-Funded Emergency Work**

### **Emergency Work Reimbursement Procedure**

Emergency spending involves work that is performed to reduce or eliminate an immediate threat to life, protect public health and safety, and to protect improved property that is significantly threatened due to disasters or emergencies declared by the President of the United States of America.<sup>89</sup> It involves two categories of work that address immediate threats: Category A debris removal, and Category B emergency protective measures.

### **Emergency Work Status Update<sup>90</sup>**

As of May 1, 2020, PREPA has requested reimbursement for eligible emergency restoration expenditures valued at \$2.652 billion. Of these requests, FEMA has obligated \$1.886 billion.<sup>91</sup> PREPA has incurred costs of \$1.779 billion related to emergency projects and FEMA has reimbursed \$1.422 billion as of the month closure. PREPA's actual payments for emergency work are greater than funds received from FEMA, and less than total FEMA obligated amounts (Exhibit 40). As part of its liquidity management efforts, PREPA is carefully managing the invoices from, and payments to, emergency vendors to align with the timing of receipt of additional obligated FEMA funds.

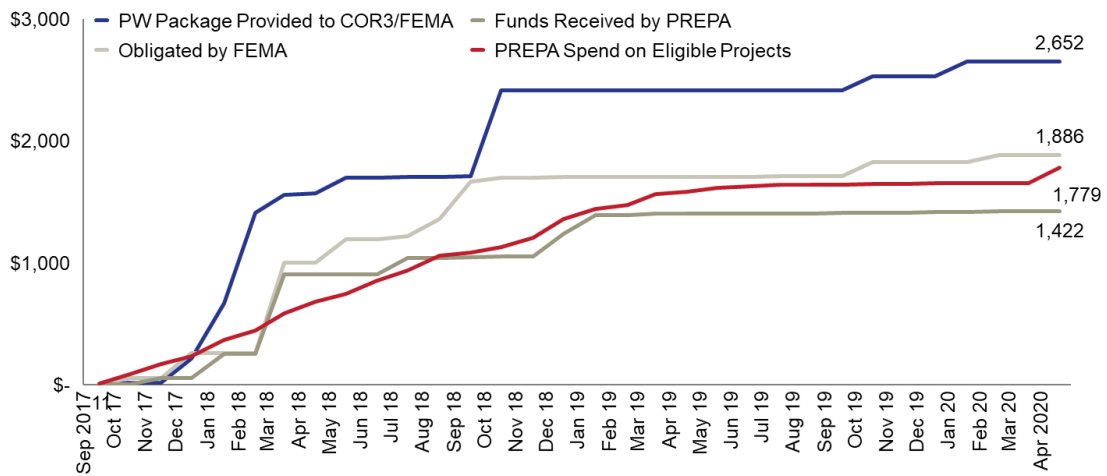
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<sup>89</sup> Source: FEMA Public Assistance Program and Policy Guide V3.1, April 2018.

<sup>90</sup> Per PREPA's "FEMA Flash Report" as of May 1, 2020.

<sup>91</sup> Includes two PWs (1) Generators and 2) St. James Security), totaling \$59.5 million, submitted but initially considered ineligible for reimbursement by FEMA. PREPA is in the process of appealing the eligibility of these PWs to FEMA. FEMA is considering categorizing the St. James PW as Category F "Permanent Work." FEMA is considering partial reimbursement for the St. James PW.

Estimated Emergency Work Reimbursement - By Month (\$ Million)



### 11.3 FEMA-Funded Permanent Work

#### Permanent Work Reimbursement Procedure

PREPA receives reimbursement for permanent work through FEMA’s 428 Alternative Procedures Program. Funding for permanent work is applicable to projects related to restoring facilities through repair or restoration to pre-disaster design, function, and capacity in accordance with codes or standards.<sup>93</sup> Under the Alternative Procedures Program, FEMA will fund all large permanent work projects based on fixed cost estimates. The procedures for obligating all PREPA permanent projects continue advancing between PREPA, COR3, and FEMA pursuant to the FEMA Advanced Award Strategy Initiative (FAASt).

Specifically related to damages caused by hurricanes Irma and Maria, the Bipartisan Budget Act (BBA) allows FEMA to provide assistance to restore disaster-damaged facilities or systems that provide critical services to an industry standard without regard to pre-disaster condition. FEMA may approve standards that are widely accepted and used, or best practices that are generally accepted by experts in the industry as long as standards are reasonable. BBA allows for the repair or replacement of components not damaged by the disaster if the work is required to restore the critical service function of the facility or system to an approved industry standard or standards. The pre-disaster condition of damaged or undamaged components is not a factor in determining the eligible scope of work.

#### Permanent Work Status Update

Under the FEMA 428 program, FEMA, COR3, and PREPA collaborate towards agreement on fixed cost estimates for all permanent work projects through the FAASt initiative. This agreement is expected to be reached between July and August 2020.<sup>94</sup>

As of May 2020, the only permanent work project in progress is the streetlight replacement project. This is an ongoing project that started during the emergency period and will continue

<sup>92</sup> Source: PREPA’s “FEMA Flash Report” as of May 1, 2020. PW Package provided by PREPA to COR3/FEMA with amounts based on project worksheet documentation generated by PREPA. PW has not necessarily been prepared by FEMA and entered into the FEMA system. Timing represented in the table above is approximate.

<sup>93</sup> Source: FEMA Public Assistance Applicant Handbook as of March 2010.

<sup>94</sup> FEMA has previously indicated and agreed that, in collaboration with PREPA and COR3, the agency will continue the process to finalize the fixed cost estimates beyond the initial submission time frame of March 2020.

into the permanent repair period. The total cost of the project will be included in the fixed cost estimate and settlement with FEMA.

#### **11.4 Federal Funding Impact**

The successful transformation of Puerto Rico's energy system will require significant capital investment over the next ten years. Federal funding plays a critical role in mitigating the burden of these costs on ratepayers. With adequate federal funding, the overall impact on energy rates would be minimal.

The appropriated federal funds are necessary for the full deployment of Puerto Rico's grid modernization plans. Should federal funding not materialize, Puerto Rico would have to make a difficult choice between increasing energy rates to meet unfunded capital investment needs, or remain unable to implement the necessary repairs and grid system modernization called for in the Proposed IRP, T&D roadmap, and PREPA and Commonwealth Fiscal Plans.

As part of the transformation, PREPA has implemented several measures that have led to improvements in liquidity management. As a result, PREPA has improved liquidity management controls and reporting cadences, providing increased visibility. These measures, which must continue to be pursued, will help reduce PREPA's future reliance external funding sources – but in PREPA's current state, access to federal funding for long overdue grid modernization will be imperative to achieving transformation objectives.

Beyond the dollar impact on customers, a lack of federal funding would have serious consequences on the reliability and resiliency of the system and the achievement of PREPA's long-term energy vision. Lack of federal funding availability for the rebuild of the T&D system represents a significant risk for overall service reliability and affordability. Federal funding support is also critical for delivering on system improvements necessary for resiliency and environmental compliance, including deployment of microgrids, distributed generation, and renewable resources.



## Chapter 12. Post-certification Reporting

PREPA submits performance and implementation-related reports to the FOMB on a regular basis. The following tables describe the required information and submission cadence for each report, which reflect improvements to PREPA’s reporting process initiated in FY2020. These reporting requirements will continue until PREPA is no longer a covered territorial instrumentality. The FOMB will work closely with selected private operators to determine the reporting requirement applicable to services and operations transferred to private operators.

Reports are submitted on a weekly, monthly, or quarterly basis. The cadence and process for reporting is described in the table below.

TABLE 17: REPORTING CADENCE

Report Type	Submission Timeline
Weekly	Submitted on Wednesdays for the preceding week
Monthly	Expected 15 days after the end of the month
Quarterly	Expected 15 days after the end of the quarter in the form of a consolidated report

### Non-operational Measures

Reporting for non-operational measures is divided into two categories: Resilience and Resource Planning, and Financial and Operational. Resilience and Resource Planning reports occur on a quarterly basis, providing an update for implementation of IRP, grid modernization, and federal funding efforts. Financial and Operational reports vary based on the nature of the reporting metric, ranging from weekly to quarterly.

TABLE 18: REPORTS ON NON-OPERATIONAL MEASURES

	Report	Detail	Cadence
<b>Resiliency &amp; Resource Planning</b>	<b>Implementation of IRP Plan<sup>95</sup></b>	Overview of generation to be added, with detailed information for each generation facility including type of generation, capacity, geography, cost to develop, and rationale for new investment over upgrading the grid, including near-term generation procurement and status of project delivery against milestones and cost/savings projections. Similar project-level details to also be included for new grid-related projects executed in line with IRP.	Quarterly
	<b>Implementation of Grid Modernization</b>	Grid modernization plan must provide an overview of the major investment categories and projects PREPA is considering to deliver reliable, resilient power and status of project delivery against milestones	Quarterly
	<b>Federal Funding Report</b>	Include quarterly updates on FEMA and CDBG funding programs, including amounts requested and for what projects, and status of disbursements and reimbursements and comparison against projections.	Quarterly

<sup>95</sup> FOMB may provide a template on quarterly capex reporting (relevant to Implementation of IRP plan, Implementation of grid modernization plan, and other initiative status reports).

	<b>Report</b>	<b>Detail</b>	<b>Cadence</b>
<b>Financial &amp; Operational</b>	<b>Budget to Actuals</b> (Reporting requirement is separate from any requirement under Section 203 in PROMESA)	Tracking of certified Budget to Actual based on template to be provided by FOMB: <ul style="list-style-type: none"> <li>■ Include explanation for material variances (greater than 10% and/or \$30 million)</li> <li>■ Include income statement in the reporting package</li> <li>■ Provide quarterly budget reporting</li> </ul>	Quarterly
	<b>Income Statement</b>	Include three types of income statement: 1) Consolidated, 2) Generation, 3) Non-generation	Quarterly
	<b>Balance Sheet</b>	Include only consolidated balance sheet	Quarterly
	<b>Cash Flow Statement</b>	Consolidated cash flow report including all receipts and disbursements, accounts receivable, accounts payable	<ul style="list-style-type: none"> <li>■ Weekly</li> <li>■ Quarterly</li> </ul>
	<b>Debt Service Statement</b>	Include a statement that shows the timeline of remaining debt to be paid, components of debt, and debt repayment; this statement should be a “double click” into the balance sheet regarding debt components	Quarterly
	<b>Operational Metrics Reporting</b>	Reporting on operational performance metrics, including: <ul style="list-style-type: none"> <li>■ Average actual incurred rates by customer type broken down into cost driver components, e.g. F&amp;PP, Base Rate, CILT</li> <li>■ Monthly SAIDI, SAIFI, and CAIDI by customer type</li> <li>■ Summary of all critical services (e.g. major industrial, commercial customer locations) without power for more than 48 hours</li> <li>■ OSHA events</li> </ul>	Monthly

## Operational Measures

Reporting for operational measures must be on a monthly cadence for all projects except for the San Juan Conversion and Repair, which will occur on a quarterly basis. The reporting for the AR/AP cash flow under the Working Capital Management measure will vary by report. The precise reporting requirements and metrics vary by the nature of the measure.

TABLE 19: REPORTS ON OPERATIONAL MEASURES

	<b>Report</b>	<b>Detail</b>	<b>Cadence</b>
<b>Purchase Power Agreements</b>	<b>EcoEléctrica</b>	Reporting requirement to include operating costs YTD with comparisons with year-over-year results	Monthly
	<b>AES</b>	Reporting requirement to include operating costs YTD with comparisons with year-over-year results. Project workplan to be provided when available for conversion from coal-based production.	Monthly
	<b>Renewable agreements</b>	Reporting on status of contract renegotiations, including detailed list of all projects under consideration, generation capacity, vendor, technology and geographical location details, and status of negotiations with timelines as available from PREPA and P3. New agreements to be included as they are added.	Monthly

	<b>Report</b>	<b>Detail</b>	<b>Cadence</b>
<b>Generation capacity upgrades and maintenance</b>	<b>San Juan Conversion</b>	Report to include any relevant and remaining conversation updates, by project workstream and/or plant, as well as projected savings	Quarterly
	<b>San Juan Repair</b>	Reporting requirement to include project worksheet and Gantt charts with timeline to completion by project workstream.	Monthly
	<b>Costa Sur Remediation</b>	Reporting requirement to include project worksheet and Gantt charts with timeline to completion by project workstream.	Monthly
	<b>Plant maintenance program</b>	Reporting requirement to include project worksheet and Gantt charts with timeline to completion by project workstream.	Monthly
<b>Fuel Supply and Infrastructure</b>	<b>Diesel supply contract</b>	Report to include diesel purchases YTD, with year-over-year comparison of results. Reporting required on renegotiation or renewal extension process.	Monthly
	<b>Bunker fuel supply contract</b>	Report to include bunker fuel purchases YTD, with year-over-year comparison of results. Reporting required on renegotiation or renewal extension process.	Monthly
	<b>Fuel supply infrastructure projects</b>	Various projects under consideration to improve the flexibility of the PREPA fuel supply infrastructure, final action plan and projects pursued will depend on IRP ruling from PREB	Monthly
<b>Customer Service Measures</b>	<b>Damaged Meter Replacement</b>	Reporting requirements to include number of meters procured, received, and installed by type of installation (e.g., damaged meters, net metering, new customers pending service etc.).	Monthly
	<b>CILT</b>	Report to include collections from Municipalities and tracking of past due amounts with identified aging for amounts by municipality	Monthly
	<b>E-billing and online payment utilization</b>	Reporting requirement to include number of customers enrolled and online payment opportunities used in transactions	Monthly
	<b>Theft reduction</b>	Reporting on PREPA's current efforts identifying irregular service usage.	Monthly
	<b>Outsourced call center utilization</b>	Reporting on usage and operational metrics available for PREPA's two outsourced centers	Monthly
<b>Grid Management and Modernization</b>	<b>Technical loss study</b>	Reporting requirements to include progress updates and findings from conducted technical study on PREPA's transmission & distribution system	Monthly
	<b>Vegetation management</b>	Reporting requirements to include project worksheet with updated figures on miles cleared, and progress results by transmission line receiving maintenance.	Monthly
	<b>Streetlighting repair</b>	Reporting requirements to include project worksheet with updated figures and progress results	Monthly
	<b>Transmission constraints projects</b>	Status reporting on key projects from FY20 Transmission Constraint Study recommendations. Reporting requirements to include project worksheet.	Monthly

	<b>Report</b>	<b>Detail</b>	<b>Cadence</b>
<b>Personnel Related w</b>	<b>Overtime reduction</b>	Reporting requirements to include hours of overtime registered by directorate	Monthly
	<b>HR procedures modernization</b>	Reporting requirements to include plan for performance improvement and updated project worksheet	Monthly
	<b>Employee injury rate reporting</b>	Reporting on number of injury cases registered, in line with OSHA standards, and progress updates on projects undertaken to reduce rates of workplace injuries.	Monthly
	<b>Pension plan reform</b>	Detailed report of Pension Contribution Expense and payment information, with actual transformation status based on project plan.	Monthly
	<b>Medical benefit reform</b>	Report to include billed amounts received from insurance providers, year-over-year comparison of financial cost of healthcare plan.	Monthly
<b>Workplace Capital Management</b>	<b>AR/AP cash flow reporting</b>	Continued reporting on PREPA cash flow, payables and receivables by client or vendor class.	Varies by report
	<b>Real estate optimization</b>	Reporting requirements to include assets identified for sale by estimated sale price, asset specification and geographical location, as well as outcomes of asset sales.	Monthly
	<b>Collections improvement and bad debt reduction</b>	Reporting requirements to include plan and progress on the project, including any tangible metrics (e.g., percent change and absolute value of bad debt and collections)	Monthly
<b>P3 Projects and T&amp;D Front End Transition</b>	<b>Legacy generation P3</b>	Reporting requirements to include RFP process updates for generation operator(s), and overview of relevant generation assets	Monthly
	<b>Procurement modernization</b>	Reporting requirements to include project workplan for the establishing of PREPA's PCM office and any other relevant procurement modernization efforts	Monthly
	<b>Enterprise project and portfolio management</b>	Reporting requirements to include progress updates and changes	Monthly
	<b>Vehicle fleet management</b>	Reporting on transition of vehicle fleet assets to operator management	Monthly
	<b>Front-end transition reporting</b>	Reporting on various projects required under the O&M Agreement to prepare for the transition of the T&D system to the new operator	Monthly

## Chapter 13. Conclusion

**PREPA has faced unforeseen challenges in the recent natural disasters and the COVID-19 pandemic.** In the aftermath of the 2017 hurricanes and 2020 earthquakes, PREPA's T&D and generation infrastructure suffered substantial damage, underscoring the need for a comprehensive transformation. As the system recovers, now is the moment to transform into a modern and resilient energy system.

**The 2020 Fiscal Plan lays out a path for PREPA to accelerate the transformation of Puerto Rico's energy system.** During this transformation, PREPA must collaborate with federal and local stakeholders to ensure fiscal and operational sustainability. The Fiscal Plan aims to strike a balance across the interests of all stakeholders involved, including maintaining affordable costs for PREPA's customers while continuing to improve service quality and reliability.

**For too long, Puerto Ricans have suffered from unreliable and costly electricity service.** The status quo cannot continue: rates need to cover operating and maintenance costs, restructured debt should achieve savings for ratepayers, and pension obligations must be fully funded – the transformation is imperative to restoring fiscal balance. The grid needs to be rebuilt, largely with federal funds, requiring a credible counterpart to ensure the appropriate and efficient use of these funds. The generation mix needs to be upgraded to reduce exposure to oil prices, and increase share of renewable generation, lowering costs and risks significantly.

**As progress has been slow, PREPA must collaborate with LUMA – the selected T&D operator – to accelerate the implementation of transformation measures in order to achieve fiscal sustainability and operational improvements.** The front-end transition process in FY2021 will require PREPA to work hand in hand with the private T&D operator on all aspects of Puerto Rico's T&D system – including day-to-day operations and maintenance of the T&D system, long-term planning, generation dispatch, asset management, financial management, emergency response, and customer service. Through the course of this transition, residents of Puerto Rico will benefit from the experience and expertise of a private operator to administer a more reliable and resilient T&D system.

**The 2020 Fiscal Plan also lays out a path to transition PREPA's legacy generation assets to private operator(s).** This transition will improve the efficiency and reliability of Puerto Rico's generation stack, ultimately reducing outages and strengthening the resilience of the energy system.

**In the longer term, implementation of IRP and T&D roadmap will be essential to building a modern, safe, reliable, and resilient electricity sector for Puerto Rico.** The 2020 Fiscal Plan sets PREPA on a course to fully transform the energy system with best-in-class operational technology and expertise. The Oversight Board stands ready to work in partnership with the PREPA to achieve this vision.

# APPENDIX

# Chapter 14. Resource Planning and Resiliency

## 14.1 Overview of the Integrated Resource Plan (IRP)

Under the PREPA enabling act, Act 57-2014 and Act 17-2019, PREPA is required to adopt an Integrated Resource Plan (IRP) for a 20-year planning period, which shall be revised every three years. PREPA filed its first IRP in 2015, which was approved by PREB in September 2016. In light of the massive impact of Hurricanes Irma and Maria in 2017, Puerto Rico not only faced an unprecedented challenge of rebuilding the electric power system, but also needed to rethink how to harden and modernize the grid to better equip Puerto Rico against future natural catastrophes, while diversifying fuel sources and increasing the reliance on renewable energy resources.

On February 13, 2019, after discussions with stakeholders, PREPA filed its initial proposed IRP (Initial IRP) for PREB's approval. After reviewing the Initial IRP, PREB issued a motion finding the Initial IRP as "non-compliant" and requested PREPA to refile the IRP after addressing a series of items listed and detailed in a resolution issued by PREB on March 14, 2019. On June 7, 2019, PREPA filed the currently proposed IRP, which is presently before PREB for approval (Proposed IRP).

The Proposed IRP offers a comprehensive and robust analysis of the challenges and opportunities PREPA faces in planning and executing on a fundamental transformation of Puerto Rico's electric power system. The preferred resource plan emerging from this analysis – the Action Plan – will guide Puerto Rico as it moves toward a future of increased reliance on renewable sources of energy and improved energy efficiency. The Action Plan also provides leeway to manage variable future costs of generation and storage resources. If approved and implemented, the Action Plan will enable PREPA to pursue a rapid uptake of renewable and energy storage systems while preserving options that will permit it to procure natural gas-fired generating resources as necessary given the pace of other resource development efforts, so that the energy system is able to meet electrical demand at all times in an efficient, environmentally responsible way.

### IRP Approach and Recommended Course of Action

The PREPA Proposed IRP analyzes a wide array of scenarios, each of which lays out a combination of system requirements needed to serve load, commodity prices, capital costs, total system costs, and risks that influence the choice of resources to serve future electric load, setting forth a recommended course of action.

One of the key variables in the IRP analysis is load served. The load currently served by PREPA is projected to decline significantly over the course of the Proposed IRP's planning horizon due to a combination of expected base load reduction, driven by declining population and economic growth forecasts, large energy efficiency gains, and the deployment of demand-side resources. Instead of focusing on the new resources required to meet load growth, the Proposed IRP is designed to address the following issues:

- Address the impacts of an aging generation fleet that burns costly liquid fuels (mostly heavy fuel oil), that does not meet environmental regulations (e.g., Mercury and Air Toxics Standards, or MATS), has poor reliability, and is inflexible, which limits the incorporation of renewable resources.
- Achieve a reduction of cost of supply by incorporating renewable resources, which will provide a permanent reduction in expensive and volatile fuel costs.
- Achieve compliance with the Renewable Portfolio Standard (RPS) mandate and exceed the mandate because the renewable cost benefits alone justify greater levels of penetration.

- Shift from centralized generation located in the south of the island to more decentralized generation resources distributed across the island.

To address the needs above, the Proposed IRP recommends the adoption of three modifications to the current grid:

- 1. Increasing share of renewable generation**– including the additions of new solar PV generation, energy storage, natural-gas-fueled generation and supply infrastructure, and retiring or converting all existing coal and heavy fuel oil generation;
- 2. Enhancing grid resilience** – including capital investment to the transmission and distribution system to support the greater resilience including minigrid and microgrid operations;
- 3. Enabling customer choice** – including changes to the system to support the incorporation of rooftop PV and the recommended energy efficiency and demand response programs, allowing the customer to play a meaningful role in Puerto Rico’s electricity grid.

## 14.2 Overview of Microgrid and Minigrid Development

One component of the Proposed IRP and a key unlock for T&D system resilience is the development of minigrids and microgrids. In an effort to increase the resiliency of the future grid, the system will be organized into independent electrical “islands” that the system can be divided into following a catastrophic event. The Proposed IRP envisions the configuration of the T&D system into eight minigrid “islands” to support resiliency and facilitate the integration of renewable and distributed energy resources. Each minigrid will be interconnected with the rest of the electric power system; however, it will also be possible to operate each “island” independently for an extended period in the event of grid failure (Exhibit 41).

EXHIBIT 41: GEOGRAPHIC LOCATION OF MINIGRIDS



Independent microgrids are located within each minigrid on a much smaller scale. Within each minigrid, the small-scale microgrid design seeks to meet the following objectives: 1) prevent systemwide blackouts if key transmission lines fail, which occurred following Hurricane Maria; 2) improve the ability to respond to and recover from catastrophic events; 3) build in system redundancy in the event of grid failure; 4) strategically support critical load infrastructure, such as hospitals, police stations, fire departments, water/sewage systems, and communications; and 5) build an additional layer of resiliency and hardening for key operation centers.

## 14.3 Status of Grid Modernization Efforts

Based on the Proposed IRP’s recommended course of action, PREPA’s vision for the T&D system is to allow for the combination of distributed energy and transmission/distribution



infrastructure that achieves acceptable levels of reliability, resiliency, and quick restoration upon catastrophic events. The T&D roadmap completed during FY2020 consolidates a plan for PREPA to improve the grid's reliability and resiliency following catastrophic events, such as the recent Hurricanes Irma and Maria in 2017. In the aftermath of the hurricanes, PREPA was compelled to reconsider its capital expenditure and planning strategy and recommit to a preventative maintenance program that includes vegetation management and adequate maintenance of equipment to support daily activities and respond to outage events.

The T&D roadmap was created to define an implementation plan for reconstruction projects recommended in previously published technical reports (e.g., COR3's Grid Modernization Plan (EGM), the 2019 Proposed IRP, and 10-Year Capital Investment Plan and Transmission Constraints Analysis). As such, the goal of the T&D roadmap is to optimize and streamline the implementation process for the design, development, and construction of the projects. It uses industry best practices to ensure that the most important projects are constructed in the most timely and efficient way so that PREPA can make optimal use of scarce resources, including anticipated FEMA funds, and ensure accountability for the use of allocated public funds. In addition to federal funding, PREPA is currently engaged with its insurers to adjust the Hurricane Maria claim and the 2020 earthquake claim. To date, PREPA has received \$100 million in advance funding, not including the \$25 million deductible with respect to the Hurricane Maria claim, and has requested \$25 million in advances related to the earthquake claim.

The T&D roadmap provides guidance on typical project processes, as well as a high-level project schedule, and approach of right-of-way (ROW) land acquisition, transmission line siting goals and requirements, and an environmental permitting plan and strategy. The appendices to the T&D roadmap include a preliminary list of all potential projects from various sources (Proposed IRP, COR3's EGM Plan, etc.) covering all aspects of electric grid infrastructure including: vegetation management, transmission centers, substations, transmission lines, sub-transmission lines, distribution lines, protection and controls, and communication systems. These projects are designed to support:

- Upgrades to the latest codes, industry standards, and practices;
- Replacement of obsolete, aging, or underrated equipment;
- Improved primary communication interface and backup communications with system operations;
- Increased use and installation of GIS to improve resistance to severe weather events;
- Increased installation of underground transmission and distribution lines, focusing on critical loads;
- Replacement of mechanical and electronic relays with new IED relays for enhanced communication with operation centers;
- Development of an effective construction equipment program, including necessary equipment to support maintenance and capital projects.

In order to operationalize the execution of projects, PREPA and its technical consultants worked on the prioritization of projects in the NME budget for FY2021. After PREPA's technical consultants conducted the necessary interviews and reviewed the projects proposed in the PREPA IRP, COR3's EGM Plan, and its own prior assessments and reports, they recommended a project list to be included in the NME T&D budget for fiscal years 2021, 2022, and 2023. The list assumes that funding from sources such as FEMA become available, and that resources, both internal and external, are greatly increased, which will be possible with the entrance of the T&D operator, as discussed in Chapter 3 "Transformation."

Today, PREPA has fallen far behind both peer utilities as well as internal plans for transformation after decades of financial and operational mismanagement. Failure to

modernize its generation and transmission and distribution system have left Puerto Rico's energy system vulnerable to costly damage and service disruptions from external shocks, including the recent earthquakes, COVID-19 and similar economic shocks, and climate change. To date, no meaningful investment in the execution of PREPA's grid modernization plans has occurred to date, including hazard mitigation measures (e.g., pole strengthening and insulator replacement for wind damage) as well as grid control and automation upgrades to modernize the aged system. Without a complete transformation and grid modernization, the island remains vulnerable to the next major hurricane or economic shock. Although the transition to private operator(s) will improve the efficiency of investments toward grid resilience, progress toward implementing these steps in the next fiscal year is crucial, even before the third-party operator commences service.