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The Puerto Rico Electric Power Authority (PREPA) is a public corporation that was founded in 1941.

- PREPA gets nearly half its electricity revenues from commercial sector and slightly more than one-third from residential consumption.
- Per capita, Puerto Rico’s electricity consumption is about two-fifths of the average in the 50 states.

PREPA owns and operates electric generating and distribution facilities serving all of Puerto Rico.

- Fleet of 31 major generating units aggregating to 5,839 MW in 20 facilities
- Fuel and purchased power represent more than 72% of PREPA’s costs

### Electricity Consumption Breakdown

<table>
<thead>
<tr>
<th>Sector</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>48%</td>
</tr>
<tr>
<td>Residential</td>
<td>37%</td>
</tr>
<tr>
<td>Industrial</td>
<td>13%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
</tr>
</tbody>
</table>
PREPA - The System

**Generation**
- Aguirre
- Costa Sur
- Palo Seco
- Cambalache
- San Juan
- AES
- Eco Eléctrica
- Renewable PPAs
- Private Generators

**Transmission**
- 2,416 miles of transmission lines
- 230 kV
- 115 kV
- 38 kV sub transmission lines
- 175 transmission centers.

**Distribution**
- 28,952 aerial miles
- 1,723 underground miles
- 334 substations
**Aguirre Combined Cycle Plant**
- **Capacity:** (MW) 900
- **Location:** Salinas
- **Construction Year:** 1975
- **Fuel Type:** Fuel Oil #6

**Costa Sur**
- **Capacity:** (MW) 990
- **Location:** Guayanilla
- **Construction Year:** 1962-1973
- **Fuel Type:** Fuel Oil #6

**Cambalache**
- **Capacity:** (MW) 248
- **Location:** Arecibo
- **Construction Year:** 2007
- **Fuel Type:** Fuel Oil #6

**Eco Eléctrica**
- **Capacity:** (MW) 540
- **Location:** Peñuelas
- **Construction Year:** 2000
- **Fuel Type:** Fuel LNG

**San Juan Combined Cycle**
- **Capacity:** (MW) 440
- **Location:** San Juan
- **Construction Year:** 2008-2009
- **Fuel Type:** Fuel Oil #2

**Palo Seco**
- **Capacity:** (MW) 602
- **Location:** Cataño
- **Construction Year:** 1960-1970
- **Fuel Type:** Fuel Oil #6

**Aguirre Thermo Electric**
- **Capacity:** (MW) 900
- **Location:** Salinas
- **Construction Year:** 1975
- **Fuel Type:** Fuel Oil #6

**AES**
- **Capacity:** (MW) 454
- **Location:** Salinas
- **Construction Year:** 1994
- **Fuel Type:** Fuel Coal
Energy Sources

Oil supplies four-fifths of the energy consumed in the Island.

The cost of imported oil drives the prices of electricity to end-user in Puerto Rico.
Energy Sources: How Puerto Rico Compares?

- **Petroleum**
- **Natural Gas**
- **Renewables**
- **Nuclear**
- **Coal**

Comparing Puerto Rico (blue), the United States (teal), and Germany (yellow).
PREPA Business Operations

PREPA's Operating Expenses for FY 2013

- Fuel: 57%
- Purchased Power: 17%
- Depreciation: 8%
- Maintenance: 5%
- Administrative and General: 4%
- Transmission and Distribution: 4%
- Customer Accounting and Collection: 3%
- Other Production: 2%

The IRP is a plan developed by PREPA that includes a specific time period, focused on guaranteeing the development of the electric power system in Puerto Rico, as well as improving the reliability, efficiency and transparency of the system.

In this case, the planning period of the IRP comprises twenty (20) years.
Puerto Rico's per capita natural gas consumption is about one-fifth of the average in the 50 states.

In 2015, about 2% of PREPA's electricity came from renewable energy sources.

In 2010, Puerto Rico's legislature enacted a renewable portfolio standard (RPS) that required PREPA to scale up its production.
Our Fiscal Plan

2017: RENEWABLE PROJECTS

2018: AGUIRRE OFFSHORE GAS PORT

2018: ALTERNATIVE FUEL SOURCE FACILITY IN PALO SECO

2018: NATURAL GAS PLANT IN COSTA SUR

2019: FLEXIBLE AC TRANSMISSION PROJECTS: STATCOMS, ENERGY STORAGE PEAKING UNITS

2019: 2ND TIER RENEWABLE ENERGY
Goals

Established benchmarks:

- 12% By 2015
- 15% By 2020
- 20% By 2035

Diversify renewable energy sources:

- Solar Photovoltaic
- Wind Power
- Waste to Energy
Background

- Siemens RE Integration Study (2014): 580 MW of utility scale projects can be safely integrated to the current grid

- 2014 - PREPA renegotiated economic and technical terms of 18 PPOAs
  - 4 of the 18 projects in operation or close to achieving commercial operation
  - 2 retired and 12 remain at or close to “shovel ready” condition
  - Most of the 12 projects are actively pursuing financing

- PREPA is working on contract amendments to provide ease of financing under the current PREPA fiscal situation
Current Situation

Environmental Compliance
- MATS Rule
- Clean Power Plan (CO2)

Restructuring Progress
- Forbearance Agreement with creditors
- Business Plan

Tier 1 Shovel Ready PPAs
- 12 projects totaling ~ 240 MW

Providing Terms that will facilitate financing to:
- Open the gates for financing and immediate start of these projects
- Allow for immediate job creation and economic activity
- Provide Fuel diversification and Energy price stabilization
CONVERSION TO NATURAL GAS IN AGUIRRE
Aguirre Offshore Gas Port
Aguirre Power Plant

1. Largest Generation Complex (1500 MW)
2. Diesel - Petroleum Fuel Based Delivered via Barge through the Jobos Bay Natural Reserve
3. Aging and outdated infrastructure
4. Non-Compliance EPA
Project Goals

**Efficiency**
Improves generation efficiency.

**Cost Reduction**
Reduces production cost for PREPA and provides EPA/MATS compliance.

**Reliability**
Reassure power service to the island.

**Affordability**
Provides cleaner and more affordable Energy plus leverage for fuel strategy.
Looking for:
Financing Partner

PREPA – Owns and warrants usage
Excelerate – Builds, operates and maintains

Benefits
Permits – Advanced
Engineering – Advanced
Time Delay Risk – Minimum
Cost Overrun Risk - Minimum

Project Description

Aguirre Power Plant Complex
FLEXIBLE ALTERNATIVE FUEL POWER PLANT IN NORTHERN REGION
Palo Seco Power Plant Current Situation

1. Main Generation Plant in North
2. Capacity 602 MW
3. Heavy fuel oil energy source
4. Aging and out-dated infrastructure
5. Non-Compliance EPA
Project Goals

- **COMPLIANCE**
  - MATS Compliance

- **COST REDUCTION**
  - Reduces costs for PREPA

- **RELIABILITY**
  - Reassure power service to the Island.

- **AFFORDABILITY**
  - Provides more affordable Energy.
Fast Track Project for 2021 Commercial Op Dual Fuel

Unavailability of natural gas (methane) on the north of the island will require plant to initially run on diesel and/or propane. Project’s main goal is environmental compliance.

Highly Flexible Generation

Size: 70 – 100 MW
Fuel: No. 2 / LPG / NG
Location: At or near Palo Seco Power Complex
Flexible: Quick Start/Stop
Type: CTCC or ICE
Project Benefits

PRECEDENTS
Power purchasing agreement and fuel supply from Private Entity.

ENDORSEMENT

INCOME
Long term guaranteed consumption
NATURAL GAS PLANT IN COSTA SUR
Costa Sur Power Plant

1. Generation Complex (1090 MW)

2. 820 MW already using Nat. Gas
   Remaining 270 MW use Diesel - Petroleum Fuel Based

3. Aging and out-dated infrastructure

4. Only Units 5 and 6 (820 MW) comply with MATS
Project Goals

- Full Conversion
- Efficiency
- Cost Reduction
- Flexibility
- Reliability
- Affordability

- Staged full conversion to Natural Gas
- Improves generation efficiency
- Reduces costs for PREPA
- Provide flexibility to be able to control energy production
- Reassure power service to the Island.
- Provides more affordable Energy.
Recommendation

ENERGY COMMISSION RECOMMENDATIONS FOR GAS CONVERSION

5 YEAR

CC TO NATURAL GAS

New combined cycle plant and natural gas infrastructure in construction in Costa Sur.

5 YEARS PLUS

REPOWERING

Removal of units 1 and 2, 3 and 4 from Costa Sur.
Fast Track Project for 2022 Commercial Op Natural Gas

Project to Substitute Capacity from Costa Sur Complex. Units 1 thru 4 to be physically retired in 2022. Units 5 and 6 will be retired in 2026 as second tier of renewable energy comes on line. The new plant will be the sole generator in the complex after 2026.

Highly Flexible Generation

Size: ~ 400 MW
Fuel: NG / No. 2
Location: At or near Costa Sur Power Complex
Flexible: Quick Start/Stop
Type: CTCC
Project Benefits

PRECEDENTS
Power purchasing agreements with natural gas facility with a private entity.

ENDORSEMENT

INCOME
Long term guaranteed consumption
FACTS and Ancillary Services
For 2nd Tier RE RFP
To Increase Generation from Renewable Sources

FACTS = Flexible AC Transmission Systems which include:

- Energy Storage: 150 MW, 600 MWh in 10 sites - $62.7 MM
- STATCOM (static synchronous compensator) 2 x 100 MVAR ea. - $36 MM

To Better Manage DG
The Distributed Energy Internet

Distributed Energy Management System – DERMS
Demand Response Optimization and Management System – DROMS
Virtual Power Plant Control - VPP

FACTS and Ancillary Services

Unpredictability
Complexity

Today
Tomorrow
Substitution of PREPA’s Frame V GT’s to modern Aero GT or Internal Combustion units

PREPA will provide existing permitted sites.
Dual Fuel
Fuel will be delivered as LNG and diesel via tanker trucks
Capacity Payment plus energy payment through dispatch for fuel volume optimization

Highly Flexible Generation

Size: ~ 300 MW in 15 sites
Fuel: NG / No. 2
Location: Sites throughout the island
Flexible: Quick Start/Stop
Type: CT or ICE
Cost: $250 MM
Goals

Established benchmarks:

12% By 2015
15% By 2020
20% By 2035

Diversify renewable energy sources:

Solar Photovoltaic
Wind Power
Waste to Energy
Environmental Compliance
- MATS Rule
- Clean Power Plan (CO2)

Restructuring Progress
- Assumes PREPA has credit rating
- A new Business Plan has been established

Regulatory Compliance
- PREC rules, as per Act 57-2014

System Cost, Reliability and Safety
- Low-Risk Environment
- 2nd tier optimized with:
  - FACTS to enable RE penetration
  - DERMs, DSM and Virtual power plant for DG
Pre-developed PPA

**Identify the Projects**
Determine renewable energy portfolio that meets the 15% of energy sales.

**Find a Place**
Government to identify the lands and to permit/pre-develop prior to P3 offering.

**Compliance**
Ensure projects are consistent with PREPA’s IRP and Energy Commission.
Thank You

For more information, please contact the Public Private Partnerships Authority
Tel. #: 787-722-2525
Email: apppr@bgfpr.com