



Federal Ministry  
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# Renewable energy and decentralized power in Puerto Rico

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Facilitator

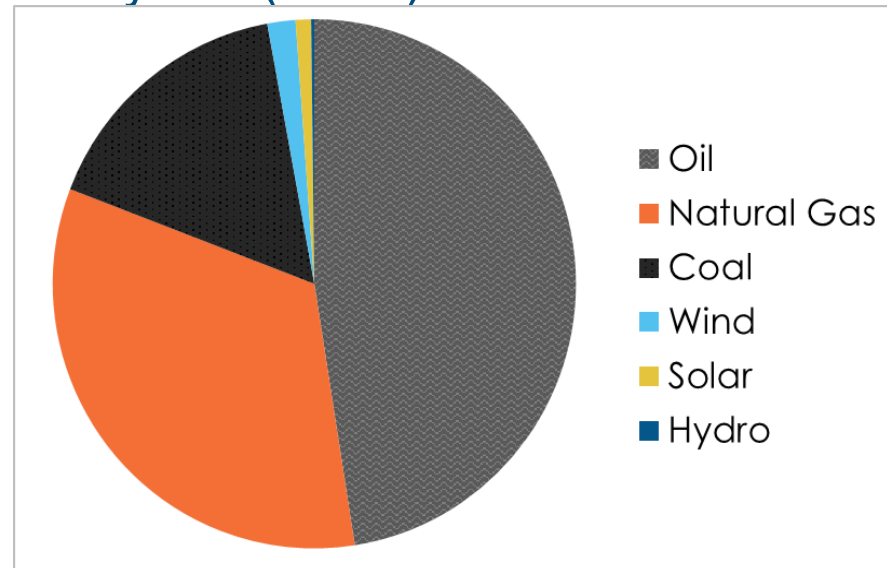
# Outline

- Background on Puerto Rico's energy system
- Status of renewable energy and distributed generation
- Hurricane Maria

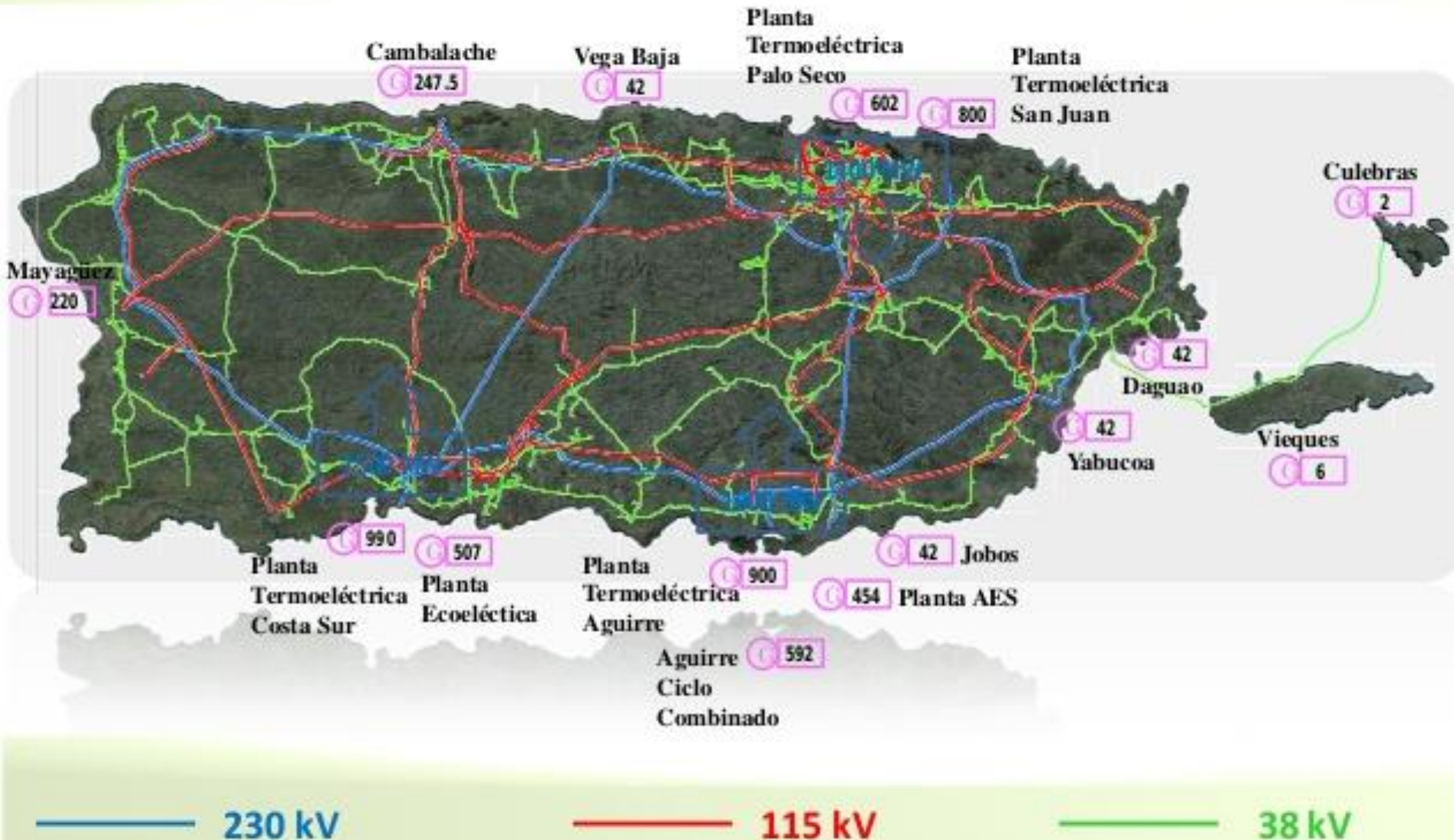
# Background: Puerto Rico's electricity system

The Puerto Rico Electric Power Authority (PREPA) is the only utility in Puerto Rico.

Puerto Rico's electricity mix (MWh):

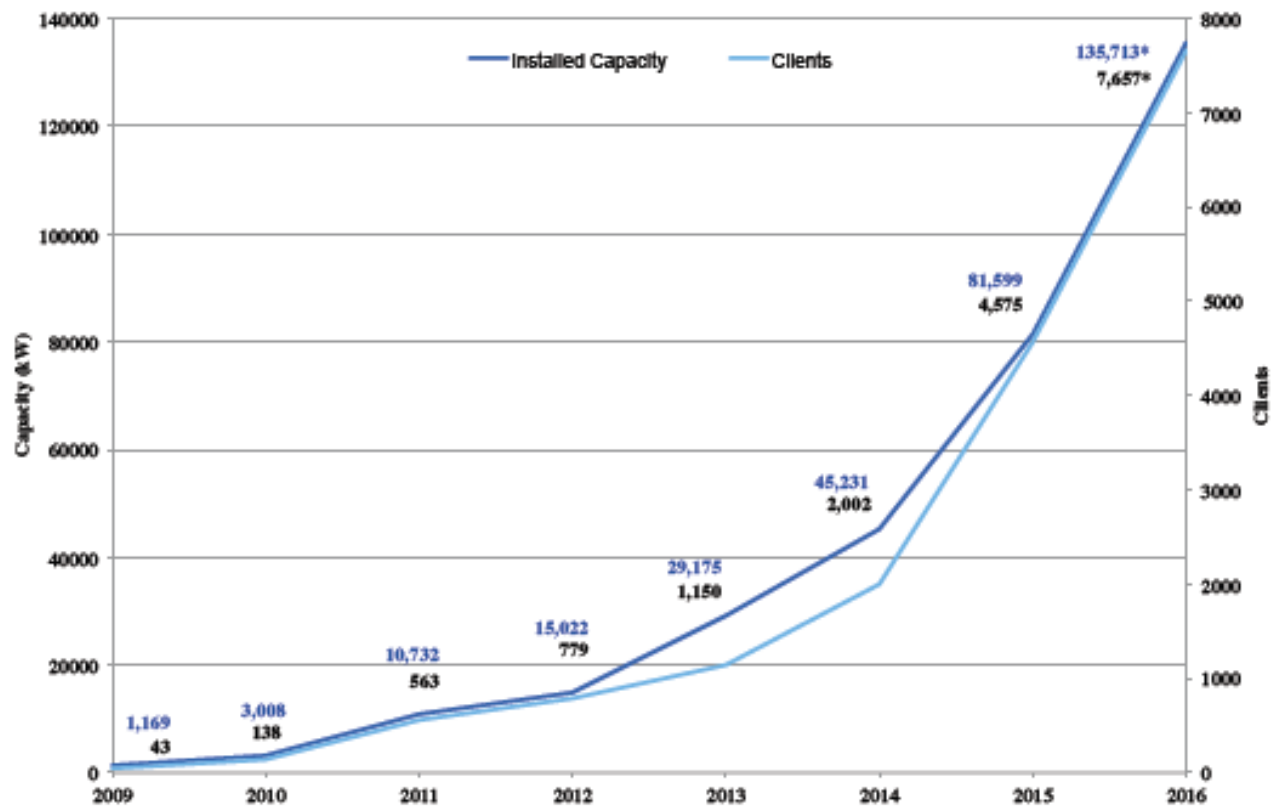


# Puerto Rico's electrical system



# Rapid growth in distributed generation:

- 2016: 136 MW (2% of total capacity)



# Solar is cost-competitive in Puerto Rico

- 2017 approved rate: 22.7 cents/kWh
- PREPA's fuel and purchased power cost: 11 cents/kWh
- Mainland US utility-scale solar PPAs: below 5 cents/kWh
- Kauai Island Utility Cooperative in Hawaii recently signed a contract for a combined PV (17 MW DC) and battery (13 MW AC) system with a fixed price of 14.5 cents/kWh

# Challenges facing PREPA (before Hurricane Maria):

- Old oil-fired power plants are not in compliance with U.S. air quality regulations
- Significant deferred maintenance on transmission and distribution system.
- High retail electric rates -- approximately double average electric rate on U.S. Mainland
- Declining demand. Sales fell 5% from 2012-2016.
- Nearly \$9 billion in debt, insolvent, unable to access capital markets
- Lack of transparency and public accountability

# Recent developments (before Hurricane Maria):

- Establishment of Puerto Rico Energy Commission in 2014
- Energy Commission charged with regulating rates, long-term plans of PREPA.
- PREPA negotiated a deal with bondholders that would have cut debt by less than 15%
- Bond deal rejected by PROMESA Fiscal Oversight Board
- PROMESA Board put PREPA in bankruptcy court in July 2017



# Renewable energy and distributed generation:

- In 2010, legislature established renewable energy targets (Law 82-2010):

12% by 2015

15% by 2020

20% by 2035

No specific targets for distributed generation

- In 2015, PREPA had 181 MW of utility-scale renewable energy – 3.3% of generation
- PREPA has 136 MW of distributed generation
- Net metering available for residential systems up to 25 kW, and non-residential systems up to 1 MW (if connecting to distribution system) or 5 MW (if connecting at sub-transmission/transmission voltage)

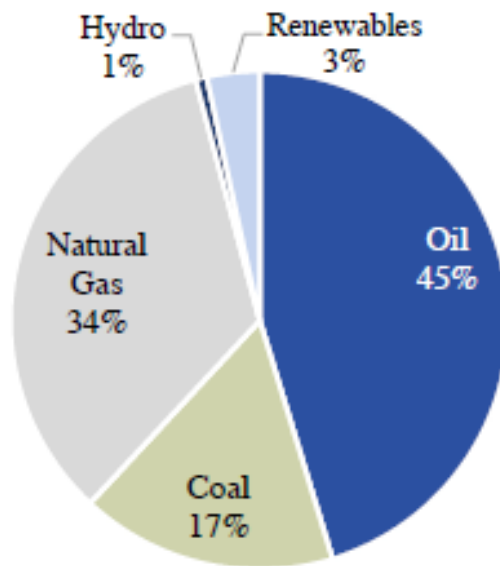
# Future of Puerto Rico's electricity system:

- PREPA's plan for 2035, presented to Energy Commission in 2015 is focused on centralized natural gas generation, including construction of a \$400 million LNG import terminal
- PREPA aiming to achieve only 15% utility-scale renewable energy by 2035

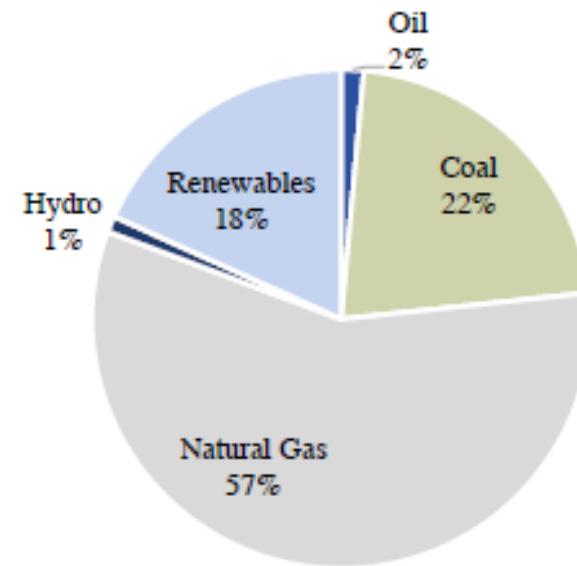
# PREPA's renewable energy plans:

- PREPA's April 2017 Fiscal Plan (for utility-owned generation):

## Pivoting the Generation Mix – FY2018 vs. FY2026



FY2018



FY2026 <sup>(1)</sup>

# Financing Puerto Rico's electricity future:

- Current level of debt at PREPA cannot be supported by Puerto Rican economy. PROMESA Board estimated in January that Puerto Rico could afford about 20% of total government debt service in FY 2019
- Bankruptcy process key to restructuring debt and PREPA's future access to capital markets
- PREPA aims to have 30% of its generation contracted through public-private partnerships by 2026. No detail has been provided on how this would occur

# Hurricane Maria



# Hurricane Maria

- 80% of transmission and distribution system seriously damaged
- Just over 10% of customers have power
- PREPA working with US Army Corps of Engineers to restore service
- PREPA projects that it will take 6 months to restore service
- Lack of power for critical loads – like hospitals. As of Friday, 25 of 68 hospitals have electricity

# Rebuilding the electrical grid

Will PREPA rebuild the same centralized grid, with generation concentrated in the south and long south-to-north transmission corridors?

Or, will PREPA use this opportunity to create microgrids and integrate more distributed generation and storage?

# Hurricane Maria and renewable energy

- Highlights the need for microgrids and distributed generation
- Coalition of business and environmental interests in Puerto Rico have been pushing for renewable energy and reform of PREPA for several years
- ICSE (Institute for Competitiveness and Sustainable Economics) is a coalition of large manufacturers, food distributors, renewable energy companies and more.



# Hurricane Maria and renewable energy

- New interest from Puerto Rican government:
  - "Although the short term goal is to restore energy to the greatest number of people, we must not sacrifice the opportunity we have to have a power system that is resilient, modern and a global leader“ – Governor Rossello
- Tesla is pushing Puerto Rican government to rebuild the grid with batteries and solar power
- Sonnen plans to build subsidized microgrids for emergency centers
- Many unanswered questions about PREPA's legacy debt and how rebuilding will be financed



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# Thank you!

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