

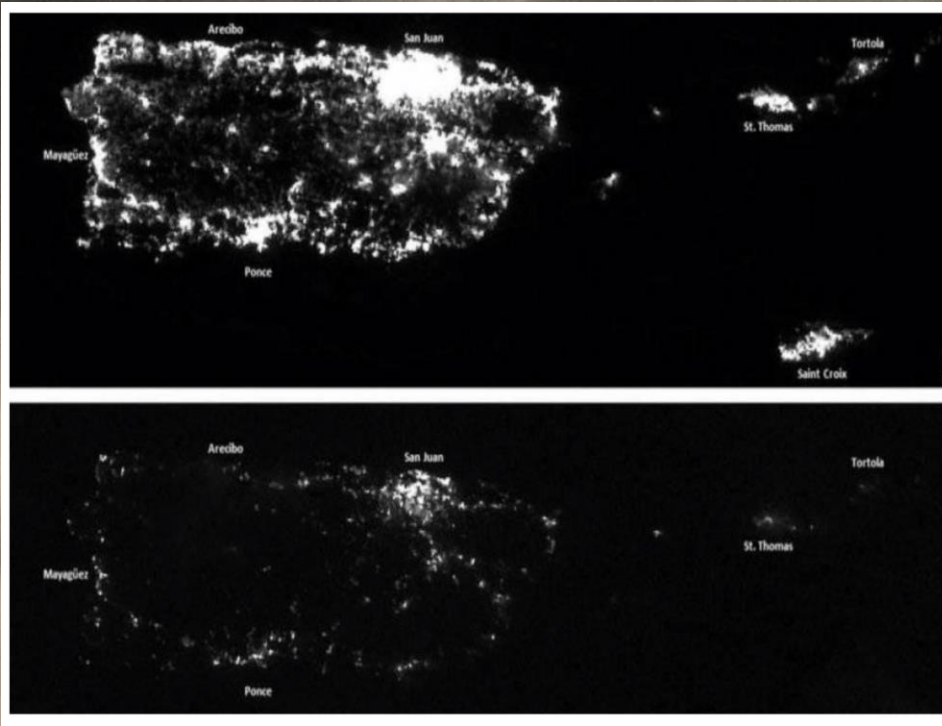


Disaster Effects of Hurricanes Irma and Maria on the Puerto Rican Energy Grid

By Cindy Miller

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Due to the onslaught of Hurricanes Irma and Maria, Puerto Rico suffered “the worst natural disaster in the history of the United States,” according to the Federal Emergency Management Agency.

80% of the transmission and distribution network collapsed.

Electrical Outages

Hurricane Maria in Puerto Rico



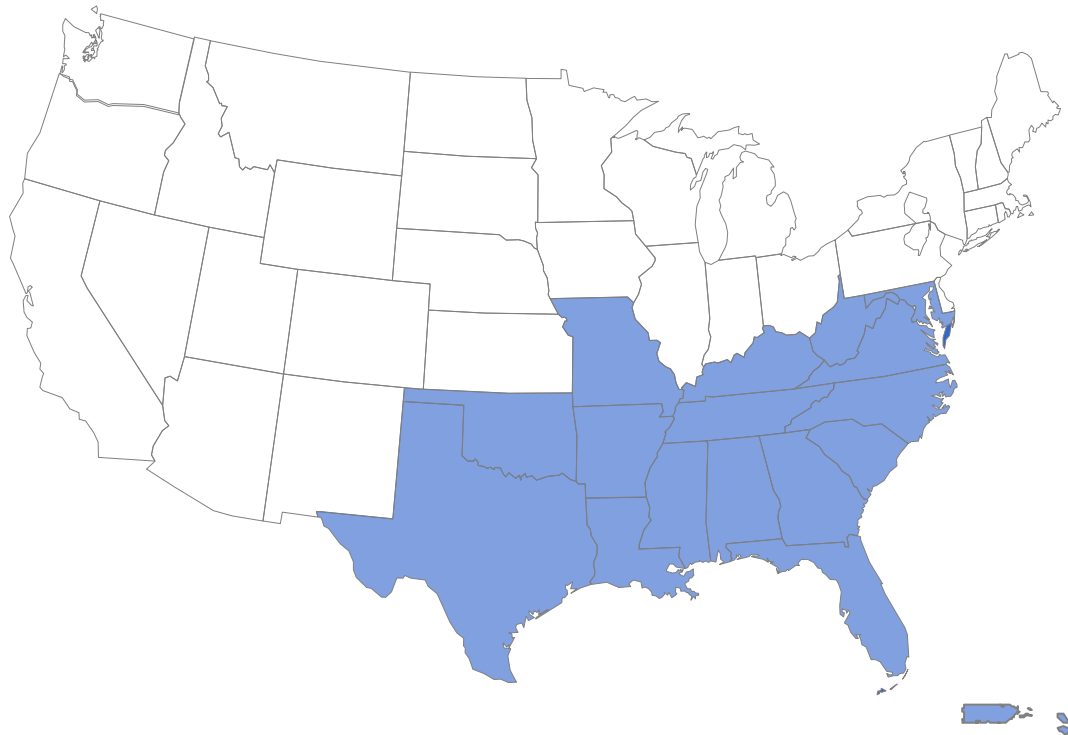
- Made landfall on September 20, 2017
- Category 4 storm – 133+ mph winds
- 15” to 20” of rain in 48 hours
- 2,975 fatalities
- 100% of residents without power
- 5 months later, 25% without power

Prior to Hurricanes Irma and Maria

- Puerto Rico was struggling with an ongoing recession, high underemployment and declining population due to migration.
- The Puerto Rican Energy Power Authority (PREPA) has \$9 billion in debt and filed for bankruptcy in July 2017.

The Blue Ribbon Task Force on Strategizing an Electric Energy Policy & Regulatory Framework in Puerto Rico

The Southern
States
Energy Board
(SSEB)
is composed of 16
southern states,
including Florida.



Puerto Rico Electric Power System Transformation Act



Passed June 20, 2018

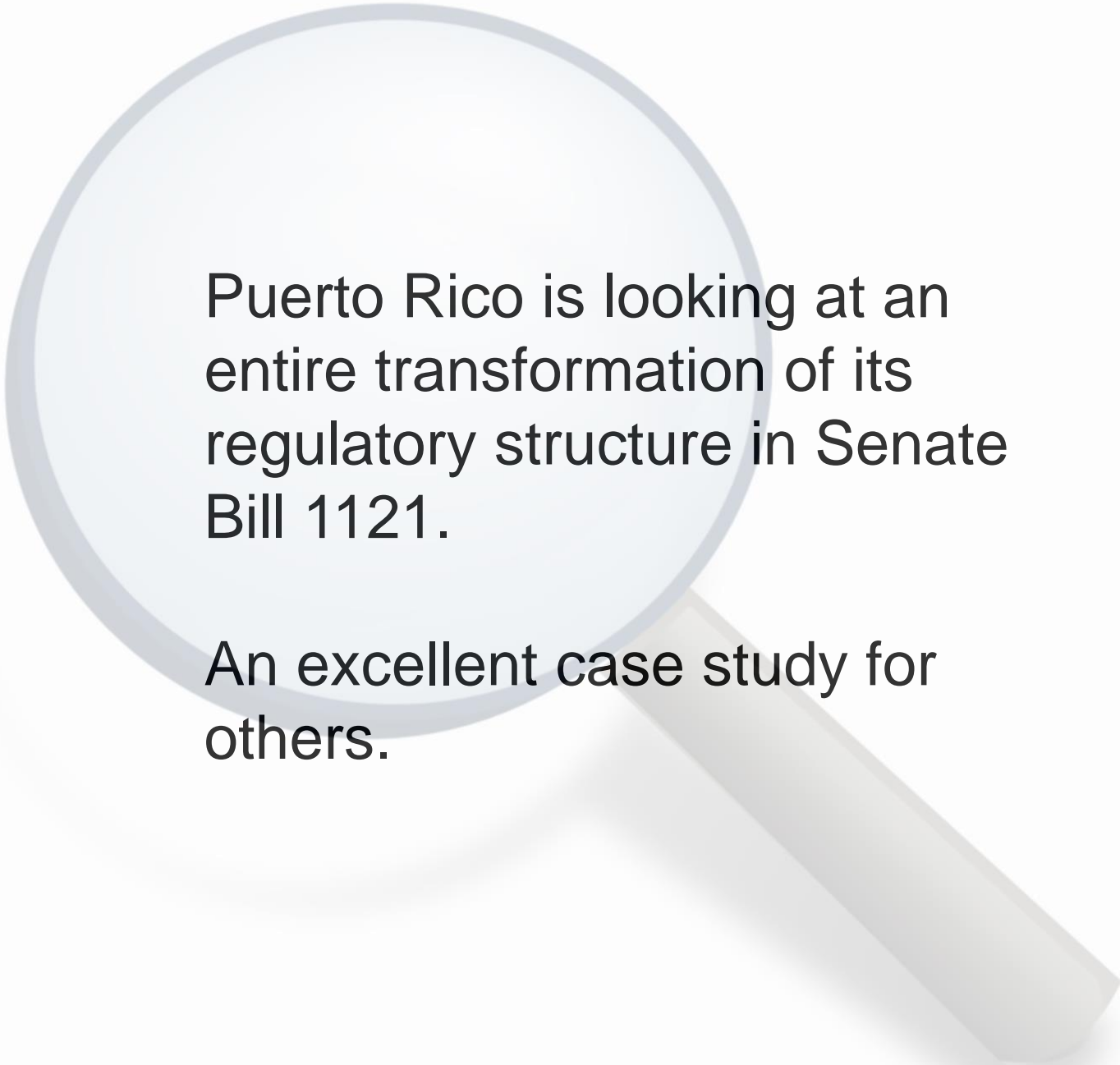
Establishes the process for the sale of power generation assets to private entities and for the concession of the transmission and distribution network through the modified Public--Private Partnership mechanism.

Puerto Rico Energy Policy Act (Senate Bill 1121)

Passed March 25, 2019

Seeks to eliminate coal-fired generation by 2028 and establishes a 100% renewable energy mandate by 2050.

SENATE BILL 1121



Puerto Rico is looking at an entire transformation of its regulatory structure in Senate Bill 1121.

An excellent case study for others.

SENATE BILL 1121

The electric system of the Puerto Rico Electric Power Authority (PREPA) “holds hostage” approximately 1.5 million customers.



PREPA is about 30 years older than our mainland average system.

SENATE BILL 1121

The legislation includes findings:

- 100% government-controlled electric service can suffer instability.
- An independent and transparent regulatory entity is needed.
- A renewable portfolio standard is set out.

SENATE BILL 1121

Guiding Principles:

- Efficiency
- Quality
- Continuity
- Adaptability
- Impartiality
- Solidarity
- Equality

Energy Public Policy

- Universal Access to Electric Power Service – must be affordable, just and nondiscriminatory
- Energy Service Model
- Energy Regulatory Entity and Performance Based Regulations
- Energy Culture, Education, Research and Development
- Energy Generation, Efficiency and Demand Response Programs
- Environmental Responsibility
- Energy Use in the Public Sector
- Distributed Energy, Energy Storage, and Technology Integration
- Infrastructure Design, Resilience, Maintenance and Security
- Customer Service, Participation and Transparency.

Unbundling and Transformation of the Electric Power System



- An open system in regards to PREPA and electric power service companies.
- Puerto Rico's Electrical System shall not be a vertical monopoly.
- Mandatory concession of the transmission, distribution and sale of electric power and system operations.

Public Policy on the Interconnection of Microgrids into the Transmission and Distribution System

- Gives mandate that process must be swift, uniform, and cost/time efficient.
- Grants capacity to connect/disconnect from the PREPA system so as to operate on or off the grid.

Public Policy on Electrical System Infrastructure

- Replace designated towers with poles to withstand sustained winds of 150mph.
- Evaluate urban centers and essential service facilities for underground distribution services.
- Integrate microgrids in essential service facilities, industrial sectors, and remote areas.
- Evaluate relocation of transmission lines for efficiency.

SENATE BILL 1121

Regulatory entity has elaborate criteria for appointment, for transparency, and for composition

Restoration funding comes from PREPA's two existing insurance funds:

- The main insurance policy covers all risk properties, but excludes overhead transmission and distribution lines.
- The self-insurance fund covers the transmission and distribution lines.



Fluor Corporation, Public Domain

PREPA's insurance will **NOT** be sufficient to fund restoration:

- Combined coverage is \$750mm, with a \$45mm deductible for windstorm losses.
- Business interruption coverage is \$200mm.
- Self-insurance has \$100.152mm left in the fund as of June 30, 2015.

Other restoration dollars are available for emergency funding through the U.S. government in terms of the Stafford Act

More permanent solutions may be subject to U.S. Congressional approval.

Community Disaster Loans (CDLs)
are necessary.

Sale of generation assets
is entailed.

Questions?



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