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Power & Utilities

Smart Grid

# Hurricanes across Texas, Florida and Puerto Rico Test Resilience of Grid

## Resource Diversification, Energy Storage, and Microgrids Touted as Preferred Solutions against Outages

October 3, 2017

## SEPTEMBER 26 HOUSE SUBCOMMITTEE HEARING

On September 26, a **House Energy and Commerce subcommittee hearing agreed that having more diversified sources of power can make the grid more reliable** during natural disasters such as the **Hurricanes Irma, Harvey, and Maria in Florida, Texas, and Puerto Rico**. The storms wrecked homes, farms, businesses, and infrastructure causing power outages, interrupting communications, and disrupting the water supply.

### 1 House subcommittee panel discussion

The panelists agreed on the following priorities for strengthening the nation's grid:

- Continue investing in new transmission lines and substations but add new technologies to the mix
- Deploy energy storage as a localized solution to improve resiliency and bring an array of other benefits
- Invest in microgrids that can both operate in island mode and support the main grid when needed
- Invest in distribution management systems that provide accurate information on outages

The hearings are a part of the Subcommittees' Powering America Series that began in July to explore electricity markets and grid resiliency. The latest September 26 hearing examined challenges and opportunities the electric power industry is facing with technology advances and changing consumer preferences, as well as the potential to optimize the grid.

### 2 Devastation in Puerto Rico

- July 2: PREPA, Puerto Rico's utility, saddled with debt and unable to maintain deficient infrastructure, files for bankruptcy
- September 7: Hurricane Irma leaves 1 million Puerto Ricans without power by dealing the initial damage to the grid
- September 20: Hurricane Maria lays waste to Puerto Rico leaving most of the island without power and vital supplies since then
- September 28: DHS allows foreign vessels to bring fuel and supplies to Puerto Rico to alleviate the disaster by waiving the Jones Act
- Puerto Rico will have to rebuild most of its grid meaning the outages would last for months


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### 3 Recovery in Texas and Florida

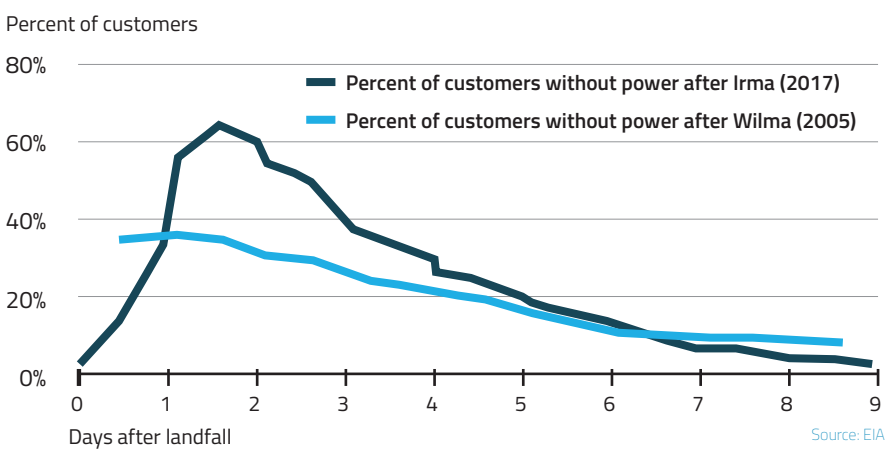
Hurricane Harvey, which made landfall in Texas on August 25, caused substantial electricity outages, as power plants and transmission infrastructure were affected by high winds and significant flooding. According to DOE, Harvey was the strongest hurricane to impact Texas since 1961 and the first Category 4 storm since Hurricane Charley that hit Florida in 2004.

**TX**

| Peak outages | Drop in refinery inputs | Fall in weekly refinery utilization |
|---|---|---|
| 10 GW | 34% | 63-96% |

**FL**

| Initially affected customers | Affected customers after 9 days | Daily rate of power restoration |
|---|---|---|
| 64% | 1% | 9% |



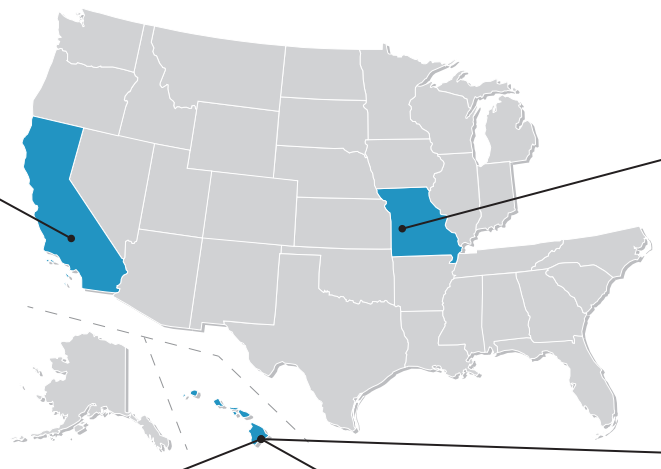

Source: EIA

Irma was the first major hurricane to hit Florida since Hurricane Wilma in 2005 that knocked out power for 36 percent of customers. According to EIA, post-Irma recovery has been faster than that in the aftermath of Wilma, which hit in 2005. Five days after Irma's landfall, outages dropped at a rate of about 9 percent per day while post-Wilma power outages declined by about 4 percent daily.

EIA noted that since 2005, Florida utilities have replaced wooden utility poles with concrete ones and deployed smart grid technologies that provide more timely and accurate information regarding outages. On September 5, as Irma approached the state, Florida Power and Light said that it had invested nearly $3 billion to build a stronger, smarter energy grid, while also cautioning that the intense storm could still cause prolonged power outages.

### 4 State legislative actions on grid resiliency

In 2012, Superstorm Sandy left about 8.5 million customers without power. In the aftermath of Sandy, New York announced its landmark Reforming the Energy Vision (REV) initiative, which seeks to transform the utility regulatory structure by integrating greater levels of DER and empowering customers with energy management options. Since then, REV has moved from a conceptual policy to the implementation phase putting New York at the forefront of grid transformation. Several other states, such as Florida, Massachusetts, and New Jersey have started climate resiliency initiatives, focusing largely on DER and microgrids that can improve resiliency in regions prone to storm-induced power outages with the help of fuel cells, solar, energy storage, and combined heat and power. In 2017, at least nine states have introduced bills on microgrids and storage:



**CA**
- AB 1400 — Passed both chambers 9/21/2017
  For projects related to the deployment of microgrids, this bill would prohibit recipients of funds awarded under specified research, development, and demonstration programs to purchase diesel generators

**MO**
- SB 190 — Introduced 5/12/2017
  Would allow an electric corporation to recover costs for electric generation, distribution, and transmission projects including renewable generation, microgrids, and storage if the projects are designed to advance the corporation's operational knowledge and increase the rate base by no more than 1 percent at the time of investment

**HI**
- SB 143 — Introduced 1/25/2017
- HB 1163 — Introduced 1/27/2017
- SB 1029 — Introduced 1/31/2017
  Would exempt microgrids that promote and serve public higher education institutions from regulation as a public utility by the Public Utilities Commission

**HI**
- HB 1280 — Introduced 2/13/2017
  Would facilitate development and use of electric microgrids powered by renewable energy and operated by the Department of Education at public schools and other properties of the Department, by exempting them from regulation as a public utility by the Public Utilities Commission

**HI**
- HB 848 — Passed both chambers 4/28/2017
  Would require the University of Hawaii to develop a microgrid plan for one demonstration project at any property owned, leased, or controlled by the university

**ME**
- LD 257 — Introduced 8/2/2017
  Would establish measures to allow municipalities, working cooperatively with electrical utilities, to create microgrids

**ME**
- LD 1157 — Introduced 5/2/2017
  Would create a limited microgrid project to stimulate economic development in northern Maine

**NY**
- A 8212 — Introduced 6/2/2017
- S 4490 — Introduced 3/8/2017
  Would establish a grant program for microgrids under NYSERDA authority; the program would award funds for reducing utility rates, decreasing utility demand, and encouraging the use of renewables

**NY**
- A 6134 — Introduced 2/23/2017
  Would require the NY PSC to develop recommendations regarding the establishment of microgrids

**MA**
- S 1870 — Introduced 9/12/2017
  Would establish a goal of generating 20 percent of Maine's total electricity use from solar energy by 2025 and require a comprehensive plan to achieve the goal including options to provide incentives for solar, and increasing energy storage and microgrids within the state

**MA**
- H 2687 — Introduced 3/8/2017
  Would authorize resiliency measures under the commercial PACE program to provide for participation in a microgrid, including any related infrastructure for such microgrid, by qualifying commercial or industrial real property, provided such microgrid and any related infrastructure incorporate clean energy

**NY**
- A 8270A — Passed one chamber 6/19/2017
- S 6617 — Introduced 6/7/2017
  Would establish adaptation measures to improve the resilience of homes and local infrastructure to the impacts of climate change with microgrids, among others

**PA**
- HB 1412 — Introduced 5/19/2017
  Would amend Title 66 (Public Utilities) of the Pennsylvania Consolidated Statutes, in restructuring of electric utility industry, providing for microgrids and energy storage

**NJ**
- S 881 — Introduced 2/27/2017
  Would require the NJ BPU to establish a program for municipalities to equip public and private facilities deemed critical by the State Office of Emergency Management in the Division of State Police with microgrids in order to allow these facilities to continue to operate during an emergency

**NJ**
- ACR 151 — Passed one chamber 1/30/2017
  Would urge the construction of microgrids at municipal facilities in New Jersey

**CT**
- HB 7208 — Passed both chambers 7/10/2017
  Would make changes to the commercial PACE program, providing that energy improvements mean participation in a district heating and cooling system by qualifying commercial real property, and participation in a microgrid, including any related infrastructure, provided such microgrid and any related infrastructure incorporate clean energy

## BOTTOM LINE

**With Their Powers Combined**

While diesel generators are typically used only during an emergency, microgrids including solar photovoltaics and energy storage provide value throughout the year. A more diversified resource mix including DER has a higher chance of withstanding inclement weather, and microgrids coupled with energy storage bring the added benefit of operating in island mode if necessary. Furthermore, storage brings an array of benefits not strictly related to resiliency as it can help integrate variable energy resources into the grid, reduce emissions and peak demand, and defer or substitute infrastructure investments. The recent storms have shown microgrids and storage could help shield the grid from these disasters. However, given the day-to-day benefits of these technologies policymakers and utilities would be wise to support them for a list other reasons as well.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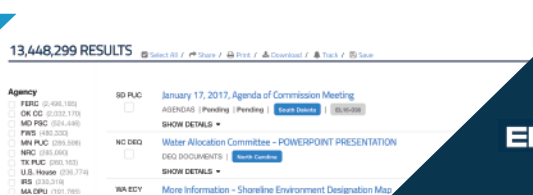

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