

**Written Testimony of Assistant Secretary Bruce J. Walker**  
**Office of Electricity Delivery and Energy Reliability**  
**U.S. Department of Energy**  
**Before the**  
**United States House of Representatives**  
**Committee on Energy and Commerce**  
**Subcommittee on Oversight and Investigations**  
**April 11, 2018**

Chairman Harper, Ranking Member DeGette, and distinguished Members of the Subcommittee, I appreciate the opportunity today to discuss the hurricane response and recovery efforts in Puerto Rico and the U.S. Virgin Islands.

Upon being sworn into my current position as Assistant Secretary for the Office of Electricity Delivery and Energy Reliability (OE) last fall, my first order of business was to travel to Puerto Rico and the U.S. Virgin Islands (USVI). Arriving on October 23<sup>rd</sup>, I spent the next two weeks assisting with the response and recovery efforts. It was imperative to see firsthand the destruction wrought by Hurricanes Irma and Maria and to understand how the U.S. Department of Energy (DOE or Department) could continue to best assist our fellow Americans.

The mission of OE is to develop innovative, cutting-edge solutions to ensure that our Nation's energy infrastructure remains reliable, affordable, and resilient. In order to fulfill this mission, DOE leverages the technical capabilities of the National Laboratories and partnerships with key private sector stakeholders to focus on early-stage research and transformative projects.

Our organization is also the lead for providing energy-related expertise to the Federal Emergency Management Agency (FEMA), interagency partners, and the Administration as part of DOE's emergency response activities. DOE serves as the coordinating agency for Emergency Support Function #12 - Energy (ESF-12) under the National Response Framework and as the Sector Specific Agency for Energy under Presidential Policy Directive 21. In addition, DOE is a primary agency for the Infrastructure Systems Recovery Support Function under the National Disaster Recovery Framework. As the lead for ESF-12, DOE is responsible for providing information and analysis about energy disruptions and for helping to facilitate the restoration of damaged energy infrastructure.

**Hurricanes Irma and Maria Response**

In early September, Hurricane Irma, the first Category 5 hurricane of the 2017 hurricane season, swept through the Caribbean and into the southeast continental United States, causing billions of

dollars in estimated damages, millions of customer power outages, and tragically, over 100 fatalities.

Just two weeks later, while Puerto Rico and the U.S. Virgin Islands were still responding to Hurricane Irma, Hurricane Maria, the second Category 5 hurricane of the 2017 hurricane season, struck Puerto Rico and the U.S. Virgin Islands, bringing powerful winds and major flooding that rendered much of the Territories' transmission and distribution infrastructure inoperable and left virtually all 1.5 million electricity customers in Puerto Rico without power. By the end of January, over 99% of eligible customers in the U.S. Virgin Islands had been restored and following a "No Customer Left Behind" campaign by the Virgin Islands Power and Water Authority, all customers were restored by the beginning of March. In Puerto Rico, restoration efforts continue. As of April 3<sup>rd</sup>, 95.8% of customers (1.4 million) were restored and all 78 municipalities are at least partially energized.

In the wake of these catastrophic events, DOE has received \$17 million in mission assignments from FEMA to support hurricane response and recovery (Irma: 6 mission assignments, \$2.2 million; Maria: 12 mission assignments, \$14.8 million). Over the course of the 2017 hurricane season, the Department provided personnel to support the National Response Coordination Center and several Regional Response Coordination Centers in support of FEMA response operations, bilingual public information personnel to provide life safety and life sustaining communications, subject matter experts as part of FEMA's Incident Management Assistance Teams, as well as technical advisors in electrical distribution, transmission, generation, energy efficiency, renewable energy, and related topics to advise the United States Army Corps of Engineers (USACE) on the assessment, planning, and reconstruction of the electrical grid in Puerto Rico.

In the U.S. Virgin Islands, DOE deployed ESF-12 responders to both St. Croix and St. Thomas to support FEMA, as well as 25 personnel and 10 line-trucks from the Western Area Power Administration (WAPA), to provide mutual assistance through multiple DOE mission assignments from FEMA. The crews from WAPA were tasked with supporting the restoration of the transmission system on St. Thomas, which was completed in November 2017, and the ESF-12 responders on the USVI were demobilized in January 2018. A team from the National Renewable Energy Laboratory was also deployed to the USVI to perform a power generation assessment under a FEMA mission assignment and DOE worked closely with the USVI and private sector partners to facilitate additional mutual assistance from industry.

In Puerto Rico, DOE continues to maintain close coordination with FEMA and three subject matter experts from the Power Marketing Administrations remain deployed to provide technical support to USACE with restoration planning, cost estimates, validation, and quality assurance. DOE has also deployed a responder under the National Disaster Recovery Framework to support FEMA recovery activities and continues to coordinate with industry about ongoing mutual assistance to support restoration efforts.

Additionally, through DOE-funded projects, we are leveraging the expertise of our National Laboratories to develop potential long-term solutions to improve the resiliency of the Puerto Rican infrastructure. I want to assure the Committee that DOE will continue to support the work

needed to restore power to Puerto Rico. I'd also like to thank all of the utility crews and responders for their dedication and hard work in restoring power.

## **Resilience**

The hurricane season of 2017 serves to highlight the need for a continued and adaptive focus on energy system resilience. The recent severe weather events, changing resource mix, and dynamic nature of grid technologies—including changes on the demand side—are bringing grid resilience to a new, more prominent place in the national dialogue. Specifically, as we keep one eye on day-to-day reliability and resource adequacy, we must also do better to incorporate resilience into the discussion.

As part of a comprehensive effort to reduce the impact of severe weather events, utilities in three hurricane-prone regions invested hundreds of millions of dollars over the last several years to improve their systems, including advanced communicating technologies across their transmission, distribution, and customer systems to mitigate and recover from grid disturbances.

In Florida, while it's difficult to compare storms, during Hurricane Wilma in 2005, more than 11,000 Florida Power and Light poles fell or snapped, and 241 substations experienced major damage while close to 100 transmission structures were damaged. However, grid hardening since Wilma limited the damage to less than 1,500 toppled poles, no major damage to substations, and no damage to transmission structures during Hurricane Irma.

In mid-to-late August 2017 in Houston, at the peak of outages, 306,000 customers were without power in Texas and Louisiana from Hurricane Harvey, whereas when Hurricane Ike hit Houston in 2008, 2.1 million customers were knocked offline. Some of this dramatic reduction was due to CenterPoint Energy's enhanced physical and remote operational protections to prevent damage at the vast majority of their 250 substations. CenterPoint's investment also built out their capability to safely reroute power around damaged grid equipment to maintain connections for more customers.

The immense challenges that New Orleans faced in the aftermath of Katrina were intensified by electric grid failures. System-wide power outages made it difficult to resume essential recovery activities such as flood control operations, water supply and treatment, transportation, emergency response, and banking. Even Memorial Medical Center had its backup generator fail 48 hours after the storm.

In January 2016, researchers at Sandia and Los Alamos National Laboratories teamed up with the City of New Orleans and other partners through DOE's Grid Modernization Laboratory Consortium to identify grid modernization priorities to minimize the negative consequences to particularly vulnerable communities. The analysis identified the lifeline services that receive greatest benefit from improved power resilience, and subsequently, identified clusters of high-impact infrastructure in those areas that can be served by advanced microgrids.

As a result of this research, the City of New Orleans is now equipped with a prioritization and implementation plan, developed in conjunction with the local utility and community stakeholders, to protect the grid that serves areas of most critical need.

**Conclusion**

I am grateful for the hard work of DOE's emergency responders during the 2017 hurricane season. We have made progress, but there is still more to do. Over the next several months, DOE's primary focus in Puerto Rico will be working with our partners to support the mission of restoring the power grid and critical infrastructure.

Secretary Perry and our DOE team look forward to a thoughtful conversation focused on our response to this season's hurricanes, and on the reliability, affordability, and resilience of the electricity system from hurricanes, as well as other extreme weather events.

Thank you, and I look forward to your questions.