

**Written Testimony of William Parks, Senior Technical Advisor**  
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**U.S. Department of Energy**  
**Before the**  
**Subcommittee on National Security**  
**Committee on Oversight and Government Reform**  
**U.S. House of Representatives**

**March 21, 2018**

Chairman DeSantis, Ranking Member Lynch, and distinguished Members of the Subcommittee, I appreciate the opportunity today to discuss the challenges to hurricane response and recovery efforts in Puerto Rico

Upon being sworn into his current position as head of the Office of Electricity Delivery and Energy Reliability (OE) last fall, Assistant Secretary Bruce Walker's first order of business was to travel to Puerto Rico and the U.S. Virgin Islands (USVI). Arriving on October 23<sup>rd</sup>, he spent the next two weeks assisting with the response and recovery efforts. It was imperative for our office 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 (SSA) 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 (NRDF). 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 second major hurricane to make landfall in the United States last year, swept through the Caribbean and into the southeast United States, causing billions of dollars in estimated damages, millions of customer power outages, and tragically, numerous fatalities.

Just two weeks later, before Puerto Rico and the U.S. Virgin Islands had recovered from Irma, Hurricane Maria made landfall in Puerto Rico as a dangerous Category 4 hurricane, bringing powerful winds and major flooding that rendered much of the Commonwealth's transmission and distribution infrastructure inoperable and left virtually all 1.5 million electricity customers on the island without power.

In Puerto Rico, restoration efforts continue, and as of March 19, 93% of customers have been restored and all 78 municipalities are at least partially energized.<sup>1</sup> In the U.S. Virgin Islands, restoration efforts are nearing completion, with 99% of eligible customers restored and a “No Customer Left Behind” campaign underway to ensure restoration of all customers impacted by the storms.

The significant damage to the energy sector caused by these hurricanes in Puerto Rico and the USVI and the complicated nature of an island response created significant logistical challenges as well as a response and recovery timeline that is longer than a Continental United States (CONUS) event. In a CONUS event, the electricity sector has well established mechanisms to provide mutual assistance, as demonstrated during Hurricanes Harvey and Irma. This highlights the need for power system operators to carry out robust pre-event planning and coordination. The movement of crews and equipment to non-contiguous parts of the United States, in this case Puerto Rico and the USVI, is far more challenging. At the height of the response to these territories, 1,500 mainland mutual assistance crews and support personnel were deployed, along with 5,000 contractors under U.S. Army Corps of Engineers. Further, the near-total loss of power after Hurricanes Irma and Maria made communications on the island quite difficult.

In the wake of these catastrophic events, DOE has received \$17 million in mission assignments from FEMA to provide technical assistance for hurricane response and recovery (Irma: 6 mission assignments, \$2.3 million; Maria: 11 mission assignments, \$14.7 million). Additionally, DOE has received \$13 million in supplemental funding from Congress for response and recovery activities already conducted, as well as for funding project activities to assist Puerto Rico as they rebuild their energy infrastructure. This provides DOE the opportunity to help the Commonwealth incorporate increased resilience and reliability into the new Puerto Rico electric grid through the utilization of current OE programs and activities.

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. This included bilingual public information personnel to

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<sup>1</sup> <http://status.pr/Home>

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.

During the response to Hurricane Maria, DOE has deployed 94 responders and recovery efforts in Puerto Rico are still underway. DOE continues to maintain close coordination with FEMA and ten 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 NDRF to support FEMA recovery activities and continues to coordinate with industry to facilitate additional mutual assistance.

ESF-12 responders deployed to both the USVI and Puerto Rico came from DOE sites across the country, including available personnel from both the Western Area Power Administration (WAPA) and the Bonneville Power Administration. 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 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. DOE worked closely with the USVI and private sector partners to facilitate additional mutual assistance from industry.

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 Subcommittee 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.

With every event, industry is the front line. The Department's activities as part of our SSA, ESF-12, and responsibilities include coordinating the response, exchange of information, waiver facilitation, and identification of unmet needs. Our goal is a safe, effective, and efficient response and recovery. Hurricanes and similar events have well established and exercised roles and responsibilities for electric sector coordination between industry and DOE.

It is also important to recognize industry's unwavering support of the American citizens in Puerto Rico and the USVI, in addition to their recovery efforts. Our coordination, with the Subsector Coordinating Councils—especially the Electric Subsector CEO coordination—has been very effective. Our work with state, local, and territorial governments, the Oil and Natural Gas Subsector Coordinating Council, the North American Electric Reliability Corporation, and the Electricity Information Sharing and Analysis Center has been critical to the response and

recovery efforts. These partnerships have demonstrated success in coordination after Hurricane Harvey and Irma and with respect to Hurricane Maria, there were tough lessons that we are still learning from this response and recovery.

### **Lessons Learned from 2017 Hurricane Season**

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.

The Department is finalizing a 2017 response season after action report and preliminary findings indicate the presence of responders at utility operation centers and early engagement with utilities is critical, in addition to presence at the Federal and state emergency operations centers.

For oil and natural gas critical infrastructure, the biggest challenges are issues around anti-trust and information sharing, e.g., the Department utilized GasBuddy and other public tools for gasoline station status and refinery status information was obtained by the Energy Information Administration per the National Petroleum Council Report.

Specifically as relates to the USVI, direct support by the Power Marketing Administrations was important to response efforts. Island response efforts highlighted the challenges of movement of equipment and crews outside CONUS. Additionally, long term deployments stressed the Department's capability to support recovery efforts and the issue of dedicated staff versus volunteers should be revisited.

The Department continues to assist the territories as they work to rebuild their energy infrastructure. We are working to consolidate the various plans for rebuilding Puerto Rico's grid and providing input into one overarching, comprehensive plan, per the supplemental funding legislation. DOE will continue to provide advice and counsel to Puerto Rico as they work toward a more reliable and resilient grid. Such efforts have enormous long term benefits, as we have seen with other utilities in other jurisdictions.

### **Resilience**

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.