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U.S. Department of Energy

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Chairman Bishop, Ranking Member Grijalva, and distinguished Members of the Committee, I appreciate the opportunity today to discuss the status of Puerto Rico's electric infrastructure and the future operation of the grid.

The U.S. Department of Energy (DOE) is 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.

DOE Involvement in Puerto Rico Response and Restoration

DOE'S Office of Electricity and Office of Cybersecurity, Energy Security, and Emergency Response have led DOE and ESF-12 response and restoration efforts for Hurricanes Irma and Maria in Puerto Rico. Restoration efforts continue and as of July 23rd, approximately 99.96% of customers (1.47 million) are restored, according to the Puerto Rico Electric Power Authority (PREPA), the island's electric utility.[1]

Over the course of the 2017 hurricane season, the Department provided numerous personnel to support response and recovery efforts. These included bilingual public information personnel to provide life safety and life sustaining communications, subject matter experts as part of FEMA's Incident Management Assistance Teams, technical advisors in electrical distribution, transmission, generation, energy efficiency, renewable energy, and related topics to advise the United States Army Corps of Engineers, and personnel to support the National Response Coordination Center, several Regional Response Coordination Centers, and state emergency operations centers.

[1] http://status.pr/

DOE continues to maintain close coordination with FEMA and Puerto Rico. The Department has deployed responders under the National Disaster Recovery Framework to support ongoing energy sector recovery activities.

DOE Involvement in Puerto Rico Recovery

A strong recovery and revitalization is important to the territory, as well as the Nation. Maintaining and enhancing the affordability and resilience of the electric grid, at fair and reasonable costs, will provide service and value to the region. Yet, no single investment in energy infrastructure at one point in time will achieve resilience. The energy infrastructure of Puerto Rico must be designed, built, managed, and maintained in such a way to withstand likely stresses, ameliorate disruptions when they inevitably occur, recover quickly, and incorporate lessons learned into post-event planning and operations. This is a continual process of improvement, one involving a reassessment and adaptation of solutions and technologies to address changing needs.

The long-term resilience and reliability of Puerto Rico's electric grid will require capable leadership, strategic investments, a strong culture of safety, and well-defined regulatory oversight. While PREPA leadership has changed over the last few weeks, and continues to be in a state of transition, DOE will continue to work in partnership with them to support Puerto Rico's recovery through several efforts.

Strategizing an Electric Energy Policy and Regulatory Framework

The Southern States Energy Board (SSEB), in association with DOE, is working in coordination with the governor and legislature of Puerto Rico to establish a reliable, affordable, and sustainable electric energy grid system, and to advise on a policy and regulatory framework for possible privatization efforts. SSEB's advisory role is explicitly described in Puerto Rico Act 12-2018, signed into law by Gov. Rosselló on June 20, 2018, which provides a legal framework for privatization of PREPA's functions.

SSEB will collect data and perform an analysis of the economic, financial, and insurance impacts of PREPA's potential privatization to inform the development of regulatory framework models. They will also identify components of PREPA's privatization economics, *e.g.*, generation, transmission, distribution; priority; rate structure; feasibility; and transparency aspects to balance the needs of the Puerto Rico government with interest from the private investment community. Additionally, SSEB will establish a Blue-Ribbon Task Force and solicit input from the Task Force on the possible regulatory framework models that provide Puerto Rico with a transparent and robust regulatory regime.

DOE Report on Energy Resilience Solutions for the Puerto Rico Grid

DOE has completed its Report on Energy Resilience Options and Potential Solutions for the Puerto Rico Grid. This report provides recommendations to FEMA and PREPA that reflect principles of resilience and are intended to inform investments in energy infrastructure in Puerto Rico. Recommendations address near-term actions and potential long-term actions that will require further analysis to make optimal investment decisions.

The interdependencies across sectors, assessment of potential alignment, and sequencing of funding across different agency programs that support various sector infrastructures will require

significant coordination. The report also notes where the results of analysis are needed to articulate resilience-related, investment-grade suggestions regarding the design and specification of the electricity system in Puerto Rico.

Although some of the additional analysis necessary to support those resilience principles is underway, recommendations proposed in our report to improve the performance of the system are as follows:

1. The Governor and PREPA should immediately ensure that updated, effective mutual aid agreements are primed to quickly provide support during the next event.

2. To align with the objectives of the National Incident Management System, incident command, control, and coordination should follow the Incident Command System (ICS). All possible parties will train in ICS and use it during a response.

3. The Puerto Rico Energy Commission (PREC) should coordinate a joint study with the Puerto Rico Telecommunications Board to determine and enforce safe loading requirements of distribution poles carrying both electric and telecommunications infrastructure.

4. Electricity transmission towers installed specifically for temporary emergency restoration should be considered for replacement, potentially by monopoles—many of the round monopole structures survived the 2017 storms.

5. The PREC should finalize microgrid regulations, and establish effective and efficient interconnection requirements and wheeling regulations with PREPA. These regulations will allow customers to design their systems to add reliability and resilience to PREPA's system.

6. The Commonwealth Energy Public Policy Office, in coordination with other appropriate Commonwealth agencies, should consider drafting an updated Energy Assurance Plan, which will provide for an Incident Management Team as well as other important components. Besides preparing for the next hurricane season, acting immediately will allow for leveraging the presence of Federal staff in the Joint Field Office and the Federal data collection efforts that have been underway since September. Finally, the SSEB may be able to facilitate peer-to-peer information sharing and lessons learned among Puerto Rico's neighboring governments and utilities.

Near-Term and Long-Term Grid Modeling Support

Another DOE effort is through grid modeling to support the rebuilding of a more resilient electric power grid system in Puerto Rico. This endeavor will develop a near real time dynamic model of the Puerto Rico power system that will be used not only as an operational tool, but also for planning purposes. This modeling effort will provide technical insight into the resiliency objectives, allowing for coordination and communication of potential solutions across stakeholder groups. As PREPA and the Commonwealth plan financial investments to strengthen

Puerto Rico's power grid and increase disaster resilience, DOE, FEMA, and the U.S. Department of House and Urban Development will remain their supportive partners.

Several potential DOE recommendations to support grid modeling require further analysis prior to finalization. However, the analysis should be conducted, to the extent practicable, with the support and engagement of PREPA, and is best suited as follows:

1. Power Flow – assesses power system operations, including generator dynamics and protective relay coordination [used to identify power system needs, evaluate technology options, and help prioritize resilience investments, *e.g.*, transmission enhancements]

2. Production Cost and Capacity Expansion – informs economic dispatch strategies and long-term planning [used to understand how resource investments, system costs, and load are impacted by key policy and technology sensitivities]

3. Microgrids, Energy Storage, and System Segmentation – identifies where clusters of generation and load provide maximum community benefit [used to identify prepositioning of emergency generation, local hardening of infrastructure, and adjustment of emergency procedures]

4. Cross-Sector Infrastructure Interdependencies – characterizes reciprocal relationships within the energy sector, *e.g.*, electricity-petroleum; electricity-liquefied natural gas, as well as cross-sector infrastructure such as telecommunications and/or water [used to investigate supply disruption impacts and identify mitigation approaches]

DOE is committed to working with FEMA, other Federal agencies, the Commonwealth of Puerto Rico, and PREPA to incorporate its near and long-term recommendations into local infrastructure projects. The end goal is a modern and resilient energy system that can serve as the robust engine for Puerto Rico's economic revitalization.

Conclusion

I am proud of the work we are doing to address the long term restoration and recovery efforts in Puerto Rico and 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 continue to be working with our partners to support the mission of strengthening the power grid and critical infrastructure for the island.

Thank you, and I look forward to your questions.