

QUESTIONS FROM CHAIRMAN GRIJALVA

- Q1. You stated that DOE believes increasing natural gas generating capacity in the San Juan area would be “one of the single most valuable investment for PREPA’s long-term recovery”. But there are others who say that going in this direction even in this limited way, could lock the island into infrastructure that will soon be obsolete. Do you agree that falling prices in renewable energy and battery storage due to advances in technology will lead to infrastructure based on fossil fuels becoming obsolete in 30 years?
- A1. I do not believe infrastructure based on fossil fuels will be obsolete in 30 years. DOE has pursued, and will continue to pursue, an all-of-the-above energy strategy, which includes fossil fuels. Electricity generated by natural gas will be less expensive and in compliance with local and Federal environmental laws that the Puerto Rico Electric Power Authority (PREPA) has had a challenge complying with. Furthermore, PREPA has issues with its system today that result in notable line loss issues, reactive power concerns, power quality concerns, over-reliance on south to north transmission corridors, and generation costs that place upward pressure on retail rates. All of these issues call for a near-term solution that can ameliorate these operational problems while simultaneously addressing Puerto Rico's relatively high retail rates, thereby improving the ability of PREPA to become solvent.
- Q2. Puerto Rico Senate Bill 1121 which will is expected to be signed into law by Governor Rossello on Thursday, April 11, 2019, contains a section establishing an independent regulatory agency. You indicate that DOE is supporting the technical development of regulatory capacity for the Puerto Rico Energy Bureau (PREB), the island’s energy regulator. Are you familiar with the regulatory framework in Senate Bill 1121?
- A2. DOE’s Office of Electricity (OE) staff is currently reviewing this legislation.
- Q2a. Do you share the view that the Energy Bureau has been diluted and weakened by the current Puerto Rico administration?
- A2a. Given the newness of the energy regulatory body in Puerto Rico, it is difficult to establish patterns in its behavior. However, OE is familiar with standard practices in the authorities of energy regulatory bodies in the United States, which include some degree of independence in decision-making, even in those states where decision-makers are directly appointed by the Governor. In addition, any government agency requires funding and staff in order to execute its mission. For any energy regulatory body to succeed in Puerto Rico, it needs both adequate staffing and independent, data-driven

decision-making, among other attributes. The current Puerto Rico administration is in a position to put the Energy Bureau in a position to succeed and there are several sources of information to consult on this topic, including, for example, a National Regulatory Research Institute study for New Mexico.^a

Q3. What, if any, should be the Federal role in ensuring that Puerto Rico has new, more efficient, and cleaner to operate power generation plants, and, if it includes financial assistance, how can taxpayers be assured that they won't be subsidizing corporate profits?

A3. Since PREPA is a municipally-owned entity governed by Puerto Rico, the Federal Government does not have a substantive role other than establishing applicable nationwide laws (such as Clean Air Act requirements) regarding the generation sources used by PREPA. However, on a voluntary basis, DOE has evaluated the needs of the electric system from a technical standpoint, and has identified preferred solutions that meet many of the needs of the system while enabling many of the investments envisioned by Puerto Rico in the future.

DOE remains committed to providing technical assistance as PREPA continues to develop its Integrated Resource Plan (IRP).

Q4. Are PREPA and the U.S. Department of Energy agreed on the new vision for PREPA's transformation?

A4. DOE has been assured by PREPA that it desires a resilient, reliable, and affordable electricity system achieved through efficient operations, focused investments, and operations and maintenance strategies that are consistent with standard utility practice. DOE remains committed to providing technical assistance on a variety of issues related to achieving that vision.

^a https://www.nmlegis.gov/publications/Studies_Research_Reports/Evaluation%20of%20Public%20Regulation%20Commission%20Staffing%20and%20Budget%20Allocation%20-%20May%202017.pdf

QUESTIONS FROM REPRESENTATIVE COSTA

- Q1. Puerto Rico has laid out an ambitious goal to derive 100% of its energy from renewable sources by 2050. In making that transition, SSEB's Blue-Ribbon Panel Report raised some questions about the role, long term use, and transportation of natural gas. What role does the Department of Energy believe natural gas should play in Puerto Rico's energy resource mix?
- A1. DOE has pursued, and will continue to pursue, an all-of-the-above energy strategy, which includes fossil fuels. Electricity generated by natural gas will be less expensive and in compliance with local and Federal environmental laws that the Puerto Rico Electric Power Authority (PREPA) has had a challenge complying with. Furthermore, PREPA has issues with its system today that result in notable line loss issues, reactive power concerns, power quality concerns, over-reliance on south to north transmission corridors, and generation costs that place upward pressure on retail rates. All of these issues call for a near-term solution that can ameliorate these operational problems while simultaneously addressing Puerto Rico's relatively high retail rates, thereby improving the ability of PREPA to become solvent.
- Q1a. Could you please elaborate on any Administration plans to support cleaner and reliable energy sources in Puerto Rico short run, while renewable sources are being developed?
- A1a. DOE, working with its national laboratories, has analyzed some of the natural gas supply and electricity generation options available to Puerto Rico, including modeling for renewables such as wind and solar. Results so far indicate that natural gas generation in the San Juan metropolitan area will improve reliability and lower costs to ratepayers. In addition, the national laboratories have looked at the economic potential for solar photovoltaics on certain brownfields, high resolution solar resource data, and utility-scale wind resource data. DOE and the laboratories will use this resource potential data to analyze fast-time-scale renewable integration issues, building on successful work from the National Renewable Energy Laboratory prior to the 2017 hurricane season.^a

^a <https://www.nrel.gov/docs/fy17osti/67799.pdf>

Q2. Natural Gas can be an important cleaner fuel for Puerto Rico and the Puerto Rico Legislature has already allowed the conversion to dual fuel capability for oil energy plants. Could you provide examples on how DoE plans to comply with the Jones Act regarding the transportation LNG moving forward?

A2. Presently, under a limited statutory waiver to the Jones Act (found at 46 U.S.C. § 501), there are approximately thirty vessels that are able to transport to Puerto Rico.

Ultimately, the Secretary of the Department of Homeland Security may grant a Jones Act waiver if the Secretary considers it necessary in the interest of national defense and following the Department of Transportation's Administrator of the United States Maritime Administration's (MARAD) determination as to whether any qualified U.S.-flag vessels are available to meet the national defense requirements.^a However, DOE monitors energy supply needs and advises federal agency counterparts on Jones Act waiver requests during periods of actual or imminent shortages of energy.

^a <https://www.energy.gov/ceser/energy-waiver-library#JA>

QUESTIONS FROM REPRESENTATIVE HICE

- Q1. Do you feel that the Board has executed its responsibilities to ensure hurricane preparedness for 2019 and beyond?
- A1. Responsibility for hurricane preparedness principally falls upon the utility, in this case the Puerto Rico Electric Power Authority (PREPA). DOE has encouraged PREPA to establish mutual assistance agreements in advance of future storms with partner utilities. To the best of our knowledge many of these agreements are now in place. DOE has also encouraged PREPA to review and exercise its emergency preparedness plan. However, the Department is unaware if these actions have been taken.
- Q1a. What kind of technical work has DOE done to ensure the Puerto Rican grid is reliable and resilient? Can you provide any examples?
- A1a. The Argonne (ANL), Pacific Northwest (PNNL), Sandia (SNL), Oak Ridge (ORNL), and Renewable Energy (NREL) National Laboratories have provided technical assistance, analysis, training, and modeling tools to PREPA and Puerto Rico's Central Office for Recovery, Reconstruction and Resiliency in support of long-term energy sector recovery and modernization. In fact, the national laboratories have completed several discrete analyses to date in an effort to assist in improving overall resilience in Puerto Rico. These analyses included help in determining the ideal amount of generation for the north side of the island and optimal siting of microgrids. National laboratory work has also identified critical assets related to grid protection equipment and locations for emergency equipment reserves that will improve reliability and disaster resilience, as well as dramatically lower the cost of power. Examples of this work include:
- *Improving Resilience of Puerto Rico Electric Infrastructure (Transmission)*, October 2018. In this report, PNNL provides preliminary recommendations for improving grid resiliency based on power flow contingency analysis, voltage stability analysis, and dynamic contingency analysis, utilizing system models and data from PREPA. PNNL's Dynamic Contingency Analysis Tool was used to analyze dynamic behavior and cascading sequences resulting from major generation and transmission outages that could arise from extreme hurricane-related events. Trusted commercial tools, PSS/E (Power Systems Simulator for Engineering) and PowerWorld, were also used.

More than 50,000 contingencies were studied, including a hurricane contingency scenario comprised of six stages of line outages. This ‘official use only’ analysis was provided directly to PREPA.

- *Summary of Palo Seco Capacity Injection Reliability Study*, December 14, 2018. Power system modeling conducted by ANL found that increasing the total nameplate capacity of the Palo Seco power plant in San Juan, Puerto Rico, to approximately 1,300 to 1,600 megawatts (MW) would greatly improve the reliability of the PREPA system against the loss of transmission lines during contingency scenarios, such as severe hurricanes. Subsequent economic modeling identified opportunities to significantly reduce total costs with this investment.
- *Multi-Lab Modeling Support for Critical Loads in Puerto Rico*, October 18, 2018. ANL and PNNL identified the location and interconnected infrastructure of several classes of critical loads in Puerto Rico and used modeling, analysis, and industry expert consultation to prioritize resilience-enhancing investments that support continuity of electricity supply to those facilities. This ‘official use only’ analysis was provided directly to PREPA.
- *Using Energy Storage to Support Puerto Rico's Transmission System*, September 2018. This Sandia National Laboratory (SNL/Sandia) report examined the most critical near-term issues with the transmission system, frequency regulation and response, and analyzed the impacts of incorporating energy storage systems of varying sizes with the goal of immediately minimizing load shedding while laying the foundation for future renewable energy integration. The analysis concluded that 240 MW/60 megawatt-hours of energy storage would stabilize system frequency sufficiently to avoid loss of load for rapid load changes or generation outages up to and including loss of the largest generation unit on the island. Based on current industry average storage costs, SNL estimated the cost to implement the initial power-focused energy storage capacity would be \$100–125 million. This analysis was provided directly to PREPA.

- *Analysis of Microgrid Locations Benefitting Community Resilience for Puerto Rico*, September 2018. An analysis of microgrids to increase resilience was conducted by SNL for the island of Puerto Rico. Critical infrastructure throughout the island was mapped to the key services provided by those sectors to help inform primary and secondary service sources during a major disruption to the electrical grid. Additionally, a resilience metric of burden was developed to quantify community resilience and a related baseline resilience figure was calculated for the area. To improve resilience, Sandia performed an analysis of where clusters of critical infrastructure are located and used these suggested resilience node locations to create a portfolio of 159 microgrid options throughout Puerto Rico. The team then calculated the impact of these microgrids on the region’s ability to provide critical services during an outage, and compared this impact to high-level estimates of cost for each microgrid to generate a set of efficient microgrid portfolios costing in the range of \$218–917 million. This analysis was provided directly to PREPA.
- *Investment Considerations for Puerto Rico’s Power System*. Based on analysis performed by the national laboratories, the Office of Electricity (OE) developed a set of investment considerations for Puerto Rico’s power system recovery as the basis for improved resilience, renewable energy investments, and lower costs.

Q2. Do you know of any examples of similarly situated utilities successfully executing a “transformation” of this scope and magnitude on this timeline? *(The reported plan is to be fully executed this calendar year.)*

A2. We are unaware of any similarly situated utilities executing a transformation of this scope and magnitude on this timeline.

Q3. Would you describe the impediments you observed attributable to central government interference with PREPA planning, operations and emergency response?

A3. DOE is not in a position to comment on the root cause(s) of PREPA’s challenges that ultimately resulted in its bankruptcy. That being said, it is fairly clear that standard operational and maintenance work has not been adequately undertaken in the past, resulting in a deteriorated system with significant line loss and high operating cost characteristics.