

GOVERNMENT OF PUERTO RICO  
PUBLIC SERVICE REGULATORY BOARD  
PUERTO RICO ENERGY BUREAU

NEPR

Received:

Dec 10, 2019

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IN RE: REVIEW OF THE PUERTO  
RICO ELECTRIC POWER AUTHORITY  
INTEGRATED RESOURCE PLAN

CASE NO. CEPR-AP-2018-0001

SUBJECT: Discovery Process

MOTION SUBMITTING SUPPLEMENTAL TESTIMONY

TO THE BUREAU:

NOW COME, CENTRO UNIDO DE DETALLISTAS (CUD); CAMARA DE MERCADEO, INDUSTRIA Y DISTRIBUCION DE ALIMENTOS (MIDA); PUERTO RICO MANUFACTURES ASSOCIATION (PRMA); UNIDOS POR UTUADO (UPU), Y EL INSTITUTO DE COMPETITIVIDAD Y SOSTENIBILIDAD ECONÓMICA DE PUERTO RICO (ICSE-PR) (hereinafter the not profit intervenors) represented by appearing counsel and respectfully allege and pray:

1. Appearing "Not For Profit Intervenors" submit with this motion the supplemental testimony of the expert witness Eric Ackerman, Managing Director, New Regulation LLC.

WHEREFORE It is respectfully requested from the Energy Bureau to receive the supplemental testimony submitted.

**CERTIFICATE OF SERVICE**

We hereby certify that, a copy of the filing was sent via e-mail to the Energy Bureau Clerk and internal legal counsel to: [secretaria@energia.pr.gov](mailto:secretaria@energia.pr.gov); [wcordova@energia.pr.gov](mailto:wcordova@energia.pr.gov); [legal@energia.pr.gov](mailto:legal@energia.pr.gov); and [sugarte@energia.pr.gov](mailto:sugarte@energia.pr.gov). A hard copy of the foregoing will be filed with the Clerk of the Energy Bureau tomorrow.

In addition, the foregoing filing was sent via e-mail to the approved or pending intervenors (Arctas, Caribe GE, League of Cooperatives and AMANESER 2025, OIPC, EcoEléctrica, Empire Gas, Environmental Defense Fund, Local Environmental Organizations, National, "Non Profits", Progression, SESA-PR, Renew, Shell, Sunrun, Wartsila, Windmar Group) and amicus (ACONER, AES-PR, RMI) at the following e-mail addresses: [sierra@arctas.com](mailto:sierra@arctas.com), [tonytorres2366@gmail.com](mailto:tonytorres2366@gmail.com), [cfl@mcvpr.com](mailto:cfl@mcvpr.com); [gnr@mcvpr.com](mailto:gnr@mcvpr.com), [info@liga.coop](mailto:info@liga.coop), [amaneser2020@gmail.com](mailto:amaneser2020@gmail.com), [hrivera@oipc.pr.gov](mailto:hrivera@oipc.pr.gov), [jrivera@cnspr.com](mailto:jrivera@cnspr.com),

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In San Juan, Puerto Rico, this 10 day of December 2019.



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## Supplemental Testimony of Eric Ackerman

### 1. PREPA should substantially revise its approach to the design of microgrids.

PREPA's approach to the design of microgrids/minigrids is biased in favor of thermal generation (i.e., generation based on the combustion of fossil fuels such as natural gas). This is a bias that is not based on evidence, and is inimical to Puerto Rico's expressed goals of developing an electricity grid powered by renewable resources. In responding to requests for information about its June 7 IRP, PREPA conceded (NFP Intervenors -PREPA-01-02) that it has not studied microgrid-related innovations on the mainland or elsewhere. Nevertheless, without any empirical basis, PREPA established a design criterion that only thermal sources can be used to serve critical facilities. This is arbitrary and capricious, and undermines PREPA's ability to meet the goals of Act-17. If PREPA looks, it will see that utilities on the mainland and elsewhere are developing microgrids that serve critical facilities through portfolios of distributed resources that include renewable sources. For example:

The Schofield Generating Station Project, developed by Hawaiian Electric Company, is a distribution microgrid located adjacent to Wheeler Annay Air Field on the island of Oahu.<sup>1</sup> The Project is configured with six 8.4 MW engine-generators that can operate individually or in combination. In terms of resource diversity, the Schofield generators can operate with a variety of fuels (i.e., oil, liquid biofuel, natural gas, biofuel gas), and can be switched instantaneously with no downtime. The generators are started using compressed air that is generated and stored on site, enabling a black start capability, both for the Project, and for other utility generators on the island. The Project can start, synchronize with the grid, and ramp to full load in less than six minutes. It can ramp up and down quickly to provide frequency regulation. It also controls Volt-Amp Reactive power output to provide voltage regulation.

The Bronzeville Community Microgrid is being developed by the Commonwealth Edison Company to provide enhanced reliability and resilience to critical public service facilities in the Bronzeville area of Chicago. The project is being developed in two phases. Phase I will integrate photovoltaic panels (.75 MW), batteries (5 MW/2 MW hours), and mobile diesel generation (3 MW). Phase II will add another 7 MW of unspecified "controllable generation," which probably means fossil-fueled.<sup>2</sup>

Princeton University has a microgrid consisting of a 15MW gas-fired CHP system, supplemented by a 4.5 MW solar array.<sup>3</sup>

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<sup>1</sup> Public Utilities Commission of the State of Hawaii, Docket No. 2018-0163, Hawaiian Electric Companies' Opening Brief, Exhibit 2-Schofield Generating Station Microgrid Project.

<sup>2</sup> Illinois Commerce Commission, *Petition Concerning the Implementation of a Demonstration Distribution Microgrid*, Docket No. 17-0331, Order, February 28, 2018 at 5 and 6.

<sup>3</sup> *Case Study: Microgrid at Princeton University*, Consulting Engineer Magazine, June 8, 2015.

Review of PREPA's IRP, PREB Docket No. CEPR-AP-2018-0001

The White Oak Microgrid at the U.S. Food and Drug Administration's Federal Research Center consists of multiple generators, including two black start generators, a 30kW PV array, three types of chillers, and 2 million gallons of thermal energy storage.<sup>4</sup>

Montgomery County Maryland's Public Safety Headquarters in Gaithersburg integrates 2MWdc of canopy-mounted PV and an 865 kW CHP system.<sup>5</sup>

Montgomery County Maryland's Correctional Facility in Boyds incorporates a 220kW CHP system and 2.8 MWdc of on-site solar capacity.<sup>6</sup>

In Potsdam New York the National Grid Utility Company proposed a microgrid to serve critical loads in the town, including a hospital, water treatment plants, a gas station, a high school, and Clarkson University. The Potsdam microgrid would make use of a portfolio of distributed resources that include hydro power, solar PV, combined heat and power (CHP) facilities, and diesel generators.<sup>7</sup> This project has not moved forward, due to a lack of support from key loads to be served. Nevertheless, it demonstrates how renewable energy sources can be integrated in microgrids serving critical loads.

Clearly, state of the art microgrids can serve critical facilities from a portfolio of generation sources that includes renewables. PREPA's minigrids are not really distributed energy applications at all. They are gas turbines installed in every region, configured with transmission lines. They do not further Puerto Rico's renewable energy goals, and they are not open to participation by prosumers. The PREB should direct PREPA to revisit its design of microgrids/minigrids to serve critical loads. In Puerto Rico, solar PV with batteries is an obvious choice, backed up with other, possibly fossil, resources as needed.

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2. PREPA should present its proposed capital budget in a more complete, understandable format.

PREPA's June 7 IRP proposes to spend over \$14 billion over the next nine years (through 2028). Nowhere is this total presented in the IRP. I have combined cost elements distributed throughout Chapter 10 to show that proposed capital spending totals \$14.762 billion. In the future the PREB should provide specific guidance regarding the formats to be used in presenting capital budgets.

Proposed Capital Spending (\$ - millions)		
Generation	PV	\$2,572
	batteries	\$928
	Palo Seco CCGT	\$293

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<sup>4</sup> International District Energy Association (IDEA)

<sup>5</sup> IDEA

<sup>6</sup> IDEA

<sup>7</sup> *Microgrids: Community Resiliency, Potsdam, NY*; presentation by Arun Vedhathiri, Director, New Energy Solutions, National Grid Company at the Advanced Energy Conference, March 27, 2018.

	Costa Sur CCGT	\$293
	18 mobile GTs	\$433
	Yabucoa CCGT	\$293
	Mayaguez CCGT	\$293
Fuel Infrastructure	San Juan LBT	\$472
	San Juan pipe1	\$25
	San Juan pipe2	\$15
	Yabucoa SBT	\$285
	Mayaguez SBT	\$215
Delivery	Minigrids Trans.	\$5,855
	Reliability Trans.	\$1,879.4
	Distribution	\$911.48
<b>Total Capadds</b>		<b>\$14,762.88</b>

3. PREPA should present the rate impact of its proposed IRP in a more complete, understandable format.

The Not for Profit Intervenors asked PREPA to forecast rates under all 35 of the resource scenarios it considered, to which the Utility responded (NFP Intervenors-PREPA-01-05) that it would be wasteful to forecast rates under all 35 LTCE scenarios. This answer is unsatisfactory, given that Act 17 established as an initial objective “[T]o establish the elements necessary for the People of Puerto Rico to attain their goal of having a new Electrical System with rates below twenty cents per kilowatt-hour (\$0.20/ kWh)...” [Article 1.6 16)]. To comply with this requirement PREPA must show that it is proposing a resource strategy that is optimal in terms of rate impact; or at least, that it has taken rate impact into careful consideration in selecting a resource strategy. PREPA cannot do this without forecasting the rate impacts of each scenario.

There also remains an issue of completeness for the scenarios whose rate impacts PREPA did forecast (i.e., the ESM and Scenario 4 strategy 2). These forecasts, which are reflected in Exhibits 8-37 and 8-59, are inconsistent with the statement on page 8-40 that non-generation costs average \$.142/kWh. Exhibits 8-37 and 8-59 reflect non-generation costs on the order of \$.06/kWh. It seems likely that Exhibits 8-37 and 8-59 do not capture all non-generation costs.

PREB should provide specific guidance regarding the form and content of rate forecasts to be used in future IRPs.

4. It is vital that PREPA help consumers make good decisions about their own potential energy efficiency and demand response investments.

In response to a request for information concerning the impact of energy efficiency (EE) on ratepayer costs (PREB-PREPA-09-01), PREPA presented modeling results assuming no EE gains and low EE gains. While it may be appropriate to model a range of EE impacts to manage uncertainty, PREPA should be far more aggressive in driving efficiency in Puerto Rico; for two reasons. First, given the bankruptcy-related risk premiums that must attend all supply-side

investments, EE is likely to be the most economic source of supply in many situations. Second, Act-17 mandates that the Energy Bureau ensure a 30% increase in EE by 2040.<sup>8</sup> For these reasons, PREPA should be required to enhance its Action Plan to implement a comprehensive strategy for customer engagement. This strategy should include extensive customer education about cost-effective options for EE and demand response (DR). In addition, PREPA and the PREB should consider incentives for customer participation in EE and DR programs, including the feasibility of an on bill financing program.

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<sup>8</sup> Act-17, Section 6.29B. Energy Efficiency.