

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

JSP - SECRETARIA
NEGOCIADO DE ENERGIA
DE PUERTO RICO

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IN RE:	CASE NO.: CEPR-AP-2018-0001
REVIEW OF THE PUERTO RICO ELECTRIC POWER AUTHORITY INTEGRATED RESOURCE PLAN	SUBJECT: FINAL BRIEF

ICSE AND THE OTHER NOT FOR PROFIT INTERVENORS (TOGETHER THE NOT
PROFIT ENTITIES) CLOSING ARGUMENT AND BRIEF

TO THE PUERTO RICO ENERGY BUREAU (PREB):

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

1. The PREB held formal hearings on The Puerto Rico Energy Electric Power
Authority (PREPA); Integrated Resource Plan (IRP) on the week of February 3 to
February 7th, 2020. Final date for submission of parties Briefs is Friday, March 6, 2020.

INTRODUCTION

2. The IRP is a planning instrument. As such it is essential, for it be a useful
planning tool, that the IRP be based on the reality, of the legal, fiscal, economic,
commercial, environmental, governmental framework in which it exists and will be
implemented.

First: we have to look to the legal framework, Law 57 of 2014, Law 17 of 2019

among others and the Regulation on IRP for PREPA, as approved by the PREB on 2018.

Law 57 of 2014 states in Article 6.23:

“Artículo 6.23. — Plan Integrado de Recursos. (22 L.P.R.A § 1054v) (a) La compañía de energía responsable de la operación del Sistema Eléctrico, deberá someter al NEPR un plan integrado de recursos (PIR) consistente con el Artículo 1.9 de la Ley de Política Pública Energética de Puerto Rico. En la elaboración del PIR, dicha compañía deberá contar con el insumo de las compañías que operen plantas generadoras. (b) La Autoridad deberá someter el PIR inicial al NEPR dentro de un período de un (1) año contado a partir del 1 de julio de 2014. (c) Inicialmente, el NEPR, atendiendo los comentarios de personas y organizaciones interesadas, revisará, aprobará y, según fuere aplicable, modificará dichos planes para asegurar el cabal cumplimiento con la política pública energética de Puerto Rico y con las disposiciones de esta Ley. (d) Luego de aprobar el Plan Integrado de Recursos, el NEPR deberá supervisar y fiscalizar el cumplimiento con el mismo. El Plan Integrado de Recursos será revisado y actualizado cada tres (3) años en cuyo caso la compañía de energía responsable de la operación del Sistema Eléctrico presentará una propuesta de modificación y actualización del Plan Integrado de Recursos al NEPR. El Negociado revisará y emitirá una determinación final conforme al proceso dispuesto en el Artículo 1.9 de la Ley de Política Pública Energética y los reglamentos que el Negociado adopte para ello. Luego de emitir una determinación final al respecto, el Negociado deberá publicar en su portal de Internet un informe detallando el cumplimiento con el Plan Integrado de Recursos y las modificaciones que se le hayan hecho al mismo luego del proceso de revisión. Disponiéndose, que si hubiese un cambio sustancial en la demanda de energía o en el conjunto de recursos, dicho proceso de revisión deberá ejecutarse antes de los tres (3) años aquí dispuestos para responder y/o mitigar dichos cambios en la demanda de energía o en el conjunto de recursos necesarios para suplir la demanda de energía. La revisión del Plan Integrado de Recursos debe reflejar los cambios en las condiciones del mercado energético, cambios en la tecnología, reglamentaciones ambientales, precios de combustibles, costos de capital, incorporación de generación a base de fuentes de energía renovable y de componentes en la red eléctrica para cumplir con la Cartera de Energía Renovable, generación distribuida, eficiencia energética y otros factores.”
(Underline ours)

Law 17 of 2019, Law on Puerto Rico's Public Policy on Energy state in Section

1.9:

“Section 1.9.- Long-term Electrical System Planning.

(1) General. Long-term Electrical System planning is critical for implementing the Energy Public Policy set forth in this Act and furthering the sustainable development of the people of Puerto Rico through the Electrical System. Such planning shall consist of an Integrated Resource Plan consistent with the provisions of this Act, Act No. 57-2014, and Act No. 83. The Integrated Resource Plan shall be devised by the electric power company responsible for the operations of the Electrical System and shall be approved by the Bureau. The IRP must be drafted with the input of the companies that operate the power plants. Any amendment or modification to the Integrated Resource Plan shall be approved by the Bureau prior to its implementation. The Bureau shall evaluate and approve the Integrated Resource Plan and any amendments or modifications thereto in conformity with the legislative intent and the declaration of public policy adopted by the Legislative Assembly in Section 3 of Act No. 120-2018, Section 13 of Act No. 29-2009 with regards to the protections and considerations applicable to Partnership Contracts, and the public policy declared herein. The Bureau may grant dispensations to or waivers for the Integrated Resource Plan for just cause.

(2) Term and Continuous Revision. The planning horizon of the Integrated Resource Plan shall be of at least twenty (20) years. The Integrated Resource Plan shall describe the combination of energy supply resources and conservation that satisfies, in the short-, medium-, and long-term, the current and future needs of Puerto Rico's energy system and of its customers at the lowest reasonable cost. The Integrated Resource Plan shall be revised every three (3) years from the date in which the Integrated Resource Plan in effect is approved by the Bureau to show changes in energy market conditions, environmental regulations, fuel prices, capital costs, and other factors; provided, that should there be a substantial change in the energy demand or group of resources, such revision process shall be carried out before the three (3) years provided herein to respond to and/or mitigate such changes. Any amendment to the Integrated Resource Plan shall also be filed with the Bureau for review and approval. The Integrated Resource Plan shall be consistent with all the mandates of this Act and with the Energy Public Policy, and shall follow the best practices in electric power industry integrated resource planning.

(3) Integrated Resource Plan Content. Every integrated resource plan shall include, but not be limited to:

(A) A range of future demand forecasts established by using methods that examine the effect of economic factors on electricity consumption as well as the effect of the use of lands under the Land Use Plan for Puerto Rico in effect, and the changes in the direction, type, and efficiency of electricity, and its end-use.

(B) An evaluation of the conservation resources available in the market, including the electricity demand management, and an evaluation of the programs in effect and the necessary programs to improve energy conservation.

(C) An evaluation of the range of conventional and non-conventional generation technologies available in the market.

(D) An evaluation of the system's transmission capacity and reliability.

(E) A comparative evaluation of the energy supply resources, including transmission and distribution.

(F) An evaluation of the combination of resources designated to promote diversification of energy sources; stabilize energy costs; and improve the reliability and stability of the electric power grid.

(G) An evaluation of the existing electric power plants or facilities of the Authority and those in private hands or granted through concessions, that takes into account the improvements in the infrastructure and operational efficiency of the power plants, their useful life, and the retirement date and decommissioning costs thereof, if applicable.

(H) PREPA and electric power service companies' environmental impact assessments related to air emissions and water consumption, solid waste, and other factors such as climate change.

(I) An evaluation of the interconnection of distributed generation and renewable energy projects and other independent power producers to the electric power grid, to comply with Act No. 82-2010, as amended.

(J) Projections with regards to the integration of distributed generation into the electric power grid.

(K) Identification of essential service facilities across the Island and the measures to be implemented to render the electric power service delivered to such facilities more resilient, such as the establishment of microgrids, distributed generation, and underground distribution lines.

(L) An evaluation of the necessary actions to achieve the energy storage system goals established at all levels by the Energy Bureau, as provided in Section 2.12 of Act No. 82-2010. " (Underline ours)

The PREB Regulation 9021, concerning the IRP-although approved prior to Law 17, states:

"B) Planning Environment- PREPA shall present a description of significant planning and regulatory factors that affect the environment in which it operates as well as the way in which these factors impact PREPA's system.

- 1) PREPA shall describe, at a minimum, the following factors: federal, state, or municipal standards and rules that impact the requirement for, or availability of, energy efficiency, renewable energy, fuel alternatives, or other resource requirements; and environmental standards and regulations that impact existing utility resources or resource choices at the present time and

throughout the planning period. (Underline ours)

- 2) The Planning Environment section shall also include a discussion of substantial regulatory or legislative standards and rules that have changed since the approval of the most recent IRP”.

The burden of proof to demonstrate compliance with Laws 57 and 17 and PREB Regulation on the IRP falls on PREPA.

It is equally obvious PREPA has not carried its burden in the current IRP submittal.

The IRP, by its legal definition and the legally defined content must be holistic. PREPA cannot pick and choose what issues it will address and which it will simply ignore and avoid.

Even more important, the PREB must look at the proposed IRP also holistically. PREB has ample power, to evaluate the IRP and even more ample-powers to implement Puerto Rico’s Energy Public Policy.

PREPA DID NOT CONSIDER FUNDAMENTAL FACTS

As was stated several years ago by Puerto Rico Supreme Court Justice Raúl Serrano Geys, “Judges cannot believe what no other person would believe and not believe what everybody else believes”.

In this sense, PREB must frame the IRP in the socio economic, fiscal reality of Puerto Rico, in particular in terms of PREPA’s, and PREPA’s customers’ real fiscal and economic condition.

PREPA ignored such realities, and it is PREB’s responsibility to compel PREPA to take account of these realities.

Let’s look at the facts:

First: PREPA admitted it does not know how much money it will receive from the insurance companies for damages caused by Maria.

Second: PREPA admitted it does not know how much money it will receive from FEMA for damages caused by Maria, much less for the 2020 earthquake damages.

Third: PREPA admitted it does not know if EPA will approve its proposed options to deal with the outage of Costa Sur.

Fourth: PREPA admitted it does not know when it will be out of bankruptcy, much less what its financial condition will be.

Fifth: PREPA has not factored the impact of the debt restructuring deal (RSA) on consumers.

As of today, the projected rate impact of the proposed RSA, included on PREPA's Fiscal Plan, as approved by the PROMESA FOMB, has resulted in the public repudiation of such agreement by the current legislative leadership, the Governor and the Government formally. Also, candidates for Governor from the major parties have repudiated the RSA. In addition, the existence of serious economic studies that clearly recognize the economic impossibility of the RSA, while there are no current studies, supporting the same. Under those circumstances, approving PREPA's proposed IRP, which requires an investment of over \$14,000 million is not responsible.

PREPA did admit that the less money they receive from insurance and FEMA the higher the rate payment for electricity for consumer will be. Such increase would be on top of the increases included in the PREPA Fiscal Plan. PREPA ignores what will happen to the sale of electricity if such increase occurs, and what will be the impact on its finances.

How can the PREB approve an IRP disconnected from this fiscal and economic reality or even more, how can it approve an IRP absent this information?

PREPA DID NOT COMPLY WITH IRP REGULATIONS

The PREB Regulation states:

"ii. PREPA shall consider the following factors in the uncertainty analysis:

- A. forward-looking economic conditions; (underlining added)
- B. environmental regulations;
- C. changes in customer electricity demand and consumption;
- D. customer generation;
- E. fuel prices;
- F. environmental costs or restrictions;
- G. construction costs; and,
- H. combinations thereof as reasonable".

How can PREB entertain an IRP based and impacted by an RSA which defangs, PREB's own authority over PREPA, ignores Law 17 Public Policy mandates and create an untenable economic situation in the island which would limit even more PREPA's capacity to invest in the IRP?

The IRP cannot be considered outside the parameters of Puerto Rico's and PREPA's fiscal reality. This is however what PREPA pretends.

There is nothing in the plan which would offer the PREB, or Puerto Rico, any comfort that PREPA has the management competence to implement the plan; for that matter, any plan. Neither there is any comfort, for PREB and Puerto Rico that the Board

of Directors of PREPA has the good faith, commitment, independence and know how to supervise this plan.

THE IRP DOES NOT INCORPORATE MAJOR MARKET DEVELOPMENTS
THAT CONSIDER ROOFTOP SOLAR WITH BATTERIES

The evidence presented was overwhelming that the energy market is moving toward individual PV installation with battery support. By failing to take account of rapidly evolving PV and storage technologies, PREPA's IRP fails to capture the many benefits these technologies can provide to electricity consumers in Puerto Rico.

A resource strategy that makes maximum use of rooftop solar with storage is one that recognizes the fundamental lesson of hurricane Maria; namely, that after a major weather event - when transmission lines down – the sun continues to shine. PV systems are not limited by fuel supply. And in Puerto Rico the sun shines virtually all year long.

Rooftop PV installations, by their very (distributed) nature also mitigate the risk of damage from extreme weather conditions. For these two reasons (i.e., access to unlimited fuel supply and distributed siting) PVs with storage provide optimum resiliency, and reduce or eliminate Transmission and Distribution costs and risks.

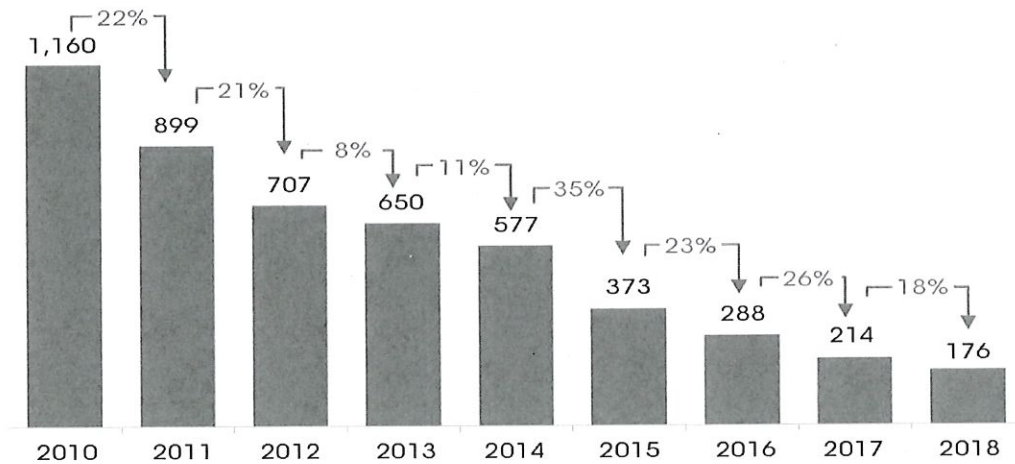
PREPA's IRP ignores this new market development. This development has tremendous potential to totally disrupt the traditional top to bottom relation between the utility and the consumer.

This new reality is totally absent from PREPA's IRP.

As included in addition, PV with storage is by far the most economic supply option in Puerto Rico. As included in one of our expert testimonies, Bloomberg's battery price survey, which tracks the annual declining costs of batteries shows the decrease in energy storage from 2010 to 2018:

Lithium-ion battery price survey results: volume-weighted average

Battery pack price (real 2018 \$/kWh)



Source: BloombergNEF

<https://about.bnef.com/blog/behind-scenes-take-lithium-ion-battery-prices/>

According to another Bloomberg (BNEF) report, included also in one of our expert testimonies, (<https://about.bnef.com/blog/battery-powers-latest-plunge-costs-threatens-coal-gas/>) the benchmark levelized cost of electricity, or LCOE, for lithium-ion batteries has fallen 35% to \$187 per megawatt-hour since the first half of 2018. Meanwhile, the benchmark [Levelized Cost of Energy or LCOE] for offshore wind has in turn declined by 24%. Bloomberg explains: "Our analysis shows that the LCOE per mega-watt-hour for onshore wind, solar PV and offshore wind have fallen by 49%, 84% and 56% respectively since 2010. That for lithium-ion battery storage has dropped by 76% since 2012, based on recent project costs and historical battery pack prices. The most striking finding on this LCOE Update, for the first-half of 2019, is on the cost improvements in lithium-ion batteries. These are opening up new opportunities for them to balance a renewables-heavy generation mix."

A latest example is the analysis from Bloomberg that shows the rapid decline in battery storage costs, as follows: *Battery prices, which were above \$1,100 per kilowatt-hour in 2010, have fallen 87% in real terms to \$156/kWh in 2019. By 2023, average prices will be close to \$100/kWh, according to the latest forecast from research company*

BloombergNEF (BNEF). <https://about.bnef.com/blog/battery-pack-prices-fall-as-market-ramps-up-with-market-average-at-156-kwh-in-2019/>

The rapid declines in the cost of solar photovoltaics (PV), battery storage, and wind power are largely unmatched by fossil-burning plants such as combined cycle gas turbines (CCGT) and combustion turbines (CT). The potential for further efficiency increases and related cost decreases has all but been fully wrung-out for CCGTs and CTs. And these technologies produce both NO_x and GHGs.

There's another major source of economy with PV and storage: it avoids much of the investment needed for LNG infrastructure (over \$1 billion), and improvements in transmission lines (over \$7 billion). So, taking full advantage of the new technologies for rooftop PV and storage mitigates the risk that grid defections will create new stranded costs.

By ignoring market developments involving rooftop PV and storage, PREPA's IRP fails to define a least-cost development plan for Puerto Rico.

PREPA'S IRP IGNORES VIRTUAL POWER PLANTS (VPPs)

Concerning Law 17 mandates as they relate to the IRP, one of the most egregious examples of how incomplete and how distant from the energy policy, the IRP is, is the failure to account for the possibility of "virtual power plants".

In addition to the arguments presented in our expert testimonies, that issue was addressed by Sunrun:

"Aggregated/networked solar plus storage, also known as 'Virtual Power Plants' (VPPs) can provide all the services fossil generation peakers can provide and can also help defer spending on transmission and distribution infrastructure. VPPs are, from economic, resiliency, environmental, land use, permitting, general pro-renewables and anti-grid defection public policy perspectives, in many ways superior to other resource options. Given their ability to be deployed in a modular, stepwise fashion, VPPs are also simple to build, deploy and grow, and can be easily financed, via well-scoped request for proposal ("RFP") processes, special rate/tariff performance or efficiency programs, and/or other procurement means; all of which have been successfully tested in other jurisdictions. Customers are demanding solar plus storage today; becoming prosumers

today. Untapped VPP resources are thus being deployed everyday, as we speak”.

The testimonies from PREPA/Siemens, Local Environmental Organizations, Sunrun, Windmar, our own expert witnesses, and the PREB expert/examiner confirmed unchallenged that PV plus batteries can substitute for oil or gas plants providing resiliency, following schedules, and providing frequency response.

The PREB Examiner/Expert] asked: **Could all of the solar and storage identified in the IRP be distributed in that fashion, or does just some of it need to be centralized?**

[PREPA/Siemens]: Answer was **If they behave the same. Frequency response; following instructions; there is no way to distinguish one from the other.** [...]

...

The executive director of PREPA himself supported this statements.

The new control technologies which make it possible to integrate individual PVs and battery packs into networked solar plus storage or VPPs means that it is possible to enhance existing roof top systems by aggregating them– through PREPA or third parties – to create new resources for communities and/or the grid. VPPs can leverage the many benefits of PVs and storage described previously. By ignoring the potential for VPPs PREPA’s IRP again fails to deliver the best and smartest resource plan for Puerto Rico. PREPA’s action plan should include research to identify the best options for procuring VPPs.

THE IRP IS NOT COMPLAINT WITH ACT 17,

As pointed out on the testimonies presented by ICSE-PR, PRMA, CUD, MIDA and UPU, the proposed IRP makes no provision for the introduction of Advanced Grid Planning (AGP) methods, even though Act 17 requires “...the fastest and most efficient grid modernization...”¹. AGP is essential to manage grid modernization efficiently

¹ Act 17Sec. 1.6 Initial Objective no. 1.

because it entails bottoms-up analyses of flows on the distribution system². PREPA used only traditional top-down analysis.

The proposed IRP makes no provision for customer engagement, even though the Act requires PREPA to enable Prosumers (Sec. 1.6 Initial Objective no. 4). Customer engagement is essential to equip consumers with the knowledge and tools to become effective prosumers.

The proposed IRP over-invests in gas supply infrastructure and generation in violation of the Act's requirement to develop renewable energy supplies to reduce and eventually eliminate power generation from fossil fuels (Sec. 1.6 Initial Objective no. 7).

The proposed IRP makes no provision for increasing PREPA's capacity for processing interconnection requests timely and safely, even though the Act requires PREPA to facilitate interconnections "...by implementing the mechanisms, strategies, and technologies available in the electric power industry..." (Sec. 1.6 Initial Objective no. 8).

The proposed IRP has no strategy for reducing rates, even though the Act requires PREPA to "...establish the elements necessary..." to reduce rates below \$.20/kWh (Sec. 1.6 Initial Objective no. 16). The June 7 IRP locks in rates at about \$.25/kWh through 2038.

The IRP as submitted could create substantial new stranded costs. Testimony provided during the hearings stated that recovery of RSA transition charge will create incentive for consumers to leave the grid; investing billions in transmission for Minigrids will increase the risk of stranded costs.

THE IRP IGNORES THE SOLAR TAX IMPOSED BY THE RSA

Concerning the solar behind the meter tax:

² See The Integrated Grid: Realizing the Full Value of Central and Distributed Energy Resources, EPRI, 2014; and Integrated Distribution Planning, prepared for the Minnesota Public Utilities Commission by ICF International, August 2016.

The Solar Tax proposed to be imposed by the RSA would have a disastrous effect on renewable energy development and investment and limit the capacity of PREPA to comply with Act 17 mandates.

The behind the Meter Solar Tax for self-provided energy uses private investment and private production to guaranty legacy bond payments when self-production was never PREPA's income nor bond holders guaranty or source of payment.

Such behind the meter solar tax would hasten grid defection, increase reduction in PREPA's income and cash flow and would end not making viable any investment plan included in the IRP.

THE IRP DOES NOT INCORPORATE MINIGRIDS IN AN ADEQUATE MANNER

PREPA's proposed minigrids are really a rehash of PREPA's own operating regions. There is no mention of minigrids as prosumer centered development, be it municipal, cooperative, etc.

Examples, on record by our expert witnesses, of the real microgrids operating in the US are:

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 Oahu³. 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.

³ Public Utilities Commission of the State of Hawaii, Docket No. 2018-0163, Hawaii Electric Companies' Opening Brief, Exhibit 2-Schofield Generating Station Microgrid Project.

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.⁴

Princeton University has a microgrid consisting of a 15MW gas-fired CHP system, supplemented by a 4.5 MW solar array.⁵

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 storage⁶.

Montgomery County Maryland's Public Safety Headquarters in Gaithersburg integrates 2MWdc of canopy-mounted PV and an 865 kW CHP system.⁷

Montgomery County Maryland's Correctional Facility in Boyds incorporates a 220kW CHP system and 2.8 MWdc of on-site solar capacity.⁸

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.⁹ This project has not moved forward, due to a lack of support from key loads to be served.

⁴ Illinois Commerce Commission, Petition Concerning the Implementation of a Demonstration Distribution Microgrid, Docket No. 17-0331, Order, February 28, 2018, at 5 and 6.

⁵ Case Study: Microgrid at Princeton University, Consulting Engineer Magazine, June 8, 2015.

⁶ International District Energy Association (IDEA)

⁷ IDEA

⁸ IDEA

⁹ Microgrids: Community Resiliency, Potsdam, NY; presentation by Arun Vedhathiri, Director, New Energy Solutions, National Grid Company at the Advanced Energy Conference, March 27, 2018.

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.

Further, the investment in mini-grids included on the IRP surpasses \$7,000 million. Nevertheless, although the magnitude of such investment, generation capacity of such mini-grids is reduced, covering only critical loads.

THE IRP IS LACKING ENERGY EFFICIENCY ANALYSIS

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 2040.¹⁰ 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.

¹⁰ Act-17, Section 6.29B. Energy Efficiency.

THE IRP IS BIASED TOWARD LNG

The ICSE-PR, PRMA, CUD, MIDA and UPU, are unopposed in stating that PREPA's liquified natural gas (LNG) plan for electric generation is overly expensive, risky, poorly conceived, and will be an albatross on the neck of all Puerto Rico electric customers, guaranteeing high electricity prices, for years to come, without properly abating GHG impacts. A likely consequence is that many current PREPA customers will pursue aggressive efforts to go "off-grid," further eroding PREPA revenue and Puerto Rico's ability to afford sensible energy solutions. Clean and distributed energy resources are far less expensive and ensure the goal of 100% renewable energy can be met on time. A collaborative effort with PREPA, the Bureau, Puerto Rico Customers, and advanced third-party providers, to provide distributed energy resources (DERs), can minimize total costs, lower demand, reduce capital cost and debt, minimize PREPA rates, and reduce grid "defection." PREPA has not, with its consultants, analyzed DERs or explored the benefits of integrated DERs, though an advanced DER implementation plan would lower customer bills, and increase resiliency during future weather challenges and natural disasters.

This record shows that the proposed tasks that PREPA should undertake include the following:

- Gap analysis with respect to bottom-up planning, starting with customers and DER options, to provide "on-time" solutions as needed that minimize cost and maximize value;
- Evaluate the net present value of scenarios across the value chain from customers to the grid and include all suppliers. Analyze covariance with respect to weather, loads, and prices;
- Address the growing gap with accelerated growth and costs declines for DERs, including opportunities to use solar photo-voltaic, smart inverter, and battery options for customer resilience, starting with critical facilities (fire stations, police, civil defense, and community centers);

- Fully explore the use of energy efficiency to reduce 1) DER costs to customers, 2) capital costs for distribution grid expansion, and 3) capital costs for transmission and generation expansion, particularly as demand reduction enables downsizing of these features and so dramatically reduces overall costs;
- Integration and optimization of DERs and supply-side options, which requires bottom-up and top-down analysis;
- Explore a new collaborative approach with a platform to coordinate grid planning, customer needs, resiliency, and DER development to minimize costs, maximize value for all stakeholders, and increase jobs.
- Develop analytics and strategy to address the declining costs of renewable and DER resources (“backwardation”)¹¹ in order to minimize rate impacts and stranded costs.

THE ISSUE TODAY IS TO ENSURE PREPA IS HEADED IN THE RIGHT DIRECTION

Given the record in this case, including the many sources of irreducible uncertainty presented, the Bureau should understand that it cannot determine a resource plan that will be suitable much less optimal through 2038. In the short term, the LNG proposal presents major uncertainties with its implementation, particularly with respect to cost, as well as safety given “reawakened” earthquake faults. There are too many degrees of freedom, too many major uncertainties we cannot predict between now and 2038. Therefore, the Bureau needs to approach the June 7, 2019 IRP knowing that it will need to provide continuing oversight. Whatever plan is approved in 2020 will need to be reviewed and updated several times before 2038. The need for course corrections is to be expected.

The record we have created reflects a broad consensus among intervenors that the Plan submitted on June 7 is deeply flawed and should not be implemented. It is not compliant with Act 17, it reflects a bias towards LNG, is not based on state-of-the-art

¹¹ Backwardation occurs when the current price (cost) of an underlying asset (such as solar PV, battery storage, or integrated DERs) is higher than the prices in the near and longer-term future. It signals an undisputed decline in price for the asset during the planning horizon.

planning methods, and it could create substantial new stranded costs. Instead of approving the June 7 Plan, the Bureau should direct PREPA to enhance its Action Plan in four key areas, as follows:

1. Implement Advanced Grid Planning - As elaborated in the filed testimonies of Mr. Ackerman and Dr. Woychik, the Action Plan should include bottom-up grid planning based on load flow and granular economics, address related tasks involving “gap” analysis, the delivery of training to staff and others, and participation in an advanced grid planning user group.
2. Engage Customers – PREPA needs to develop and implement a strategy for ongoing customer engagement. The Action Plan should include tasks involving the conduct of a customer collaborative to identify the resources customers need to become effective prosumers, the analysis of customer metering and billing data to frame investment and other decisions, the use of analytic tools to support customer decisions, and the design of customer incentives for efficient consumption and investment.
3. Process Interconnection Requests – PREPA needs to build its capacity for processing interconnection requests. The Action Plan should include tasks related to identifying hosting capacity, and surveying other jurisdictions that have done the same thing to understand how they did it (e.g., what analytic tools they used, what level of staff resources they committed, what business processes they redesigned).
4. Critical Facilities – PREPA needs to revisit its strategy for strengthening the reliability and resilience of service to customers, critical facilities, and network these services with resilient communications. The Action Plan should include a survey of design approaches to securing critical facilities on the mainland. It might also provide for a design competition similar to the New York Prize program.

5. The PREB should approve what energy supply is needed, not what specific technologies are needed. The PREB' should focus on the amount of new generation needed, and its required characteristic.

THE IRP IGNORES HYDROELECTRIC POWER OPPORTUNITIES

In terms of hydroelectric generation action plans and proposed investments, the IRP only refers to a Request for Qualifications for a Long-Term Lease and Energy Sales Agreement(s) for Hydroelectric Power Plants Owned by Puerto Rico Electric Power Authority, issued on April 16 by the Puerto Rico Public-Private Partnerships Authority (P3), as indicated on footnote #18, page 4-8 of the IRP¹².

Neither the RFQ nor the information in the IRP constitute a specific plan to consider the actual integration of hydroelectric generation facilities, generating units and associated water system resources into the Integrated Resources Plan (IRP). Only the *Capacity, Availability and Capacity Factor* time frame goals included on the IRP Exhibit 4-10, *PREPA Operational Hydro Capacity Assumptions*, constitute information that can be used in a future action plan. The information in that Exhibit is included also as part of the April 16, 2019 RFQ. Notwithstanding, the information included on Exhibit 4-10 is neither explained nor justified, nor are specific directives, priorities or resources provided for each unit or site to be retrofitted.

Approving an IRP that does not includes specific plans for hydroelectric facilities, generating units and associated water systems deprives Puerto Rico's ratepayers, residents, customers and all stakeholders of an important renewable energy resource. Undoubtedly the integration of hydroelectric generation would not only reduce system costs and environmental impacts, but it would also provide system reliability and resiliency at locations where the most socioeconomically vulnerable people live, that is, in the central mountain areas that were most affected by Hurricane Maria.

¹² Footnote #18, PREPA Proposed IRP, dated June 7, 2019:

[18 REQUEST FOR PROPOSALS: Long-Term Lease and Energy Sales Agreement(s) for Hydroelectric Power Plants Owned] by: Puerto Rico Electric Power Authority]

Further, not restoring nor adequately maintaining Puerto Rico's hydroelectric facilities including generation units, dams, reservoirs and related water systems creates a public safety issue. The IRP does not consider safety issues and their very real costs. As previously occurred with the Carraizo dam during hurricane Hugo in 1989 and recently with the Guajataca dam during hurricane María in 2017, the lives of many people were at risk during and after those natural disasters. This IRP needs to consider the restoration of those sites with the additional benefit of the well-being and safety of their region. If hydroelectric sites are not taken into account within this IRP review process, emergency response costs to be incurred by PREPA could be higher than refurbishing, repowering or restoration costs.

Hydroelectric generation costs less than natural gas generation, especially in Puerto Rico.

With the exception of the Eco Eléctrica plant, which supplies natural gas for its own generation and to Costa Sur units 5 & 6, there is currently no natural gas utility scale supply capabilities at Puerto Rico, or local natural gas production. Adequate utility scale distribution facilities are also lacking near the proposed fossil fuel generation areas, especially on the north part of the island. To solve these issues would require a huge initial investment, as stated in the current and previous IRP versions, estimated at over one billion dollars. These financial costs will have a direct impact on the cost of electricity.

Costs related to hydroelectric generation are substantially lower than those associated with any fossil fuel option, especially in Puerto Rico when considering the refurbishing of existing hydroelectric generation sites. **Hydroelectric generation marginal costs are close to zero** and levelized costs are also usually lower than natural gas generation.

There is no future fuel cost certainty. The cost of gas and fossil fuels costs may rise considerably and unexpectedly. This would make hydroelectric generation a better and more cost stable alternative than fossil fuel generation, including natural gas. The benefits of hydroelectric generation are even more compelling when considering construction, O&M and the environmental costs of fossil fuel generation.

CONCLUSION

The IRP as proposed by PREPA is flawed. The IRP ignores the reality in which it would operate. It is detached from the fiscal reality of Puerto Rico and PREPA; it is detached from technological developments:

It is detached from the modern market tendencies;

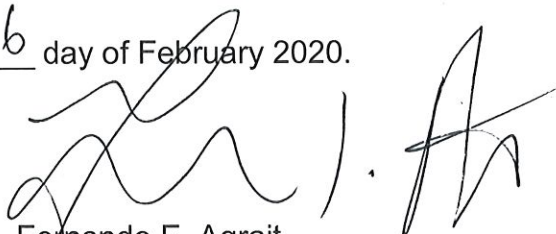
It fails to consider real alternatives while it focus exclusively in LNG.

The IPR is not viable.

For the above-mentioned reasons, the PREB should reject the proposed IRP or direct PREPA to substantially revise it. Additionally, due to the lack of analysis presented by PREPA in terms of Distributed Energy Resources (DER), PREPB should consider an interim order, approving only minimum investment required on supply energy resources, while a new IRP is developed that consider full benefits of DER in accordance with Act 17.

CERTIFICATION: I hereby certify a copy of this motion was notified by electronic mail to: astrid.rodriguez@prepa.com; jorge.ruiz@prepa.com; n-vazquez@aepr.com; c-aquino@prepa.com; mvazquez@diazvaz.law; kbolanos@diazvaz.law; Agustin Carbo, <acarbo@edf.org>; Javier Rúa-Jovet, <javier.ruajovet@sunrun.com>; pedrosaade5@gmail.com; rmurthy@earthjustice.org; carlos.reyes@ecoelectrica.com; ccf@tcmrslaw.com; victorluisgonzalez@yahoo.com; Marc Roumain, <mgrpcorp@gmail.com>; Hannia Rivera Diaz, <hrivera@oipc.pr.gov>; jrivera@cnspr.com; Manuel Fernandez, <manuelgabrielfernandez@gmail.com>; acasellas@amgprlaw.com; corey.brady@weil.com; maortiz@lvprlaw.com; rnegrón@dnlawpr.com; paul.demoudt@shell.com; escott@ferraiuoli.com; castrodieppalaw@gmail.com; voxpopulix@gmail.com; Carlos Fernandez Lugo <cfl@mcvpr.com>; sierra@arctas.com; tonytorres2366@gmail.com; info@liga.coop; amaneser2020@gmail.com; mpietranтони@mpmlawpr.com; Alana Pagan, <apagan@mpmlawpr.com>; sproctor@huntonak.com; Vanessa I. Acarón Toro, <viacaron@energia.pr.gov>; Cecilia Sánchez Negrón, <csanchez@energia.pr.gov>; Sylvia Ugarte, <sugarte@energia.pr.gov>; Gladys A. Maldonado Rodriguez, <gmaldonado@energia.pr.gov>; Ileana Reyes, <ireyes@energia.pr.gov>; Brenda Liz Mulero, <bmulero@energia.pr.gov>; Alexandra Sanz <asanz@energia.pr.gov>; Nuri Nuñez, <nnunez@energia.pr.gov>; Wanda Cordero, <wcordero@energia.pr.gov>

In San Juan, Puerto Rico, this 6 day of February 2020.

A handwritten signature in black ink, appearing to read 'F. Agrait', written over a horizontal line.

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