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PUBLIC SERVICE REGULATORY BOARD  
PUERTO RICO ENERGY BUREAU

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**IN RE:**

INTEGRATED RESOURCE PLAN  
FOR THE PUERTO RICO  
ELECTRIC POWER AUTHORITY

**NO.:** CEPR-AP-2018-0001

**SUBJECT:** REPLY BRIEF

**REPLY BRIEF OF ENVIRONMENTAL DEFENSE FUND**

TO THE HONORABLE PUERTO RICO ENERGY BUREAU:

COMES NOW the Environmental Defense Fund (“EDF”), which respectfully submits the following *Reply Brief of Environmental Defense Fund*, pursuant to Regulation No. 9021 (“Regulation 9021”), known as the Regulation on Integrated Resource Plan (“IRP”) for the Puerto Rico Electric Power Authority (“PREPA” or “Company”), Section 9.06 of Regulation 8543, known as the Regulation on Adjudicative, Notice of Noncompliance, Rate Review and Investigation Procedures, Rule 201 of the Rules of Evidence of Puerto Rico, as amended, Resolution, Completeness Determination of PREPA’s IRP Filing and Procedural Calendar, July 3, 2019, Order, Recalendarization of Administrative Procedures and Method of Filing Documents, March 31, 2020, and Resolution and Order, Deadline For Reply to Final Briefs. April 15, 2020.

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## **I. Introduction**

EDF submits this Reply Brief pursuant to the Puerto Rico Energy Bureau's ("Energy Bureau") Resolution dated February 28, 2020.<sup>1</sup> The first section of the brief addresses the three questions raised by the Energy Bureau's Resolution and Order dated March 3, 2020.<sup>2</sup> The second section addresses arguments raised by certain parties. Please note that, pursuant to the Rules of Evidence of Puerto Rico, EDF has made references to materials that can be accurately and readily determined from sources whose accuracy cannot reasonably be questioned, and this Honorable Energy Bureau can take administrative notice at any stage of the proceeding.<sup>3</sup>

## **II. First Question Raised by Energy Bureau - Rooftop Solar**

The Energy Bureau poses the question as to whether rooftop solar should be used in lieu of utility-scale solar to transform Puerto Rico's electric system.

While both utility-scale and customer-sited solar have their roles to play in advancing Act 17 goals, we recommend PREPA and the Energy Bureau leverage and encourage the growing demand for decentralized, customer-sited solutions. Summarizing best practices from Hawaii's IRP, EDF's expert witness, Dr. Elizabeth Stanton, explains how distributed energy resources (DERs) can be enabled to maximize net benefits to customers:

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<sup>1</sup> See Resolution, *Extension of Final Substantive and Legal Briefs and Reply to Legal Briefs Deadline*, CEPR-AP-2018-0001 (March 6, 2019).

<sup>2</sup> See Resolution, *Topics identified during the public comment process to be added by the parties*, CEPR-AP-2019-0001 (March 3, 2020).

<sup>3</sup> Rules of Evidence of Puerto Rico, Rule 201, 32 L.P.R.A. Ap VI, R. 201; see also *Banks v. Schweiker*, 654 F.2d 637, 641 (9th Cir. 1981) (noting that the appropriate scope of administrative notice is broader in administrative proceedings than in trials).

## Hawaiian Best Practices

Hawaii's electric-sector planning experience illuminates best practices that help enable distributed energy resources to provide maximum benefit for electric customers utilities must prioritize:

a) Shift from centralized to distributed energy resources: Distributed energy resources provide a more resilient, reliable and economic grid where customers provide a multitude of valuable services;

b) Assess all types of distributed energy resources on an equal footing with other capacity expansion opportunities: Building diverse distributed energy resources and considering opportunities to build these resources in community-based sites like micro grids and local energy districts is the best way to most fully capture the range of potential benefits offered by distributed generation opportunities; and

c) Consider grid services and risk reduction from distributed energy resources relative to other capacity expansion opportunities: Distributed energy resources provide valuable direct and indirect grid services, such as providing system security benefits or offsetting future transmission-and-distribution infrastructure upgrades, which are important benefits to be considered relative to other capacity expansion options.<sup>4</sup>

At the same time, however, it is crucial that neither the Energy Bureau nor PREPA should pick one technology over another. Rather, all technologies should be considered on their own merits and their ability to advance Act 17 goals. Act 17 requires the Energy Bureau to consider “all reasonable resources” for the IRP, including traditional resources and distributed generation.<sup>5</sup> The list of factors the Energy Bureau must consider in evaluating the IRP includes the following three items that require an evaluation of distributed resources as part of the IRP:

1. [T]he range of conventional and non-conventional generation technologies available in the market;<sup>6</sup>

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<sup>4</sup> B. Woods, E. Tavares, S. Alisalad & E. Stanton, *Puerto Rico Integrated Resource Plan: Lessons Learned from Hawaii's Electric Sector*,

<https://static1.squarespace.com/static/5936d98f6a4963bcd1ed94d3/t/5daf57304d56a44d67897c77/1571772211636/Hawaii+IRP+Lessons+for+PR+22Oct2019.pdf> (October 22, 2019) (last visited March 11, 2020).

<sup>5</sup> Puerto Rico Energy Public Policy Act, sec 1.2 (p), Act 17 (2019); see *Legal Brief of EDF*, pp. 5-6 (March 6, 2020).

<sup>6</sup> Act 17-2019, sec 1.9 (3)(C) (2019).

2. [A]n 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;<sup>7</sup> and,
3. [P]rojections with regards to the integration of distributed generation into the electric power grid.<sup>8</sup>

There is no “one-size-fits-all” answer when considering renewable utility-scale vs. DERs and it is evident that both solutions are needed to comply with Act 17. If one were to look only at the levelized cost of energy, as analyzed in the Lazard Levelized Cost of Energy (LCOE) report, we could conclude that utility-scale solar is cheaper than rooftop solar.<sup>9</sup> However, while LCOE incorporates many key PV metrics important to electricity generation costs, it is an imperfect measure. For example, the LCOE does not consider regional differences in resource availability nor does it take into account the different services and value technologies can provide to the electric system.<sup>10</sup> A discussion focused on cost only will also be reductive in that it would ignore how customer-sited solar advances the customer-centric objectives of Act 17. With rooftop solar, customers not only have a choice in how they receive and use their energy but they are also empowered to choose cleaner, more affordable, more resilient power options.

As such, the LCOE comparison is an important yet insufficient metric by which to assess the value that utility-scale or customer-sited solar can offer to Puerto Rico in advancing its RPS.

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<sup>7</sup> *Id.* at sec 1.9 (3)(F).

<sup>8</sup> *Id.* at sec 1.9 (3)(I).

<sup>9</sup> Lazard, *Levelized Cost of Energy and Levelized Cost of Storage 2019*, <https://www.lazard.com/perspective/lcoe2019> (last visited March 11, 2020).

<sup>10</sup> Lazard, *Lazard's Levelized Cost of Energy Analysis – Version 13.0*, p. 1, <https://www.lazard.com/media/451086/lazards-levelized-cost-of-energy-version-130-vf.pdf> (Nov. 2019) (last visited March 11, 2020); Lazard summarizes the caveats as follows: “Other factors would also have a potentially significant effect on the results contained herein, but have not been examined in the scope of this current analysis. These additional factors, among others, could include: *capacity value vs. energy value; network upgrades, transmission, congestion or other integration-related costs; significant permitting or other development costs*, unless otherwise noted; and costs of complying with various environmental regulations (e.g., carbon emissions offsets or emissions control systems).”

In addition to generation cost, we need to perform a rigorous inventory of energy resources able to support expanding customer desires and also enhance the resiliency and value of the larger electric system while also advancing Act 17.

EDF recommends that the Energy Bureau, together with PREPA, determine regional and local system needs - not just generation but also transmission and distribution needs and customer preferences - when exploring utility-scale and DG solutions. For example, both rooftop and utility-scale solar could provide benefits such as peak-shaving, resiliency, voltage and frequency support but not every building is suitable for a solar installation. At the same time, not every circuit can or should integrate a solar farm. Benefits associated with both utility-scale and rooftop solar need to be analyzed, considering temporal and geographic variability as well as the added benefits storage can offer intermittent resources. Such an analysis should also incorporate an integrated “bottoms-up” approach by which existing resources such as customer-sited solar are leveraged to not only reduce overall costs but also to improve resilience, as discussed by expert witness Ronny Sandoval (Sandoval) and Eric Ackerman at the hearing. As EDF concluded in its Initial Brief:

This type of analysis will provide guidance to prosumers and third-party investors to make the most economically efficient investments and identify locations for DERs which will provide the most grid value. Further, this approach to grid planning allows PREPA to deploy new grid components where and when they are needed and avoids unnecessary upward pressure of rates by preemptively investing in modern grid components before the market is ready. Integrated distribution planning using a bottoms up approach as described by Ackerman should be included in all future IRP processes.<sup>11</sup>

For example, a recent report on non-wires alternatives (NWA) by the Smart Electric Power Alliance (SEPA) examined ten representative NWA projects across the country.<sup>12</sup> The study found that NWAs can successfully delay and permanently defer infrastructure upgrades, that they

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<sup>11</sup> Legal Brief of EDF, p. 59, CEPER-AP-2018-0001 (March 6, 2020).

<sup>12</sup> Non-Wires Alternatives: Case Studies from Leading U.S. Projects, November 2018, available at: <https://sepapower.org/resource/non-wires-alternatives-case-studies-from-leading-u-s-projects/> (last visited March 30, 2020).

provide an incremental approach to addressing load growth uncertainty while avoiding major up-front costs, and that they have the potential to significantly reduce overall costs.

In summary, the Energy Bureau should evaluate rooftop solar on a level playing field with utility-scale solar and approve a resource plan that optimizes both of these important resources. EDF's recommendations in its Initial Brief provide a pathway for the Energy Bureau to do so.<sup>13</sup>

Regarding utility-scale renewable power purchase and operating agreements ("PPOAs"), the IRP includes a summary of projects in operation, under re-negotiations, and not re-negotiated.<sup>14</sup> In the 2016 IRP Final Order, the Energy Bureau requested an independent audit of PREPA's existing contracts in order to pursue re-negotiation or an exit to those contracts.<sup>15</sup> In addition, PREPA was asked to commence a competitive bidding process by June 30, 2017 for new renewable energy projects.<sup>16</sup> The IRP failed to address the status of that directive. EDF recommends, as ordered by the Energy Bureau, that PREPA be required to submit to the Energy Bureau progress reports every six months on the status of re-negotiations of PPOAs and competitive bidding processes for renewable energy projects. Furthermore, for future IRPs, information on expirations of those contracts should be included in the summary of projects.

### **III. Second Question Raised by Energy Bureau - Hydroelectric Resources**

Hydroelectricity is a renewable energy source that has been underestimated and not even included in PREPA's IRP, considering the number of existing facilities in Puerto Rico. This

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<sup>13</sup> See *Legal Brief of EDF*, CEPR-AP-2018-0001 (March 6, 2020).

<sup>14</sup> Revised IRP, sec. 4.2.2, p. 4-13, *et seq.* (June 2019).

<sup>15</sup> See *Final Resolution and Order on the First Integrated Resource Plan of the Puerto Rico Electric Power Authority*, pp. 37-38, CEPR-AP-2015-0002 (Sept. 23, 2016).

<sup>16</sup> See *id.*

resource offers operational flexibility and responds to fluctuations in electricity demand. From a sustainability perspective, hydroelectric resources could be developed and operated in a manner that is economically viable, environmentally sensible and socially responsible, meaning that they have a longer lifetime, improve air quality, help fight climate change, and contribute to the storage of drinking water.<sup>17</sup> However, PREPA's hydroelectric facilities have been discouraged and replaced with highly polluted fossil-fueled sources, increasing negative environmental and public health externalities.

The construction of reservoirs in Puerto Rico, at the beginning of the last century, provided significant water storage capacity to supply the demand of agricultural, energy, and public consumption needs. At that time, Puerto Rico built 15 reservoirs for just hydroelectric generation purposes. The legislative history provides evidence of the importance of hydroelectric facilities in Puerto Rico. By 1933, one facility produced 38 million kilowatts per hour per year, which amounted to almost half of all the energy produced in Puerto Rico for that year.<sup>18</sup> Notwithstanding their importance from an environmental perspective, these hydroelectric facilities were gradually abandoned and disused due to the preference for and construction of petroleum-based thermoelectric plants.<sup>19</sup>

According to PREPA's Revised IRP, the Company has 21 hydroelectric generating units at eleven generating facilities for a total installed capacity of 105 MW.<sup>20</sup> However, "some of these units are not operational, or are underutilized due to staffing and funding shortages resulting in

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<sup>17</sup> See USGS, Hydroelectric Power: Advantages of Production and Usage, [https://www.usgs.gov/special-topic/water-science-school/science/hydroelectric-power-advantages-production-and-usage?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects](https://www.usgs.gov/special-topic/water-science-school/science/hydroelectric-power-advantages-production-and-usage?qt-science_center_objects=0#qt-science_center_objects) (last visited March 10, 2020).

<sup>18</sup> See Act 31-2015, Statement of Motives (2015).

<sup>19</sup> See *id.*

<sup>20</sup> Revised IRP, sec.4.2.1.4, pp. 4-8 – 4-9 (2019).



deferred maintenance issues.”<sup>21</sup> The operational units total 34 MW, with a capacity factor of less than 20% as of the first quarter of 2018. As EDF identified in its Initial Brief:

The IRP fails to provide for resource diversity for flexibility and balance and fails to address existing assets, e.g., hydro resources. This is an important consideration because using different types of renewable resources together can improve the efficiency of both. . . . [Furthermore, t]he hydro resources should have been an important consideration because they are already in place and merely needed to be restored, and this would have provided an important flexible resource that would have helped meet the Act 17 renewable energy target.<sup>22</sup>

Thus, due to the lack of information provided in the current IRP, EDF recommended to develop a technical potential study for refurbishing and upgrading hydro facilities and that the study be released to the public well in advance of PREPA’s issuance of any RFPs that it will use to develop inputs for the next IRP.<sup>23</sup> This comprehensive hydroelectric feasibility study, as well as a recommended reservoir management assessment, needs to be conducted in order to determine whether rehabilitating existing hydro facilities is a viable alternative. Such a study can assess the capacity of those water bodies and the costs associated with dredging sedimentation to increase their storage capacity, how much electricity should and can be generated in each plant - considering changes in seasonal precipitation, generation profiles and climate patterns, and how much water is available for electricity generation. A thorough investigation of hydropower resources could also be instructive with regards to the multiple co-benefits hydropower can provide including “water storage for drinking and irrigation, drought-preparedness, flood control protection, aquaculture.”<sup>24</sup>

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<sup>21</sup> *Id.*

<sup>22</sup> *Legal Brief of EDF*, p. 27, CEPR-AP-2018-0001 (March 6, 2020).

<sup>23</sup> *See id.* at 52.

<sup>24</sup> *See* Hydroelectric Power A Guide for Developers and Investors. International Finance Corporation, [https://www.ifc.org/wps/wcm/connect/906fa13c-2f47-4476-9476-75320e08e5f3/Hydropower\\_Report.pdf?MOD=AJPERES&CVID=kJQI35z](https://www.ifc.org/wps/wcm/connect/906fa13c-2f47-4476-9476-75320e08e5f3/Hydropower_Report.pdf?MOD=AJPERES&CVID=kJQI35z) (last visited March 31, 2020).

Furthermore, the IRP also failed to address the transfer of hydroelectric assets through legislative action and other legal means, such as the cases with the municipalities of Comerio and Villalba. Although these scenarios have not been fully developed, PREPA is privy to all of these developments while involved in these real estate transactions, yet they have chosen to stay silent in the IRP.

- a. Hydroelectric facilities that have been transferred to some municipalities, provide a decentralized solution that could benefit the grid as well as local communities and businesses near those facilities.*

Although hydroelectric facilities in Puerto Rico have not been operational for many decades, some recent developments are providing a possible future for this technology. In 2015, a law was enacted to sell and transfer to the Municipality of Comerío two dams owned by PREPA built for hydroelectric purposes. The law requires that the Municipality enters into a public-private partnership or consortium to, among other things, generate electricity. The law also creates a Special Committee, composed of agency leaders, for the rehabilitation and operation of Comerío I and II dams for the production of renewable energy and tourism development. Unfortunately, due to many negative externalities, including Comerio's fiscal situation, the project has stalled. If the municipality fails to implement the goals of the law, the transferred properties can be reverted back to the state.

In 2018, the Puerto Rico legislature, in a bipartisan vote, passed a bill to transfer a hydroelectric facility to the Municipality of Villalba and to be used by a Mountain Electric Consortium ("Consortium") (including the neighboring municipalities of: Barranquitas, Orocovis, Morovis, and CIales).<sup>25</sup> The bill was very similar to the law that transferred the hydroelectric dams

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<sup>25</sup> See P.R. Senate Bill 433 (2017).

to Comerio, *supra*. However, on December 31, 2018 the bill was vetoed by the then-Governor of Puerto Rico. That hurdle did not stop PREPA and the new Governor of Puerto Rico from negotiating a real estate transfer through other legal alternatives outside of what had been originally proposed by the legislature. As of this filing, the transaction is yet to be executed. However, the Consortium, led by the Municipality of Villalba, is collaborating with communities and a major global medical device industry located in its town to make this a reality. It is important to note that this negotiation and project is not discussed in the PREPA Revised IRP.

While the Consortium is committed to move forward with this project in order to enjoy more energy independence from PREPA and to provide a resilient and cleaner energy solution to its communities, to make the hydro facility operational they will have to rely on a public-private partnership approach. Therefore, prior to issuing an RFP, EDF recommends that a thorough technical potential study, including a reservoir management assessment, be developed. Only after such a study is developed, can an assessment be made as to who should bear the costs of dredging the reservoir and whether the facility should be selected as part of a least-cost supply plan.

*b. The P3 Authority approach could be a transparent alternative to retrofit and make operational existing hydro facilities, once a technical potential study is developed.*

In the Revised IRP, PREPA briefly discussed an alternative method to economically increase the output and continuing operation from hydroelectric resources through the issuance of an RFP regarding long-term lease and energy sales agreement for their hydroelectric power plants.<sup>26</sup> Exhibit 4-6 shows a Scenario to increase hydroelectric contribution to 70 MW, assuming

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<sup>26</sup> See note 14 at 4-8.

a high level estimate of a total of \$100 million investment through 2023.<sup>27</sup> However, the discussion did not provide more information on the RFP process or subsequent actions. Parallel to the mentioned RFP, on April 16, 2019, the P3 Authority issued a request for qualifications (RFQ) for the Hydroelectric Power Plants Revitalization Project, in which a contractor would rehabilitate and operate hydroelectric units at nine existing sites around Puerto Rico.<sup>28</sup> The RFQ called for the “rehabilitating, upgrading, managing and operating sixteen (16) hydroelectric generating units and their respective turbines, switchyards, dams and reservoirs at nine (9) facilities . . . located throughout . . . Puerto Rico, including the administration of federal disaster recovery funding, if any, pursuant to a long-term contract.”<sup>29</sup>

The P3 Authority qualified interested parties through this process, but they have yet to issue an RFQ for this project. The Revised IRP is silent about this process. Although this type of approach could provide a viable avenue to retrofit and operate these abandoned facilities, as discussed above, *supra*, a technical potential study is recommended prior to issuing an RFP. This also could help attract more potential parties interested in bidding through such a process. Depending on the bid results, these facilities could be included as part of a least-cost supply plan for the next IRP.

#### **IV. Third Question Raised by the Energy Bureau - VPPs**

A Virtual Power Plants (VPP) is a proven consumer-centric solution which, when implemented correctly, can lower consumer bills by both lowering grid investment costs due to their decentralized manner but also by leveraging existing behind the meter assets. While Act 17

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<sup>27</sup> *Id.*

<sup>28</sup> P3 Authority, Request for Qualifications, RFQ 2019-2 (April 16, 2019).

<sup>29</sup> *Id.*

calls for PREPA to invest in decentralized consumer-centric solutions, the IRP completely ignored this emerging low-cost technology. While some parties discussed VPPs in the context of solar and storage, there are many additional types of energy solutions which can be included in the supply plan, such as controllable hot water heaters, programmable heating and cooling in efficient buildings, and smart charging from electric vehicles.<sup>30</sup> Through the use of VPPs, PREPA can leverage consumer-sited resources for normal operational capacity volume (MWh) but also grid management services such as peaker generation, frequency balancing, and voltage control.

The only barrier that exists for VPPs to materialize in Puerto Rico is the lack of financial incentives for companies and customers to offer their resources as a service to PREPA. To unlock this, PREPA must create a process that would allow VPP developers to monetize the benefits from VPPs. There are certain steps that must be taken for PREPA to include VPPs in its IRPs. First, PREPA must create a process that would allow VPP developers to monetize the benefits from VPPs. Second, PREPA must have a procurement plan that would allow it to acquire VPPs as part of its IRP.

There are a few different ways PREPA could monetize the benefits from VPPs:

1. Issue an RFP for interested parties to submit bids for providing VPP services for a given level of capacity.
2. Allow VPPs to equally participate in service specific RFPs with utility-scale resources. For example, for services such as reserve capacity.
3. Offer a tariff for specific services, such as peak generation, with clear terms and conditions for measuring and assigning a tariff for these services.

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<sup>30</sup> See DOE, *Grid-Interactive Efficient Buildings* (April 2019), [https://www.energy.gov/sites/prod/files/2019/04/f61/bto-geb\\_overview-4.15.19.pdf](https://www.energy.gov/sites/prod/files/2019/04/f61/bto-geb_overview-4.15.19.pdf); NASEO-NARUC Grid-Interactive Efficient Buildings Working Group, *Grid-Interactive Efficient Buildings: State Briefing Paper*, <https://naseo.org/data/sites/1/documents/publications/FINAL-GEB-NASEO-report-full.pdf> (last visited March 12, 2020).

Dr. Stanton discussed the Hawaii Electric Company's ("HECO") approach to monetizing and procuring VPPs at the hearing and EDF also discussed this in its Initial Brief. HECO currently offers the following tariffs that could be used as a basis for an aggregator to solicit customers and bundle the customers together to develop VPPs:

**Customer Grid Supply (CGS)** – Participants receive a Commission-approved credit for electricity sent to the grid and are billed at the retail rate for electricity they use from the grid. The program remains open until the installed capacity has been reached.

**Customer Grid Supply Plus (CGS Plus)** – Systems must include grid support technology to manage grid reliability and allow the utility to remotely monitor system performance, technical compliance, and if necessary, control for grid stability.

**Smart Export** – Customers with a renewable system and a battery energy storage system have the option to export energy to the grid from 4 p.m. to 9 a.m. Systems must include grid support technology to manage grid reliability and system performance.<sup>31</sup>

EDF recommends that PREPA issue an RFP for VPPs as part of its next planning process and that the technology-neutral, all-resource RFP be written broadly enough to include VPPs. In addition, PREPA should begin to explore these types of tariffed services now because tariffs can take several months to develop, and having one or more tariffs for VPP procurement would help accelerate PREPA's procurement of flexible renewable resources.

While most VPP grid management services can easily be incorporated into PREPA's operations, integration into PREPA's control centers for automated dispatch is a barrier that prevents VPPs from offering advanced grid services for some use cases such as, for example, spinning reserves. EDF recommends that the Energy Bureau consider these VPP integration issues

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<sup>31</sup> See HECO, *Advanced Rate Design Strategy* (September 25, 2019), at pp. 24-25, [https://www.hawaiianelectric.com/documents/clean\\_energy\\_hawaii/grid\\_modernization/dkt\\_2018\\_0141\\_20190925\\_cos\\_ARDS.pdf](https://www.hawaiianelectric.com/documents/clean_energy_hawaii/grid_modernization/dkt_2018_0141_20190925_cos_ARDS.pdf) (last visited March 12, 2020).

as part of a separate proceeding, where all stakeholders, including VPP developers such as Sunrun, can participate.

While VPPs offer the most versatility and controllability of consumer-centric solutions, in the short term, PREPA can also offer simplistic programs such as Green Mountains Power's bring your own device (BYOD) program.<sup>32</sup> While this type of program does not utilize the full value of a consumer asset, it can quickly unlock the visibility of what resources are available on the consumer side, release capacity from existing on the ground systems, and also encourage more customers to invest in behind the meter solar and storage. Alongside VPP procurement programs, PREPA should also pursue programs such as this which allows individual customers choice to either to contribute to the system through a third party VPP or individually.

#### **V. Reply to PREPA's Initial Brief**

In its initial brief, PREPA simply summarizes the law, the case history and argues that the ESM plan is the best alternative. PREPA's initial brief does not discuss any of the pre-filed testimonies filed by intervenors or the numerous recommendations made by the intervenors' expert witnesses at the IRP hearing. PREPA's initial brief failed to present arguments as to why the Energy Bureau should reject the recommendations by the other parties' expert witnesses. Curiously, PREPA offered no arguments against Dr. Elizabeth Stanton's recommendations. Therefore, the Energy Bureau should adopt Dr. Stanton's recommendations in full. Her

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<sup>32</sup> See Green Mountain Power, *Bring Your Own Device*, <https://greenmountainpower.com/bring-your-own-device/> (last visited March 11, 2020).

recommendations were well-reasoned, consistent with industry best practices, well-supported by the facts of the case and were not rebutted by PREPA.

At page 4 of its initial brief, PREPA concludes that the IRP complies with Regulation 9021 and Act 17. EDF respectfully disagrees. EDF's Initial Brief presents several reasons why the IRP violates both Regulation 9021 and Act 17. EDF supported each reason with a detailed explanation at pages 16 through 40 of its Initial Brief. PREPA's initial brief failed to address any of these points. As a result, EDF recommends that the Energy Bureau reject PREPA's unsupported conclusion that the IRP complies with the law.

At page 20 of its initial brief, and at various other places, PREPA states that it is using conventional resources, e.g., LNG, as a "hedging" tool just in case renewable energy deployment and energy efficiency do not materialize. This is an absurd condition to impose, as is the excessiveness of the capital-intensive, fossil fuel-based infrastructure aka "hedging" tool. PREPA curiously posits that "the degree to which renewable generation and storage resources, distributed generation and energy efficiency improvements will actually be developed and achieved is uncertain..."<sup>33</sup> This stands in stark contrast to the proposed IRP, which claims that its "implementation will transition the Puerto Rico electric system from one centered on fossil fuels to one in which renewable resources play a central, if not, the predominant role."<sup>34</sup> How much and how fast renewable energy and energy efficiency resources are added is primarily within PREPA's control and conversely PREPA is able to sabotage any potential for these resources to be adopted. To present legal and regulatory compliance as though it is outside of PREPA's control

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<sup>33</sup> Legal Brief of PREPA, p. 32, CEPR-AP-2018-0001 (March 6, 2020).

<sup>34</sup> IRP Main Report p. 1-2



is misleading and worrisome, especially when the proposed IRP so clearly misses the mark on prioritizing renewable energy deployment and demand-side resources.

Beginning at page 19 of its brief, PREPA discusses how it used a 30% reserve margin for the IRP. Even though PREPA used a 30% reserve margin for the IRP as a whole, it made additional assumptions that led to an excessive amount of capacity by the end of the planning period. These additional assumptions were: (1) dividing the island into eight minigrids; and (2) imposing a constraint that the critical load in each minigrid must be served by 100% thermal resources and by 80% local resources. So even though it might have been reasonable to use a 30% reserve margin for the island as a whole as a planning assumption, the fact that Siemens adopted these additional constraints created an excessive amount of extra capacity that was the functional equivalent of a 100% reserve margin by the end of the IRP planning period,

PREPA discusses carbon pricing beginning at page 21 of its brief and this discussion highlights the confusing way that PREPA treated carbon pricing in the IRP. The IRP contains a forecast of future carbon prices and it appeared that the IRP included a price on carbon as part of the least-cost analysis. After all, what is the point of including a carbon price forecast if you're not going to use it? But as it turns out, PREPA didn't include a carbon price in the IRP until it was asked to do so in an ROI.

Utilities routinely included carbon pricing in their IRPs after the Obama Administration introduced the Clean Power Plan (CPP) in 2014 because the CPP required carbon reductions and an IRP must take into account all environmental constraints. In 2017, the Trump Administration withdrew from the Paris Agreement and it later took steps to change the EPA's rules on how the health impacts from air pollution are calculated, which would make it easier to withdraw the CPP.

As a result, regulation of carbon emissions is less certain in the near-term. Nevertheless, the scientific evidence for global warming is becoming increasingly clear, leaving a strong case that carbon will be regulated at some point. Moreover, utilities are increasingly adopting a corporate policy of decarbonizing for environmental and economic reasons.<sup>35</sup> Finally, the adoption of Act 17's 100% renewable energy requirement by 2050 makes clear that fossil resources will not be permitted after that date. Given these circumstances and the environmental and economic risks associated with fossil fuels, the Energy Bureau should order PREPA to include carbon pricing in future IRPs.

PREPA argues at page 20 of its initial brief that it was reasonable not to include offshore wind and hydroelectric resources in its IRP. EDF disagrees. As EDF pointed out in its Initial Brief, PREPA used outdated information on the cost of offshore wind to conclude that it would not be cost-effective. The cost for all forms of renewable energy has been declining rapidly so PREPA should have obtained a technical potential study for offshore wind and refreshed pricing. PREPA also should have obtained a technical potential study for hydroelectric resources. As discussed in EDF's Initial Brief, IRP best practices include obtaining current pricing for all resources. This is necessary to obtain the optimal resource plan that is least-cost and fulfills the planning objectives.

At pages 28 through 29 of its initial brief, PREPA states that the ESM plan recommended by the IRP was developed by the Central Office for Recovery, Reconstruction, and Resiliency ("COR3") as part of the grid modernization plan, and that the grid modernization planning

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<sup>35</sup> See, e.g., Utility Dive, *CenterPoint Unveils CO2 Emissions Strategy, Omitting Details on 1 GW of Coal Capacity* (March 4, 2020), <https://www.utilitydive.com/news/centerpoint-announces-co2-emissions-strategy-while-future-of-coal-plants-1/573427/> (last visited March 12, 2020).

included an ESM working group that helped prepare the ESM. This is contrary to how COR3 describes the situation. In the grid modernization plan, COR3 states that the grid modernization plan was developed based on PREPA's IRP plan and not the other way around. The fact that PREPA was using the ESM to prepare the grid modernization plan, and not the other way around, shows that PREPA had a clear bias toward the ESM from the very beginning and that it really wasn't open to comments from other parties like COR3 or the IRP stakeholders regarding alternative plans. In addition, EDF recommends that a grid modernization plan and integrated distribution system plan be included as part of future IRPs and the IRPs should incorporate the same assumptions as presented in those plans.

**VI. Proposals for increasing the amount of LNG delivered through either new LNG facilities and/or new LNG pipelines is not in the best interest of consumers and such proposals should be rejected**

Some other parties have proposed other supply plans that call for increasing the amount of LNG delivered to the island, either through new offshore LNG facilities or through a new LNG pipeline from the EcoElectrica plant to the Aguirre plant. EDF recommends that the Energy Bureau reject both proposals, because adding new LNG supply is not in the best interests of PREPA or its customers. Moreover, PREPA should not rely on the PPOA as a hedge for failure to implement enough renewable energy or energy efficiency because, as the Local Environmental Organizations and Arctas explain in their briefs, the PPOA is not enforceable.<sup>36</sup>

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<sup>36</sup> See *Legal Brief of Local Environmental Groups*, CEPR-AP-2018-0001 (March 6, 2020); see also *Legal Brief of Arctas*, CEPR-AP-2018-0001 (March 6, 2020).

**VII. Expedite integration of solar and storage is pivotal to comply with the RPS targets established in Act-17**

As EDF has mentioned elsewhere, Act 17 sets aggressive renewable energy targets by 2050. Sunrun’s legal brief stated that one of the central mandates of Act-17 is to “focus on distributed renewable generation plus energy storage as the path from fossil fuels and towards a certain 100% renewables generation portfolio.”<sup>37</sup> Sunrun also expressed that one of the goals of Act 17 is to facilitate the interconnection of distributed generation and encourage the use of energy storage technology for consumers at all levels.<sup>38</sup> Having those rules in place can help expedite the deployment of DGs plus storage in an expedited manner. Moreover, Sunrun recommended large deployments of renewable energy on public building rooftops as a fast alternative to comply with RPS targets established by law.

To that effect, the Local Environmental Organizations in their legal brief urged the Energy Bureau order PREPA to provide an expedited timeline to actually implement *Comunicado Tecnico 19-2*, which would allow automatic interconnection of distributed PV systems, as well as net metering for those systems once an independent engineer performed the inspection.<sup>39</sup> As they expressed, Act 17 requires “expedited processes under the regulations of interconnection of generators or distributed systems and an effective process to reduce interconnection time.”<sup>40</sup> They concluded their statement reciting Puerto Rico’s public policy that consumers should be empowered to be part of the energy resources portfolio through the installation of distributed generation.<sup>41</sup>

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<sup>37</sup> Legal Brief of Sunrun, p. 11, CEPR-AP-2018-0001 (March 6, 2020), *quoting* Act 17-2019, sec. 1.6.

<sup>38</sup> *See id.*

<sup>39</sup> *Legal Brief of Local Environmental Organizations*, p. 32, CEPR-AP-2018-0001 (March 6, 2020),

<sup>40</sup> *Id.*

<sup>41</sup> *Id.*

Considering the above, EDF supports these recommendations provided by Sunrun and the Local Environmental Organizations, and encourages the Energy Bureau to promote the expedited deployment of solar plus storage, with appropriate rulemaking actions, in an effort to comply with the RPS targets established in Act 17.

VIII. **Response to ICPO - Implementing scenario S4S2S9 as a preferred option in the IRP is less consistent with Act-17 renewable energy targets**

The Independent Consumer Protection Office (“ICPO”) was not in favor of PREPA’s preferred ESM scenario, but rather favored a modified S4S2S9 scenario, including PREPA’s minigrad concept, keeping EcoElectrica natural gas generation units, and repairing Costa Sur or building a new natural gas power plant to substitute the base load provided by such generating facility. Although the ESM was PREPA’s preferred scenario, RMI, in its *Amicus Curiae* brief, identified scenario S3S2S8B as a desirable outcome in this case, when it filed its preliminary amicus brief on September 20, 2019.<sup>42</sup> EDF, in its Initial Brief, agreed with RMI’s recommendation, with modifications, for several reasons as discussed in detail in that brief.<sup>43</sup>

One benefit of the preferred S3S2S8B scenario is that it relies most heavily on new renewables. The desired ICPO scenario falls between the ESM and RMI’s recommendation, but with additional new natural gas infrastructure. RMI reiterated its position in its regular brief on December 20, 2019.<sup>44</sup> See Table I, *supra*, for a Summary of Investments Decisions by Scenario.

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<sup>42</sup> *RMI Amicus Curiae Brief*, CEPR-AP-2018-0001 (Sept. 20, 2019).

<sup>43</sup> See note 22.

<sup>44</sup> See note 42.

Table 1 - Summary of Investment Decisions by Scenario

	Preferred Scenarios		
	ESM PREPA	S3S2S8B* EDF	S4S2S9+ ICPO
	Renewables		
RPS 2038	67%	87%	68%
New Solar 2038 (MW)	2,400	4,140	2,820
	Large and Medium CCGTs (MW)		
San Juan 5 & 6	440	440	440
Palo Seco	302	-	302
EcoElectrica	507	-	507
Yabucoa	302	-	-
Conv. Mayaguez	200	-	-
Mobile Generators	421	-	-
Costa Sur	EcoElectrica instead; 5 & 6 retired in 2020	5 & 6 retired in 2021 & 2019	302
Gas Peakers Generation (2025)	421	348	348
<b>Total Gas Generation</b>	<b>2,172</b>	<b>788</b>	<b>1,899</b>
	New Proposed LNG Terminals		
San Juan (ship-based)	X	X	X
San Juan (land-based)	X		X
Mayaguez (ship-based)	X		
Yabucoa (ship-based)	X		

\* S3S2S8B modified with no new gas plants or gas peaking plants during the five-year action item period  
 + S4S2S9 modified with Costa Sur or build a new large scale CCGT, EcoElectrica and consider converting AES to natural gas.

Regarding the minigrid concept, EDF recommends against full implementation of the eight proposed minigrids in the IRP. EDF’s Initial Brief agreed with the Grid Modernization Plan’s recommendation that minigrids should be deployed gradually since this type of system is the first of its kind and recommended that the Energy Bureau grant conditional approval to develop one minigrid.<sup>45</sup> EDF believes that it is not reasonable or prudent to carry out an expansion of the minigrid concept, as contemplated in the IRP, prior to determining whether a minigrid is capable of functioning as planned.<sup>46</sup> PREPA proposes to spend over \$3.8 billions on the eight minigrids.

<sup>45</sup> See *id.*

<sup>46</sup> See *id.*

This is an exorbitant amount for a concept that has not been tested or proven and would lead to, as currently planned, an extremely excessive amount of excess capacity, which would even further increase the cost of the IRP, without necessarily adding any additional resiliency. For these reasons, EDF recommended testing a single minigrid, as explained in EDF's Initial Brief and by the Local Environmental Organizations' expert witness Ronny Sandoval in his testimony.<sup>47</sup> EDF also recommended that the approval should further be conditioned on PREPA developing an acceptable plan, to be approved by the Energy Bureau, following comments by interested stakeholders, for the type and location of resources and the amount of reserve margin for the minigrid.<sup>48</sup>

Regarding decisions involving infrastructure investments, such as gas infrastructure, EDF cautioned that they can result in stranded assets and exacerbate PREPA's dependence on fossil fuels.<sup>49</sup> Also, EDF alerted that the IRP did not reflect the full costs of the new gas plants, such as the ones recommended by the ICPO, and that these resources would have had an unfair advantage over clean energy resources which do not face this same challenge of becoming stranded assets in 2050, when the island must be served by 100% renewable energy pursuant to Act 17.<sup>50</sup>

Regarding new investments in Costa Sur, PREPA's preferred scenario relies on the EcoElectrica PPOA's renegotiation instead of adding a new 302 MW CCGT. Although the ICPO's preferred scenario makes similar assumptions for Costa Sur, they recommend a variation including repairment or building a new CCGT at such a facility. EDF respectfully disagrees with ICPO's recommendation to build a new CCGT at Costa Sur. As EDF established in its Initial

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<sup>47</sup> See note 22 at pp. 50-51; see also Legal Brief of Local Environmental Groups, pp. 35-40, CEPR-AP-2018-0001 (March 6, 2020).

<sup>48</sup> See note 22 at 50.

<sup>49</sup> See *id.*

<sup>50</sup> See *id.*

Brief, the best solution for PREPA's supply needs is to make major investments in new renewables, storage and energy efficiency, and no new investments in additional natural gas generating resources.

On a separate note, on February 12, 2020, PREPA filed an urgent petition to the Energy Bureau for approval of a "confidential" request for proposals for temporary emergency generation in light of the unavailability of power from Costa Sur (earthquake-related damages).<sup>51</sup> PREPA argues that it would not be able to supply the required base load during the summer peak demand and that it would need 500 MW of emergency generation to supply such a need. PREPA expects that the emergency generation would be needed for up to 18 months. On March 3, 2020, the Energy Bureau authorized PREPA to issue an RFP to only secure a lease agreement for the "temporary" generation needed. PREPA has not established a need for this temporary emergency generation. At the conclusion of the IRP hearing, the Energy Bureau ordered PREPA to file an earthquake damage assessment on the Costa Sur plant within 30 days. PREPA has partially complied with this request, with two (2) assessment reports (including the *Geotechnical Post Seismic Event Condition Survey*) still waiting to be completed and filed with the Energy Bureau.<sup>52</sup> Having a complete assessment report should be the first step before PREPA issues an RFP to replace that generation.

EDF recommends that, in all cases where PREPA seeks to procure generation, the RFP should be available to the public or, in the alternative, to interested stakeholders who enter into a confidentiality agreement. The RFP should be technology neutral. The RFP process should be overseen by an independent monitor to eliminate any bias that PREPA might have toward adding

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<sup>51</sup> See *Request for Approval of Request for Proposals for Temporary Emergency Generation*, NEPR-AP-2020-0001 (March 2020).

<sup>52</sup> See *PREPA's Motion to Submit Reports Assessing Damages*, NEPR-AP-2020-0001 (April 1, 2020).



more natural gas plants. These steps would create more transparency and help ensure that the generation supply mix complies with the objectives of the Energy Bureau and Act 17.

IX. **Conclusion**

EDF thanks the Energy Bureau and its consultants for its consideration of the arguments presented in this Reply Brief. Based on the foregoing and its Initial Brief, EDF respectfully requests that the Energy Bureau reject the IRP and approve a modified IRP with recommendations as submitted in EDF's briefs.

**RESPECTFULLY SUBMITTED,**

IN SAN JUAN, PUERTO RICO, THIS 20th DAY OF APRIL, 2020.

**ENVIRONMENTAL DEFENSE FUND**

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IT IS HEREBY CERTIFIED that the foregoing was sent to the Puerto Rico Energy Bureau through its electronic filing tool at <https://radicacion.energia.pr.gov> and to the Puerto Rico Electric Power Authority to the following: Nitza D. Vázquez Rodríguez (n-vazquez@aepr.com); Astrid I. Rodríguez Cruz (astrid.rodriguez@prepa.com); Jorge R. Ruíz Pabón (jorge.ruiz@prepa.com), Katuska Bolaños (kbolanos@diazvaz.law), and Maralíz Vázquez (mvazquez@diazvaz.law).

IN SAN JUAN, PUERTO RICO, THIS 20th DAY OF APRIL, 2020.

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**CERTIFICATION OF FILING AND SERVICE**

I hereby certify that on April 20, 2020, I have sent the above Reply Brief of Environmental Defense Fund to the following intervenors: Javier Rúa-Jovet, Sunrun (javier.ruajovet@sunrun.com); Pedro Saadé-Lloréns, Ruth Santiago and Raghu Murthy, Local Environmental Organizations (pedrosaade5@gmail.com, rstgo2@gmail.com and rmurthy@earthjustice.org); Carlos A. Reyes and Carlos E. Colón-Franceschi, EcoEléctrica (carlos.reyes@ecoelectrica.com and ccf@tcmrslaw.com); Roy Torbert, Rocky Mountain Institute (rtorbert@rmi.org); Víctor L. González and Marc G. Roumain-Prieto, Grupo Windmar (victorluisgonzalez@yahoo.com, mgrpcorp@gmail.com); Hannia B. Rivera-Díaz and Jessica Rivera-Pacheco, Oficina Independiente de Protección al Consumidor (hrivera@oipc.pr.gov, jrivera@cnslpr.com); Manuel Fernández-Mejías, Empire Gas Company (manuelgabrielfernandez@gmail.com); Axel E. Colón-Pérez, AES Puerto Rico (axel.colon@aes.com, sboxerman@sidley.com and bmundel@sidley.com); Alexandra Casellas-Cabrera and Corey Brady, National Public Finance Guarantee (acasellas@amgprlaw.com and corey.brady@weil.com); Josh Franklin, Progression Energy (jfranklin@progression-energy.com); Paul De Moudt, Shell (paul.demoudt@shell.com); Eugene Scott-Amy, Wartsila North America (escott@ferraiuoli.com and sproctor@huntonak.com); Jéramfel Lozada-Ramírez, ACONER (aconer.pr@gmail.com); Fernando E. Agrait, Non Profit Intervenors (agraitfe@agraitlawpr.com); Pablo Vázquez-Ruíz, CIAPR (presidente@ciapr.org); Arctas Capital Group (sierra@arctas.com, tonytorres2366@gmail.com); SESA-PR & Caribe GE (cfl@mcvpr.com); League of Cooperatives of Puerto Rico and AMANESER 2025 (info@liga.coop, amaneser2020@gmail.com).

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