

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

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IN RE: PUERTO RICO ELECTRIC
POWER AUTHORITY INTEGRATED
RESOURCE PLAN

CASE NO. CEPR-AP-2018-0001
SUBJECT: REPLY BRIEF

LOCAL ENVIRONMENTAL ORGANIZATIONS' REPLY BRIEF

TO THE HONORABLE PUERTO RICO ENERGY BUREAU:

COME NOW, Comité Diálogo Ambiental, Inc., El Puente de Williamsburg, Inc. -Enlace Latino de Acción Climática, Comité Yabucoeño Pro-Calidad de Vida, Inc., Alianza Comunitaria Ambientalista del Sureste, Inc., Sierra Club and its Puerto Rico chapter, Mayagüezanos por la Salud y el Ambiente, Inc., Coalición de Organizaciones Anti-Incineración, Inc., Amigos del Río Guaynabo, Inc., Campamento Contra las Cenizas en Peñuelas, Inc., and CAMBIO Puerto Rico, Inc., (“Local Environmental Organizations”).

Local Environmental Organizations first address the three questions posed by the Energy Bureau in its March 3, 2020 order. Local Environmental Organizations next address PREPA’s non-compliance with the required elements for its Integrated Resource Plan,¹ as laid out by Law 17-2019 Section 1.9(3), and respond to the parties’ briefed positions on each element.

¹ Puerto Rico Electric Power Authority, Integrated Resource Plan Rev 2.1, Dkt. No. CEPR-AP-2018-0001 (June 19, 2020) [“IRP”].

I. Local Environmental Organizations' Response to Questions Posed by the Energy Bureau

During the public comment process, the Energy Bureau observed that the overwhelming majority of Puerto Ricans want an Integrated Resource Plan that takes full advantage of renewable resources, particularly onsite distributed renewable resources, and moves quickly away from the dirty, unreliable, and costly fossil fuels-based generation that have impacted public health for decades. Puerto Ricans also pointed out that in prior decades, PREPA had actually relied on more than 100 MW of renewable capacity from the island's hydroelectric resources, but had let that capacity dwindle in recent years due to lack of maintenance. On March 3, 2020, the Energy Bureau ordered all parties to address three questions raised during the public comment process on rooftop solar, hydroelectric resources, and virtual power plants.²

² Puerto Rico Energy Bureau, Resolution on Topics Identified During the Public Comment Process to be Addressed by Parties, Dkt. No. CEPR-AP-2018-0001 (Mar. 3, 2020), <http://energia.pr.gov/wp-content/uploads/2020/03/Resolution-CEPR-AP-2018-0001.pdf>.

- (1) **Rooftop Solar: Provide comments on reasonable alternatives to make the transformation of the electric system viable by using rooftop solar systems in lieu of utility scale solar developments.**

PREPA's Final Substantive Legal Brief ("PREPA's Brief") acknowledges that transformation of the system using distributed generation is not only viable, but that distributed generation must take a **predominant** role in the Puerto Rico grid.³

Section I(H) of Local Environmental Organizations' Final Substantive & Legal Brief provides details of many specific steps that can be added to PREPA's Action Plan to immediately begin the transformation of the electric system through rooftop solar + storage. Those steps are laid out below. If Puerto Rico is truly serious about embracing rooftop solar to transform the grid, then these steps must be made part of PREPA's Fiscal Year 2020 budget.

First, PREPA must provide an expedited timeline to allow automatic interconnection of distributed PV systems, as well as net metering for those systems, after inspection by an independent engineer.⁴ The current COVID-19 crisis demonstrates the value of automatic interconnections: they can be done without straining limited PREPA resources. For that reason, Law 17-2019, Section 1.5(8)(b) requires "expedited processes under the regulations for the interconnection of generators to the distribution system" and "an effective process

³ Puerto Rico Electric Power Authority, Final Substantive Legal Brief at 10, Dkt. No. CEPR-AP-2018-0001 (Mar. 6, 2020) ["PREPA Brief"].

⁴ Comunicado Tecnico 19-02 would implement these steps. PREPA's February 24th Information Response to the Independent Consumer Protection Office made it clear that implementation has not yet been completed.

to reduce the interconnection time.” This comports with Puerto Rico’s declared public policy to “empower the consumer to be part of the energy resources portfolio through . . . the installation of distributed generation”⁵

Second, PREPA must coordinate with owners of current distributed renewable generation & storage to gain visibility of these resources, and PREPA must offer to compensate customers for the services these resources could then provide to the grid. Regulation 9021 2.03(H)(2)(C) requires PREPA to take advantage of the low level of utility-borne costs from demand-side resources. Puerto Ricans have currently installed 172.75 MW of distributed generation, with a significant but unknown accompanying amount of distributed storage.⁶ Even without any incentives at all, Siemens forecasts distributed generation to rise to 1,176 MW by 2038. At the hearing, an expert witness called this “the biggest untapped Virtual Power Plant resource in the world.”⁷

Third, PREPA must coordinate with the Bureau, the Energy Efficiency program administrator, and stakeholders on designing a customer engagement plan “to educate citizens and electric power service customers on energy efficiency consumption reduction, distributed generation strategies, and other available tools to empower consumers to have more control over their energy consumption,”

⁵ Law 17-2019, Section 1.5(2)(e).

⁶ IRP, App’x 4, Exhibit 3-1. *See also* Brief for Rocky Mountain Institute as Amicus Curiae, at 22, *In re: Review of the Puerto Rico Electric Power Authority Integrated Resource Plan*, Dkt. No. CEPR-AP-2018-0001 (Dec. 20, 2019) (referencing reports from solar developers, and explaining that about ninety percent of installations following Hurricane Maria are coupled with battery storage).

⁷ *Negociado de Energía en vivo, Evidentiary Hearing / CEPR-AP-2018-0001*, YouTube (Feb. 7, 2020), <https://youtu.be/zkGmgsj6OTs?t=13114>.

as required by Law 17-2019 Section 1.5(4)(b). We note that PREPA titled Part 3 of its Action Plan “Engaging the Customer” but did not actually include a customer engagement plan.⁸ A customer engagement plan would also help PREPA develop a “reasonable set of assumptions for econometric and/or end use variables” as required by Regulation 9021 Section 2.03(C)(2)(c).

Finally, PREB should open a new docket to examine options to finance distributed generation. Financing strategies and instruments must be requested from all sectors: credit unions, cooperatives, and others to achieve renewable generation goals with a distributed generation strategy. PREPA could also use its budget to incentivize customers to build distributed solar and storage systems, and share implementation costs with customers. Senate Bill 1879 details such a program.⁹

Through these programs, Puerto Rico could achieve the goals of the Queremos Sol proposal: for 75% of homes to have a rooftop solar system of around 1.5 kW of generation capacity accompanied by a 10 kWh storage system by 2035, fulfilling at least 50% of the island’s capacity and energy needs.¹⁰ This is essential and should guide the actions of the Bureau. Going forward, Puerto Rico’s efforts to integrate distributed generation will also benefit from a study that has been commissioned by the Queremos Sol coalition. This study will analyze the

⁸ IRP, Section 10.3.

⁹ Senate Bill 1879 would require PREPA to cover up to 80% of the total cost and installation of renewable energy systems in the residences of the participating owners that have the average consumption of a family of four members, or 800 kilowatts of energy per month, whichever is greater. In turn, it provides that the excess energy produced by the systems installed and acquired through the incentive must be used to reduce the energy cost in Puerto Rico.

¹⁰ See Queremos Sol, <https://www.queremossolpr.com/>

distribution system, as Siemens should have done, with the goal of maximizing distributed renewables. The study will further analyze the impact on the transmission and sub-transmission system of these resources. The analysis will include identifying modifications/improvements and investment costs in both systems to achieve renewable generation goals with a distributed generation strategy.

(2) Hydroelectric Generation: Provide comments on the alternative of rehabilitating the existing hydroelectric plants and dredging the existing reservoirs to optimize their capacity.

Siemens' analysis of hydroelectric resources is a great example of one of the key failings of Siemens' IRP: the failure to incorporate real-world data. In the case of hydroelectric resources, Siemens' analysis is based entirely on one "unsolicited proposal" received by PREPA. That "unsolicited proposal" is not in the record before this Energy Bureau.¹¹ At the hearing, Mr. Paredes agreed to submit additional information on the proposal, but PREPA has failed to submit anything to date.¹² Based on that unsolicited proposal, Siemens can only provide a "high-level estimate" of the cost and timing of restoring hydroelectric resources.¹³ Fortunately, as detailed below, intervenors' experts were able to provide specific steps to restoring Puerto Rico's hydroelectric resources.

¹¹ Negociado de Energía en vivo, *Evidentiary Hearing / CEPR-AP-2018-0001*, YouTube (Feb. 5, 2020), <https://youtu.be/vIXWJt52Hfk?t=13353>.

¹² *Id.*

¹³ PREPA Integrated Resource Plan Section 4.2.1.4

Local Environmental Organizations support a study for the potential of rehabilitating existing hydroelectric plants, as well as the potential for using newer, more modular micro-hydro technology to create smaller, more distributed hydroelectric facilities at other sites, with minimized environmental impacts. During Panel G, Jose O. Aleman-Bermudez¹⁴ described a series of steps to restore Puerto Rico's hydroelectric resources, and highlighted the research conducted into micro-hydro co-authored by Local Environmental Organizations' expert witness, Dr. Agustín Irizarry Rivera.¹⁵ In 2009, Dr. Irizarry and others examined micro-hydro technology as part of a paper sponsored by the Energy Affairs Administration, titled "Achievable Renewable Energy Targets for Puerto Rico's Renewable Energy Portfolio Standard".¹⁶ The International Center for Small Hydro Power recognized Dr. Irizarry's work and included it in the World Small Hydropower Development Report 2013.¹⁷ That work, recognized around the world, can now be applied on the island. We urge that PREPA consider the blackstart capability and location-specific resiliency benefits of hydroelectric resources, which allow them to power nearby loads immediately after a major event. We also urge PREPA to work with the Puerto Rico Aqueduct and Sewer Authority and the Department of Natural and Environmental Resources on scheduling, since those

¹⁴ Mr. Aleman spoke with the perspective of 27 years' experience working at PREPA: including oversight of the specific hydroelectric resources at issue here. Direct Testimony of Jose O. Aleman-Bermudez, P.E., M.B.A., p. 4

¹⁵ Negociado de Energía en vivo, *Evidentiary Hearing / CEPR-AP-2018-0001*, YouTube (Feb. 5, 2020) <https://youtu.be/vIXWJt52Hfk?t=13807>.

¹⁶ Agustín Irizarry-Rivera, José Colucci-Ríos, Efraín O'Neill-Carillo, Achievable Renewable Energy Targets for Puerto Rico's Renewable Energy Portfolio Standard (May 2009), <https://www.uprm.edu/aret/>.

¹⁷ United Nations Indus. Dev. Program, International Center on Small Hydropower <http://www.smallhydroworld.org/> (last accessed Apr. 13, 2020).

agencies use these reservoirs for water supply, habitat, fishing and recreational activities. PREPA must also account for all environmental impacts, including the amount of water diversion each of these actions will cause, and the flooding footprint. Finally, we recommend that PREPA solicit community input on possible locations for placing dredged material, well in advance of selecting sites.

(3) Virtual Power Plants: Provide comments on the alternative of using virtual power plants (i.e. aggregators) as a resource to PREPA, and how these should be incorporated in PREPA's competitive processes for the acquisition of new generation resources.

Local Environmental Organizations are generally supportive of the idea of using aggregation to meet the needs of PREPA customers. Aggregation is an important piece of the puzzle, but not the entirety of the picture, and how the grid services it provides are acquired matters a great deal. These projects are customer-initiated and paid for without compensation for any grid services from PREPA. It is a no-regret decision to leverage these projects for the frequency response and other grid services they can provide.

But millions of Puerto Ricans—at the very least the 45 percent of Puerto Ricans who live below the poverty level—are precluded by income from benefiting from the aggregation of grid services. They require a different model to enable them to afford solar and battery storage on their own homes. This is one reason LEOs are generally but not unconditionally supportive of aggregation. It would

be inadequate for the Energy Bureau to carve out a piece of the pie, so to speak, for aggregators and conclude that it has done all that was necessary to include distributed generation in PREPA's resource mix. A deeper, more holistic, and more proactive program to bring the benefits of distributed generation to income-limited Puerto Ricans is needed.

We also emphasize that how the services those aggregators provide are acquired is very important. PREPA has a history of overpaying for numerous generating resources from renewable PPOAs to fuel contracts.¹⁸ The Bureau should make clear that:

- 1) PREPA is legally required to seek the Bureau's approval process in order to issue any RFP. To initiate the Energy Bureau approval process, PREPA's Executive Director must submit a detailed recommendation to the Energy Bureau.¹⁹
- 2) PREPA must convene a Project Committee composed of members with the specialized background necessary to understand the scope of the Project at issue.²⁰

¹⁸ For example, Arctas' Final Substantive and Legal Brief explains how PREPA is overpaying under a power contract with EcoEléctrica LP and a fuel purchase agreement with Naturgy Aprovevisionamientos S.A. Arctas Capital Group, LP, Final Substantive and Legal Brief at 2, Dkt. No. CEPR-AP-2018-0001 (Mar. 6, 2020) ["Arctas Brief"].

¹⁹ Regulation 8815, Section 4.2.

²⁰ *Id.*, Sections 3.1, 4.1.

- 3) The Project Committee must follow the applicable rules including keeping detailed minutes of each meeting and presenting written recommendations to the PREPA Board.²¹
- 4) Further, all qualified respondents to any (Bureau approved) RFPs are subject to review by the Bureau prior to execution of a contract for services.²²

At the evidentiary hearing, expert witnesses also identified several ways Virtual Power Plants could offer grid services to address system needs. These procurement processes include:

- Issuing requests for proposals (RFPs) for system needs, such as non-wires alternatives (NWAs);
- Developing tariffs and rates designed to incentivize specified services to the grid; and
- Administering programs that encourage energy conservation and demand response.

PREPA can play an important role in creating a transparent process that identifies the critical system needs and seeks solutions from customers and energy experts alike. Publicizing specific information, including the timing, location, and the nature of these system needs to potential respondents of these opportunities could result in novel and efficient proposals that leverage demand-side solutions.

²¹ *Id.*, Article 4, Article 7.1.

²² Act 57-2014, Section 6.32.

It's worth noting that the Bureau's resolution on the on-going "Regulation for Energy Efficiency and Demand Response" proceeding contemplates the selection of a third-party administrator to oversee the operation of these demand-side programs, including those that may be used to seek NWAs.²³ However, even in the instance that a party aside from PREPA solicits customer sited solutions, the resolution states that the transmission and distribution provider and/or system operator "shall identify opportunities where EE or DR resources may cost-effectively avoid or defer the need to construct transmission or distribution infrastructure".

Finally, PREPA must create programs to bring the benefits of distributed generation to low-income communities. Puerto Rican community organizations, credit unions, and cooperatives have already created programs to serve as a model for PREPA to follow. For example, through donations and social investments, Casa Pueblo has installed solar panels, with battery storage and micro-inverters, in 62 homes in an Adjuntas community. Through Casa Pueblo's initiative, dozens of Adjuntas merchants and businesses have installed solar panels and batteries on their storefronts as well.

Distributed generation can not only provide resilient energy, but also strengthen a community's social fabric. Access to low-cost sustainable energy is a

²³ Puerto Rico Energy Bureau, Resolution on Notice of Proposed Regulations and Request for Public Comments, Dkt. No. NEPR-2019-0015 (Sept. 4, 2019), <https://energia.pr.gov/wp-content/uploads/2019/09/Resolution-NEPR-MI-2019-0015-2.pdf>.

means of encouraging economic resilience and nurturing grassroots community development.

Credit unions and cooperatives have a strong commitment to being a part of transformation of the energy grid; they have created financing packages for homeowners to obtain solar panels and batteries. The majority of Puerto Ricans, especially those in low-income communities, are already familiar with these financial institutions.

II. Law 17-2019 Section 1.9(3), Integrated Resource Plan Content

Having offered answers to this Honorable Bureau's questions, the Local Environmental Organizations must now respond to the erroneous claims of PREPA's Final Legal Substantive Brief.

In the introduction to its Brief, PREPA acknowledges that its IRP must "identif[y] and exhaustively assess[] alternative strategies" for supplying resilient generation while controlling costs and acting in an "environmentally sustainable way."²⁴ PREPA, and its consultant Siemens, fail to meet that standard: for example, they present wildly exaggerated costs for solar and storage technologies in Puerto Rico, completely disconnected from actual prices on the Island. It strains credulity to label as "exhaustive" a desktop analysis whose authors couldn't bother to verify local prices—by making a simple phone call to a Puerto Rican supplier—and who present artificially inflated costs for technologies that Puerto Ricans

²⁴ PREPA Brief at 3.

already know to be cost-effective, resilient, and environmentally sustainable. At the same time, PREPA hides the true costs of imported methane gas, large-scale, centralized gas plants, and long, vulnerable North-to-South transmission lines: the very same resources that failed in Hurricane Maria and the January 2020 seismic events. When asking why the Integrated Resource Plan overestimates the costs of renewables and underestimates the cost of gas-fired generation, it must be noted that buildout of gas-fired generation benefits two of the foreign consultants that PREPA deferred to during this Integrated Resource Planning process: Siemens and King & Spalding.

PREPA's consultants also drove up the amount of gas-fired generation they claim is necessary by refusing to include any Action Plan items at all on energy efficiency or demand response. PREPA's approach to these least-cost resources does not meet the bare minimum required by Law 17-2019, and is certainly not an "exhaustive" assessment of an alternative strategy to continued reliance on fossil fuels. PREPA's Action Plan fails to achieve compliance with Puerto Rico's energy efficiency standards in Law 17-2019; Siemens representatives conceded that due to PREPA's failure to put any energy efficiency or demand response actions into its Action Plan, non-compliant "low or . . . no energy efficiency" scenarios are the most likely futures for PREPA over the next 20 years.²⁵ The proposed Action Plan does not provide any indication of how PREPA will quickly move towards the substantial energy savings that are not only legally required,

²⁵ Negociado de Energía en vivo, *Evidentiary Hearing / CEPR-AP-2018-0001*, YouTube (Feb. 4, 2020), <https://youtu.be/-RXb0bf5ScY?t=2970>.

but also “least cost” resources, as experts—including PREPA’s and Siemens’ own representatives—testified to numerous times during the hearing and in pre-filed testimony. PREPA’s sparse and non-serious consideration of energy efficiency and demand response programs in no way qualifies as “exhaustive.”

The mischaracterizations contained in PREPA’s Brief culminate in the erroneous conclusion that the IRP that PREPA has submitted in this docket “complies in all material respects with the applicable requirements of the Energy Bureau’s Regulation 9021 and the Act 17-2019, and other applicable laws and regulations.”²⁶ As the final briefs of several other parties have noted, Law 17-2019, Section 1.9, imposes twelve elements with which an Integrated Resource Plan must comply.

The people of Puerto Rico demanded this law, and it was enacted by our representatives to transform our system to benefit our public and environmental health, resilience to disaster, encourage Puerto Ricans’ participation in our own utility system, and to improve our financial well-being. Where Law 17 requires “broad citizen participation” in the IRP,²⁷ it is because we have been excluded from decisions about our energy system. Where Law 17 requires the consideration of the environmental impacts of the electric system, including “air emissions and water consumption, solid waste, *and* . . . climate change,”²⁸ it is because the citizens of Puerto Rico have been made to breathe air laden with toxic emissions,

²⁶ PREPA Brief at 4.

²⁷ Act 17-2019, Section 2.1.

²⁸ *Id.*, Section 1.9 (emphasis added).

watch our aquifers drained to cool fossil-fueled power plants, experience disease from hazardous coal ash, and generally inhabit a place that is already more affected by climate change than *anywhere else in the world*.²⁹

PREPA's IRP does not comply with the requirements of Act 17-2019 Section 1.9. These elements, and the proof of PREPA's noncompliance, are considered in detail below. PREPA's Action Plan provides no immediate, tangible steps to begin the required transformation of Puerto Rico's grid. The Energy Bureau should reject PREPA's Integrated Resource Plan, order PREPA to redo the IRP to correct for errors, and instead adopt the no-regret Action Plan steps laid out in Local Environmental Organizations' briefs.

(A) PREPA's demand forecasts failed to examine the effect of several economic factors on electricity consumption: the RSA Transition Charge, Electric Vehicle Adoption, and the Optimal Reserve Margin.

Law 17-2019, Section 1.9(3)(A) requires the IRP to include 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."

²⁹ David Eckstein, Vera Künzen, Laura Schäfer, Maik Wings, Global Climate Risk Index 2020, Germanwatch (Dec. 2019), https://germanwatch.org/sites/germanwatch.org/files/20-2-01e%20Global%20Climate%20Risk%20Index%202020_10.pdf.

PREPA's Final Brief asks, but fails to answer, a critical question on an economic factor affecting electricity consumption: "How (and when) will PREPA emerge from Title III and the debt restructuring process and regain its creditworthy counterparty status?"³⁰ PREPA expects to emerge from the process through a Restructuring Support Agreement, which imposes a Transition Charge on PREPA ratepayers. The Transition Charge is the vehicle for PREPA ratepayers to shoulder the burden of paying off the mistakes of the past, in an attempt to make PREPA to become fiscally stable. The Transition Charge being considered in the Restructuring Support Agreement is a major economic factor that will profoundly affect electricity consumption, and therefore PREPA was required to account for it in the Integrated Resource Plan. In addition, the currently-proposed Transition Charge discourages distributed generation and renewables, in direct conflict with the goals of Law 17-2019.³¹ Siemens failed to seriously address these issues in its analysis. Siemens did not account for the costs of the Restructuring Support Agreement or the Transition Charge to PREPA or ratepayers: essentially assuming that the debt restructuring process would resolve itself at zero cost. Local Environmental Organizations' Legal Brief, Section VIII describes in further detail how this failure violates Law 17-2019, Section 1.9(3)(A).

³⁰ PREPA Brief at 15.

³¹ This is because the Transition Charge, as currently contemplated, would impose a fee based on the amount of electricity consumed by a private customer, regardless of the source of such electricity, including, solar and other renewable or recyclable sources. It would include energy generated through private resources owned by such consumer, rather than assets belonging to PREPA.

PREPA's future demand forecasts also failed to consider the effect of increased electric vehicle adoption. Local Environmental Organizations' Final Brief, Section I(G) describes this in further detail. EDF's Final and Substantive Legal Brief provides specific steps on EV adoption that PREPA must take.³²

Finally, PREPA's future demand forecasts failed to incorporate an optimal reserve margin, as required by Law 2019, Section 1.11(c). The section of PREPA's Brief on Resource Needs Assessment focuses heavily on the 30% minimum Planning Reserve Margin that Siemens input into the modeling.³³ This is quite strange, because that margin had little to no effect on the Preferred Plans that Siemens ultimately came up with, which have reserve margins two or three times larger than the minimum Planning Reserve Margin. PREPA's Preferred Plans include extraordinarily high reserve margins of 50% to 90% in S4S2 and 60% to 100% in the Energy System Modernization plan. The reserve margin is intended to be a critical constraint on resource optimization because it dictates the level of reserves that Puerto Rico finds to be economically optimal. When Siemens realized that the 30% Planning Reserve Margin had failed to act as a reserve margin is intended to, Siemens should have created an Optimal Reserve Margin, as Law 17-2019, section 1.11(c) requires. That optimal reserve margin would have allowed Siemens to create a more sensible Load Forecast; under the current forecast,

³² Environmental Defense Fund, Final Brief at 47, Dkt. No. CEPR-AP-2018-0001 (Mar. 6, 2020) ["EDF Brief"].

³³ PREPA Brief at 18-19 ("[T]he PRM of 30% does not impose a binding constraint in most years in almost all cases, and a PRM reduced to levels lower than 30%, e.g., 20%, would not significantly affect planned generating resource additions.").

PREPA's Preferred Plans require ratepayers to pay for installed capacity of about 7,000 MW in 2038, while Siemens forecasts peak demand to fall to 1,706 MW by that time.³⁴ This includes a massive amount of new gas-fired generation, to the benefit of PREPA's foreign consultants. Local Environmental Organization's Legal Brief, Section I(E) describes in further detail how PREPA's failure to incorporate an optimal reserve margin violates Law 17-2019, Section 1.9(3)(A).

(B) PREPA completely failed to evaluate the energy efficiency and demand response measures necessary to transform Puerto Rico's grid.

Law 17-2019, Section 1.9(3)(B) requires the IRP to include 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."

PREPA's Final Brief acknowledges that in order to meet the Governing Board's First Pillar, the Integrated Resource Plan must include the steps necessary to let energy efficiency and demand response take a **predominant** role in Puerto Rico's grid.³⁵ Siemens' forecasts demonstrate that PREPA has utterly failed in this task. Siemens estimates that due to the lack of energy efficiency steps in this IRP, "we have the view that the most likely scenario could be actually the no energy efficiency case—either the low or the no energy efficiency case."³⁶

³⁴ IRP, Exhibits 3-24, 3-25, & 3-26.

³⁵ PREPA Brief at 10 (emphasis added).

³⁶ Negociado de Energía en vivo, *Evidentiary Hearing / CEPR-AP-2018-0001*, YouTube (Feb. 4, 2020), <https://youtu.be/-RXb0bf5ScY?t=2970>.

Under the no energy efficiency scenario, demand would only drop by 5%, instead of 30%, over the study period.³⁷ This completely fails the requirement of Law 17-2019, Section 1.9(3)(B), and also fails to meet PREPA's own goal to give energy efficiency a predominant role in the transformation of the grid. Finally, PREPA admits it has not reached out to any large customers to set up demand response programs,³⁸ and PREPA's Action Plan does not include any future outreach to any customers at all.

In sum, PREPA completely failed to evaluate available conservation resources, electricity demand management, and the necessary programs to improve energy conservation, as required by Law 17-2019, Section 1.9(3)(B). The Energy Bureau's Order on PREPA's first IRP made it clear that "PREPA should ...incorporate into its Action Plan whatever actions are necessary to accomplish energy efficiency-related goals."³⁹ All intervenors, including AES-PR, agree that energy efficiency is a no-regret investment that PREPA must be ordered to make immediately.⁴⁰ Local Environmental Organizations' Brief, Section I(F), describes this point in further detail, and also provides steps that the Energy Bureau must include in the Action Plan.

³⁷ See Puerto Rico Electric Power Authority Additional Responses To The Puerto Rico Energy Bureau Ninth Requirement Of Information at 3, Dkt. No. CEPR-AP-2018-0001 (Dec. 6, 2019).

³⁸ Negociado de Energía en vivo, *Evidentiary Hearing / CEPR-AP-2018-0001*, YouTube (Feb. 4, 2020), <https://youtu.be/-RXb0bf5ScY?t=8435>.

³⁹ Puerto Rico Energy Bureau, Final Resolution and Order on the First Integrated Resource Plan of the Puerto Rico Electric Power Authority, para. 191, Dkt. No. CEPR-AP-2015-002 (Sept. 23, 2016).

⁴⁰ AES Puerto Rico, Post Hearing Brief at 1, 17, Dkt. No. CEPR-AP-2018-0001 (Mar. 6, 2020).

(C) PREPA failed to properly evaluate the generation technologies available in the market.

Law 17-2019, Section 1.9(3)(C), requires the IRP to include “an evaluation of the range of conventional and non-conventional generation technologies available in the market.”

PREPA’s Brief quotes from Matthew Lee, a financial advisor to PREPA, who explains how PREPA’s Integrated Resource Plan failed to meet this requirement: “The resource options presented in the IRP are based on estimated costs and assumptions regarding siting and overall project feasibility which eventually must be tested in the real world. We do not know today whether the cost estimates reflected in the IRP analysis are accurate”⁴¹

This is not a problem with all IRPs. This is a problem specific to PREPA's IRP, and the blame must lay squarely at the feet of Siemens, who prepared the IRP. In the 24 months that this case has been pending, Siemens had more than enough time to obtain real-world market data on the resource options presented in the IRP. Instead, Siemens refused to obtain real-world cost information for any piece of equipment from any vendor, and chose instead to rely on generic and outdated assumptions.⁴² This is plainly inconsistent with Law 17-2019 Section 1.9(3)(C), and nothing in PREPA’s Brief demonstrates otherwise.

⁴¹ PREPA Brief at 28.

⁴² Wärtsilä North America, Inc., Final Substantive and Legal Brief at 5-6, Dkt. No. CEPR-AP-2018-0001 (Mar. 6, 2020) [“Wärtsilä Brief”].

(1) PREPA failed to properly evaluate conventional generation technologies.

Siemens' analyses of utility-scale solar, gas-fired plants, and utility-scale wind resources were riddled with flaws. Each of these flaws reflected a bias against renewable resources, and in favor of large, centralized gas-fired power plants.

First, Siemens' generic estimate of utility-scale solar resource overestimated the cost by thirty percent.⁴³ Local Environmental Organizations' expert witness, Anna Sommer, explained that mistake quite clearly in her testimony. PREPA never questioned Ms. Sommer's point in discovery, never answered it in rebuttal testimony, and never addressed it during the evidentiary hearing. PREPA's Brief is silent on this point; the Energy Bureau should therefore accept Ms. Sommer's point of the cost of utility-scale solar resources as an unchallenged fact in this proceeding.

Next: Siemens significantly underestimated the cost of importing methane gas to Puerto Rico.⁴⁴ One of the possible reasons is that, as Arctas Capital Group L.P. points out, Siemens' gas forecasts were prepared without the help of "any commercially recognized experts in arranging LNG supply, price, and commercial terms," and did not include "price comparisons with other LNG contracts."⁴⁵

⁴³ See detailed explanation in Local Environmental Organizations' Legal Brief, Section I(B), Dkt. No. CEPR-AP-2018-0001 (Mar. 6, 2020) ["LEO Brief"].

⁴⁴ *Id.* Sections I(b) and III.

⁴⁵ Arctas Brief at 15, 17.

Siemens also underestimated the capital costs of large, centralized gas-fired plants; Siemens' estimates do not line up with any CCGT construction project anywhere in the world.⁴⁶ Siemens further refused to account for the climate, environmental, health, and safety risks from operation of fossil fuel plants.⁴⁷

Wärtsilä points out three more flaws with Siemens' analysis of gas-fired resources. First, Siemens failed to include start-up costs for any gas-fired unit.⁴⁸ This biases the analysis in favor of units with higher start-up costs, like the CCGTs favored by PREPA's senior management and foreign consultants. Second, Siemens inaccurately modeled minimum downtime for gas-fired units by incorrectly assuming that all units have a minimum downtime of two hours.⁴⁹ This hides a weakness of CCGTs: a relatively long downtime compared to other gas-fired units.⁵⁰ Finally, Siemens failed to include variable O&M costs for CCGTs.⁵¹

Finally, Siemens did not properly analyze wind resources, because it failed to understand the importance of energy output patterns from this resource. Dr. Bacalao acknowledged that Siemens' analysis was deficient because of its failure to look at the output patterns for wind resources, further conceding that this was only "one of the aspects that I think our analysis may be short."⁵² Dr. Bacalao explained that because Siemens should have included modeling of wind resources

⁴⁶ LEO Brief Section I(b) and Section III.

⁴⁷ *Id.* Section VI.

⁴⁸ Wärtsilä Brief at 7.

⁴⁹ *Id.*

⁵⁰ This is another example of Siemens' bias towards large, centralized gas-fired units.

⁵¹ *Id.* at 5.

⁵² Negociado de Energía en vivo, *Evidentiary Hearing / CEPR-AP-2018-0001*, YouTube (Feb. 5, 2020), <https://youtu.be/vIXWJt52Hfk?t=13073>.

in the IRP, because wind resources can have a diurnal pattern, producing the most energy at night—at the same time Puerto Rico’s energy demand peaks. EDF’s Final and Substantive Brief further points out that the IRP should have considered wind in combination with solar because wind’s output pattern complements the output pattern of solar resources well, with solar producing energy during the day and wind picking up at night.⁵³

(2) PREPA failed to properly evaluate any non-conventional generation technologies.

Environmental Defense Fund’s Final Brief points out that PREPA failed to seriously consider non-conventional technologies and “[e]ssentially, the IRP only analyzed two types of conventional supply resources – gas and utility-scale solar plants.”⁵⁴ Local Environmental Organizations’ Legal Brief details the many ways in which PREPA failed to evaluate “non-conventional” generation technologies, especially distributed generation technologies that are already providing affordable, resilient energy on the island right now. This is an egregious failure considering that the Legislature, the Energy Bureau, and PREPA itself have acknowledged that distributed generation and distributed storage are key to transforming Puerto Rico’s grid. The Governing Board of PREPA has declared

⁵³ EDF Brief at 27 (“[U]sing different types of renewable resources together can improve the efficiency of both. For example, wind resources tend to reach their highest capacity factor later in the afternoon, as solar resources are scaling back.”).

⁵⁴ *Id.* at 32.

that the IRP must afford “customer side energy resources” like distributed generation “a **predominant** role” on the grid.⁵⁵

To estimate the cost of distributed generation, Siemens could have simply picked up the phone and obtained data from companies installing rooftop solar on the island right now, many of whom are parties to this proceeding. Instead, Siemens insisted on a flawed method relying on generic data, which overestimated the cost of distributed solar by at least 50%.⁵⁶ Siemens failed to fully appreciate the full benefits of renewables and storage, especially for resiliency.⁵⁷ The IRP failed to consider the contributions that distributed storage is making to grid resiliency **right now**. Finally, the IRP has not properly evaluated the potential for distributed generation deployment to rise far more quickly than currently forecasted, if PREPA provides proper incentives and interconnections.⁵⁸

In sum, PREPA’s evaluation of conventional and non-conventional generation technologies failed to satisfy Law 17-2019, Section 1.9(3)(C) for two main reasons. First, as PREPA advisor Matthew Lee explained, Siemens inexplicably refused to obtain real-world data on the actual costs of generation technologies. Siemens even refused to accept this data when companies like Wartsila offered it; it must be noted that the equipment manufactured by Wartsila competes directly with equipment from Siemens’ manufacturing arm. Second, Siemens’ analysis was biased at every step against renewables, storage, and

⁵⁵ IRP at 1-1.

⁵⁶ LEO Brief, Section I(A).

⁵⁷ *Id.* Sections I(D), I(E).

⁵⁸ *Id.* Section I(H).

distributed generation, and in favor of large, centralized gas-fired power plants that rely on a vulnerable network of long-distance North-to-South transmission lines.

(D) PREPA has hidden the real evaluation of its transmission system from the Energy Bureau and the public.

Law 17-2019, Section 1.9(3)(D), requires the IRP to include an “evaluation of the system’s transmission capacity and reliability.”

PREPA has failed to provide an adequate evaluation of the transmission system in this IRP, because PREPA has hidden billions of dollars in costs for planned transmission upgrades.⁵⁹ PREPA’s Preferred Plans advocate for “the interconnection of large new thermal resources,” but only hint at the massive costs for transmission upgrades necessary to support such resources.⁶⁰ These costs are hidden in a confidential section of IRP Appendix 1, Section 3.6. The London Economics Institute’s report on the transmission system and the Grid Modernization Plan both reveal that the transmission system will need tens of billions of dollars in investments, which appear nowhere in PREPA’s Preferred Plans or Action Plan. Importantly, both of these reports highlight that these costs vary widely based on PREPA’s resource decisions: in other words, the decisions being made in this proceeding. Both reports explain that construction of new large, centralized gas-fired plants will increase the costs of transmission upgrades, while

⁵⁹ *Id.* Section V.

⁶⁰ PREPA Brief at 24.

moving to distributed generation instead would lower those costs. It was absolutely critical, then, for PREPA to provide the full picture of planned transmission investments in this Integrated Resource Plan.

(E) PREPA failed to conduct a fair comparison of the different energy supply resources.

Law 17-2019, Section 1.9(3)(E), requires the IRP to include a “comparative evaluation of the energy supply resources, including transmission and distribution.”

PREPA has failed to fairly evaluate and compare these resources because of its bias in favor of large, centralized gas plans and against renewables and distributed generation. Here are just a few examples of this bias:

- Siemens overestimated costs of distributed generation by 50%⁶¹
- Siemens overestimated costs of utility-scale solar by 30%⁶²
- Siemens underestimated costs of methane⁶³
- Siemens underestimated costs of CCGTs⁶⁴
- Siemens wrongly assumed that only thermal resources and not renewables could serve critical loads after a major event, when the earthquake showed that the opposite was true⁶⁵

⁶¹ LEO Brief at 10.

⁶² *Id.* at 12.

⁶³ *Id.* at 41.

⁶⁴ *Id.* at 43.

⁶⁵ *Id.* at 16.

- Siemens failed to incorporate battery storage capability to replace thermal reserve⁶⁶
- Siemens failed to reveal that using distributed onsite generation instead of new gas-fired plants could save billions in planned transmission spending⁶⁷
- Siemens failed to analyze the climate, environmental, health and safety impacts from gas-fired generation⁶⁸
- PREPA failed to acknowledge that PREPA’s consultants, Siemens and King & Spalding, both have a vested interest in having PREPA build out gas-fired infrastructure⁶⁹

PREPA’s “hedge” proposal, to spend unknown tens of millions of dollars on planning and permitting for gasports and gas plants at both Yabucoa and Mayagüez, is fueled solely by its bias against renewables and in favor of large, centralized gas-fired plants. PREPA spends much of its Brief defending its “hedge” proposal, claiming the “hedge” is necessary to guard against two uncertainties.⁷⁰ Both of PREPA's arguments for the “hedge” fail.

PREPA first claims that the “hedge” is necessary if load growth is higher than projected. First, Siemens' Aurora modeling does not support that claim: it never selected gas plants at Yabucoa or Mayagüez, even under high load sensitivities. Second: the Integrated Resource Plan shows that under the high load

⁶⁶ *Id.* at 19.

⁶⁷ *Id.* at 48.

⁶⁸ *Id.* at 54.

⁶⁹ *Id.* at 66.

⁷⁰ PREPA Brief at 3, 16, 17, 23, 26, 27, 28, 29, 32, & 33.

growth sensitivity, the ESM Plan, including construction of the Yabucoa and Mayagüez gas infrastructure would result in violations of the Renewable Portfolio Standards.⁷¹ Since the “hedge” will cause violations of Puerto Rico law, then the Bureau is prohibited from approving it. The record demonstrates that a better solution for the high load growth scenario would be to embrace the lowest-cost resources: energy efficiency, demand response, distributed generation, and renewables. PREPA's “hedge” distracts the agency from these resources, and instead risks unknown tens of millions of dollars on planning and engineering for fossil fuel infrastructure that PREPA acknowledges may never be built, and that PREPA indeed hopes will never be necessary.

PREPA's Brief next claims that the “hedge” is necessary if PREPA cannot quickly deploy renewables, storage, and energy efficiency. This claim also fails. First, Local Environmental Organizations and other intervenors have set forth several no-regret proposed Action Plan items that will make aggressive deployment possible. Second, PREPA's own IRP explains that the biggest obstacle to renewables deployment is limited PREPA resources, and that “augmenting PREPA's internal capabilities” is necessary.⁷² The “hedge” actually exacerbates this problem by directing limited PREPA resources away from deployment of renewables, distributed generation, energy efficiency, and demand response.⁷³

⁷¹ IRP, Exhibit 1-9 (showing that the ESM, under the High Load sensitivity, achieves only 53% renewables by 2038, in violation of the RPS).

⁷² IRP Section 10.1.1.

⁷³ Many PREPA employees have already been trained to work on renewables and distributed generation; the “hedge” may even force these employees to stop working with those resources and instead work on fossil fuel projects.

Arctas explains that PREPA overspending, whether on the “hedge” proposal or anything else, “jeopardizes the viability of adding other needed generation, including future solar and peaking generation – there is only so much money to go around.”⁷⁴ Siemens built numerous safeguards into its model for the so-called “technology risk” of installing solar and storage, while ignoring the numerous risks from gas buildout. Yet even with these biases in their favor, PREPA’s gas-heavy Preferred Plans still did not outperform a portfolio that rejected gas plants for renewables.

Empire Gas, a company with deep experience building fuel infrastructure, has examined the “hedge” proposal and determined that “substantial expansion of the LNG import and distribution infrastructure” remains “an unlikely scenario.”⁷⁵ OIPC, on behalf of the island’s ratepayers, also rejects the “hedge” proposal.⁷⁶

In sum, PREPA failed to conduct a fair comparison of different energy supply sources, because of PREPA’s bias against renewables and in favor of large, centralized gas-fired plants. The Energy Bureau should reject PREPA’s Preferred Plans and PREPA’s “hedge” proposal for failure to comply with Law 17-2019, Section 1.9(3)(E).

⁷⁴ Arctas Brief at 31.

⁷⁵ Empire Gas Company, Inc., Final Brief at 5, Dkt. No. CEPR-AP-2018-0001 (Mar. 6, 2020) [“Empire Brief”].

⁷⁶ Oficina Independiente de Protección al Consumidor, Alegato at 5, Dkt. No. CEPR-AP-2018-0001 (Mar. 6, 2020) [“OIPC Brief”].

(F) PREPA failed to diversify between utility-scale and distributed generation, and failed to set forth an evaluation of resources to improve system resiliency.

Law 17-2019, Section 1.09(3)(F), requires the IRP to include 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.”

Diversification between utility-scale generation and distributed generation is critical; PREPA’s Brief acknowledges that in order to meet the Governing Board's First Pillar, the IRP must take the steps necessary to let distributed generation take a **predominant** role in Puerto Rico's grid.⁷⁷ Siemens' forecasts demonstrate that PREPA has failed to satisfy Law 17-2019, Section 1.09(3)(F), as well as its own goal to diversify between distributed and utility-scale generation: Siemens estimates that under this IRP, in the next twenty years, PREPA’s Preferred Plans will only add enough distributed generation to cover about fifteen percent of Puerto Rico’s generation mix, while utility-scale resources continue to dominate with 85%.⁷⁸

PREPA has also failed to meet the Law 17-2019 Section 1.9(3)(F) requirement to properly address the reliability and stability of the electric power grid. PREPA attempted to address this requirement through Siemens’ MiniGrids concept, but at the evidentiary hearing, Siemens representatives acknowledged

⁷⁷ PREPA Brief at 10.

⁷⁸ IRP, Exhibits 8-16 & 8-46.

that concept is still at the planning stage. Siemens representatives urged the Energy Bureau **not** to authorize any spending on the concept before further studies into its feasibility.⁷⁹ All intervenors, including AES-PR, affirm that the MiniGrids concept is not in any way ready to implement: therefore, the IRP has no immediate, tangible steps to improve grid resiliency.⁸⁰ PREPA's Final Brief acknowledges that the "IRP is centered on the concept of MiniGrids..."⁸¹ The Energy Bureau cannot approve an Integrated Resource Plan centered on a concept that, after eighteen months, is has not advanced beyond the planning level.

(G) PREPA's evaluation of its existing fleet is obsolete, and requires a thorough revision.

Law 17-2019, Section 1.09(3)(G), required the IRP to include 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."

All parties, including PREPA, can most likely agree that the June 2019 IRP of Puerto Rico's existing generation fleet no longer satisfies this requirement for the reasons detailed in PREPA's January 20, 2020 Urgent Request to Stay

⁷⁹ LEO Brief, Section II.

⁸⁰ AES-PR's Final Brief excludes MiniGrids spending from its definition of "no-regrets" investments, and suggests euphemistically that PREPA needs additional time to "further optimize[] its analysis of MiniGrids..." AES-PR Final Brief pp. 1, 17

⁸¹ PREPA Final Brief, p. 11

Proceedings, to Set Aside Procedural Calendar Sine Die and For Status Conference:

As the Energy Bureau must know, the IRP that was submitted for the consideration and future approval of the Energy Bureau does not take into consideration the unexpected seismic activity that occurred in the morning of January 7, 2020 and the subsequent and ongoing replicas. . . . At present, the Draft IRP takes into consideration [the damaged Costa Sur plant's] baseload generation as part of PREPA's generation fleet to supply the demand of PREPA customers. This unexpected development requires PREPA to regroup and assess the damages to one of its main generation plants and strategize a plan forward, including a thorough revision of the Draft IRP because it might have become obsolete.⁸²

PREPA acknowledges that its evaluation of existing plants “might have become obsolete” due to the earthquake damage to EcoEléctrica, the Costa Sur gas plant, and the gas import terminal that serves both. That evaluation must be revised to consider the vulnerability of large, centralized gas-fired plants and gasports to seismic events.⁸³ Beyond that, the seismic events exposed that PREPA’s evaluation of the island’s existing fleet also fell short of Law 17-2019, Section 1.09(3)(G), in at least five other ways.

⁸² Puerto Rico Electric Power Authority, Urgent Request to Stay Proceedings, to Set Aside Procedural Calendar Sine Die and For Status Conference at 6, Dkt. No. CEPR-AP-2018-0001 (Jan. 20, 2020), <https://energia.pr.gov/wp-content/uploads/2020/01/Urgent-Request-to-Stay-Proceedings-to-Set-Aside-Procedural-Calendar-Sine-Die-and-for-Status-Conference-CEPR-AP-2018-0001.pdf>.

⁸³ PREPA now claims it needs to spend \$1.2B over 18 months to rent temporary emergency generation to make up for the failure of these plants. Local Environmental Organizations, along with UTIER, have filed a Motion urging that PREB halt that RFP proceeding and make that RFP public. Local Environmental Groups and UTIER’s Joint Petition for Intervention and Motion for Reconsideration, Dkt. No. NEPR-AP-2020-001 (Mar. 25, 2020).

First, following the seismic events, PREPA has relied on approximately 234 MW of generation owned by large customers to lower the overall burden on PREPA's resources.⁸⁴ PREPA's IRP fails to account for this generation.

Second, PREPA's evaluation of the island's generation fails to recognize "the biggest untapped [Virtual Power Plant] resource in the world": the distributed solar and storage already installed on the island.⁸⁵

Third, due to the COVID-19 crisis, PREPA has observed a 169 MW decrease in peak demand and expects lowered demand to continue through the summer, until September.⁸⁶ Similar to the January 2020 seismic events, PREPA's Integrated Resource Plan might have become obsolete due to this unforeseen new crisis.

Finally, PREPA has not provided the public with a sufficient explanation of why only a quarter of its baseload generation capacity is available, or whether investments could improve available baseload generation capacity. PREPA's evaluations of the Costa Sur plant have ignored input from its own current and retired workers, concerning the costs and timing of repairs to Costa Sur gas plant.⁸⁷ These workers have decades of experience on the ground at the plant; their expertise must not be ignored. On March 12, 2020, PREPA submitted a

⁸⁴ Puerto Rico Electric Power Authority, Presentation for Evid. Hr'g Panel A at Slide 15 (Feb. 3, 2020), <https://app.box.com/s/fuvsx24ceblv64drlskvohiru8thsywt>

⁸⁵ Negociado de Energía en vivo, Evidentiary Hearing / CEPR-AP-2018-0001, YouTube (Feb. 7, 2020), <https://youtu.be/zkGmgsj6OTs?t=13114>.

⁸⁶ *La AEE proyecta baja en la factura de luz al menos hasta septiembre*, El Nuevo Día (Mar. 31, 2020), <https://www.elnuevodia.com/noticias/locales/nota/laaeeprojectabajaenlafacturadeluzalmenoshastaseptiembre-2557429/>.

⁸⁷ Negociado de Energía en vivo, *Public Hearing / CEPR-AP-2018-0001* (Feb 11, 2020) <https://www.youtube.com/watch?v=pfYfdxwuJ7U&t=14761s>. See also PREPA March 31, 2020 Costa Sur Assessment and Repairs Project Status Report, <https://app.box.com/s/n92053ku4x5rnce7kdpe2ltp2zoxd9gl>

document in this case titled, PREPA Production of Documents in Response to Information Requests Made During the IRP Hearing. The referenced Response is woefully incomplete, and its redacted documents, such as Exhibit B, “PREPA’s Generation Directorate Generation Fleet Status” invite many further questions.⁸⁸ For example, PREPA has provided the public with no explanation of why Aguirre steam unit 1 is listed with available capacity of 112 MW, a far cry from its 450 MW installed capacity.⁸⁹ On March 31st, PREPA submitted a new report which now claims that 683 MW of capacity in generation units, previously listed as offline in PREPA’s publicly available post-earthquake assessments, will be back online by May 1st.⁹⁰

In sum, PREPA’s evaluation of its current generation fleet is obsolete and fails to satisfy Law 17-2019 Section 1.9(3)(G). This is partly for reasons out of PREPA’s control (the seismic events and COVID-19), and partly due to PREPA’s failures to account for generation resources owned by both small and large customers, and PREPA’s failure to explain the status of its existing plants, especially Costa Sur.

(H) PREPA has utterly failed to assess the climate, environmental, health, and safety impacts of burning fossil fuels on the island.

⁸⁸ Puerto Rico Electric Power Authority, Production of Documents in Response to Information Requests Made During IRP Evidentiary Hearings, Dkt. No. CEPR-AP-2018-0001 (Mar. 12, 2020).

⁸⁹ *Id.* Exhibit B.

⁹⁰ *Id.* The units are Aguirre CC 1, Aguirre CC 2, Aguirre CC Stag 2 (2-2), San Juan 8, San Juan CC STG 5, San Juan CC CT 5, San Juan CC 6, Palo Seco Hidrogas, Mayaguez 2, Mayaguez 4, and Vega Baja 1-1.

Law 17-2019, Section 1.9(3)(H), requires the IRP to include “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.”

PREPA’s cursory environmental review grossly fails to satisfy this requirement, because PREPA failed to examine anything beyond the minimum required for environmental compliance.⁹¹ First, this ignores the numerous violations incurred at PREPA plants, as well as the AES-PR coal plant; these violations are detailed in Section VI of Local Environmental Organizations’ Legal Brief. Environmental Defense Fund sent Requests Of Information to PREPA seeking more information on these violations; PREPA’s response, in total disregard of Law 17-2019, Section 1.9(3)(H), explained that PREPA “did not see the relevance of requesting this type of information and how it may be related to the evaluation of the IRP.”⁹²

Second, Law 17-2019 does not stop at environmental compliance. It requires a thorough examination of all climate, environmental, and health risks. Law 17-2019 lists the requirement of environmental impact assessments separately from the requirement to demonstrate environmental compliance—so compliance, even if PREPA could achieve it, would not satisfy Law 17’s climate mandate. Similarly, Regulation 9021 2.03(H)(2)(b)(ii)(F) requires that PREPA’s resource plan sensitivity analysis account for environmental costs or restrictions,

⁹¹ PREPA Brief at 22.

⁹² EDF Brief at 36.

and which it also lists separately from environmental regulations. For decades, PREPA has refused to account for the harmful impacts of burning coal and oil to the communities where power plants are located. The current crisis has exposed the true harm from these impacts: the COVID-19 death rate is significantly higher in frontline communities.⁹³ Under Law 17-2019, Section 1.93(3)(H), these communities can no longer be ignored.

A major factor left unaddressed in PREPA's environmental analysis is the health impacts from nearly two decades of coal ash dumping across Puerto Rico, and health impacts from coal ash going forward, if the AES-PR coal plant continues to operate.

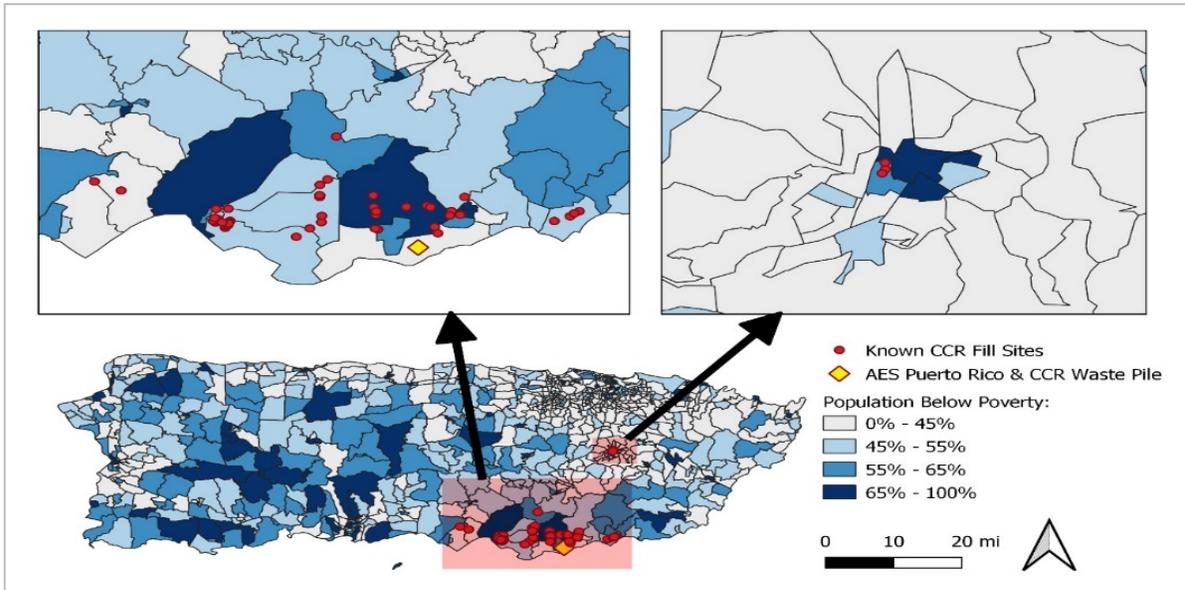
AES-PR coal ash fill sites in Puerto Rico are concentrated in communities that are among the island's most low-income communities. Of the 53 fill sites identified and documented in Puerto Rico to date, at least 43 sites, or 88 percent, are in the municipalities of Guayama, Salinas, and Arroyo.⁹⁴

⁹³ Exposure to air pollution and COVID-19 mortality in the United States, Wu et al, <https://projects.iq.harvard.edu/covid-pm>

⁹⁴ See Notice of Intent to Sue AES Corporation (and local affiliates) for Violations of the Resource Conservation and Recovery Act Involving Uncontrolled Disposal of Coal Ash Waste Generated at the AES Coal-fired Power Plant in Guayama, Puerto Rico, at 6 & Appendix A (Sept. 26, 2012) (“Appendix A to this letter provides the approximate co-ordinates of known location of 36 places where the Waste that has been disposed to date. Appendix A also includes photographs of some of these sites. Appendix B provides maps showing those locations.”); V. Alvarado Guzman, Report on Coal Ash Sampling (Mar. 2, 2019) (“Of 36 previously identified sites, the amount increased to 49. Of these, 18 showed exposed ashes.”); Altol Chemical Environmental Laboratory, Inc., Muestras Cenizas de Carbon, Custody Numbers 102551, 102521, and 100959 (Oct. 9, 2019).

Data estimates for census tracts, or smaller subsections of each municipality, confirm that Puerto Rico’s known structural fill sites disproportionately impact some of the poorest communities on the island.

Coal Ash Fill Sites in Puerto Rico & Census Tract Poverty Estimates⁹⁵



Percent Population Below Poverty	Total # of CCR Fill
0% - 45%	3
45% - 55%	25
55% - 65%	12
65% - 100%	12

In July 2016, the University of Puerto Rico, Graduate School of Public Health conducted an epidemiological study of communities in Guayama, downwind from the AES plant and other industrial facilities. The research project emerged as a response to residents’ claims of environmental conditions present in

⁹⁵ *Id.*

their communities, in particular, the exposure to ash from the burning of coal to generate electric power, that were adversely affecting public health.⁹⁶ The purpose of the study was to determine if the prevalence of respiratory and other diseases were higher in the communities in Guayama, in comparison to communities in Fajardo, which is not proximate to sources of coal ash or coal burning. Information was collected on sociodemographic characteristics, housing, vulnerability factors to environmental pollution, perception of environmental pollution, reproductive health and respiratory, skin, cardiovascular diseases and cancer.

Among the findings of the epidemiological study carried out in these communities, the studied determined that in Guayama:

- More than two thirds of the population considers environmental pollution and poor or bad air quality as severe;
- 1 of every 3 people has been diagnosed with respiratory disease;
- 1 of every 4 people has been diagnosed with cardiovascular disease;
- Pediatric asthma is approximately 5 times greater;
- Severe asthma in children is 6 times higher;
- The prevalence of urticaria (hives) is 7 times higher;
- The prevalence of spontaneous abortions is more than 6 times higher;
- The probability of suffering from chronic bronchitis in the larger population of 45 years is 9 times higher; and

⁹⁶ Jorge Albarraçín et al, *Estudio Epidemiológico en las Comunidades de Puente de Jobos y Miramar en Guayama y Santa Isidra y Rafael Bermúdez en Fajardo*, Universidad de Puerto Rico, Recinto de Ciencias Médicas, Escuela Graduada de Salud Pública, Departamento de Bioestadística y Epidemiología, (2017), <https://pesquisa.bvsalud.org/portal/resource/es/por-58655>.

- The chance of suffering from pediatric asthma is roughly 6 times greater.

These statistics prove that exposure to long-term air, water and soil pollution from the AES plant has caused increased diseases in Guayama, just as pollution from other Puerto Rico fossil fuel plants has undoubtedly caused disease in other environmental justice communities. That pollution exacerbates the current pandemic, because “the majority of the pre-existing conditions that increase the risk of death for COVID-19 are the same diseases that are affected by long-term exposure to air pollution.”⁹⁷

(I) PREPA has failed to provide an evaluation of the interconnection of distributed generation to the grid, and failed to properly project integration of distributed generation.

Law 17-2019, Section 1.9(3)(I) and (J) require the IRP to include:

- 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.
- Projections with regards to the integration of distributed generation into the electric power grid.

PREPA’s IRP demonstrated that PREPA has very little visibility of the substantial amounts of distributed generation that Puerto Ricans have already

⁹⁷ Exposure to air pollution and COVID-19 mortality in the United States, *supra*, <https://projects.iq.harvard.edu/covid-pm>

installed. PREPA has also not done enough to deal with its long backlog of existing distributed generation systems waiting to be interconnected to the grid.⁹⁸ OIPC's Final Brief noted that PREPA's forecasts for integration of distributed generation were done with "extremely limited data."⁹⁹

Siemens demonstrated a noted indifference towards distributed onsite generation. In fact, Siemens surprisingly claimed that a 300 MW gas-fired power plant could be considered distributed generation; this does not fit anyone's definition of "distributed generation," not even the definition that Siemens itself included in the IRP: "customer installed generation that is behind the meter."¹⁰⁰

Siemens refused to consider the contribution that distributed storage is already making towards resiliency on the island, and refused to consider the contributions going forward, as distributed storage deployments skyrocket. And finally, Siemens also violated Law 17-2019, Section 1.9(3)(I) and (J), by refusing to project integration of distributed generation with proper incentives, cost-sharing, and interconnection under Comunicado Tecnico 19-02 implemented.

(K) Siemens failed to provide tangible, immediate steps to improve resiliency of power for critical facilities and critical loads.

Law 17-2019, Section 1.9(3)(K), requires that the IRP include "[i]dentification of essential service facilities across the Island and the measures

⁹⁸ OIPC also highlights this concern. OIPC Brief at 7-8.

⁹⁹ *Id.* at 11-12

¹⁰⁰ IRP, App'x 4, at 3-20.

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.”

Siemens attempted to fulfill this requirement using its MiniGrids concept. That has failed: eighteen months after publicly introducing the MiniGrids concept, Siemens acknowledges it is still at the planning stage and urges the Energy Bureau **not** to spend any money on the concept until further studies can be done into the concept’s feasibility. Siemens’ MiniGrids concept failed, in part, because it hinged on the false assumption that only thermal resources could serve critical loads.¹⁰¹ The Energy Bureau’s Energy Storage Study debunked that claim.¹⁰² Local Environmental Organizations’ Brief lays out Action Plan steps that would encourage renewables, distributed generation and distributed storage, which have already proven their ability to power critical loads and critical facilities immediately after a major event.

(L) PREPA failed to lay out the actions necessary to advance energy storage, both at the utility-scale level and the distributed level.

¹⁰¹ See Puerto Rico Electric Power Authority, 2019 Fiscal Plan for the Puerto Rico Electric Power Authority at 80 (June 27, 2019), [https://aeepr.com/es-pr/Documents/Exhibit%201%20-%202019%20Fiscal Plan for PREPA Certified FOMB%20on June 27 2019.pdf](https://aeepr.com/es-pr/Documents/Exhibit%201%20-%202019%20Fiscal%20Plan%20for%20PREPA%20Certified%20FOMB%20on%20June%2027%202019.pdf) (claiming only thermal units would be “readily available” after a major event); IRP Section 1.2.1 (“The need to serve critical and priority loads within the MiniGrids resulted in the necessity to add 17 to 18 small GTs (23 MW each) at selected locations across the island.”).

¹⁰² Puerto Rico Energy Bureau, Energy Storage Study For a renewable and resilient island grid for Puerto Rico at Section 6.1 (Dec. 19, 2019), filed in Dkt. NEPR-MI-2020-0002, <http://energia.pr.gov/wp-content/uploads/2020/01/NEPR-MI-2020-0002-Estudio-Sistemas-de-Almacenamiento-de-Energi%CC%81a.pdf>

Law 17-2019, Section 1.9(3)L), requires that the IRP include 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.”

The Legislature highlighted the importance of listing specific **actions** that PREPA could take to achieve energy storage system goals. PREPA cannot fulfill Section 1.9(3)(L) by merely forecasting adoption or projecting a certain level of storage, but rather PREPA must explain how those deployments would be accomplished. PREPA has failed to provide locations for storage, budget allocations, or mapped out the necessary investments. PREPA has failed to even consider the role of distributed storage in the grid. PREPA refuses to follow through on an RFP for storage, while simultaneously carrying out secret RFPs for gas-fired resources.¹⁰³ In fact, PREPA’s efforts on storage were so deficient that the Energy Bureau was forced to commission its own analysis of Energy Storage in December 2019.¹⁰⁴ The excellent study commissioned by the Energy Bureau debunks many of the falsehoods and inaccuracies that underlie PREPA’s Preferred Plans.¹⁰⁵

¹⁰³ For example, the March 2020 RFP for temporary generation.

¹⁰⁴ Puerto Rico Energy Bureau, Energy Storage Study For a renewable and resilient island grid for Puerto Rico at Section 6.1 (Dec. 19, 2019), filed in Dkt. NEPR-MI-2020-0002, <http://energia.pr.gov/wp-content/uploads/2020/01/NEPR-MI-2020-0002-Estudio-Sistemas-de-Almacenamiento-de-Energi%CC%81a.pdf>

¹⁰⁵ Local Environmental Organizations’ Final Brief pp. 18, 19, 38, 39

Conclusion

For the reasons detailed above and those set forth in the Local Environmental Organizations' Legal Brief, the Energy Bureau should reject PREPA's Preferred Plans and Action Plan, order PREPA to carry out the Proposed Action Plan steps laid out by Local Environmental Organizations in their Legal Brief, and order PREPA to redo the Integrated Resource Plan, correcting for the errors detailed in all intervenors' briefs.

Respectfully submitted,

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CERTIFICATE OF SERVICE

We hereby certify that, on April 20, 2020, we have filed this Reply Brief via the Energy Bureau's online filing system, and sent to the Puerto Rico Energy Bureau Clerk and legal counsel to: secretaria@energia.pr.gov; astrid.rodriguez@prepa.com; jorge.ruiz@prepa.com; n-vazquez@aeep.com; c-aquino@prepa.com and to the following persons:

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