

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: AES PUERTO RICO POST-HEARING BRIEF

AES PUERTO RICO’S POST-HEARING BRIEF

TO THE HONORABLE PUERTO RICO ENERGY BUREAU:

AES Puerto Rico L.P. hereby submits this post-hearing brief.

INTRODUCTION

AES Puerto Rico L.P., (“AES-PR”) supports Puerto Rico’s responsible transition to a more reliable, resilient, lower cost and renewable energy future, consistent with the strategic direction of the Puerto Rico Integrated Resource Plan 2018-2019 (“IRP”). Accordingly, AES-PR urges the Puerto Rico Energy Bureau (“Bureau” or “PREB”) to direct the Puerto Rico Electric Power Authority (“PREPA”) to move forward promptly with the “no regrets,” investments in solar energy and energy efficiency measures, while – in parallel – PREPA further optimizes its analysis of MiniGrids and evaluation of potential natural gas-fired options to determine what is in the best interests of the people of Puerto Rico.

None of the testimony presented to the PREB provides a reason to delay these essential measures or adopt a different approach. To the contrary, the pre-filed and hearing testimony confirmed that the IRP provides the framework needed to address contentions raised by intervenors and the public, such as expanded opportunities for distributed generation, energy efficiency, and other measures, with the guidance of this Bureau.

AES-PR can play a critical role in this orderly transition for Puerto Rico. First, the Bureau should affirm the IRP finding to retain AES-PR’s current coal-fired operations through 2027,

unless PREPA and AES-PR agree to transition AES-PR sooner through a build out of solar capacity and/or redevelopment to natural gas under an amended Power Purchase and Operating Agreement (“PPOA”). During the transition to renewables, AES-PR’s coal-fired generating capacity will be an essential resource for Puerto Rico. It is the lowest cost baseload energy provider on the island, is critical to ensuring low electricity rates for Puerto Rico, and has consistently demonstrated it is one of the most reliable and resilient resources for PREPA, including in the face of hurricanes and earthquakes. By contrast, Siemens found, as confirmed by AES-PR’s expert, Mr. Ronald Moe, that early retirement of AES-PR would be extraordinarily costly to ratepayers, imposing an additional cost of over \$900 million (net present value) on the PREPA system. There is no evidence to the contrary.

Second, at the same time, AES-PR can provide solutions to support the island’s energy transformation through the “Green Blend & Extend” structure that AES-PR has outlined in this proceeding, which is AES-PR’s preferred solution. Through this approach, AES-PR can be transformed to provide utility scale renewable energy for Puerto Rico, as it already does through AES Ilumina, to support the orderly and planned transition to renewable energy. A redeveloped AES-PR facility could also use existing infrastructure to operate on natural gas if it proves to be a low-cost alternative for PREPA and its customers. Accordingly, the Bureau should direct PREPA to continue efforts to reach a responsible transformation of the AES-PR plant, including to work with AES-PR to conduct additional analyses of a natural gas alternative. Those analyses can be done now, without disrupting the need to move forward expeditiously with the roadmap in the IRP.

In sum, AES-PR urges the Bureau to approve the IRP, move forward with this planning effort, and begin the task of transforming the way energy is provided in Puerto Rico.

BACKGROUND

The AES Corporation (“AES”) is a global power company that provides reliable, affordable, and sustainable energy in 13 countries across the Americas, Asia and Europe. *See* Pre-Filed Direct Testimony of Kristina Lund For Intervenor AES Puerto Rico at 1-2 (Oct. 23, 2019) (“Lund Testimony”).¹ AES's diverse “portfolio includes solar, wind, hydro, natural gas, coal and landfill gas power plants.” Lund Testimony at 1. AES is a worldwide leader in “solar and battery installations in different parts of the world,” including utility scale energy storage, with “the world’s largest solar and storage system in operation” on Kauai, Hawaii, as well as 160 MW of batteries in operation, including in the Dominican Republic. Lund Testimony at 2, 19-20.

AES’ corporate mission is, “to improve lives by accelerating a safer and greener energy future,” and it has set ambitious goals to achieve that mission. Lund Testimony at 2. To that end, AES has committed to reducing the carbon intensity of its global portfolio 50% by 2022 and 70% by 2030. Lund Testimony at 2. To achieve that mission, AES expects to add 2-3 GW of renewable capacity to its portfolio, primarily wind and solar, every single year. Lund Testimony at 2.

For this reason and because AES-PR has longstanding experience successfully providing reliable energy in Puerto Rico, AES-PR believes it can be a crucial part of Puerto Rico’s reliable, clean, and affordable energy future. Lund Testimony at 3-4. AES-PR, a subsidiary of AES, was selected by PREPA in 1994 to build a state of the art coal fired facility to help modernize Puerto Rico’s aging energy fleet. Lund Testimony at 6. AES-PR invested \$800 million – one of the largest private investments on the island – in building this 454 MW plant. Lund Testimony at 6.

¹ Ms. Lund is the Chief Financial Officer of the Mexico, Central America and Caribbean business unit of AES.

AES-PR's coal-fired plant has been in operation since 2002, and by the terms of the governing AESPR-PREPA PPOA, as amended,² the plant will continue to operate until 2027. Lund Testimony at 6-7. Further, AES owns and operates AES Ilumina, a 20 MW utility-scale solar generation facility in Guayama, Puerto Rico. Lund Testimony at 6. At the time it was commissioned in 2012, AES Ilumina was "the first and largest solar project in the Caribbean and the first utility scale solar plant to connect to the grid in Puerto Rico." Lund Testimony at 6.

Through these electricity generating resources, AES-PR is a crucial part of the energy supply in Puerto Rico. AES-PR supplies 17% of the electricity in Puerto Rico, at the lowest cost, Lund Testimony at 7-8; and at a consistently high capacity factor. *See* Response of AES Puerto Rico L.P. to First Request of Information from Intervenor, Local Environmental Organizations, to Intervenor, AES Puerto Rico L.P. at 5 (Jan. 10, 2020) ("AES-PR Discovery Response") (from 2009 to 2019 capacity factor has ranged from 80 to 92%, excluding periods in 2017 and 2018 when Maria limited transmission) (Exhibit A). AES-PR has been available when PREPA has needed it, as it has a demonstrated track record of very low forced outage rates and high availability. Lund Testimony at 7.

AES-PR intervened in this proceeding because the IRP will chart the course for Puerto Rico's energy future for the next 20 years and beyond. Lund Testimony at 3-4. AES-PR is currently a critical part of Puerto Rico's energy grid because it is a large reliable baseload power generator with the lowest cost of production on the island, Lund Testimony at 4, and seeks to be a catalyst in transforming's Puerto Rico's energy grid into a more a reliable, affordable, and greener future. AES-PR should continue to produce reliable and affordable energy under the PPOA until 2027, or until its operations can be transitioned to solar or natural gas through an amended PPOA.

² PPOA is in the record at PREPA_ROI_2_18 Attach 1.pdf and PREPA_ROI_2_18 Attach 2.pdf.

LEGAL STANDARD

Puerto Rico law directs the Bureau to evaluate the IRP for “full compliance with the public policy on energy of Puerto Rico.” 2018 P.R. Laws Act 211, § 64 (amending 2014 P.R. Laws Act 57, § 6.23(c)) (to be codified at 22 L.P.R. § 1054v(c)). All of the Bureau’s determinations shall be “governed by . . . the public interest,” and the provisions of its statute “shall be construed liberally in order to achieve its purposes.” 22 L.P.R. 1054b(rr) (as amended by 2019 P.R. Laws Act 17, § 5.10). An IRP must cover a 20-year planning period, and must “describe the combination of energy supply resources and conservation that satisfies, in the short-, medium-, and long-term, the current and future needs of Puerto Rico’s energy system and of its customers at the lowest reasonable cost.” 2019 P.R. Laws Act 17, § 1.9(2).

It is the goal of this IRP that “[t]he cost of the electric power generated, transmitted, and distributed in Puerto Rico shall be affordable, just, and nondiscriminatory for all consumers,” “[t]he availability of energy supply [] be guaranteed to the People,” and “[t]he implementation of strategies geared toward achieving efficiency in the generation, transmission, and distribution of electric power shall be sought in order to guarantee the availability and supply thereof at an affordable, just, and reasonable cost.” P.R. Laws Ann. tit. 22 § 1051(a)-(b), (d). To reach this goal, the IRP must evaluate “the range of conventional and non-conventional generation technologies available in the market . . . the combination of resources designated to promote energy sources diversification; stabilize energy costs; and improve the reliability and stability of the electric power grid,” and “the existing electric power plants or facilities of PREPA that takes into account the improvements in the operational efficiency of plants, the useful life of existing plants, and the retirement date and decommissioning costs thereof, if applicable.” P.R. Laws Ann. tit. 22

§ 196c(h)(2)(C)-(G). In preparing the IRP, PREPA must “follow the best practices in electric power industry integrated resource planning.” P.R. Laws Ann. tit. 22 § 196c(h)(1).

ARGUMENT

I. THE BUREAU SHOULD ADOPT THE STRATEGIC DIRECTION IN THE PUERTO RICO INTEGRATED RESOURCE PLAN AND ACTION PLAN

AES Puerto Rico fully supports Puerto Rico’s responsible transition to a more reliable, lower cost and renewable energy mix as framed in the IRP and associated Action Plan, as the proposed IRP satisfies each of the statutory requirements and is in the public interest. AES-PR can, and should, be a key part of Puerto Rico’s energy future, including helping to pave the way towards achieving its renewable energy goals.

A. The Bureau should adopt the IRP finding to retain AES-PR’s current coal-fired operations in full through 2027.

1. The Bureau should retain AES-PR through the end of the PPOA, because the plant provides critical reliability and resiliency for the Puerto Rico energy grid.

The Bureau should retain AES-PR as provided in the IRP, because AES Puerto Rico works for the people of Puerto Rico and is necessary to meet the statutory mandate for reliable electricity in Puerto Rico. *See* P.R. Laws Ann. tit. 22 § 1051(a)-(b), (d). While Puerto Rico continues to be impacted by PREPA service reductions and PREPA struggles under financial hardships to operate and transform its system, AES-PR remains a steady, reliable producer of energy for PREPA. The IRP correctly recognizes AES-PR’s reliability. As part of its analysis, Siemens assigned an assumed forced outage rate based on its assessment of past outage reports. IRP at 4-5; *see also* Lund Testimony at 7. A forced outage rate measures the percentage of time a unit stops operating unexpectedly, and thus a lower forced outage rate means a more reliable unit. Lund Testimony at 7. As shown in Exhibit 4-13 of the IRP, both of the AES-PR units have an assumed forced outage rate of just 3% -- one of the lowest of any plant on the island. IRP at 4-13; *see also* Lund

Testimony at 7. For comparison's sake, Aguirre Steam Units 1 and 2 have a 20% assumed forced outage rate, while the San Juan Combined Cycle Units 5 and 6 have an assumed forced outage rate of 18%. IRP at 4-6 to 4-7; *see also* Lund Testimony at 7. AES-PR is undeniably one of the most reliable power plants on the island.

Moreover, AES-PR is available to provide this reliable baseload energy when the people of Puerto Rico need it most. During Panel A, PREPA presented evidence showing that Puerto Rico's energy infrastructure is in a critical state. *See* PREPA Presentation, January 2020 Earthquakes: Effect on Existing Resources (presented Feb. 3, 2020, Hearing Panel A) ("PREPA Presentation"). In the aftermath of the recent earthquakes, PREPA reported that Puerto Rico lacks sufficient reserve capacity, lacks sufficient spinning reserve, and cannot fully meet the current demand and reserve requirements with existing capacity. PREPA Urgent Request to Stay Proceedings at 3-4. As PREPA Engineer Soto testified, AES-PR is critical to serving PREPA's load. Testimony of Engineer Gary Soto, Hearing Panel A (Feb. 3, 2020). This difficult environment reaffirms the critical importance of reliable energy from AES-PR to ensuring Puerto Ricans have electricity every day. As the Bureau heard from Siemens' lead manager, Dr. Nelson Bacalao, under no circumstances should AES-PR be retired until new generation resources are available to fully replace it and are actually online. Testimony of Dr. Nelson Bacalao (Feb. 3, 2020, Hearing Panel B).

Likewise, AES-PR provides critical resiliency to the PREPA system. Indeed, as the Bureau heard during the hearing, AES-PR has shown resiliency during the recent natural disasters that hit Puerto Rico. AES Puerto Rico was the only large generation resource that was 100% available in the wake of the earthquakes. PREPA Presentation, Hearing Panel A, at 24 (listing "available capacity" for AES alone as "100%"). AES-PR is so critical on the island right now that PREPA

asked that the company postpone routine planned maintenance to keep the plant running, which AES-PR agreed to do. Testimony of Engineer Gary Soto (Feb. 3, 2020, Hearing Panel A). As Engineer Soto testified, if AES-PR were not in operation, then many Puerto Ricans would lose power, Testimony of Engineer Soto (Feb. 3, 2020, Hearing Panel A), as there would be no available alternative.

This resiliency is critical. As the IRP recognizes, there is “[a] real additional risk of future natural disasters in the coming years [that] cannot be ignored.” IRP, Section 2.4, Hurricane Impacts on the IPR, at 1-7. For this reason, the IRP places resiliency of the grid as one of the top priorities for Puerto Rico, noting that “[d]isaster planning is an important component to the IRP and may drive decisions that favor resiliency over other lower cost options.” IRP, Section 2.4, Hurricane Impacts on the IPR, at 1-8. AES-PR is crucial to this resiliency. In addition to being available after the recent earthquakes, AES-PR declared its availability to PREPA within a few weeks of Hurricane Maria. Lund Testimony at 8.

It is clear that AES-PR has a recognized track record of being able to get back up and running quickly following major disruptive events to provide much needed energy. This comes from its world class construction and maintenance, the nature of its operations as a coal-fired plant, and AES’ experience operating in island locations around the world. Lund Testimony at 10-11. The Bureau should affirm the IRP’s direction and ensure that AES-PR can continue to bring this essential reliability and resiliency to Puerto Rico up to and through the end of its PPOA.

2. The Bureau should likewise retain AES-PR through the end of the PPOA because AES-PR’s Guayama facility is undeniably the lowest cost provider in Puerto Rico.

PREB should also affirm the continued operation of AES-PR because it is in the best interest of ratepayers. *See* P.R. Laws Ann. tit. 22 § 1051(a)-(b), (d). The un rebutted evidence is clear that AES-PR is the lowest cost provider of baseload power in Puerto Rico.

Both the IRP and PREPA/Siemens’ own analysis repeatedly recognize this fact. For example, in two of the principal cases in the IRP, S4S2B and ESM, AES-PR was shown to have the lowest cost per megawatt-hour in every year from 2019 to 2027.³ Lund Testimony at 8. Additionally, the levelized cost of energy (“LCOE”) analysis in the IRP shows that above 60% capacity factor, AES-PR is the lowest cost provider even as compared to proposed new combined cycle generator models, *see* IRP Exhibit 6-20; Lund Testimony at 8. AES-PR’s capacity is consistently above 60%. *See* AES-PR Discovery Responses at 5. It is also shown to be the lowest cost source when compared to existing fossil fuel generators EcoElectrica and Costa Sur units 5 and 6 (when operational). IRP Exhibit 6-20. Moreover, PREPA has been clear throughout this proceeding that the AES-PR plants are “the most economic unit[s] in the fleet, in terms of dispatch costs...” *See* The Puerto Rico Electric Power Authority Additional Responses to the Energy Bureau Sixth Set of Requirements of Information, PREB-PREPA ROI 6-03 at 3, 5 (Oct. 17, 2019) (“AES is the most economical unit in the fleet”).⁴

The low cost energy generated by AES-PR provides substantial overall value to the Puerto Rico economy. The lower cost of power provided by AES-PR saved PREPA more than \$550 million from December 2002 to June 2007. *See* Estado Libre Asociado de Puerto Rico, Oficina

³ IRP Workpapers, ESM_Metrics_Base_Sii.xlsx, S4S2B_Metrics_Base_Case_SII.xlsx, “Costs by Resource” tab.

⁴ This is true even if a hypothetical “carbon adder” is included, as in PREPA’s response to PREB ROI 6-03.

del 6 Contralor, Informe de Auditoría CP-10-02, at 10 (Aug. 4, 2009) (Unidad 3075, Auditoría 12867).⁵ Extrapolated to 2019, the savings to Puerto Rico’s consumers is approximately \$2 billion in total energy costs. Lund Testimony at 9. These kinds of energy savings are critical as PREPA faces financial uncertainty and difficulty, and AES-PR’s low cost energy is essential to PREPA’s ability to meet the target price of \$0.20 per kilowatt hour set forth in Act 17-2019.

Critically, because it is the low cost provider of energy in Puerto Rico, the undisputed evidence presented to the PREB demonstrates that any proposed early retirement of AES-PR will impose substantial financial costs on PREPA and the ratepayers in excess of \$900 million. In response to AES-PR’s request for information, in December 2019 Siemens provided additional sensitivities of its model to evaluate “the early retirement of the AES coal plant,” and Siemens found these analyses “clearly identified that this retirement would have a negative impact to the rate payers with an increase on the net present value of the revenue requirements of over \$900 million.” Rebuttal Testimony of Nelson Bacalao, Ph.D. at 15 (Dec. 20, 2019). At the hearing, during Panel A, Dr. Bacalao confirmed this testimony that retiring AES-PR prior to 2027 would be more costly to the economy and ratepayers than continuing operations. Hearing Testimony of Dr. Nelson Bacalao, Panel A (Feb. 3, 2020) (confirming that the NPV of early retirement of AES-PR would be more than \$900 million). Likewise, in his supplemental testimony, AES-PR’s expert witness, Mr. Ronald Moe, explained and then analyzed in detail the AES-PR ROIs and the additional sensitivities Siemens had run in response. *See* Pre-Filed Supplemental Testimony of Ronald Moe for Intervenor AES Puerto Rico, L.P. at 2-12 (Dec. 11, 2019) (“Moe Suppl. Testimony”). As Mr. Moe explained, “[f]orcing the retirement of the AES-PR coal plant at the

⁵ *See* <https://iapconsulta.ocpr.gov.pr/OpenDoc.aspx?id=3ecc8bd7-c701-4385-96a6-4026408a6313&nombre=CP-10-02>.

end of 2020 increases PREPA's costs by \$938 million" in NPV over the 20 year IRP planning period. Moe Suppl. Testimony at 10,12 ("It will be very costly to PREPA and its customers if the AES-PR coal plant is forced to retire"). None of the testimony of Dr. Bacalao and of Mr. Moe was disputed or rebutted.

These updated analyses confirmed the conclusion Siemens had reached when analyzing five AES-PR early retirement scenarios. Submittal of Redacted AES Coal Plant Conversion Assessment (Aug. 23, 2019), submitting Draft, AES Coal Plant Conversion Assessment (Aug. 16, 2019) ("Siemens Report"). As Siemens explained in a supplemental memorandum PREPA filed regarding these early retirement analyses, Siemens found "*unequivocally* ... that the option of retiring ... the [AES-PR] plant is more costly than the option of continuing operations, resulting in higher costs to the economy and the ratepayers." See Submittal of AES Coal Plant Conversion Report Caveats and Limitations (Aug. 30, 2019), Siemens Memorandum, AES Coal Plant Conversion Report Caveats and Limitations at 1 (Aug. 28, 2019) ("Siemens Memo") (emphasis added). In fact, as Mr. Moe explained in his initial pre-filed testimony, the Siemens' Report confirms that PREPA's power supply costs and customer rates will be substantially higher if AES-PR were retired early. Pre-Filed Direct Testimony of Ronald Moe For Intervenor AES Puerto Rico L.P. at 36 (Oct. 23, 2019) ("Ronald Moe Testimony") ("In all five cases analyzed, the NPV of power supply ...was materially higher ... if the AES-PR coal plant is forced to retire..." and the "power supply component of customer rates ... will also be materially higher"); *see also* Lund Testimony at 17 ("*In all scenarios analyzed* the Siemens Report still affirms that PREPA's power supply costs and customer rates will be substantially higher if AES-PR were retired by the end of

2020, when compared to the IRP, which recommends AES-PR continuing to operate through the end of the PPOA”) (emphasis in original).⁶

The IRP recognizes the common sense notion that “[t]he retirement of existing generating units should be only implemented after ... all new resources are fully operational, and units planned for retirement are not required for reliable operation of the system.” IRP at 8-4. AES-PR has a capacity of 454 MW and provides 17% of the island’s energy. That reliable, resilient capacity simply cannot be replaced economically in the near term, let alone at the same cost per kilowatt hour that AES-PR provides. Lund Testimony at 16. Unless AES-PR and PREPA agree to an extended PPOA that would transition away from coal earlier than 2027, the record before the Bureau is clear that AES-PR remains the most cost-effective option for the island. Hence, the continued operation of AES-PR through the end of the PPOA in 2027 will provide substantial savings to Puerto Rico’s consumers as part of an orderly and planned transition to renewables under the direction of this Bureau.

B. The Bureau should direct PREPA to continue efforts to reach a responsible transformation of the AES-PR plant, including to work with AES-PR to conduct additional analyses of a natural gas alternative.

Fundamental to the IRP is a commitment to an “ambitious program of investment and restructuring” of Puerto Rico’s energy resources to “green[] the supply” including through “the additions of new solar PV generation, energy storage, natural gas fueled generation and supply infrastructure, and retiring or converting all existing coal and heavy fuel oil generation.” IRP at Action Plan at 9-1. This commitment is essential for Puerto Rico to move forward on the path to achieve the renewable energy goals established by the Puerto Rico legislature.

⁶ In these earlier analyses, Siemens had failed to account for the capacity purchase payments that PREPA would owe AES-PR under the PREPA-AESPR PPOA if the plant were retired early. The later Siemens analysis considered those costs. Bacalao Rebuttal Testimony at 15; Moe Suppl. Testimony at 9.

In order to meet this goal, AES-PR is a ready and available partner for PREPA, as AES is uniquely placed to implement workable and creative solutions to meet Puerto Rico's energy needs both today and over the next 20 years. AES has deep global expertise in developing renewables, natural gas fuel generation and natural gas supply infrastructure, Lund Testimony at 1-2, 4, *and* deep experience with investing and operating in Puerto Rico. Lund Testimony at 4. Thus, AES combines its global experience in developing renewable resources, with more than 20 years of on-the-ground development, financing, construction and operations experience in Puerto Rico. *Id.* Between the Guayama facility and AES Ilumina, AES-PR has 110 employees and numerous contractors who have the institutional knowledge and real world experience to build and maintain energy production facilities in Puerto Rico. *Id.* at 5. AES-PR's team understands the importance of reliable energy to Puerto Rico, as well as the real world challenges Puerto Rico faces.

1. AES-PR can offer solutions to PREPA to advance the IRP's ambitious goals to develop utility scale solar power resources.

Drawing on its expertise, AES-PR is prepared to work with PREPA to implement solutions to transform its business in Puerto Rico as the IRP is implemented in the coming years. As discussed in Ms. Lund's pre-filed testimony, AES-PR's preferred approach is to transition its business from coal-fired power to operate utility scale solar power resources. Lund Testimony at 10 (describing AES's "Green Blend and Extend" structure). Under this approach, AES-PR would build additional solar capacity through an amended PPOA. Lund Testimony at 4, 9-10; AES-PR Discovery Responses at 7-8. This would allow AES-PR to ramp up solar capacity to 500 MW net capacity in advance of 2027 when the current AES-PR PPOA for the coal-fired units expires. AES-PR Discovery Responses at 8. Once the additional solar capacity becomes operational, under an amended PPOA with AES-PR, PREPA could adjust its future generating mix to meet the island's needs. AES-PR Discovery Responses at 8.

This approach would be firmly in line with the IRP’s goals to add significant solar capacity. Testimony of Dr. Nelson Bacalao, Hearing Panel D (Feb. 4, 2020) (confirming that retirement of existing sources should only occur when new generation is online). The two principal cases in the IRP, S4S2B and ESM Base, require the addition of 2,820 MW and 2,580 MW respectively of new solar photovoltaic capacity over the next 20 years. *See* IRP Exhibits 1-7 through 1-9, at 1-15 to 1-21. In the ESM case, the IRP adds 1800 MW of solar over the next 4 years and a minimum of 300 MW of solar capacity in the next 12 months.

Exhibit 10-1: ESM Annual Solar PV Additions

	2019	2020	2021	2022	2023
Solar PV Additions (MW)	0	300	480	600	420
Cumulative Additions (MW)	-	300	780	1380	1800
Capital Expenditures (\$M)	-	\$452	\$686	\$848	\$586

IRP Exhibit 10-1 at 9-3

In addition to utility scale solar generation, the IRP plans investments in energy storage that would be “unprecedented.” Ronald Moe Testimony at 22. Indeed, as the IRP acknowledges, “the amount recommended in the IRP is much higher than the total capacity currently installed in the whole United States” and “represents an installation never done before in a power grid, especially ... in an isolated system like the one in Puerto Rico.” IRP at 8-4.

Thus, this is an ambitious plan under any circumstances, as Dr. Bacalao agreed repeatedly at the hearing. Testimony of Dr. Nelson Bacalao, Hearing Panel D (Feb. 4, 2020); Testimony of Dr. Nelson Bacalao, Hearing Panel H (Feb. 6, 2020). However, the scope and magnitude of the investments and development of utility scale solar and battery storage in this short time period in Puerto Rico would be extraordinary, particularly given the scope of the investments compared to the overall size of the PREPA system, as well as past PREPA experience in attempting to move PPOAs into commercial operations. *See* Ronald Moe Testimony at 18. Puerto Rico has additional

financial and executional challenges in light of its location as an island positioned in the hurricane belt and its need to attract significant amounts of capital investments in a short period of time. While AES sees these and other financial and execution risks inherent in the IRP, *see* Lund Testimony at 12-15 and Moe Testimony at 2-4, AES has the expertise and experience to be a reliable and knowledgeable partner to help Puerto Rico towards achieving its renewable goals. Lund Testimony at 4-5, 19-20. Dr. Bacalao agreed at the hearing that Puerto Rico will need to work with experienced providers in order to execute its ambitious plans and that AES-PR is one of the most experienced providers on the island. Testimony of Dr. Nelson Bacalao, Hearing Panel D (Feb. 4, 2020). Accordingly, PREPA should continue to work with AES-PR to develop a PPOA for consideration by this Bureau to provide for the build out of solar capacity as a way to transition from coal and oil-fired generation.

2. PREPA should collaborate with AES-PR to analyze further whether to redevelop AES-PR to operate as a natural gas-fired facility.

AES-PR's preferred approach is to work with PREPA to transform its operations to provide energy through renewables. Lund Testimony at 4. The company has also suggested that AES-PR, PREPA, and Siemens collaborate to further analyze the possibility of redeveloping the AES-PR site to utilize natural gas, which is not an option considered by the IRP. This could involve many potential configurations, such as a conversion of the existing boilers or the addition of new gas turbines. Lund Testimony at 4, 10-11, 15. Utilizing the AES-PR site could offer the potential for cost savings by utilizing some existing infrastructure – such as the steam turbine, PREPA transmission connections, and port facility. *See* Moe Testimony at 25-28. Siemens started that process in response to AES-PR's ROIs, producing results that indicate that extending the PPOA to site a 585 MW natural gas fired plant at AES-PR after 2027 “is essentially the same” cost as a resource plan without a plant. Moe Suppl. Testimony at 16. However, as Ronald Moe explained,

further analysis could show that an optimized redevelopment would be a low-cost alternative for PREPA and its customers that allows both parties to leverage the additional investment in Guayama to bring a natural gas facility to the island at a lower cost than building an entirely new plant. Moe Suppl. Testimony at 17 (“fine tuning by AES-PR and PREPA/Siemens about the assumed operating characteristics and costs of the 585-MW combined cycle that PREPA/Siemens modeled would likely lead to selection of a (modified) AES-PR plant as an element of a least-cost plan.”). Indeed, at the Hearing, Dr. Bacalao agreed that with more detailed technical analysis, a redeveloped AES-PR gas plant could be optimized and might prove to be a lowest cost natural gas option for PREPA and Puerto Rico. Testimony of Dr. Nelson Bacalao, Hearing Panel B (Feb. 3, 2020). Importantly, additional analysis of the costs and timelines for this proposed alternative could be done “without affecting the overall schedule PREB has established for the PREPA IRP” and as PREPA has outlined in the Action Plan. Moe Testimony at 32; Lund Testimony at 15.

Aside from the potential to have a lower cost alternative for Puerto Rico, there are other reasons for the Bureau to direct to PREPA to collaborate with AES-PR on a redevelopment. Foremost, implementing a natural gas-fired option at AES-PR would have “materially lower execution risk” than alternatives, given the company’s extensive experience on the island and in developing natural gas-fired capacity and LNG infrastructure, including in the Caribbean. Moe Suppl. Testimony at 17.⁷ Indeed, as with solar, AES is highly experienced with providing natural gas fired energy, including at bringing LNG to markets without domestic gas reserves. AES operates LNG terminals and plants in the Dominican Republic and Panama which, like Puerto Rico, do not have natural gas reserves. AES understands the challenges and risks of developing

⁷ At a minimum, the analysis should go forward to ensure Puerto Rico has this option as “an element of one or more backup plans to be deployed if available capital, energy efficiency savings, and/or renewable capacity additions fall short of the amounts reflected in the least-cost plans.” Moe Suppl. Testimony at 17; Moe Testimony at 28,

and operating such facilities in comparable locations and has a demonstrated track record of success. Accordingly, the Bureau should direct PREPA to work with AES-PR to develop data and a proposal regarding the possible re-development of Guayama to liquefied natural gas.

C. The Bureau should move forward with the IRP as a plan for Puerto Rico’s energy future, which allows for adjustments as the plan is implemented.

The testimony at the hearing strengthened AES-PR’s overall recommendations to the Bureau that it is in the best interest of ratepayers and Puerto Rico to move forward with the IRP and the Action Plan. While the IRP could be improved and some additional analysis should be performed, the testimony confirmed that PREPA can and should move ahead with its essential “no regrets” investments in solar, while further optimizing its analysis of MiniGrids and decisions regarding gas resources. Testimony of Dr. Bacalao, Hearing Panel I (Feb. 7, 2020). As Dr. Bacalao testified on February 8, 2020, none of the testimony regarding energy efficiency, distributed generation, and renewables should change the outcome of the IRP. Testimony of Dr. Bacalao, Hearing Panel I (Feb. 8, 2020) (the testimony at the hearing made him “even more convinced” the Action Plan should proceed). The required framework for each is clearly provided in the Action Plan. The testimony on Panel A made clear that Puerto Rico is in a crisis situation with regard to its energy production and current capacity. Puerto Rico and PREPA needs to start moving forward towards their new energy future. AES-PR, as it has for two decades, stands at the ready to be a part of it.

CONCLUSION

AES-PR urges the Bureau to approve the IRP, direct PREPA to move forward with the “no regrets” investments in solar energy, while providing for further review as the investments in solar and energy efficiency measures are made and implemented to ensure the system has reliable, resilient, and low cost energy available for the ratepayers. By approving the IRP, the Bureau will

affirm the IRP's sound determination to retain AES-PR for the life of its PPOA, while allowing PREPA and AES-PR to consider alternative solutions to amend and extend the PPOA by transitioning to utility scale solar. Further, in order to ensure that the lowest cost natural gas-fired option is considered, the Bureau should direct PREPA to collaborate promptly with AES-PR on an optimized analysis of redeveloping AES-PR to operate on natural gas, before presenting final decisions to the Bureau on other natural gas-fired assets and infrastructure.

RESPECTFULLY SUBMITTED.

CERTIFICATE OF SERVICE

We certify that this Post-Hearing Brief was submitted to the Puerto Rico Energy Bureau through its electronic filing tool at <https://radicacion.energia.pr.gov>, sent via email to wcordero@energia.pr.gov, secretaria@energia.pr.gov; legal@energia.pr.gov; sugarte@energia.pr.gov and viacaron@energia.pr.gov, and sent to the Puerto Rico Electric Power Authority through the following email addresses: Katuska Bolaños (kbolanos@diazvaz.law); Nitza D. Vázquez Rodríguez (n-vazquez@aeep.com); Carlos M. Aquino Ramos (c-aquino@prepa.com); Astrid I. Rodríguez Cruz (astrid.rodriguez@prepa.com); Jorge R. Ruíz Pabón (jorge.ruiz@prepa.com), and Maralíz Vázquez (mvazquez@diazvaz.law). We also certify that on this date we sent a copy of this Brief to: rtorbert@rmi.org; victorluisgonzalez@yahoo.com; corey.brady@weil.com; presidente@ciapr.org; secretaria@energia.pr.gov; csanchez@energia.pr.gov; ireyes@energia.pr.gov; asanz@energia.pr.gov; bmulero@energia.pr.gov; nnunez@energia.pr.gov; gmaldonado@energia.pr.gov; sierra@arctas.com; tonytorres2366@gmail.com; cfl@mcvpr.com; gnr@mcv.com; info@liga.coop; amaneser2020@gmail.com; hrivera@oipc.pr.gov; jrivera@cnslpr.com; carlos.reyes@ecoelectrica.com; ccf@tcmrslaw.com; manuelgabrielfernandez@gmail.com; acarbo@edf.org; rstgo2@gmail.com; larroyo@earthjustice.org; jluebkmann@earthjustice.org; acasellas@amgprlaw.com; loliver@amgprlaw.com; epo@amgprlaw.com; robert.berezin@weil.com; marcia.goldstein@weil.com; jonathan.polkes@weil.com; gregory.silbert@weil.com; agraitfe@agraitlawpr.com; maortiz@lvprlaw.com; rnegron@dnlawpr.com; pedrosaade5@gmail.com; rmurthy@earthjustice.org; castrodiappalaw@gmail.com; voxpathulix@gmail.com; paul.demoudt@shell.com; sproctor@huntonak.com; giacribbs@huntonak.com; javier.ruajovet@sunrun.com; escott@ferraiuoli.com; mgrpcorp@gmail.com, and aconer.pr@gmail.com.

In San Juan, Puerto Rico, on March 6, 2020.

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EXHIBIT A

**EXCERPTS FROM AES-PR'S RESPONSE TO LEO FIRST
REQUEST FOR INFORMATION**

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

IN RE:

Case No.: CEPR-AP-2018-0001

REVIEW OF THE PUERTO RICO
ELECTRIC POWER AUTHORITY
INTEGRATED RESOURCE PLAN

SUBJECT: RESPONSE OF AES PUERTO
RICO, L.P. TO FIRST REQUEST OF
INFORMATION FROM INTERVENOR,
LOCAL ENVIRONMENTAL
ORGANIZATIONS, TO INTERVENOR,
AES PUERTO RICO L.P.

**RESPONSE OF AES PUERTO RICO, L.P. TO FIRST REQUEST OF INFORMATION
FROM INTERVENOR, LOCAL ENVIRONMENTAL ORGANIZATIONS, TO
INTERVENOR, AES PUERTO RICO L.P.**

Comes now Intervenor AES Puerto Rico, L.P. (AES-PR) in response to the First Request of Information from Intervenor, Local Environmental Organizations (Request):

General Objections – AES-PR objects to this Request as an overly broad set of 60 requests plus subparts that is unduly burdensome and seeks information irrelevant to the straightforward purpose of this proceeding: the Review of the Puerto Rico Electric Power Authority (PREPA) Integrated Resource Plan (IRP) by the Puerto Rico Energy Bureau (PREB). Further, AES-PR objects to this Request to the extent it seeks privileged and/or confidential information or documents protected by any and all privileges afforded under applicable Puerto Rico and federal law, including attorney client privilege, work product doctrine, settlement privilege, and protections for confidential information, such as confidential business information and trade secrets.

Objections to Instructions – AES-PR objects to the scope of the instructions here, as the instructions impose undue burdens well beyond the scope of reasonable discovery of an intervenor in this administrative proceeding including: to require documentation of privileges, which would be documented should there be motion practice (Instruction #2), to require a search for information

AES-PR Response: Hawaii and California. Hawaii's RPS: 2020 – 30%, 2030 – 40%, 2040 – 70%, and 2045 – 100%. California's RPS: 2020 – 33%, 2024 – 44%, 2027 – 52%, 2030 – 60%, and 2045 – 100%.

6. On p. 26, Mr. Moe states that AES-PR has the lowest [LCOE] of all the existing or proposed fossil-fired resources considered in the PREPA IRP at a capacity factor of 60 percent or higher.

a. Would the AES facility still have the lowest LCOE if the capacity factor dropped below 60 percent?

AES-PR Response: *See* Exhibit 6-20 of the IRP, on which Mr. Moe based his testimony.

b. Please provide the annual capacity factor of the AES-PR facility for each year since it came online.

AES-PR Response: The annual capacity factor of the AES-PR facility for the past 10 years was as follows:

2009 85%
2010 80%
2011 88%
2012 81%
2013 86%
2014 92%
2015 82%
2016 87%
2017 58% (87% before onset of Hurricane Maria)
2018 63% (73% once AES-PR resumed dispatching fully after transmission issues were resolved post Hurricane Maria)
2019 88%

c. Please provide the LCOE of the facility, in 2019 dollars, for the AES-PR facility at the capacity factors provided in response to 6(a).

AES-PR Response: The price of energy provided by AES-PR is set by the PPOA. The AES-PR capacity factor has consistently been above 60%. Therefore, according to the calculations

planning process (see Mr. Moe's CV), the planners factored in the fact that they would not be able to access natural gas after the 20 year planning horizon, because that was similarly a knowable factor in the planning process.

9. On p. 10, Ms. Kristina Lund refers to a structure named "Green Blend and Extend".

a. Please provide a detailed description of this structure.

b. Please provide all documents in the possession of AES-PR concerning this structure.

c. Please provide copies of all correspondence between AES-PR and the Puerto Rico government concerning this structure.

AES-PR Response: AES-PR objects to this request as it calls for production of irrelevant, confidential, and privileged information. Notwithstanding and without waiving its objections, AES-PR states: Ms. Lund described Green Blend and Extend in her testimony. See Pre-Filed Direct Testimony of Kristina Lund for Intervenor AES Puerto Rico, L.P. (10/22/2019). The Green Blend and Extend (GB&E) is being developed to support the orderly and planned transition from conventional, fossil fuel generation to renewable resources in Puerto Rico. The detailed structure will depend on discussions with PREPA, as well as review and approval by the PREB, the Fiscal Oversight Board and the Title III court and lenders to AES-PR. A final, detailed structure is not available at this time.

Conceptually, the Green Blend and Extend may include 1) An extension of the PPOA for generation from new solar capacity, and 2) An amendment to the PPOA to enhance coal plant flexibility.

1) Extension of the PPOA for Solar

Under a GB&E, new solar capacity would be built under an extension of the PPOA. AES-PR and its affiliates are working to develop a proposal for up to 500 MWn of new solar capacity

in Puerto Rico. An extended PPOA would likely involve a long-term contract, a fixed price, customary operational performance obligations, and other terms that would be required to secure financing.

2) **Amendment to the PPOA for Coal Plant Flexibility**

Once the new solar capacity is operational, an amended PPOA would allow PREPA to reduce its purchase of electricity generated from fossil fuels, including coal and petroleum fuels. PREPA's future generation mix will need to be balanced to meet the island's environmental, reliability and financial objectives. To help PREPA balance its energy mix, the amended PPOA could, for example, give PREPA more flexibility with respect to AES-PR's coal operations.

Benefits of the GB&E

The GB&E could help PREPA to accelerate its transition from fossil fuels to renewables through a framework that would be cost-effective for customers. AES-PR and its affiliates have global expertise in building and operating renewables and structuring commercial and operational programs to transition from thermal to renewable sources. AES-PR also has nearly two decades of operating experience in Puerto Rico. AES-PR is committed to helping PREPA transition to a cleaner and sustainable energy future.

If AES-PR and PREPA were to negotiate a new power purchase agreement that encompasses a GB&E, as appropriate, that final agreement would come before PREB for review, consistent with the Bureau's rulings. *E.g.*, Resolution and Order, In Re: Request For Approval of Amended and Restated Power Purchase and Operating Agreement With EcoElectrica and Natural Gas Sale and Purchase Agreement With Naturgy, Case No. NEPR-AP-2019-0001 (Nov. 27, 2019). At that point, certain information could be disclosed, consistent with the limits on disclosure and protections afforded under federal and Puerto Rico law. *Id.*

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In San Juan, Puerto Rico, on January 10, 2020.

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