

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

IN RE: IMPLEMENTATION OF THE PUERTO RICO ELECTRIC POWER AUTHORITY INTEGRATED RESOURCE PLAN AND MODIFIED ACTION PLAN

CASE NO.: NEPR-MI-2020-0012

SUBJECT: Renewable Energy Generation and Energy Storage Resource Procurement Plan – First Tranche Projects for Phase III Contract Negotiation and Final Interconnection Plan Approvals

RESOLUTION AND ORDER

I. Introduction

On August 24, 2020, the Energy Bureau of the Public Service Regulatory Board (“Energy Bureau”) issued the IRP Order¹, regarding the Integrated Resource Plan (“IRP”) of the Puerto Rico Electric Power Authority (“PREPA”). The IRP Order approved a Modified Preferred Resource Plan that included a plan for six (6) tranches of procurement of renewable energy and battery storage resources.²

On December 16, 2021, PREPA filed a document titled *Motion Submitting 733 MW of PV Renewable Energy Draft Power Purchase and Operating Agreements Offered in Tranche 1 of PREPA’s Renewable Generation and Energy Storage Resources RFP for Energy Bureau Evaluation and Approval* (“December 16 Motion”). In that December 16 Motion, PREPA identified fifteen (15) Photo-Voltaic (“PV”) projects totaling 732.7 MW and submitted draft bespoke power purchase and operating agreements (“PPOAs”) for those projects, for the evaluation and approval by the Energy Bureau. In the December 16 Motion, PREPA also identified three (3) Battery Energy Storage System (“BESS”) resource projects (4-hour duration) totaling 220 MW, for which PREPA indicated it planned the submission of bespoke energy storage services agreements (“ESSAs”) by or before December 23, 2021. PREPA included in its December 16 Motion submission, as Attachment A, a memorandum from PREPA’s Tranche 1 Evaluation Committee describing the detailed evaluation approach taken to arrive at its selection of project offerings for approval.

On December 23, 2021, PREPA filed a document titled *Supplemental Motion Submitting PV Renewable Energy Draft Power Purchase and Operating Agreements (PPOAs) As Well As Energy Storage Service Agreements (ESSAs) As Part of PREPA’s Tranche 1 Renewable Generation and Energy Storage Resources RFP For Energy Bureau Evaluation and Approval* (“December 23 Motion”). PREPA submitted three bespoke ESSA contracts totaling 220 MW reflecting the projects stated in the December 16 Motion and submitted three solar PV bespoke contracts totaling 112.1 MW, additional to the 732.72 MW of solar PV projects submitted for authorization in the December 16 Motion. The combined solar PV resource procurements for which authorization was sought by PREPA was 844.82 MW.

On February 2, 2022, the Energy Bureau issued a Resolution and Order (“February 2 Resolution”) authorizing eighteen (18) PV project PPOAs for PREPA to finalize its negotiations with those proponents.

On February 2, 2022, PREPA filed a document titled *Motion in Compliance with the January 28 Order Submitting Energy Storage Resources Information, the Next Two Projects Totaling 50MW of Solar PV Resources and Memorandum of Law Requesting Confidential Treatment*

¹ See, Final Resolution and Order on the Puerto Rico Electric Power Authority’s Integrated Resource Plan, *In re: Review of the Puerto Rico Electric Power Authority Integrated Resource Plan*, Case No. CEPR-AP-2018-0001, August 24, 2022 (“IRP Order”).

² IRP Order, pp. 266-268, ¶ 860.



("February 2 Motion"). PREPA filed information regarding the six additional BESS projects and the two projects totaling 50 MW of solar PV resources.³

On March 1, 2022, PREPA filed a document titled *Memorandum of Law in Support of Request for Confidential Treatment of Attachment A* ("March 1 Memorandum"). The March 1 Memorandum included as Attachment A, filed under seal, a document titled *Informative Motion Regarding Status of VPP Contract Negotiations and Delays in Finalizing Form of Interconnection Agreement* ("March 1 Motion"). Through the March 1 Motion, PREPA provides an update on the status of PREPA's discussion regarding the Virtual Power Plant ("VPP") Proponents and with representatives of LUMA⁴ regarding a potential significant delay regarding the Interconnection Agreement. The March 1 Motion includes as Exhibit A, on a confidential basis, a Bespoke GSA as it stands with one of the VPP Proponents.⁵

On March 17, PREPA filed a document titled *Memorandum of Law in Support of Request for Confidential Treatment of Attachment A* ("March 17 Memorandum"). The March 17 Memorandum included as Attachment A, filed under seal, a document titled *Informative Motion Identifying Concerns Regarding Pricing and Certain Commercial Terms Offered by Tranche 1 VPP Project Proponents and Request for Confidential Meeting to Discuss Selection of Tranche 1 VPP Proposals* ("March 17 Motion"). The March 17 Motion provides an update on the status of the two VPP Proponents and the finalization of the GSA's.⁶

On April 11, 2022, the Energy Bureau issued a Resolution and Order ("April 11 Resolution") to obtain additional information from PREPA and LUMA about the status of Tranche 1 resource offerings and interconnection cost considerations. In the April 11 Resolution, the Energy Bureau issued questions 1-5 for PREPA to respond and issued questions 6-7 for LUMA to respond. Both PREPA and LUMA were to respond on or before April 19, 2022.

On April 19, 2022, LUMA filed a document titled *Motion Submitting Partial Response and Requesting Brief Extension to Submit LUMA's Full Answers to Questions 6 and 7 in the Energy Bureau's Resolution and Order of April 11, 2022* ("April 19 Motion"). In the April 19 Motion, LUMA addressed the lack of access to certain information that PREPA provided to LUMA on April 18, 2022. Due to the short period to respond, LUMA prepared partial responses to Questions 6 and 7 and requested an extension until April 29, 2022, to submit its complete answers.⁷

On the same day, PREPA filed a document titled *Motion for Extension of Time Until April 25, 2022, to Comply with Responses Required by the April 11, 2022, Resolution and Order* ("April 19 Request"), where PREPA requested an extension until April 25, 2022, to file its responses to the April 11 Resolution.

On April 22, 2022, the Energy Bureau issued a Resolution and Order granting both PREPA and LUMA to file their complete responses to the April 11 Resolution on or before April 28, 2022.

On April 27, 2022, the Energy Bureau issued a Resolution and Order ("April 27 Resolution") through which it ordered LUMA to file the results of the final Tranche 1 technical studies by May 30, 2022 and ordered PREPA to file the execution copies of the 18 authorized PPOAs by June 30, 2022.

³ February 2 Motion, p. 5.

⁴ LUMA Energy, LLC and LUMA ServCo, LLC (collectively, "LUMA").

⁵ March 1 Motion, pp. 2-3, ¶ 2.

⁶ March 17 Motion, p. 3, ¶ 5.

⁷ April 19, Motion, p. 3, ¶¶ 6-7.



On June 13, 2022, the Energy Bureau issued a Resolution and Order (“June 13 Resolution”) authorizing PREPA to finalize negotiations on nine (9), 4-hour duration utility-scale battery energy storage projects totaling 490 MW of capacity and one (1) 17 MW VPP, and authorizing PREPA to finalize its contract negotiations with those Tranche 1 proponent offerings.

On June 30, 2022, PREPA filed a document titled *Motion to Submit Execution Copies of PPOAs in Compliance with the April 27 and June 13 Orders, Request for Additional Time to Submit Certain PPOAs and Memorandum of Law Requesting Confidential Treatment of PPOAs and Exhibits* (“June 30 Motion”). In its June 30 Motion PREPA described the status of the 18 PPOAs for PV energy approved by the Energy Bureau in its February 2, 2022 Resolution and Order.

On July 5, 2022, the Energy Bureau issued a Resolution and Order through which it granted confidential designation and treatment to Exhibits A, B, C, D, and E attached to the June 30 Motion. Additionally, the Energy Bureau ordered PREPA to show cause, on or before July 8, 2022, as to why the Energy Bureau should not issue an order requiring PREPA to file a redacted (public) version of the execution copies of PPOA’s included in Exhibit A of the June 30 Motion.

On July 8, 2022, the Energy Bureau issued a Resolution and Order through which it approved nine (9) executed copies of solar PV PPOAs for nine (9) PV resource projects from the June 30 Motion Exhibit A, totaling 430.1 MW, across Puerto Rico.

On August 4, 2022, PREPA filed a *Motion to Submit Additional PPOAs in Compliance with July Resolution and Order* (“August 4 Motion”). PREPA submitted execution copies of PPOAs totaling 109.37 MW. PREPA also indicated that negotiations remained ongoing with two respondents and an associated five projects (totaling 305 MW) for which final executed copies of PPOAs were then still under development. The August 4 Motion included submittal of an Exhibit A (under seal), containing executed PPOA contracts for four of the original eighteen (18) approved PPOAs for solar PV resources from the Energy Bureau's February 2, 2022 Resolution and Order.

On August 13, 2022, PREPA filed a *Motion to Submit Additional PPOA in Compliance with July 8 Resolution and Order* (“August 13 Motion”). PREPA submitted an execution copy of an additional solar PV PPOA for 60 MW and indicated that negotiations remain ongoing with a respondent for four (4) additional PPOAs for which final executed copies of PPOAs were then still under development. The August 13 Motion included submittal of an Exhibit A (under seal), containing an executed PPOA contract for one of the original eighteen (18) approved PPOAs for solar PV resources from the Energy Bureau's February 2, 2022 Resolution and Order.

On August 15, 2022, the Energy Bureau approved the execution copies of five (5) PPOAs for solar PV resources submitted by PREPA in its August 4 and August 13 Motions (“August 15 Resolution”).

On August 26, 2022, PREPA filed a document titled *Motion to Submit Remaining Executed PPOAs and BESS Contracts in Compliance with the August 15, 2022 Resolution and Order* (“August 26 Motion”). Through the August 26 Motion, PREPA submitted the remaining four (4) executed utility-scale solar PV PPOAs for 245 MW in total (120 MW, 80 MW, 25 MW, and 20 MW) as part of Exhibit A. PREPA also submitted in Exhibit A of the August 26 Motion two (2) executed contracts for energy service storage agreements (“ESSAs”) each for a four-hour duration utility-scale battery energy storage projects co-located with two of the solar PV PPOAs also submitted with the August 26 Motion, each with a nominal rating of 100 MW and 400 MWh.⁸ PREPA requested that the specific pricing associated with the battery energy

⁸ August 26 Motion, pp. 1, 3-4, and as indicated in the Exhibit A Energy Storage Service Agreements.



storage projects in the August 26 Motion remain confidential until the remaining battery energy storage project ESSAs are finalized.⁹

II. Discussion and Findings

In the August 26 Motion, PREPA references the increased cost of the four solar PV projects in the execution copies of the PPOAs,¹⁰ compared to the pricing agreements originally submitted by the respondent and filed by PREPA in December 16, 2021.¹¹ PREPA notes that the percentage increase in costs for these four solar PV projects are generally higher than increases seen for other Tranche 1 executed PPOAs, since these four projects “started from a much lower base price proposal than the others”.¹² PREPA notes in the August 26 Motion that the entire portfolio of the Tranche 1 PPOAs has a capacity-weighted average levelized cost of energy (“LCOE”) of \$108.03/MWh and “individually remain within the price threshold set for the Tranche 1 process by PREPA’s Governing Board of approximately \$110/MWh”.¹³ PREPA notes that proponents of the four solar PV and two BESS projects in the August 26 Motion attributed the price increases reflected in the executed PPOAs and ESSAs to “extraordinary pressures” resulting from a myriad driving factors, including supply chain interruptions, increased shipping, commodity, labor and raw material costs, higher financing rates, the war in Ukraine, solar equipment tariff threats and other import restrictions.¹⁴

The Energy Bureau has conducted an independent update of the LCOE for the four projects submitted in Exhibit A to the August 26 Motion and has completed an update of the LCOE, in nominal and real terms, for all of the Tranche 1 solar PV PPOAs.

Appendix A to this Resolution and Order (“Appendix A”) lists the set of eighteen (18) projects, including the four projects submitted in Exhibit A to the August 26 Motion, and contains a set of metrics describing the cost of the projects and their computed levelized costs over the full 25-year term of these solar PV PPOAs.

Appendix A shows an update to the nominal values for project LCOEs in accordance with the compensation terms of the execution copies of the PPOAs from PREPA’s filings of June 30, August 4, August 13, and August 26, 2022. Appendix A updates to nominal LCOEs are based on those terms and the Energy Bureau’s independent computation of nominal LCOEs for the individual projects and for the portfolio of resources. Appendix A shows that the portfolio of 844.8 MW of solar PV has a capacity weighted nominal LCOE of \$108.1/MWh.

To allow for comparison in a manner similar to that described in the February 2 Resolution, which initially approved these projects as in alignment with the IRP Order on the basis of a comparison of real costs, the Energy Bureau has also computed an adjustment to real LCOE values originally contained in Confidential Appendix A to the February 2 Resolution. This revision is based on the updated compensation values filed in the eighteen (18) execution copies of the PPOAs and the Energy Bureau’s independent computation of the real LCOEs, individually and for the portfolio of projects.

⁹ *Id.*, p. 4.

¹⁰ *Id.*, pp. 4-5.

¹¹ See, *In re: Implementation of the Puerto Rico Electric Power Authority Integrated Resource Plan and Modified Action Plan*, Case No. NEPR-MI-2020-0012, *Motion Submitting 733 MW of PV Renewable Energy Draft Power Purchase and Operating Agreements Offered in Tranche 1 of PREPA’s Renewable Generation and Energy Storage Resources RFP for Energy Bureau Evaluation and Approval*, filed by PREPA on December 16, 2021.

¹² August 26 Motion, p. 6.

¹³ *Id.*, p. 5.

¹⁴ *Id.*, p. 4.



The original computation for the real value of LCOE (in 2021 currency) used in support of the February 2 Resolution included an assumption of 2% annual inflation. This value was used to both estimate the real value of IRP¹⁵ assumptions for solar PV and battery costs, and to evaluate the levelized cost of the PPOAs and ESSAs to reflect 2021 currency values.

Computing 2021 real currency value is important because project operation will not commence until 2023 or 2024. To reflect the changes to annual inflation estimates for the year 2022 and 2023 (the construction and ramp up period for the projects), whose effects are seen in the updated nominal pricing for the execution copies of all solar PV PPOAs, Appendix A to this Resolution and Order updates the inflation assumption for 2022-2023 to average 3.9% per year for the years 2022 and 2023. This updated value is used when computing the real LCOEs (in 2021 currency) for the individual projects and the portfolio.

The 3.9%/year average inflation for this two-year period is based on the most recent US Federal Reserve Board projection of the median value of core PCE (personal consumption expenditures) inflation across the 2022 and 2023 periods.¹⁶ The effect of considering increased inflation is to compute a solar PV PPOA cost metric that can appropriately be compared to the real costs (2021) of alternatives considered in the IRP Order.

As seen in Appendix A – roughly in alignment with PREPAs reported capacity-weighted average cost - the Energy Bureau independently computed a portfolio-weighted average LCOE of \$108.1/MWh for the eighteen (18) Tranche 1 solar PV projects represented by the set of execution PPOAs for these projects. This is a nominal value. The four projects in Exhibit A of the August 26 Motion exhibit pricing roughly in the middle of the range of project costs, as Appendix A lists the project in LCOE rank order (lowest to highest).

The real levelized cost of the portfolio of solar PV PPOAs on a capacity-weighted basis is \$85.4/MWh, in 2021 real currency. This value is roughly \$3.8/MWh greater than the real costs seen in the February 2 Resolution, and within the range of increase considered by PREPA to account for finalization of interconnection costs.¹⁷

Based on a review of the Exhibit A contracts in the August 26 Motion, for four solar PV projects, the Energy Bureau **ACCEPTS** PREPA's filing of these four (4) executed PPOA contracts and **FINDS** that PREPA is in compliance with the April 27, June 13, and August 15 Resolutions for this portion of the solar PV portfolio. Therefore, the Energy Bureau **APPROVES** the executed contracts depicted in Exhibit A of the August 26 Motion.

The Energy Bureau also **DETERMINES**, based on an updated assessment of the real levelized costs of the capacity-weighted portfolio of eighteen (18) solar PV projects from the Tranche 1 RFP responses and execution copies of PPOAs, that these projects are fully in alignment with the Modified Action Plan of the IRP Order.

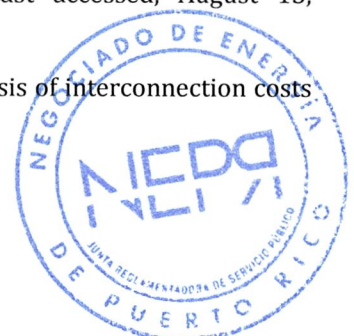
The Energy Bureau **GRANTS** PREPA's request to keep confidential the specific pricing details of the battery energy storage projects contained in Exhibit A since seven (7) storage projects continue a deliberative and negotiation process with other proponents. Once the process for the selection of the storage projects concludes, then such information shall be public.

The Energy Bureau has initially assessed the two battery energy storage projects provided in Exhibit A of the August 26 Motion. The Energy Bureau **FINDS** at this time that the cost of

¹⁵ Integrated Resource Plan ("IRP").

¹⁶ US Federal Reserve, Monetary Policy Report, June 2022, Table 1. Economic Projections of Federal Reserve Board members and Federal Reserve Bank presidents, under their individual assumptions of projected appropriate monetary policy, June 2022. Available at: <https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20220615.htm> (Last accessed, August 13, 2022).

¹⁷ PREPA estimated in its December 2021 filing that LUMA's more detailed analysis of interconnection costs could change the PPOA costs by +/- \$5/MWh.

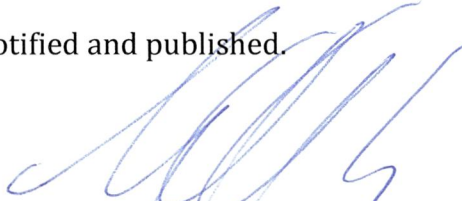


these two projects is within the range of battery energy storage market prices considered when the Energy Bureau initially authorized PREPA to proceed to final negotiation for a set of nine (9) battery energy storage projects and one Virtual Power Plant ("VPP") in the June 13 Resolution.¹⁸

The Energy Bureau **APPROVES** these execution copies of ESSAs for these two projects. Upon receipt of all outstanding battery energy storage project ESSA execution copies the Energy Bureau **ANTICIPATES** a similar reporting of nominal and real levelized costs for the remaining portions of the portfolio of energy storage projects under final negotiation.

The Energy Bureau **WARNS** PREPA that any proposed amendments or modifications to the PPOAs shall be submitted before the Energy Bureau for review and approval by the same.

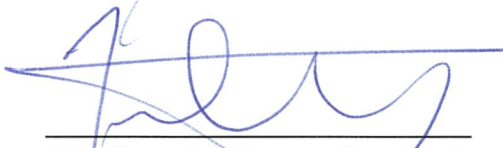
Be it notified and published.



Edison Avilés Deliz
Chairman



Lillian Mateo Santos
Associate Commissioner



Ferdinand A. Ramos Soegaard
Associate Commissioner



Sylvia B. Ugarte Araujo
Associate Commissioner

CERTIFICATION

I hereby certify that the majority of the members of the Puerto Rico Energy Bureau has so agreed on September 1st, 2022. I also certify that on September 1st, 2022, a copy of this Resolution and Order was notified by electronic mail to the following: laura.rozas@us.dlapiper.com, margarita.mercado@us.dlapiper.com, kbolanos@diazvaz.law and mvazquez@diazvaz.law. I also certify that today, September 1st, 1, 2022, I have proceeded with the filing of the Resolution and Order issued by the Puerto Rico Energy Bureau.

For the record, I sign this in San Juan, Puerto Rico, today September 1st, 2022.



Sonia Seda Gaztambide
Clerk



¹⁸ See, *In re: Implementation of the Puerto Rico Electric Power Authority Integrated Resource Plan and Modified Action Plan*, Case No. NEPR-MI-2020-0012, Resolution and Order, June 13, 2022 ("June 13 Resolution"), pp. 8-9.



Appendix A - Tranche 1 Solar PV Projects

Proponent Name	Project Name	Project ID	Interconnection Voltage kV	Project Nominal MW	Cumulative Projects, MW	1stYr Mwh	Cumulative 1st Year MWh	Source of Price Stream Data	1st Year Product Cost, Nominal \$/MWh	1st Year Interconnection, Nominal \$/MWh	1st Year Total Cost, Nominal \$/MWh	Annual Escalator	Nominal LCOE		Real LCOE (\$2021)	
													Nominal LCOE (IEA) \$/MWh	Portfolio Weighted Nominal LCOE (IEA) \$/MWh	\$2021 Real LCOE (IEA) \$/MWh	Portfolio Weighted \$2021 Real LCOE (IEA) \$/MWh
Solarblue Bemoga, LLC	Bemoga	AJ-1-P	38	25.0	25.0	53,975	53,975	Executed PPOA	88.0	1.2	89.2	1.25%	98.4	98.4	77.7	77.7
Putnam Bridge	Ciro Two Salinas	AD-1-P	115	33.0	58.0	59,635	113,610	Executed PPOA	84.8	4.6	89.4	2.00%	104.2	101.4	82.3	80.1
Convergent E&P, LLC	Coamo Solar	I-1-P	115	100.0	158.0	202,013	315,623	Executed PPOA	84.1	6.8	90.9	2.00%	106.5	104.7	84.2	82.7
Uriel/Canadian Solar	Cabo Rojo	AQ-1-P	115	100.0	258.0	217,838	533,462	Executed PPOA	88.0	3.4	91.4	2.00%	107.3	105.8	84.7	83.5
Pattern Energy	Pattern Barceloneta Solar	W-3-P	115	60.0	318.0	156,898	690,360	Executed PPOA	103.2	4.5	107.7	0.00%	107.7	106.2	85.1	83.9
Diverxia Infrastructure	Diversys Mayaguez	O-2-P	38	25.0	343.0	60,612	750,971	Executed PPOA	94.5	13.5	108.0	0.00%	108.0	106.3	85.3	84.0
Diverxia Infrastructure	Cabo Rojo	O-1-P	38	20.7	363.7	49,392	800,364	Executed PPOA	95.5	12.5	108.0	0.00%	108.0	106.5	85.3	84.1
AES Puerto Rico	Salinas Solar	C-1-P	115	120.0	483.7	251,111	1,051,475	Executed PPOA	88.4	4.1	92.5	2.00%	108.5	106.9	85.7	84.5
AES Puerto Rico	Jobos Solar	A-1-P	115	80.3	564.0	169,854	1,221,329	Executed PPOA	81.7	10.8	92.5	2.00%	108.5	107.1	85.7	84.6
Pattern Energy	Vega Baja	AB-1-P	38	25.0	589.0	65,374	1,286,703	Executed PPOA	99.8	9.1	108.9	0.00%	108.9	107.2	86.0	84.7
AES Puerto Rico	Naguabo Solar B	B-2-P	38	20.0	609.0	41,643	1,328,346	Executed PPOA	80.1	13.2	93.3	2.00%	109.5	107.3	86.5	84.8
AES Puerto Rico	Naguabo Solar A	B-1-P	38	25.0	634.0	51,867	1,380,213	Executed PPOA	80.1	13.2	93.3	2.00%	109.5	107.4	86.5	84.8
Sonnex Solar PR, LLC	Yabucoa	AK-1-P	115	32.1	666.1	73,362	1,453,575	Executed PPOA	83.5	10.3	93.8	2.00%	109.6	107.5	86.7	84.9

Proponent Name	Project Name	Project ID	Interconnection Voltage kV	Project Nominal MW	Cumulative Projects, MW	1stYr Mwh	Cumulative 1st Year MWh	Source of Price Stream Data	1st Year Product Cost, Nominal \$/MWh	1st Year Interconnection, Nominal \$/MWh	1st Year Total Cost, Nominal \$/MWh	Annual Escalator	Nominal LCOE		Real LCOE (\$2021)	
													Nominal LCOE (IEA) \$/MWh	Portfolio Weighted Nominal LCOE (IEA) \$/MWh	\$2021 Real LCOE (IEA) \$/MWh	Portfolio Weighted \$2021 Real LCOE (IEA) \$/MWh
Energle (Go Green)	Yabucoa Energy Park	AT-1-P	115	38.7	704.8	33,133	1,486,707	Executed PPOA	104.0	5.7	109.7	0.00%	109.7	107.5	86.7	85.0
Solaner PR One, LLC	Solaner San German	AI-1-P	115	35.0	739.8	73,490	1,560,197	Executed PPOA	91.7	6.3	98.0	1.85%	110.0	107.7	86.9	85.0
Coqui Power ETC, LLC	Esmeralda Solar Farm	N-1-P	115	60.0	799.8	160,074	1,720,271	Executed PPOA	99.3	2.7	102.0	1.00%	110.3	107.9	87.1	85.2
Yarotek PR, LLC	Tetris Power	AS-1-P	38	20.0	819.8	39,831	1,760,102	Executed PPOA	91.3	11.5	102.8	1.00%	111.0	108.0	87.7	85.3
Putnam Bridge	Guayama Solar Energy	AE-1-P	38	25.0	844.8	49,814	1,809,915	Executed PPOA	86.9	8.6	95.5	2.00%	111.4	108.1	88.0	85.4

