

**COMMONWEALTH OF PUERTO RICO
PUERTO RICO ENERGY BUREAU**

IN RE: REVIEW OF THE PUERTO
RICO ELECTRIC POWER
AUTHORITY INTEGRATED
RESOURCE PLAN

NO. CEPR-AP-2018-0001

SUBJECT: Direct Testimony of
Matthew Lee

Direct Testimony of

MATTHEW LEE

Office of the Chief Financial Advisor
Puerto Rico Electric Power Authority

June 14, 2019



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1 **I. INTRODUCTION AND SUMMARY**

2 **A. Witness Identification**

3 **Q. Please state your name, title, employer, and business address.**

4 A. My name is Matthew Lee. I am a Managing Consultant with Filsinger Energy Partners,
5 an energy- sector advisory firm ("FEP"). Since December 2017, Todd Filsinger, the head
6 of FEP, has served as Chief Financial Advisor to the Puerto Rico Electric Power
7 Authority ("PREPA"). In my capacity as a Consultant with FEP, I have worked in the
8 Office of the Chief Financial Advisor as an advisor to PREPA. My business address is
9 90 Madison St, Suite 600, Denver, CO 80206.

 10 **Q. On whose behalf are you testifying?**

11 A. I am testifying on behalf of PREPA, in support of testimony being provided by
12 Mr. Filsinger in this proceeding (see PREPA Exhibit ("Ex.") 4.0) concerning the analyses
13 and considerations that have driven development and refinement of the Integrated
14 Resource Plan ("IRP") which PREPA filed in this proceeding on June 7, 2019 (PREPA
15 Ex. 1.0) (plus attachments). As represented in this testimony, I have assisted PREPA
16 management in an advisory role supporting the development of the Action Plan contained
17 in the IRP.

18 **Q. Have you previously provided testimony before the Energy Bureau?**

19 A. Yes. I provided testimony regarding the alternative fuel Request for Proposals initiated
20 by PREPA in 2018. In addition, I submitted prepared direct testimony in support of the
21 previous version of the IRP which PREPA filed in this docket on February 13, 2019.

B. Summary of Direct Testimony

Q. **What does your Direct Testimony address?**

A. My testimony is intended to provide certain details supporting the high-level overview of PREPA's IRP (PREPA Ex. 1.0) (plus attachments), that Mr. Filsinger offers in his Direct Testimony. I also provide additional detail concerning PREPA's Action Plan which was developed at the direction of PREPA management and in close collaboration with PREPA's Planning Directorate (the Action Plan may be found in Part 10 of the IRP). Through Dr. Nelson Bacalao, PREPA's IRP consultant, Siemens Power Technologies International ("Siemens") is presenting detailed Direct Testimony in support of the IRP, including the Action Plan. This testimony appears as PREPA Ex. 6.0. The IRP and the associated Action Plan are endorsed by PREPA's senior management, as shown in the Direct Testimony of PREPA's Executive Director and Chief Executive Officer, José F. Ortiz Vázquez (PREPA Ex. 3.0).

Q. **Are there any exhibits to your testimony?**

A. Yes. My testimony includes Ex. 5.01 – my *curriculum vitae*.

C. Qualifications and Professional Background

Q. **What are your duties and responsibilities as a Managing Consultant with Filsinger Energy Partners relating to PREPA?**

A. FEP is an independent energy advising firm consisting of senior executives and experts who have decades of experience in the power sector and other sectors of the energy industry. Our firm advises clients on issues relating to utility and energy company restructuring, the development, purchase and disposition of utility-scale power generation

44 assets, pursuit of facility and enterprise-wide operational improvements, utility and
45 project finance, utility budgeting and billing and collection, and other areas. The services
46 we provide include the performance of independent engineering reviews of utility and
47 power generation operations, advising on utility and power generator financing, assisting
48 in construction monitoring, and advising on facility start-up, testing, and operation and
49 maintenance. We also complete financial evaluations to support power supply
50 investment and business decisions.

51 Since 2017, FEP has staffed the Office of the Chief Financial Advisor, which was
52 established in accordance with PREPA's revised Fiscal Plan to support PREPA's Chief
53 Executive Officer ("CEO"). Other FEP personnel and I provide the CEO with general
54 financial and managerial support on such matters as budgeting, financial management,
55 cash management, and expense approval. We also advise and support the CEO in the
56 implementation of the fiscal and operations restructuring reforms and initiatives outlined
57 in the certified Fiscal Plan and the implementation of the certified Budget. We assist and
58 support the CEO on any other matters on which he requests our help.

59 As a Managing Consultant working in the office of the Chief Financial Advisor, I
60 have provided advice to PREPA on an as-needed basis during the IRP process, in
61 particular concerning the optimization of the Energy System Modernization ("ESM")
62 Plan and the Action Plan.

63 Q. **What is your educational background?**

64 A. I received a B.S. in Mechanical Engineering from the Colorado School of Mines in 1992.

65 Q. **What is your professional background?**

66 A. I have 28 years of experience leading and advising companies in the energy and
67 petrochemicals sectors, including a number of participants in the electric power sector. I
68 have managed the development, design, permitting, and financing of power,
69 petrochemical and infrastructure projects, and have provided consulting services in
70 connection with private debt and equity placements, project financings and public
71 offerings. I have advised a number of purchasers and sellers of energy assets, as well as
72 electric utilities and municipalities. My experience includes traditional and renewable
73 forms of generation, gas and electric power distribution, plant performance testing,
74 economic modeling, operational reviews, technical due diligence, and valuations. I have
75 been responsible for contract negotiations involving the development of a number of
76 electric generating facilities. I have advised power project developers, electric utilities,
77 municipalities, lenders and other energy and petrochemical sector companies on resource
78 evaluation, project permitting and compliance with environmental laws and regulations.
79 My current CV is attached as PREPA Ex. 5.01.

80 **II. PREPA'S PREFERRED RESOURCE PLAN**

81 **Q. What is PREPA's Action Plan?**

82 A. PREPA's Action Plan is set forth in Part 10 of the IRP main Report (PREPA Ex. 1.0). It
83 incorporates PREPA's preferred approach to immediately address vulnerabilities to
84 system resiliency by replacing aging, peak generation resources, and to the long-term
85 improvement of the Commonwealth's electric utility system by, among other things,
86 creating MiniGrids that will incorporate sufficient localized generation to serve critical
87 loads connected to each MiniGrids under conditions of system stress. For purposes of the

88 IRP, critical loads represent loads necessary for safety and health and those required to
89 support recovery services. The Action Plan addresses PREPA's resource requirements
90 for the next five years, and envisions the implementation of elements of the ESM Plan
91 and Scenario 4, Strategy 2 ("S4S2"), which was developed through the IRP process. As
92 described more completely in the IRP, the ESM and S4S2 are similar. They provide for
93 system resiliency and are designed to comply with public policy and renewable energy
94 portfolio standards. PREPA's proposed Action Plan favors the ESM Plan, as it will
95 better position PREPA to respond to deviations in modeling assumptions related to load
96 forecast and future costs of generation resources and energy storage systems. The Action
97 Plan recommends that development activities associated with the ESM's fuel
98 infrastructure and generation resources begin immediately, and be reevaluated prior to
99 committing capital for equipment or construction.

100 **Q. How was the Action Plan developed?**

101 A. The Action Plan was developed by a collaborative working group led by PREPA and the
102 Puerto Rico Central Office for Recovery, Reconstruction and Resiliency ("COR3");
103 supported by advisors to PREPA and COR3, including FEP. The Action Plan reflects
104 significant input from other utility industry experts and governmental agencies, such as
105 the U.S. Department of Energy.¹ It envisions implementation of the various initiatives
106 identified by PREPA, COR3, their advisors and other stakeholders in the ESM Plan and
107 in the IRP's S4S2 scenario. I supported data gathering efforts, coordinated activities with
108 other FEP subject matter experts, assisted with the definition of permit requirements at

¹ The U.S. Department of Energy has expressed particular interest in the repowering of the Palo Seco Power Plant as it represents a key resource located in PREPA's highest load region.

both the federal and Commonwealth levels, and assisted PREPA with optimizing generation locations identified in the ESM Plan and incorporated in the Action Plan.

Q. **Would you describe the Action Plan more specifically?**

A. The Action Plan is PREPA's Preferred Resource Plan, as that term is used in the regulations establishing the criteria an IRP must meet. It is designed to be flexible to reflect risks associated with load forecasts and the timing of new project development. As noted in the Action Plan, PREPA must maintain its current fleet of generation resources to preserve reliability until requisite new resources become available. The Action Plan sets forth PREPA's preferred implementation strategy considering all other plans that were evaluated during the IRP process. It draws primarily on the ESM Plan and the S4S2 scenario, and it offers a low cost, practical option for achieving PREPA's stated objectives of improving system resiliency through the integration of MiniGrids and distributed generation. The Action Plan envisions the deployment of distributed generation technologies that conform to RPS requirements, as they have been modified by the recently-enacted Puerto Rico Electric Public Policy Act, Act No. 17-2019. The Action Plan also takes into account specific Energy Bureau directives, including the requirement that all IRP scenarios assume the conversion of PREPA's San Juan Units 5 & 6 to be fueled primarily by natural gas. It includes flexibility that will enable PREPA to alter course and either increase or decrease the amount of natural gas-fired generating capacity, and modify the locations of gas-fired capacity additions, to respond to permitting or renewable resource procurement and installation delays or changes in electric demand projections. It contemplates the commencement of permitting processes

131 as soon as possible, so that it will be possible for PREPA or developers of generating
132 resources to address uncertainty and bring resources online as they are needed.

133 As more fully described in the IRP and by Siemens' witness Dr. Bacalao (PREPA
134 Ex. 6.0), the Action Plan is PREPA's preferred approach. It was derived from many
135 different generating resource scenarios modeled with three load projections, and three
136 generation resource strategies. The Action Plan emerged from the IRP process based on
137 the modeled results, as performed by Siemens, and is PREPA's Preferred Resource Plan
138 because it is designed to mitigate future potential disasters by emphasizing a MiniGrid
139 solution with sufficient distributed generation to serve critical loads. It also incorporates
140 enough large-scale, centralized generation to provide the cost effective, efficient,
141 base-load capacity that will be required to supplement growing amounts of renewable
142 generation that will be available only intermittently, even with large amounts of battery
143 energy storage.

144 Q. **How does the Action Plan relate to the ESM Plan and S4S2 Plans and scenarios**
145 **considered in the IRP process?**

146 A. The Action Plan presents PREPA with a cost effective opportunity to redesign its utility
147 system to increase reliability and resiliency of the Commonwealth's electric grid in light
148 of Puerto Rico's desire to decrease its dependence on oil and favor renewable energy.
149 The Action Plan draws on options identified in the ESM relating primarily to new fuel
150 infrastructure and generation resources. The aspects of the ESM Plan that have been
151 incorporated into the Action Plan reflect PREPA management's views as to the best way
152 to plan for and provide contingencies to serve load that may be different than the IRP's
153 forecasts. The Action Plan recommends that development activities related to the ESM's

154 new fuel infrastructure and generation resources, activities that require multiple years,
155 begin immediately. Near the completion of development activities, PREPA will evaluate
156 load and resource conditions before committing capital for equipment or construction. In
157 other words, if load declines, energy efficiency gains materialize, and renewables are
158 successfully deployed in accordance with forecast amounts, new generation resources
159 will be canceled or delayed – effectively reverting the Action Plan to the S4S2 plan.
160 Pending new resource availability, PREPA will continue to expend operations and
161 maintenance capital on current generating resources to maintain system reliability.

162 As an example, an aspect of the ESM component of the Action Plan is to locate
163 new base-load generation in the east, near Yabucoa. The advantage of the Yabucoa
164 location, from PREPA's perspective, is that it provides additional resiliency to an area of
165 the island that was hardest hit by Hurricane Maria. Therefore, the ESM Plan proposes
166 the initiation of development activities for new gas-fired generation at Yabucoa, and the
167 Action Plan includes this element. The major benefit of this approach is that the Action
168 Plan addresses the multi-year process required to develop new generation resources
169 without committing PREPA to expend capital on equipment or construction unless
170 conditions warrant. Having a permitted project location will allow PREPA to react, in a
171 timely manner, should load, energy efficiency gains, or the deployment of distributed
172 generation resources differ materially from the IRP's forecast.

173 Q. **What would you characterize as the essential elements of the Action Plan?**

174 A. The Action Plan envisions the reconstruction and renewal of Puerto Rico's electric
175 supply, transmission and distribution infrastructure in a manner that will balance the
176 objectives of enhancing resiliency, reducing costs, and achieving sustainability. The

177 Action Plan is intended to provide a roadmap for meeting future electricity demand at
178 reasonable cost, while significantly improving electric system reliability in ways that are
179 economically and environmentally sustainable and responsible.

180 The resource options presented in the IRP are based on estimated costs and
181 assumptions regarding siting and overall project feasibility which eventually must be
182 tested in the real world. We do not know today whether the cost estimates reflected in
183 the IRP analyses are accurate or whether particular evaluated project development
184 alternatives are feasible. The Action Plan preserves flexibility and optionality in the face
185 of this uncertainty. It provides alternatives that may be pursued in the event that certain
186 resource options cannot be developed or procured as expected as a result of site-specific
187 evaluations or responses of prospective resource developers on the basis of then-current
188 market conditions.

189 Q. **How does the Action Plan measure up against the criteria the Energy Bureau must**
190 **apply in evaluating it?**

191 A. The Action Plan satisfies the requirements which a Preferred Resource Plan must meet
192 under the Energy Bureau's Regulation No. 9021. A Preferred Resource Plan must
193 adequately address (i) minimization of the present value of revenue requirements;
194 (ii) system reliability; (iii) short- and long-term risk; (iv) environmental impacts;
195 (v) transmission needs and implications; (vi) distribution needs and implications;
196 (vii) financial impacts on PREPA; and (viii) the public interest. (Regulation No. 9021, §
197 2.03(H)(2)(d)). The Preferred Resource Plan need not be the lowest-cost portfolio
198 evaluated, so long as the reasons for choosing a portfolio that is not lowest-cost are
199 described in detail. (Regulation No. 9021, § 2.03(H)(2)(d)(iii)).

200 The Action Plan envisions the execution of the ESM Plan and the S4S2 Plan,
201 which under many (though not all) combinations of assumed conditions would be the
202 least cost, yet practical, means of satisfying the requirements identified in the IRP. The
203 Action Plan effectively recommends pursuing elements of the S4S2 Resource Plan, and
204 initiating development activities associated with new fuel infrastructure and generation
205 resources identified in the ESM Plan. Thus the Action Plan is intended to give PREPA
206 options through which anticipated electric power demands may be met over the IRP
207 planning horizon in a reliable, sustainable way, consistent with Puerto Rico's renewable
208 energy portfolio objectives, even if electric demand and the timing and locations of
209 resource additions do not precisely match those assumed in the IRP.

210 A central feature of the Action Plan is the establishment of a number of
211 "MiniGrids" which, when integrated with identified distributed generation resources, will
212 be significantly more reliable and resilient than Puerto Rico's grid is today.
213 Implementation of the Action Plan should reduce both short- and long-term risks of
214 catastrophic system failures and unacceptably long recovery times. In other words, the
215 Action Plan incorporates lessons learned from the recent disasters, with a mind to better
216 serving the areas that were hardest hit. It assumes a decisive move away from petroleum-
217 based fuels in favor of renewable resources and natural gas, which will yield very
218 substantial reductions in air emissions, aid in the achievement of National Ambient Air
219 Quality Standards, and reduce the potential for environmentally damaging fuel oil spills.
220 The establishment of MiniGrids and the distribution of generation and storage resources
221 around the Island will address vulnerabilities and inadequacies in Puerto Rico's
222 transmission and distribution systems in ways that will minimize the need for costly

223 additional transmission infrastructure development. This, along with fuel cost savings
224 that will result from the displacement of petroleum-based fuels with renewable resources
225 and natural gas, will reduce the financial burden which high and increasing fuel and
226 maintenance costs have imposed on PREPA. All of these outcomes would be consistent
227 with the public interest.

228 **III. CONCLUSION**

229 **Q. Does this conclude your Direct Testimony?**

230 **A. Yes, it does.**



ATTESTATION

me
Affiant, Matthew Lee, being first duly sworn, states the following: The prepared Pre-Filed Direct Testimony and the information, documents and workpapers attached thereto and the portions of the IRP filing I am sponsoring constitute the direct testimony of Affiant in the above-styled case. Affiant states that he would give the answers set forth in the Pre-Filed Direct Testimony if asked the questions propounded therein at the time of the filing. Affiant further states that, to the best of his knowledge, his statements made are true and correct.

[Signature]
Matthew Lee

Affidavit No. 1543

Acknowledged and subscribed before me by Matthew Lee, in his capacity as, Consultant, for the Puerto Rico Electric Power Authority, who is personally known to me or whom I have identified by means of his driver's license number 92-131-9024, in San Juan, Puerto Rico, this 14 day of June, 2019.



[Signature]
Public Notary