COMMONWEALTH OF PUERTO RICO
ENERGY COMMISSION

IN RE: INTEGRATED RESOURCE PLAN FOR THE PUERTO RICO ELECTRIC POWER AUTHORITY	ORDER NO. CEPR-2015-0002 SUBJECT: Integrated Resource Plan for the Puerto Rico Power Authority

INTERROGATORY AND REQUEST FOR INFORMATION

TO : PUERTO RICO ELECTRIC POWER AUTHORITY (PREPA)

P/C : NELIDA AYALA JIMENEZ, ESQ.
PO BOX 36928
SAN JUAN, PUERTO RICO 00936-3928

FROM: INSTITUTO DE COMPETIVIDAD Y SOSTENIBILIDAD ECONOMICA DE PUERTO RICO

P/C : FERNANDO E. AGRAIT. ESQ.
701 PONCE DE LEON AVENUE
SUITE 414
SAN JUAN, PUERTO RICO 00907

Comes now the "Instituto" and respectfully submits to PREPA and request the following documents and information:

Instructions:

a. Responses shall be made in writing, separately and under oath.

b. Responses to questions and production of documents, shall state the

person responsible for the response or production of the document, respectively.

c. Furthermore, when production of a document is required, the response shall identify the document produced and the date it is delivered to the Intervenor (PRCSEI in this case).

d. If PREPA or its legal representatives, agents, employees, and/or contractors, cannot answer any interrogatory or request for production in full, it should respond to the extent possible and explain why it is unable to respond further.

e. All documents shall be delivered by email to agraitfe@caribe.net. If the documents exceed the size limit to be sent by email, they shall be saved to a USB and sent by courier to Fernando E. Agrait, 701 Ponce de Leon Avenue, Suite 414, San Juan, Puerto Rico 00907.

f. These interrogatories and requests of information and documents are deemed to be continuing in nature, if further information is obtained or discovered by PREPA it is to be informed by amending its answer or notifying Intervenors in a reasonable matter.

DISCOVERY REQUEST

1. Please provide and explain the energy tariff rate assumptions (in ¢/kWh) that were used to support, or that are implied by, the peak and hourly forecasted demand and usage assumed by the proposed IRP. Please provide any related analyses or workpapers.

2. Please provide and explain the list of all other assumptions used to project demand and usage for the proposed IRP. Please provide any related analyses or workpapers.

3. Please provide copies of all computational and statistical models used to project energy demand and usage for the proposed IRP. Please provide any related analyses or workpapers.

4. Please provide any audited Financial Statements that support the tariff used to project energy demand and usage for the proposed IRP. Please provide any related analyses or workpapers.

5. With regard to demand studies underlying the proposed IRP, please explain the method by which "verification of sound estimations by PREPA was performed for public lighting, agricultural, and other customer classes" (Vol. III, page 1-1). Please also provide related graphical or tabular comparisons, analyses, studies, or workpapers.

6. Please provide the projections obtained from Advance Business Consulting (ABC) and those provided by the Commonwealth of Puerto Rico's Planning Board (Planning Board) that were not used in the demand studies as indicated on Vol. III, page 1-5. Please provide any related analyses or workpapers.

7. For each of the customer classes analyzed, please provide the statistical results, related analyses, or workpapers, for each of the models studied, including the following:

a. the 'single-equation econometric model',

b. the 'autoregressive model', and

c. the 'VAR model'.

The response regarding the statistical results should include, but not necessarily limited to the following: For each variable included:

i. Definition of the variable, including any adjustments made to the data

ii. Estimated coefficient

iii. Estimated standard error of the coefficient

For each equation estimated:

iv. R-squared and Adjusted R-Squared

v. Standard Error of the Regression

vi. Durbin-Watson statistic

vii. Number of included observations and/or data range analyzed

For all of the above, please provide any related analyses or workpapers.

8. As noted on Vol. III, page 1-8, the primary criteria for selecting among the estimated models was the "goodness of fit", but that "other criteria were considered".

a. For each customer class, indicate where the "other criteria" supplanted the choice that would have been made strictly on the basis of the "goodness of fit" criteria. Please provide any related analyses or workpapers.

b. Please provide the definition used for the "goodness of fit" parameter used for this criterion. Please provide any related analyses or workpapers.

9. Please provide any analyses, studies, or workpapers in which the system peak demand was directly analyzed using any of the three (3) methodologies described in Vol. III of the IRP report. (Note: by "directly analyzed," we mean not determined from an energy-load factor approach.) Please provide any related analyses or workpapers.

10. Please provide all of the data provided by PREPA in regards to system peak demand "technical loss contribution" as described on Vol. III, page 1-13. The data referenced is described as being calculated "for each month from July 2013 to January 2015", and from which the 9.4% loss value was selected. Please provide any related analyses or workpapers.

11. Please provide the details of the calculations related to "non-technical loss contribution" as described on Vol. III, page 1-14, along with an explanation of the calculations. Please provide any related analyses or workpapers.

12. Please provide an explanation of how this conclusion was reached: "PREPA forecast is validated versus the results obtained by the Consulting Team" (Vol. III, Page 1-15). Please provide any related analyses or workpapers.

a. Was there a comparison of the PREPA forecast with the two forecasts made by the Consulting Team, and if so, did "validation" consist of the PREPA forecast being generally bracketed by the Consulting Team forecasts? (Such a comparison is contained, for system peak demand, on Vol. III, pages 1-26 and 1-27.) Please provide any related analyses or workpapers.

b. If additional considerations or some alternative comparison approach was used, please explain and provide all associated analyses, studies, or workpapers.

13. Did PREPA develop any direct estimates of the relationship of historical changes in peak demands to the proximate causes: weather, economic conditions, and so forth?

a. If so, please explain and provide all associated analyses, studies, or workpapers.

b. If not, please explain why PREPA chose not to conduct such analysis as part of the demand forecasting used to develop its proposed IRP. Please provide any related analyses or workpapers.

14. On Vol. I, page 1-2, EPA MATS compliance is mentioned and Volume IV provides additional environmental compliance measures.

a. Did the IRP include the impact of the RICE-NESHAP rule and any impacts to number of operating hours? Please provide any related analyses or workpapers.

b. If yes, then please describe facilities impacted (including generation at the sub-transmission and distribution system) and operating hours for each facility. Please provide any related analyses or workpapers.

15. On Vol. I, page 1-7, Table 1-2 "Supply Portfolio Capital Costs Summary", transmission capital costs remain the same under all portfolio and supply combinations.

Please explain how transmission interconnection costs and costs associated with transmission projects to relieve reliability impacts (due to retirements) were derived for each supply portfolio. Please provide any related analyses or workpapers.

16. Please explain what efforts were made to determine that no portfolio would be developed that could handle the 20% renewable standard. (See Vol. I, page 2-1.) Please provide any related analyses or workpapers.

17. For any of the Futures, were the costs of transmission needed to achieve a 20 percent renewable PPOA penetration calculated? Please provide any related analyses or workpapers.

a. If not, then please explain why not. Please provide any related analyses or workpapers.

b. If so, then please explain what transmission options were considered to deliver renewable resources. Please provide any related analyses or workpapers.

c. Please provide a list of the transmission options (i.e., specific transmission projects) and associated costs. Please provide any related analyses or workpapers.

18. Please explain which uncertainties regarding Puerto Rico's compliance with the EPA Clean Power Plan (CPP) and compliance with other EPA regulations were identified as creating uncertainty for PREPA's optimal IRP. Please provide any related analyses or workpapers.

a. Please explain how the identified uncertainties were quantified or evaluated in terms of capital expenditures in PREPA's

proposed IRP. Please provide any related analyses or workpapers.

b. Please provide such quantifications or evaluations. Please provide any related analyses or workpapers.

19. Did any of the supply portfolios consider the cycling of fossil fuel facilities, lower minimum generation output or out of merit de-commit options to accommodate a 20 percent renewable PPOA penetration?

a. If yes, then please provide a description of all options that were explored.

20. Please provide the Emergency Operating Procedures assumed under all Futures.

21. On Vol. I, page 3-4, the statement was made, "Based on the agreed system planning criteria, Siemens screened multiple generation resources candidates to form three Supply Portfolios."

a. Please explain and/or define what is meant by the "agreed system planning criteria", including a complete listing of any/all assumptions related to such criteria. Please provide any related analyses or workpapers.

b. Please provide all information, including but not limited to engineering and financial information, regarding any alternative plan(s) suggested by NRG and/or ITC or any other third-party generation (including distributed generation) or transmission developer that PREPA considered in addition the Supply

Portfolios formed by Siemens. (See footnote 1 on page 1 of the Commission's December 4 order, which refers to an alternative plan submitted by NRG, York Capital Management Global Advisors, and ITC.) Please provide any related analyses or workpapers.

c. If PREPA did not consider any supply plan(s) other than those formed by Siemens, then please explain why PREPA did not solicit or consider alternatives suggested by parties other than Siemens? Please provide any related analyses or workpapers.

22. On Vol. I, page 3-5, the IRP states that "PEACE cost estimates are not as accurate as getting equipment and construction costs estimates from suppliers and contractors, but are suitable for planning purpose and provide a consistent approach across all generation resource options."

a. Please explain what analyses or studies were performed in order to determine that the PEACE cost estimates are less accurate than equipment and construction costs estimates from suppliers and contractors. Please provide any related analyses or workpapers.

b. Also, please explain if it might be possible that more accurate estimates could change the ultimate choice of power supply portfolio. Please provide any related analyses or workpapers.

23. Please provide methodology and work papers to support the proposed IRP's assumed financing cost of 2 percent and cost of debt of 6.86 percent. Please provide any related analyses or workpapers.

24. On Vol. I, page 3-6, the IRP states that "Capital costs are assumed to modestly increase over time based on the fact we are currently near the low end of the commodity cycle and our experience that technology improvements over time offer a more advanced technology while keeping costs the same."

a. Please provide any analyses, studies, or workpapers that support the position that "we are currently near the low end of the commodity cycle". Please explain explicitly how the "commodity cycle" is defined.

b. Please provide any analyses, studies, or workpapers that support your claim that "our experience that technology improvements over time offer a more advanced technology while keeping costs the same." Please explain explicitly whether you are measuring costs in nominal or real dollars in reference to your statement.

25. On Vol. I, page 3-8, the IRP report notes that, because of practicality, separate PROMOD analyses were not made for a wide range of possible generating options, but instead the SCC-800 was used as the operational basis. The IRP report states, "Also, it was not practical to analyze several different generating unit options for the small combined cycle over all the portfolios and futures in all years covered by the IRP analysis. So the SCC-800 (located at Palo Seco site) was selected for PROMOD

runs and Siemens incorporated sensitivity analysis over a limited period to determine how other generation options would compare. Such options include large reciprocating engine generators as well as intercooled or standard aeroderivative GT peaking units."

a. Please provide the sensitivity analysis performed, including the specified "limited period" used for the analysis, as well as an explanation of how that "limited period" was determined. Please provide any related analyses or workpapers.

b. Were longer or shorter periods examined?

i. If not, why not?

ii. If so, please describe them and explain why they were examined.

iii. If so, please also explain why were they not ultimately selected.

iv. For each of the above, please provide any related analyses or workpapers.

26. On Vol. I, page 3-11, the IRP states that multiple factors were considered in the development of the potential future generation options for PREPA, and that among these factors was "Capacity loss from units that will be retired (or relegated to limited use) for MATS compliance". Please provide and explain the amounts (MW and number of units) of capacity loss involved and how such amounts were determined. Please provide any related analyses or workpapers.

27. Please provide and explain the assumptions for forced outage rates by facility for each Supply portfolio described in the IRP report. Please provide any related analyses or workpapers.

28. Please provide and explain the derivation of assumptions regarding planning and operating reserve margin needed for fuel transport constraint management, energy deliverability constraint management, and local reliability. Please provide any related analyses or workpapers.

29. Please provide and explain assumptions on delivered fuel prices – separated into transport, storage (if any) and underlying fuel costs to include any transactions meant to hedge the fuel price (e.g., swaps, options) as part of the proposed IRP. Please provide any related analyses or workpapers.

30. On Vol. I, page 3-11, the IRP report states that multiple factors were considered in the development of the potential future generation options for PREPA, and that among these factors was "Dual fuel capability". Please explain how dual fuel capability was treated in any analytical calculations, including explanations about the way(s) in which the treatment of dual fuel capability was special or unique from other types of fuel assumptions. Please provide any related analyses or workpapers.

31. On Vol. I, page 3-15, the IRP report states, "Note that the final GT PRO performance is somewhat different from the published figures, but the selections still fit the intended classes of size and efficiency."

a. Please provide and explain the data showing the differences between the GT PRO performance and the published figures. Please provide any related analyses or workpapers.

b. Are there any other such differences for other units contained in the IRP? Please provide any related analyses or workpapers.

32. On Vol. I, page 4-1, the IRP states, "When considering the percentages to be studied as part of this IRP, it is important to refer to PREPA Renewable Generation Integration Study (February 14, 2014), where was founded that PREPA's current generation configuration can only safely integrate a limited amount of renewables, until new and flexible generation is added."

a. Please provide a list of the operational considerations that make a unit "flexible" to include but not limited to economic and emergency minimum and maximum output, cold start up time, and shut down time. Please provide any related analyses or workpapers.

b. Please explain whether Supply Portfolio 2 or Supply Portfolio 3 provide greater "flexibility" to PREPA. Please provide any related analyses or workpapers.

33. In Vol. I, Table 4-3 ("Additional Generic PV Projects Required for 15 Percent RPS Level in 2035"), the Capacity Factor for PVs in the table are shown to be 21% (uniformly).

a. Please explain how considerations of Act 82 provisions helped determine this value. Please include any supporting analysis, studies, or workpapers.

b. Please explain any other considerations that helped determine this value? Please include any supporting analysis, studies, or workpapers. Vol. I, P. 4-4.

34. On Vol. I, page 4-7, the IRP report states, "the DG generation was not considered for the RPS compliance and with no RECs credit assumed."

a. Please explain how Act 82 provisions support the appropriateness of not considering DG for RPS compliance and for not assuming RECs for DG. Please include any supporting analysis, studies, or workpapers.

b. Please explain any other considerations that helped determine the appropriateness of these decisions. Please include any supporting analysis, studies, or workpapers.

35. On Vol. I, page 4-7, the IRP states, "It has some hidden costs to PREPA however as much of this generation is photovoltaic and PREPA needs to supply the load during night time. Thus there are no savings in the generating fleet capacity or the transmission and distribution system, but the energy is priced as if there were. Also Distributed Generation changes the voltage profile of the distribution system resulting in the need for advanced voltage compensation." Please provide answers to the following questions:

a. Please explain the significance of the following statement: "but the energy is priced as if there were." Please provide any related analyses or workpapers.

b. Please explain how the current pricing of power was incorporated into the IRP study, including any elements of the study that would be altered if a different pricing strategy (i.e. different retail tariffs) were to be assumed effective. Please provide any related analyses or workpapers.

c. Please explain the extent to which any potential situation in which the addition of distributed generation might result in the need for less voltage support? Please provide any related analyses or workpapers.

36. In the development of the futures contained in Vol. I, Section 6, did PREPA consider any separate future scenario with loads lower than those contained in the PREPA base/pessimistic forecast?

a. In what magnitudes or other ways would assumed load need to drop in order for PREPA to recommend a different power supply portfolio to be selected for recommending for Commission approval? Please provide any analyses, studies, or workpapers in support of your answer.

b. In what ways – with specific reference to generation, transmission, and distribution plans – would the selected portfolio change if load were expected to decrease annually by 5% or 10%, respectively, across all customer classes and across all hours? For each scenario (-5% and -10% annual

peak load growth rates) Please provide any analyses, studies, or workpapers in support of your answer.

37. Please provide all analyses, studies, or workpapers, associated with the FY 2013 Allocated Cost of Service Study, results of which are reported here: http://www.aeepr.com/Documentos/Ley57/ANEJO%204%20-%20FY%202013%20ALLOCATED%20COST%20OF%20SERVICE%20STUDY.pdf.

38. Please provide any analyses, studies, or workpapers, associated with all other allocated cost of service studies for the years covered by the proposed IRP

39. Please provide any analyses, studies, or workpapers, associated with all other allocated cost of service studies for any other Fiscal Year(s).

Note: The following questions are those that supplement the Commission's directives to PREPA in the Commission's December 4, 2015 order.

40. Please explain baseline assumption of expected DG penetration as a modification to load and clearly present the data by expected fuel-type and MW amount. Please provide any related analyses or workpapers.

a. Please explain all the assumptions PREPA used to assess the impacts of DG penetration for different customer classes. Please provide any related analyses or workpapers.

41. Please provide all major planned transmission upgrades for the next 25 years. For each upgrade, please designate the reason for the project (e.g., baseline reliability, generation interconnection, renewable delivery), the allocation of the upgrade costs to customers, and the timing of those costs, as shown in the following sample table. Please provide any related analyses or workpapers.

Transmissio n Project	Constructio n Period	In-Servic e Date	Projec t Cost	Allocatio n Period
Project XXXX	2016-2019	2019	$50M	2016-2019
Project YYYY	2020-2021	2021	$160M	2021

42. Please explain the energy storage options PREPA considered for its proposed IRP, including but not limited to identification of projects paired with or collocated with renewable generation or distributed generation, avoided net costs of transmission or generation upgrades, and the type of storage technology considered (e.g., battery, fly-wheel). Please provide any related analyses or workpapers.

43. Please explain the Request for Proposal ("RFP") process(es), if any, that PREPA used to solicit alternative integrated resource plans from third-party providers of generation or transmission construction or operation services.

a. If PREPA did not conduct any, then please explain why. Please provide any related analyses or workpapers.

I H EREBY CERTIFY that the foregoing was sent via certified mail, return receipt requested to and via email to: Nelida Ayala Jimenez, Esq. General Counsel, Puerto Rico Electric Power Authority, PO Box 36928, San Juan, Puerto Rico 00936-3928; n_ayala@aeepr.com, Copy was sent via regular mail to the following parties:

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RESPECTFULLY SUBMIITED.

In San Juan, Puerto Rico, on December 14, 2015.

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