Kentucky Power Company
KPSC Case No. 2019-00443
Kentucky Industrial Utility Customers Second Set of Data Requests
Dated June 23, 2020

DATA REQUEST

KIUC 2_01 KIUC 1-4 requested the Company to provide Plexos derived output reports.

a. The Company supplied 13 expansion plan case files in response to KIUC 1-1, but just 11 files associated with Plexos output. Please either provide the missing cases, or if they are not available, explain why that is.

b. The Company's Plexos reports provide a summation to derive total system costs. Does the Company have corresponding energy balance reports, that would show how native load plus sales balances with generation plus purchases plus emergency energy? If so, please provide that for all 13 cases, and if not, please provide all components to derive an energy balance.

RESPONSE

a. The Company supplied the developed Plexos output files in response to KIUC 1-1 and KIUC 1-4. The Company did not develop these two reports/files for the high and low load scenarios. As stated in Section 5.2.2.2, the Company's analysis with regards to these two scenarios is to compare the resource additions (MW) to the base optimal plan and as stated on pages 120 - 121 of the IRP the resource additions are very similar to the Case 1 Base optimization.

b Please refer to the confidential attachments to KIUC_1_04. On the Summary worksheet of these files,

- Column AA represents the total energy sales by the Company in the scenario.
- Column AB provides the Native Load the Company is expected to serve in the scenario.
- Column AE represents the net energy surplus/(purchases) to/from the Market to meet net load requirements.

Witness: Gordon S. Fisher

Witness: John F. Torpey

DATA REQUEST

KIUC 2_02 See Figure 29 on page 102 containing the Large Scale Solar Pricing Tiers with ITC and refer to the workpapers:
KPCO_R_KIUC_1_11_ConfidentialAttachment1.xlsx and
KPCO_R_KIUC_1_11_ConfidentialAttachment1.xlsx

a. Attachment1 contains the LCOE values for the Figure 29, however, the LCOE values that derive Figure 29 are pasted-in values (See Tab=KY Solar Cost) and Attachment4 does not show the calculation of the values that were used to create Figure 29. Please provide the specific workpaper, electronically with all formulas intact, and provide all input assumptions that led to the derivation of the Tier 1 and Tier 2 LCOE values.

b. For the solar resources added in 2023 and 2024 in the Preferred Resource Plan, explain the Company's ITC assumptions, and describe how ITC was treated in the calculation of the LCOE values.

c. For the solar resources added after 2030 in the Preferred Resource Plan, explain the Company's ITC assumptions, and describe how ITC was treated in the calculation of the LCOE values.

d. For the Solar resources added in 2023 and 2024, identify where the VO&M, FO&M, and Transmission Interconnection costs may be found in the LCOE calculations, and explain the basis for the assumptions used.
e. Please identify any other solar costs that were included in the derivation of the Solar LCOE cost, and explain the basis for those costs.

RESPONSE

a. Please refer to KIUC_1_11_ConfidentialAttachment 4.xlsx. The LCOE's are calculated for each Project Scenario listed in the Projects_Info worksheet. The annual calculations are detailed in the Project Costs worksheet, rows 34-63. The LCOE calculation is performed in cells L9-L11 of this same worksheet. It is necessary to select the Project Name in cell G16 to see the calculations for each individual scenario.

b. For solar resources added in 2023 and 2024, the Company assumed an ITC with Safe Harbor of 30%. The ITC is normalized and applied on an annual basis as a credit to the Total Revenue Requirement. This can be reviewed in Cells L34:63 of the Project Costs worksheet in KIUC_1_11_ConfidentialAttachment 4.xlsx.

c. For this IRP after 2030, the 10% ITC benefit is assumed to become indiscernible from potential variations in forecasted installed cost and is no longer included in the LCOE calculations.

d. The Transmission Interconnection costs are included in the Installed Cost/Purchase Price ($/kW) listed in the Projects_Info worksheet in KIUC_1_11_ConfidentialAttachment 4.xlsx. The FO&M costs are included and shown in column K of the Project Costs worksheet in the same attachment. The Company assumed there are no VO&M costs associated with the new solar resource.

e. As part of the Installed Cost/Purchase Price ($/kW), the Company includes a Project Management cost associated with the construction of the project, assumed to be $0.0285/kW.

Witness: Gordon S. Fisher

Witness: John F. Torpey

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DATA REQUEST

KIUC 2_03 See the Response to KPSC 1_49. Would the Company have an objection for modeling purposes to assume that it could contract for market capacity purchases on a year by year basis? In other words, if the Company believes that contracts for up to three years could be obtained, would the Company find it objectionable to allow its optimization model to add market capacity purchases that would either have a 1, 2 or 3 year life? This would mean that market capacity purchases could be selected all the way through the planning period by the optimization model. If the Company finds this objectionable, please explain the reasons why.

RESPONSE

The assumption is not practicable. At this time the Company is not aware of PJM capacity purchases available during time periods for which a PJM capacity auction has not been completed. However, as the Company pursues resource acquisition it plans to allow multi-year capacity options in its solicitation for new resources.

Witness: Gordon S. Fisher

Witness: Brian K. West

Witness: John F. Torpey

DATA REQUEST

KIUC 2_04 See KIUC 1-15, in which the Company stated, "Similarly, an increase in capacity prices would indicate that new generation is required to meet reserve margins. Consequently, the model-driven valuation of capacity value may not reflect the vagaries of the regulatory process affecting PJM capacity prices."

a. Please clarify this as it appears the Company is explaining that the results it uses for modeling purposes are lower than what it believes will actually occur. Please clarify this statement.

b. If the results are lower than what the Company believes will actually occur, why hasn't the Company derived modeling adjustments to address this issue?

c. Please provide a list of studies in which the Company relies on these market capacity prices besides the IRP and indicate if the Company believes that its market capacity prices are possibly too low for use in those studies?

RESPONSE

a. The Company's statement, "Consequently, the model-driven valuation of capacity value may not reflect the vagaries of the regulatory process affecting PJM capacity prices," was intended to highlight the potential for disparity between the Company's objective model-driven capacity values and those resulting from PJM's evolving auction-driven process. The Company's reported capacity values and power price values are inextricably linked and result from the economically optimized generation fleet created by the Aurora energy market simulation model while PJM's Capacity Market structure, through its Reliability Pricing Model, utilizes short-term auction signals to support capacity investment. The Company does not have any pre-conceived position about whether PJM's capacity values will be higher or lower than the Company's model-driven values over the next three years of PJM's auction.

Additionally, the Company's statement, "It would be reasonable to infer that low capacity prices mean that the model is long in generation and that new generation is not required to maintain reserve margins," is rooted in the reality that it is more cost effective to keep existing generation than it is to build new generation to provide energy and maintain reserve margins. It is also true that an increase in the Company's capacity values would signal that lower cost existing generation is not available and new generation must be built to provide available capacity and maintain reserve margins.

b. Not applicable.

c. The model-driven capacity values are a key component of the Company's Fundamentals Forecast and are relied upon for multiple regulatory and internal uses. The projection of capacity values is neither too low nor too high.

Witness: Gordon S. Fisher

Witness: John F. Torpey

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DATA REQUEST

KIUC 2_05 See KIUC 1-27 Attachment 1. The Company stated that it ran the System Advisor Model to validate its capacity factor assumption. What is the purpose of all of the financial data in that report, and why does it differ from what the Company used for the IRP (for example, the $1.72/W Installed Cost)?

RESPONSE

The financial data in the System Advisor model is based on values compiled in the NREL application. The System Advisor model outputs are based on a highly configurable set of variables that would only apply to the assumptions made for that particular report. In contrast, the Company used Bloomberg New Energy Forecast (BNEF) benchmark data which provides a broader regional dataset to serve as a proxy for the installed cost for evaluating solar resources.

Witness: Gordon S. Fisher

Witness: John F. Torpey

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DATA REQUEST

KIUC 2_06 Please provide the hours that the Company considers to be on-peak and off-peak for use in deriving its on-peak and off-peak energy prices.

RESPONSE

Please refer to the table below.

Time Period	**Definition**
On-Peak	normal peak hours: 5 days (Monday through Friday) x 16 hours
Off-Peak	All hours not on-peak

Witness: Gordon S. Fisher

Witness: John F. Torpey

DATA REQUEST

KIUC 2_07 KIUC 1-11 requested workpapers for the tables and graphs presented on various pages in the IRP report. KIUC seeks clarification as follows:.

a. For pages 79-82, the Company referred to the Company's response to KIUC 1-9. However, KIUC 1-9 did not fully supply workpapers for all of the lines on the graphs showing all of the forecasts. For example, Figure 18, Nominal natural gas prices includes Base, Higher Band, Lower Band and No CO2 gas price forecasts. The same is true for the other figures as well. Please supply all of the workpapers for those forecasts.

b. Please provide workpapers for the Table 13 on page 93. Workpapers were not provided in response to KIUC 1-11.

RESPONSE

a. Other than the information previously provided, no additional workpapers were created or archived. The information presented in the IRP report, pages 79-82 (and presented in tabular form in the Company's response to KIUC 1-9) result from utilization of the Aurora energy market simulation model. Power prices ($/MWh), Heat Rates (mmBtu/MWh) and Capacity prices ($/MW-day) are all direct outputs of the Aurora model. Emissions ($/ton), Renewable Energy Subsidies ($/MWh) and Inflation Factors are direct inputs to the Aurora model. Fuels prices are not a direct output of the Aurora model, rather the model informs the fuel price forecast by providing hourly fuel consumption for North American electric generators. A multi-run, iterative process results in the balance between fuel price and electric generation fuel consumption across North America. To complement the Base Case Fundamentals Forecast, four associated cases were also created; the Lower Band, Upper Band, Base No Carbon and Lower Band No Carbon cases. The associated cases were designed and generated to define a plausible range of outcomes surrounding the Base Case Fundamentals Forecast. The Lower and Upper Band forecasts consider lower and higher North American demand for electric generation and fuels and, consequently, lower and higher fuels prices, respectively. Nominally, fossil fuel prices vary one standard deviation above and below Base Case values. The Base No Carbon and Lower Band No Carbon cases assume there will be no regulations limiting CO2 emissions throughout the entire forecast period.

b. Workpapers associated with Table 13 on page 93 were provided as part of the response to KIUC 1-12. Table 13 in the IRP is found in the worksheet labeled "IRP Table".

Witness: Gordon S. Fisher

Witness: John F. Torpey

Kentucky Power Company
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DATA REQUEST

KIUC 2_08 Please provide workpapers for Figure 27 on page 98 concerning energy storage. On that page, the Company states that it developed the figure based on a review of a wide range of sources. This request seeks the workpapers the Company created evaluating those sources, which led to the creation of Figure 27.

RESPONSE

Refer to KIUC 1_12 Confidential Attachment 1.xlsx. Specifically, the 2019 Storage Pull Data worksheet, column K, rows 518 - 528, includes the resources reviewed.

Witness: Gordon S. Fisher

Witness: John F. Torpey

VERIFICATION

The undersigned, Gordon S. Fisher, being duly sworn, deposes and states he is the Resource Planning Manager for the American Electric Power Service Corporation, that he has personal knowledge of the matters set forth in the foregoing responses, and that the information contained therein is true and correct to the best of his information, knowledge, and belief.

Scott Fisher

Gordon S. Fisher

State of Indiana)
) Case No. 2019-00443
County of Allen)

Subscribed and sworn before me, a Notary Public, by Gordon S. Fisher this 17 day of July, 2020.

Regiana M. Sistevaris Digitally signed by Regiana M. Sistevaris Date: 2020.07.17 09:37:36 -04'00'

Notary Public, Regiana Maria Sistervaris

My Commission Expires: January 7, 2023

VERIFICATION

The undersigned, John F. Torpey, being duly sworn, deposes and states he is the Managing Director of Resource Planning and Operation Analysis for the American Electric Power Service Corporation, that he has personal knowledge of the matters set forth in the foregoing responses, and that the information contained therein is true and correct to the best of his information, knowledge, and belief.

John F Torpey

John F. Torpey

State of Indiana)
) Case No. 2019-00443
County of Allen)

Subscribed and sworn before me, a Notary Public, by John F. Torpey this 17 day of July, 2020.

Regiana M. Sistevaris Digitally signed by Regiana M. Sistevaris Date: 2020.07.17 09:43:54 -04'00'

Notary Public, Regiana Maria Sistervaris

My Commission Expires: January 7, 2023

VERIFICATION

The undersigned, Brian K. West, being duly sworn, deposes and states he is the Director of Regulatory Services for Kentucky Power Company, that he has personal knowledge of the matters set forth in the foregoing responses, and that the information contained therein is true and correct to the best of his information, knowledge, and belief.

Brian K. West

State of Indiana)
) ss Case No. 2019-00443
County of Allen)

Subscribed and sworn to before me, a Notary Public, in and for said County and State, Brian K. West this 17th day of July, 2020.

Regiana M. Sistevaris

Digitally signed by Regiana M. Sistevaris
Date: 2020.07.17 09:22:28 -04'00'

Regiana M. Sistevaris, Notary Public

My Commission Expires: January 7, 2023