

**COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION**

In the Matter of:

ELECTRONIC 2022 INTEGRATED)
RESOURCE PLAN OF KENTUCKY)
POWER COMPANY) CASE NO. 2023-00092
)

**TENDERED INITIAL DATA REQUESTS OF JOINT MOVANTS FOR INTERVENTION AS
JOINT INTERVENORS MOUNTAIN ASSOCIATION, APPALACHIAN CITIZENS' LAW
CENTER, KENTUCKIANS FOR THE COMMONWEALTH,
AND KENTUCKY SOLAR ENERGY SOCIETY**

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Dated: May 22, 2023

DEFINITIONS

1. "Document" means the original and all copies (regardless of origin and whether or not including additional writing thereon or attached thereto) of any memoranda, reports, books, manuals, instructions, directives, records, forms, notes, letters, or notices, in whatever form, stored or contained in or on whatever medium, including digital media.
2. "Study" means any written, recorded, transcribed, taped, filmed, or graphic matter, however produced or reproduced, either formally or informally, a particular issue or situation, in whatever detail, whether or not the consideration of the issue or situation is in a preliminary stage, and whether or not the consideration was discontinued prior to completion.
3. "Person" means any natural person, corporation, professional corporation, partnership, association, joint venture, proprietorship, firm, or the other business enterprise or legal entity.
4. A request to identify a natural person means to state his or her full name and business address, and last known position and business affiliation at the time in question.
5. A request to identify a document means to state the date or dates, author or originator, subject matter, all addressees and recipients, type of document (e.g., letter, memorandum, telegram, chart, etc.), identifying number, and its present location and custodian. If any such document was but is no longer in the Company's possession or subject to its control, state what disposition was made of it and why it was so disposed.
6. A request to identify a person other than a natural person means to state its full name, the address of its principal office, and the type of entity.
7. "And" and "or" should be considered to be both conjunctive and disjunctive, unless specifically stated otherwise.
8. "Each" and "any" should be considered to be both singular and plural, unless specifically stated otherwise.
9. Words in the past tense should be considered to include the present, and words in the present tense include the past, unless specifically stated otherwise.
10. Unless otherwise specified in each individual interrogatory or request, the

terms "you," "your," "Kentucky Power," "KY Power," "KPCo," or "KP" refer collectively to Kentucky Power Company, including any parent or affiliated companies, predecessors-in-interest, employees, authorized agents, outside consultants or contractors, or other representatives.

11. "Kentucky Power," "KY Power," "KPCo," or "KP" means Kentucky Power Company and/or any of their officers, directors, employees or agents who may have knowledge of the particular matter addressed, and any parent or affiliated companies (including but not limited to American Electric Power Company ("AEP") and its affiliated entities).

12. "The Company" means Kentucky Power.

13. "Joint Movants" means the Mountain Association, Appalachian Citizens' Law Center, Kentuckians For The Commonwealth, and Kentucky Solar Energy Society, who were have moved for the status of full joint intervention in this matter.

14. "Commission" or "PSC" means the Kentucky Public Service Commission, including its Commissioners, personnel, and offices.

15. "Unless otherwise specified in each individual interrogatory or request, the term "IRP" means the integrated resource plan, as filed in this matter by Kentucky Power."

16. "AEO" means Annual Energy Outlook.

17. "ATB" means Annual Technology Baseline.

18. "CRA" refers to Charles River Associates, consulting firm engaged by Kentucky Power.

19. "DSM-EE" means Demand Side Management-Energy Efficiency.

20. "EE" means Energy Efficiency.

21. "EIA" means U.S. Energy Information Administration.

22. "EIR" means Energy Infrastructure Reinvestment.

23. "FIP" means Federal Implementation Plan.

24. "ICAP" means Installed Capacity.

25. "IRM" means Installed Reserve Margin.
26. "NREL" means National Renewable Energy Lab.
27. "O&M" means Operation and Maintenance.
28. "RFP" means Request for Proposals.
29. "RTO" means Regional Transmission Organization.
30. "UCAP" means Unforced Capacity.

INSTRUCTIONS

1. If any matter is evidenced by, referenced to, reflected by, represented by, or recorded in any document, please identify and produce for discovery and inspection each such document.
2. These requests for information are continuing in nature, and information which the responding party later becomes aware of, or has access to, and which is responsive to any request is to be made available to Joint Movants. Any studies, documents, or other subject matter not yet completed that will be relied upon during the course of this case should be so identified and provided as soon as they are completed. The Respondent is obliged to change, supplement, and correct all answers to interrogatories to conform to available information, including such information as it first becomes available to the Respondent after the answers hereto are served.
3. Unless otherwise expressly provided, each data request should be construed independently and not with reference to any other interrogatory herein for purpose of limitation.
4. Whenever the documents responsive to a discovery request consist of modeling files (including inputs or output) and/or workpapers, the files and workpapers should be provided in machine-readable electronic format (e.g., Microsoft Excel), with all formulas and cell references intact.
5. The answers provided should first restate the question asked and also identify the person(s) supplying the information.
6. Please answer each designated part of each information request separately. If you do not have complete information with respect to any interrogatory, so state and give as much information as you do have with respect to the matter inquired about, and identify each person whom you believe may have additional information with respect thereto.
7. Wherever the response to a request consists of a statement that the requested information is already available to Joint Movants, please provide a detailed citation to the document that contains the information. This citation shall include the title of the document, relevant page number(s), and, to the extent possible, paragraph number(s) and/or chart/table/figure number(s).
8. If you claim a privilege including, but not limited to, the attorney-client privilege or the work product doctrine, as grounds for not fully and completely responding to any discovery request, please describe the basis for your claim

of privilege in sufficient detail so as to permit Joint Movants or the Commission to evaluate the validity of the claim. With respect to documents for which a privilege is claimed, please produce a "privilege log" that identifies the author, recipient, date, and subject matter of the documents or interrogatory answers for which you are asserting a claim of privilege and any other information pertinent to the claim that would enable Joint Movants or the Commission to evaluate the validity of such claims.

9. In the case of multiple witnesses, each interrogatory should be considered to apply to each witness who will testify to the information requested. Where copies of testimony, transcripts or depositions are requested, each witness should respond individually to the information request.

10. The interrogatories are to be answered under oath by the witness(es) responsible for the answer.

**TENDERED INITIAL DATA REQUESTS PROPOUNDED TO
KENTUCKY POWER COMPANY BY JOINT MOVANTS**

- 1.1. Please provide all Kentucky Power responses to data requests from all other parties in this proceeding.
- 1.2. Please provide any redacted documents included in this filing in non-redacted, electronic versions (machine readable, unprotected, with formulas intact), if they have not already been provided to the Joint Movants.
- 1.3. Please refer to the IRP at page 87 of 1182, footnote 15, stating: "The smaller single shaft NGCC block size can also be considered as a proxy for a partial ownership option for a larger multi-shaft NGCC where Kentucky Power would coordinate the addition of this resource with other parties."
 - a. Did the Company also evaluate partial ownership of the H-class turbine single shaft configuration with 418 MW capacity? If not, please explain why not.
 - b. Did the Company evaluate partial ownership of resource options other than the larger multi-shaft NGCC mentioned in the above-referenced statement?
 - i. If so, please explain how partial ownership of each resource option was evaluated in this IRP, provide supporting workpapers

in native file format with formulas intact, and describe conclusions drawn from that evaluation.

ii. If not, please explain why not.

1.4. Please refer to the IRP, Section 5.7, addressing “Short-Term Market Purchase” alternative resources and answer the following requests:

- a. Please provide the workpaper(s) underlying Figure 35, titled “PJM Capacity Price Outlook”, in native file format with formulas intact.
- b. Please identify and describe the source for the Company’s forecasted price levels in the PJM Reliability Pricing Mechanism.
- c. At page 110 of 1182, the IRP explains that the short-term market purchase “resource is assumed to have no energy associated with it and a contract term of one year.” Is the Company assuming a short-term market purchase of capacity would be accomplished through a bilateral contract, through the RPM, or some other means? Please explain in full.
- d. At page 111 of 1182, the IRP explains that the short-term market purchase “resource is available in the model through 2025 and in 2028 up to 500 MW per year, and in 2026, 2027, 2030, 2031, 2033, 2034, 2036, and 2037 up to 235 MW per year.”
 - i. Please confirm that the short-term market purchase resource was not available to be selected in the model in each of the following years: 2029, 2032, and 2035. If anything but confirmed, please explain in full.
 - ii. If subpart (i) is confirmed, please explain in full the Company’s reason for making the short-term market purchase resource unavailable in certain years.
 - iii. Please explain in full the Company’s reasons for limiting short-term market purchases to 500 MW through 2025 and in 2028.
 - iv. Please explain in full the Company’s reasons for limiting short-term market purchases to 235 MW per year in 2026, 2027, 2030, 2031, 2033, 2034, 2036, and 2037.

1.5. Please refer to the IRP, at page 17 of 1182, stating that “[i]n total, the Kentucky Power portfolio is expected to reduce emissions by 90% by 2037 relative to the 2005 baseline.” Please confirm that this statement refers to direct carbon dioxide emission reductions. If not confirmed, please describe in detail each air emission included in the referenced statement.

1.6. Please refer to the IRP, Section 7.2.4.2, at page 151 of 1182, stating that the “Local Impacts and Sustainability” objective “allows Kentucky Power to evaluate the relative exposure of resource portfolios under outcomes where significant reductions in GHG emissions are required in the power sector – a plausible outcome with potentially material impacts on the cost to serve Kentucky Power’s customers.”

- a. Has Kentucky Power attempted to estimate the direct methane emissions of its existing portfolio, or any resource portfolio options presented in the IRP? If so, please produce each such estimate. If not, please explain in full why not.
- b. Has Kentucky Power attempted to estimate the direct nitrous oxide emissions of its existing portfolio, or any resource portfolio options presented in the IRP? If so, please produce each such estimate. If not, please explain in full why not.
- c. Has Kentucky Power attempted to estimate the direct greenhouse gas emissions of its existing portfolio, or any resource portfolio options presented in the IRP using a carbon dioxide equivalent metric? If so, please produce each such estimate. If not, please explain in full why not.

1.7. The IRP assumes the Company’s portfolio will not include the Mitchell units in 2028. (*E.g.*, Vol. A at 14 (“This going-in position reveals a need for new capacity in 2028, reflecting the divestiture of Kentucky Power’s stake in Mitchell coal plant.”); *id.* at 26 of 1182 (“A key assumption in the 2019 Preferred Plan that is not included in the current IRP was the continued stake in the Mitchell coal plant (780 MW), which is now divested in 2028.”); *id.* at 55 of 1182 (“The capacity associated with Kentucky Power’s share of the Mitchell Plant will cease after the 2027/2028 PJM Planning Year.”)). As part of the Company’s three-year action plan (summarized in the IRP’s Executive Summary at page 18), do you anticipate filing an application pursuant to SB 4 (2023) seeking approval from the Commission for the retirement of a fossil fuel-fired generating unit? If not, please explain why not.

1.8. Please refer to the IRP, Section 7.2.4.2, at page 152 of 1182, stating that “[c]arbon emissions are defined as the direct emissions from Kentucky Power’s owned and contracted generating resources.” Has Kentucky Power attempted to estimate its indirect carbon emissions? If so, please produce each such estimate. If not, please explain why not.

1.9. For each monthly billing period in calendar years 2021 and 2022, as well as the first quarter of 2023, please provide the following information for residential customers (under the Residential Service tariff):

- a. Service charge (per month);
- b. Energy charge (per kWh);
- c. FAC factor (per kWh);
- d. Actual average monthly usage (kWh).

1.10. Please refer to Figures 67 and 68 of the IRP, Volume A, and answer the following requests.

- a. Please confirm that the performance indicator “% of Income”, reflecting the metric “Percentage of wallet for residential customers,” was not included in the final IRP Scorecard.
 - i. If confirmed, please explain why the % of income performance indicator was eliminated.
 - ii. If not confirmed, please explain in full.
- b. Please describe the data and calculations that would have been used to quantify the “percentage of wallet for residential customers” impact for each portfolio.
- c. Did the Company determine, preliminarily or otherwise, for any portfolio considered in the IRP, the “percentage of wallet for residential customers”? If so, please explain and provide the results of each such analysis, including production of workpapers in native file format with formulas intact.

1.11. Please refer to the IRP, Volume A, Section 7.5.3, summarizing the “Estimated Bill Impacts of the Preferred Plan” and answer the following requests:

- a. Please produce the workpaper(s) underlying Figure 83, presented at page 180 of 1182.
- b. Please provide the monthly bill impact for the Reference portfolio.
- c. At page 179 of 1182, the IRP states that “the monthly bill for all portfolios increased,” and continues to compare the increased bill impact between the Reference portfolio and the Preferred Plan. Please provide the monthly bill impact for each portfolio evaluated as part of the IRP.

1.12. Please refer to the IRP, Volume A, at pages 14–15 of 1182. The number of megawatts of New Wind and New Solar depicted in Figure ES–2 appear to differ from the numbers stated on p. 15 (“800 MW of new solar and 700 MW of new wind”). Please explain the discrepancy.

- 1.13. Please refer to the IRP, Volume A, at page 16 of 1182, which states, “It should be noted that growth for the commercial class is fueled by a large customer addition.”
- a. Please identify the large customer addition (including the nature of the customer’s business, the customer’s location, and the anticipated timing of the addition), and the energy demand associated with that large customer addition.
 - b. Has the Company modeled the load forecast without that large customer addition?
- 1.14. Please refer to the IRP, Volume A, at page 24 of 1182, which states “Pending an assumed completion of a transfer of Kentucky Power from AEP to Liberty Power, the Company will participate as a member of the Power Coordination Bridge Agreement (PCBA) through the 2023/2024 PJM Planning year. The Company will then look to source bilateral capacity agreements as needed to support any capacity needs not fulfilled by its own firm resources.”
- a. Does the Company still plan to participate in the PCBA through the 2023/2024 PJM Planning year? Please explain why or why not.
 - b. Does the Company still plan to source bilateral capacity agreements for the years following the 2023/2024 PJM Planning Year? Please explain why or why not.
- 1.15. Regarding the “assumed completion of a transfer of Kentucky Power from AEP to Liberty Power,” IRP, Volume A, page 24 of 1182, the Company has subsequently announced that the planned sale has been cancelled.¹
- a. Please confirm that the Company still plans to seek securitization of retired coal assets, as stated in the news release. If yes, please identify by what means the Company plans to seek securitization, which retired coal assets the Company intends to seek to securitize, and the anticipated timeframe for that request.
 - b. Does the Company plan to securitize retired coal assets change any of the modeling assumptions or modeling results for the IRP? Please explain why or why not and please provide any related data, documentation, or analysis.
 - c. With regard to the Company’s stated intent to focus on economic development in the region, has the Company identified any

¹ See American Electric Power, *News Release: AEP Outlines Strategic Focus on Kentucky* (Apr. 17, 2023), <https://www.aep.com/news/releases/read/8905/AEP-Outlines-Strategic-Focus-On-Kentucky>.

specific businesses, projects, or programs as targets for its economic development efforts? If yes, please explain in detail. If not, please explain why not.

- d. The Company's press statement says that the Company "believes that leveraging Kentucky's manufacturing talent will help attract onshoring and reshoring which, combined with access to lower cost power, will strengthen the regional economy and attract new investment."
 - i. Please explain the phrase "access to lower cost power." Lower cost power relative to whom or what?
 - ii. Please identify any specific industries or businesses that the Company intends to target for "onshoring and reshoring." If there are none currently, please explain why not.
- e. Does the Company intend to offer discounted electric rates to industrial customers through special contracts and/or its Tariff E.D.R.? If yes, please explain in detail. If not, please explain why not.
- f. Does the Company intend to seek any changes to its Tariff E.D.R.? If yes, please explain in detail. If not, please explain why not.

1.16. Please refer to the IRP, Vol. A, at page 39 of 1182, which states, "Commercial usage is buoyed by large customer additions in the near term and sees average annual growth of 4.0% over the 2021-2030." Please explain the basis for this statement. If Kentucky Power has identified any specific expected large customer additions, please identify them and their anticipated size, location, energy consumption, and type.

1.17. Does Kentucky Power Company consider cryptocurrency facilities to be commercial or industrial customers? Please explain your answer.

1.18. With respect to the cryptocurrency facilities in Kentucky Power territory:

- a. Please identify all currently operating cryptocurrency facilities in Kentucky Power territory by name, location, capacity need (in MW), percentage of capacity need that is firm capacity, and anticipated load factor.
- b. Please identify all proposed cryptocurrency facility that the Company anticipates will begin operating in its territory in the next three years by name, location, capacity need (in MW), percentage of capacity need that is firm capacity, and anticipated load factor.
- c. For each currently operating or proposed cryptocurrency facility identified in response to paragraphs (a) and (b), please explain in

detail whether or how the Company has incorporated the facility into its load forecast for this IRP.

1.19. Please refer to the IRP, Volume A, at page 52 of 1182, which states, “Since 2016, the Company’s economic development team has identified 22 projects that could play a significant role in either a new firm entering the local economy or an existing firm expanding its operations.”

- a. Please provide the list of 22 projects identified by the Company’s economic development team since 2016, and please identify the economic sectors to which they belong.
- b. Are any of those projects currently under way? If so, please identify them.
- c. Please identify any assumptions and inputs into the Company’s IMPLAN model as described on p. 52.

1.20. Please refer to the IRP, Volume A, at page 58 of 1182, which states, “A FIP that further revises the ozone season NOx budgets under the existing CSAPR program in those states, including Kentucky, is expected to be finalized in spring of 2023 and will likely take effect for the 2023 ozone season. Management is evaluating the impact of changes in the rule.” EPA announced that it has finalized this FIP on March 15, 2023.²

- a. Please provide any analysis of the impacts of this FIP as finalized on March 15, 2023, on Kentucky Power’s existing supply-side generating resources.
- b. Does Kentucky Power’s IRP modeling account for the costs of purchasing annual and ozone season NOx allowances for fossil fuel-fired generators for both current and future fossil fuel-fired resources? If yes, please provide the cost assumptions used by Kentucky Power in its modeling. If no, please explain why not.
- c. Does the final FIP change the cost assumptions used by Kentucky Power? Please explain why or why not. If so, please explain how the cost estimates will change.
- d. Does the Company anticipate additional (i.e., not currently in use) pollution control measures or equipment will need to be utilized to comply with this rule? Please explain your answer.

² EPA, *EPA Announces Final “Good Neighbor” Plan to Cut Harmful Smog, Protecting Health of Millions from Power Plant, Industrial Air Pollution* (last updated Mar. 15, 2023), <https://www.epa.gov/newsreleases/epa-announces-final-good-neighbor-plan-cut-harmful-smog-protecting-health-millions>.

- e. If so, does the Company have estimates regarding cost of compliance? Do those differ from estimates and assumptions already incorporated in the IRP model? Please explain your answer.
- f. Does the Company anticipate needing to purchase additional allowances through the open market beyond what it will be allocated for Big Sandy and its shares of Mitchell? Please explain your answer.
- g. Please provide the monthly historical number of annual and ozone season NO_x allowances used, purchased, and sold by Kentucky Power and the associated purchase cost for the 2017–2022 period.

1.21. Please refer to the IRP, Volume A, at page 58 of 1182. Please provide the following information related to SO₂ emissions allowances:

- a. Does the Company's IRP modeling include costs for purchasing SO₂ emissions allowances for both current and future fossil fuel-resources? Please explain why or why not.
- b. Please provide any cost estimates for SO₂ emissions allowances relied on by the Company in its IRP modeling.
- c. Please provide the monthly historical number of SO₂ emissions allowances used, purchased, and sold by Kentucky Power and the associated purchase cost in the 2017-2022 period.

1.22. For the new gas combustion turbine in the IRP preferred portfolio:

- a. Please confirm that the gas CT selected in the preferred portfolio is not modeled with carbon capture and sequestration and/or hydrogen cofiring.
- b. Has Kentucky Power developed estimates of the costs of those cofiring with hydrogen and carbon capture and sequestration (including capital and operating costs) over the 15-year IRP study period? If so, please provide those cost estimates and any data or analysis supporting those estimates.
- c. Is the new gas CT selected by the Company's preferred portfolio expected to be a low load, intermediate load, or baseload unit?
- d. Is the gas CT in the preferred portfolio capable of meeting the Clean Air Act 111(b) New Source Performance Standards as proposed by EPA?³

³ EPA, *Greenhouse Gas Standards and Guidelines for Fossil Fuel-Fired Power Plants*, (last updated May 15, 2023), <https://www.epa.gov/stationary-sources-air-pollution/greenhouse-gas-standards-and-guidelines-fossil-fuel-fired-power>

- e. Does the capacity of the new gas CT in the preferred portfolio account for the heat rate and capacity penalties associated with CCS?

1.23. Regarding the Big Sandy life extension modeled in the IRP:

- a. Does the Big Sandy extension supply-side resource in the IRP preferred plan include an assumption that the unit will be retrofitted with carbon capture and sequestration or co-fire with hydrogen? Why or why not?
- b. In the preferred portfolio, is Big Sandy expected to operate with greater than 50% capacity factor?
- c. Is the Big Sandy extension in the Company's preferred portfolio capable of meeting the Clean Air Act 111(d) performance standards for greenhouse gas emissions as proposed by EPA?⁴

1.24. Please refer to the IRP, Vol. A, page 112 of 1182, which states that “an analysis to undertake a study to determine if there are customer benefits to be gained from leaving PJM or other options is anticipated following a presumed completed transaction for Kentucky Power to Liberty.” Does Kentucky Power still plan to conduct an analysis regarding “customer benefits to be gained from leaving PJM or other options”? If so, on what timeline? If not, please explain why not.

1.25. For the Short-Term Market Purchases of capacity selected by the preferred portfolio, how does Kentucky Power plan to procure that capacity? Will the Company issue an all-source request for proposals? Please explain your answer.

1.26. Did the Company model the impact of the Energy Community Tax Credit Bonus⁵ for projects, facilities, and technologies located in energy communities inside the Kentucky Power service territory and elsewhere?

- a. Has Kentucky Power done any mapping or spatial analysis of areas within its service territory that qualify for the Energy Community Tax Credit Bonus?
 - i. If so, please provide any such maps or analysis.
 - ii. If not, please explain why not.

⁴ *Id.*

⁵ U.S. Dep't of Energy (“DOE”), *Energy Community Tax Credit Bonus* <https://arcgis.netl.doe.gov/portal/apps/experiencebuilder/experience/?id=a2ce47d4721a477a8701bd0e08495e1d> (last visited May 22, 2023).

- 1.27. Did the Company's IRP Modeling consider the availability of low-interest loans for reducing emissions from existing fossil fuel infrastructure through the DOE Energy Infrastructure Reinvestment (EIR) program⁶?
- a. If so, what was the cost impact of utilizing the DOE EIR program for this purpose? Please provide any relevant data or analysis.
 - b. If not, please explain why not.
- 1.28. Did the Company's IRP process consider the availability of the Low-Income Communities Bonus Credit Program for solar and wind facilities in low-income communities or developed as part of a qualified low-income residential building project or economic benefit project.⁷
- 1.29. In reference to the Market Potential Study on page 64 of 1182 of the IRP, please answer the following requests:
- a. When was the study initiated?
 - b. What is the timeline for completion of the study?
 - c. Will initial findings be available during this IRP process?
 - d. Is this the same study referenced on page 82 of 1182 of the IRP that is being conducted by GDS Associates?
 - e. Will this study evaluate demand response potential, both active and passive?
 - i. If not, please explain why demand response has been excluded.
- 1.30. Please provide the analysis, results, and decisions related to the benchmarking exercise discussed on page 82 of 1182 of the IRP in a fully functional electronic format, with all workpapers for the benchmarking exercise provided in fully functional Excel format with formulas intact.
- a. Did this benchmarking exercise consider demand response?
 - i. If it did, please provide a table for demand response like that provided in Table 4.
 - ii. If not, please explain why demand response was excluded.

⁶ DOE, *ENERGY INFRASTRUCTURE REINVESTMENT (EIR) PROGRAM (SECTION 1706)* <https://www.energy.gov/lpo/inflation-reduction-act-2022> (last visited May 22, 2023).

⁷ See e.g., Internal Revenue Service Notice 2023-17, *Initial Guidance Establishing Program to Allocate Environmental Justice Solar and Wind Capacity Limitation Under Section 48(e)* (Feb. 13, 2023), <https://www.irs.gov/pub/irs-drop/n-23-17.pdf>.

- 1.31. On page 82 of 1182 of the IRP, GDS Associates assumed that Kentucky Power could ramp up to 1% annual savings over 4 years.
- What is the basis for this assumption? Please include any workpapers or analysis related to this determination.
 - Please explain how this assumption accounts for the current lack of energy efficiency programs.
- 1.32. On page 83 of 1182 of the IRP, it is stated that the energy efficiency cost inputs for the IRP are from the benchmarking exercise which leveraged the results of a recent potential study.
- Please provide the potential study that GDS leveraged in a fully functional electronic format.
 - Please provide all workpapers for the study in fully functional Excel format with formulas intact.
- 1.33. Reference page 83 of 1182 of the IRP, Section 4.2.1 Determination of Bundles, please detail:
- Was lighting included in any of the bundles? If so, please identify the bundle and types of lighting.
 - For each bundle, please detail the measures and level of efficiency assumed with those measures.
 - Please provide the rationale behind the \$/MWh costs for each bundle.
 - Do any of the bundles consider demand reductions, passive or active?
- 1.34. Please provide the data behind Figure 13 EE IRP Bundles – MWh Savings Potential (page 85 of 1182 of the IRP).
- Please provide a similar table with the demand reduction potential.
- 1.35. In relation to the energy efficiency assumptions, particularly regarding cooling load, please detail the assumptions related to the Inflation Reduction Act rebates and tax credits. If this was not considered, please explain.
- As part of its analysis of the Inflation Reduction Act for this IRP, did the Company consider potential increases in load because of electrification? If so, please explain how.
- 1.36. As part of the energy efficiency and code assumptions, did the model consider impacts resulting from federal funding, including the American

Rescue Plan⁸ and Bipartisan Infrastructure Law?⁹ Please explain in detail why or why not.

- 1.37. Given the Company's projected capacity purchases and capacity shortfall projected in this IRP, please explain in detail why the Company has not yet sought Commission approval for any new proposed DSM programs.
- a. Does the Company anticipate seeking Commission approval for any new proposed DSM programs in the next three years? Please explain in detail why or why not.
- 1.38. Please refer to page 62 of 1182 of the IRP where Kentucky Power indicates that there are 6.2 MW of peak DR capability. What are the rules surrounding this demand response capacity? If it is in a tariff, please reference where it can be found in the tariff.
- 1.39. Please refer to page 42 of 1182 of the IRP, where it says, "The Company's load forecast does not reflect any on-going adjustments for DSM" and "For this load forecast, there was no DSM/EE included." Please confirm if these statements are related to addressing historical energy efficiency savings or new energy efficiency savings.
- 1.40. Please refer to page 47 of 1182 of the IRP, where it states, "The sharp increase in commercial energy sales is associated with the addition a large industrial customer with significant energy requirements."
- a. Please confirm if this refers to the addition of a cryptocurrency customer to Kentucky Power's service territory. If not, please identify the large industrial customer that is referenced.
 - b. Please explain how Kentucky Power treated the projected load from the proposed Ebon facility for this IRP.¹⁰
- 1.41. Please refer to Section 3.2 on page 54 of 1182 of the IRP.
- a. Please confirm if Kentucky Power included the 14.7% IRM or the PJM FPR of 8.9% as the planning reserve margin in AURORA.
 - b. Please confirm if Kentucky Power is modeling existing and new thermal resources on a UCAP or ICAP basis.
- 1.42. Please refer to Section 4.2.1 and 4.2.2 of 1182 of the IRP.

⁸ American Rescue Plan Act of 2021, Pub. L. No. 117-2, 135 Stat. 4.

⁹ Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, 135 Stat. 429 (2021).

¹⁰ See *In re: Special Contract Filing of Kentucky Power Company for Approval of a Special Contract with Ebon International, LLC*, Case No. 2022-00387.

- a. Please provide all supporting workbooks, with formulas and links intact, used to develop the energy efficiency savings and cost for each residential and C&I bundle modeled in AURORA.
- b. Please provide all supporting workbooks, with formulas and links intact, used to group the energy efficiency measures into each of the residential and C&I bundles modeled in AURORA.
- c. Please provide the line loss factor that Kentucky Power used to adjust energy efficiency savings from the meter to the generator.
- d. Please explain if the income qualified energy efficiency bundles were modeled as selectable within AURORA or as a fixed resource decision in the model.

1.43. Please refer to pages 92-93 of 1182 of the IRP for the costs of battery storage resources.

- a. Please confirm if the capital cost assumptions and the Fixed O&M are from the EIA AEO or the NREL ATB.
- b. Please provide the project life that was modeled for Li-ion batteries.
- c. Please provide any battery augmentation assumptions that Kentucky Power made for the Li-ion batteries modeled in AURORA.

1.44. Please refer to Figure 21 on page 95 of 1182 of the IRP. Please confirm if the Fixed O&M for new wind resources is from the EIA AEO¹¹ or the NREL ATB.¹²

1.45. Please refer to Section 5.4.1 and 5.4.2 of the IRP on the costs of new wind and solar resources.

- a. Please explain if the costs for new wind and solar resources were modeled within AURORA on a levelized \$/MWH basis or if the “FOM \$/MW-week” input field within AURORA was used.
- b. Please provide the supporting workbooks, with all formulas and links intact, used to develop the cost inputs for new resources as they are modeled in AURORA.
- c. Please provide the following input tables from the AURORA model:
 - i. New Resources;
 - ii. Resources;
 - iii. Storage;
 - iv. Annual, Monthly, and Hourly Time Series.

¹¹ U.S. Energy Information Administration, *Annual Electric Power Industry Report, Form EIA-861* (Oct. 6, 2022), <https://www.eia.gov/electricity/data/eia861/>.

¹² NREL Electricity Annual Technology Baseline (ATB) 2022, <https://atb.nrel.gov/electricity/2022/data> (last visited May 22, 2023).

- 1.46. Please refer to page 94 of 1182 of the IRP, where it states, “Both the hourly production profile and average capacity factor are estimated based on AURORA national database information representative of resources in the region.”
 - a. Please provide the region that was defined for developing the capacity factor for new wind resources.
 - b. Please explain in detail if Kentucky Power is modeling new wind resources with the assumption that wind would be built within Kentucky or if projects would be from outside of the state (or both).

- 1.47. Please refer to Section 5 of the IRP.
 - a. Please explain in detail how Kentucky Power developed the annual and cumulative maximum build constraints for battery storage, wind, and solar resources modeled in AURORA.
 - b. Please provide the supporting workbooks, with all formulas and links intact, for Figures 18, 19, 20, 21, 22, and 23.
 - c. For each of the new generating resources modeled in AURORA, please provide the inflation rate assumed to translate the capital and fixed O&M costs from real to nominal dollars.

- 1.48. Please refer to Figure 35 on page 111 of 1182 of the IRP.
 - a. Please provide the source of the PJM Capacity Price Outlook shown in Figure 35.
 - b. Please provide the supporting workbook, with all formulas and links intact, used to develop the capacity prices shown in Figure 35.

- 1.50. Please refer to page 112 of 1182 of the IRP, where it states, “Kentucky Power has modeled portfolio adequacy in both the summer and winter seasons for this integrated resource planning process.”
 - a. Please explain if this means that Kentucky Power modeled a summer and a winter reserve margin in AURORA or if Kentucky Power evaluated portfolios after they were developed within AURORA to see if they met a winter reserve margin requirement.
 - b. Please provide the reserve margin that Kentucky Power assumed for the winter.

- 1.51. Please refer to page 113 of 1182 of the IRP, where it states, “For modeling purposes, Kentucky Power modeled generic interconnection costs for resource evaluation based on a recent LBL study.”

- a. Please provide the interconnection costs modeled for each of the new supply side resources modeled in AURORA.
- b. Please provide the supporting workbook, with all formulas and links intact, used to develop the interconnection costs modeled for each new supply side resource.

1.52. Please refer to Section 6.3.4.1 of the IRP.

- a. Please confirm whether Kentucky Power modeled any scenarios where the PTC and the ITC do not expire by 2035.
 - i. If not, please explain why Kentucky Power did not consider an extension of the tax credits beyond 2035.
- b. Please explain if Kentucky Power considered that renewable or battery storage projects could qualify for the Energy Community bonus adder.
 - i. If not, please explain why Kentucky Power did not consider this bonus adder for new renewable and battery storage resources.

1.53. Please refer to Section 6.4 of the IRP.

- a. Please provide the load growth assumptions that were used to develop electric vehicle adoption and greater building electrification for the Clean Energy Technology Advancement ("CETA") scenario.
- b. Please provide the supporting workbook for Figure 47.
- c. Please provide the supporting workbooks for Figure 49, 50, and 51.

1.54. Please refer to Section 6.5.2 on page 133 of 1182 of the IRP, where it states, "The ELCC value of the renewables and 4-hour battery storage are based on the amounts installed in each scenario."

- a. Please confirm if Kentucky Power modeled the ELCC values shown in Figures 54, 55, and 56 or if the values from Figures 41, 42, and 43 were used in the capacity expansion modeling in AURORA.
 - i. If the PJM values shown in Figures 41–43 were not used, please explain how Kentucky Power developed the ELCC values from each scenario.
 - ii. Please provide the supporting workbooks, with all formulas and links intact, that show how Kentucky Power developed the ELCC values.

- 1.55. Please refer to Section 6.6 of the IRP on page 137 of 1182. Please provide the supporting workbooks for the stochastic gas prices, power prices, and renewable output modeled in AURORA.
- a. Please refer to page 150 of 1182 of the IRP, where it says, “This metric is calculated by dividing the winter UCAP of the resource plan by Kentucky Power’s winter peak requirement and the summer UCAP of the resource plan by Kentucky Power’s summer peak requirement for years 2023-2037 across all five market scenarios.” Please provide the winter UCAP for each of the thermal, solar, wind, battery storage, and energy efficiency resources assumed across the five market scenarios.
- 1.56. Please refer to page 152 of 1182 of the IRP, where it states, “To reflect potential development risk associated with challenges in locating renewables inside Kentucky Power territory, a conservative assumption is made that new wind will not contribute to local impacts, while only 75% of new solar capacity will contribute to this metric.”
- a. Please explain how Kentucky Power developed the assumption of 75% of capacity for new solar resources.
- 1.57. Please refer to page 155 of 1182 of the IRP, where it states, “The AURORA output is then used by CRA’s PERFORM model to build a full annual revenue requirement, inclusive of capital investments, fixed operating and maintenance costs, tax credits, and financial accounting of depreciation, taxes, and utility return on investment.”
- a. Please provide the AURORA output that was input into the PERFORM model for each of the scenarios modeled in the IRP.
 - i. If the modeling output from AURORA does not include output from the Resource Table, please provide the Resource Table output for each of the scenarios modeled in the IRP.
 - b. Please provide the supporting workbooks, with all formulas and links intact, used to develop the annual revenue requirement using the PERFORM model for each of the scenarios modeled in the IRP.
- 1.58. Please refer to Figure 69 on page 156 of 1182 of the IRP.
- a. Please confirm if “New DSM” represents energy efficiency and demand response resources or only energy efficiency resources.
 - b. Please explain if demand response was allowed to be a selectable resource within AURORA.

- i. If demand response was not modeled as a selectable resource within AURORA, please explain why not.

1.59. Please refer to Figure 79 on page 172 of 1182 of the IRP.

- a. Please provide the supporting workbooks, with all formulas and links intact, used to develop the calculations for each of the metrics presented in the portfolio scorecard for each of the portfolios.
- b. Please provide the annual carbon emissions for each of the portfolios shown in Figure 79.
- c. Please explain how it is possible for AURORA to have optimized the "ECR" portfolio to have an average reserve margin of 3.4% which is less than the 8.9% PJM requirement discussed in Section 3.2 of the IRP.

1.60. Please refer to the discussion of the estimated bill impacts of the Preferred Plan on page 179 of 1182 of the IRP.

- a. Please provide the supporting workbook, with all formulas and links intact, used to develop the bill impacts for each of the portfolios modeled.

1.61. Please refer to Exhibits C-27 and C-28 on page 216 of 1182 of the IRP.

- a. Please provide the supporting workbooks, with all formulas and links intact, used to develop Exhibits C-27 and C-28.
- b. Please confirm that the electric vehicle adoption and distributed generation forecasts are included within the load forecast modeled in AURORA.
- c. Please explain how Kentucky Power developed the Electric Vehicle forecast.
- d. Please explain if the Inflation Reduction Act tax incentives were factored into the Electric Vehicle forecast.
- e. Please explain how Kentucky Power developed the distributed energy resources forecast.
- f. Please provide the units for the "Distributed Energy Resource" and "Capacity" column shown in Exhibit C-28.
- g. Please explain if the Inflation Reduction Act tax incentives were factored into the distributed energy resources forecast.
- h. Figure 9 (page 41 of 1182) shows a significant increase in DER between 2020 and 2021. Please explain why the forecast from 2022 forward is linear and a much smaller rate of increase than seen between years 2020 and 2021.

- 1.62. Please refer to the “Key Supply-Side Resource Option Assumption” on page 218 of 1182 of the IRP.
- a. Please provide the supporting workbook, with all formulas and links intact, used to develop the levelized cost of energy (“LCOE”) for each of the new generation technologies shown in the table.
 - b. Please explain the discrepancy between the “Installed cost” numbers shown in this table and the capital cost assumptions shown in Figure 18, 20, and 22 for battery storage, wind, and solar resources.
- 1.63. Please refer to Exhibit E1 on pages 219–223 of 1182 of the IRP.
- a. For each of the scenarios, please provide the energy efficiency bundles that were selected in the AURORA capacity expansion optimization.
 - b. Please explain if the Big Sandy extension was hardcoded into the model or if AURORA was allowed to optimize the decision on whether to extend operations at the Big Sandy unit.
 - c. Please identify any additional operation and maintenance costs or capital expenditures needed for the Big Sandy unit to extend operations until 2041. Please explain in detail the nature and amount of any such costs and their anticipated timing.
 - ii. If there are additional costs, please provide the costs that were included in the AURORA model for the Big Sandy extension.
 - d. Please explain if Kentucky Power evaluated any modeling runs where the level of capacity purchases in 2028 is set to a value lower than the 500 MW limit.
- 1.64. Please refer to Exhibit E-2 on pages 225–304 of 1182 of the IRP. Please provide all modeling results presented in Exhibit E-2 in machine readable format, with all formulas and links intact.
- 1.65. For the Big Sandy and Mitchell plants, please provide the following historical annual data by unit, or, if Kentucky Power does not maintain unit-level data, by plant, from 2015 to present:
- a. Fixed O&M cost;
 - b. Variable O&M cost;
 - c. Fuel Costs;
 - d. Capital expenditures;

- e. Heat rate;
- f. Generation;
- g. Capacity factor;
- h. Forced outage rate;
- i. Planned outage rate;
- j. Energy revenues;
- k. Capacity revenues.

1.66. For the Big Sandy and Mitchell plants, please provide the following projected data by unit for the planning period modeled for this IRP:

- a. Fixed O&M cost;
- b. Variable O&M cost;
- c. Capital expenditures;
- d. Forced outage rate.

1.67. In comparing and evaluating possible supply-side and demand-side resource additions (including distributed generation) does the Company consider the costs of pollutants and environmental damage, negative health impacts, and the potential avoided costs of these?¹³ If yes, please explain in detail how they are considered. If no, please explain in detail why not.

1.68. How did the Company include consideration of weather extremes into the IRP planning process, if at all? Do the Company's forecasts and planning take account of the risk of more extreme weather in the future, as is expected due to climate change, and as we have already been experiencing in recent years? Please explain in full.

1.69. In the Commission's May 14, 2021 Order in Case No. 2020-00174¹⁴, the Commission identified several principles that Kentucky Power should follow in

¹³ See e.g., the costs quantified in: EPA, [Public Health Benefits-per-kWh of Energy Efficiency and Renewable Energy in the United States: A Technical Report \(May 2021\)](https://www.epa.gov/sites/default/files/2021-05/documents/bpk_report_second_edition.pdf), https://www.epa.gov/sites/default/files/2021-05/documents/bpk_report_second_edition.pdf; and Interagency Working Group (IWG) on the Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* (Feb. 2021), https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

¹⁴ Order, *In re Electronic Application of Kentucky Power Company for (1) A General Adjustment of Its Rates for Electric Service; (2) Approval of Tariffs and Riders; (3) Approval of Accounting Practices to Establish Regulatory Assets and Liabilities; (4) Approval of a Certificate of Public Convenience and Necessity; and (5) All Other Required Approvals and Relief*, Case No. 2020-00174, at 21–23 (May 14, 2021).

evaluating distributed generation. These include: evaluating eligible generating facilities as a utility system or supply side resource; Treating benefits and costs symmetrically; conducting forward-looking longer term and incremental analyses; avoiding double counting; and ensuring transparency. Please indicate:

- a. How the Company has followed these principles when planning for the role of distributed generation in the planning period.
- b. What avoided costs have been incorporated into the analyses of distributed generation? For example, have any of the following been included: avoided energy cost, ancillary services cost, generation capacity cost, transmission capacity cost, distribution capacity cost, carbon cost, environmental compliance cost?
- c. How the Company has applied any of these same principles and avoided costs to evaluation of any of its DSM (including energy efficiency) programs?
- d. Has the Company considered jobs benefits of distributed generation or energy efficiency programs? Please explain in full.

1.70. The National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources ("NSPM-DER ")¹⁵ provides a comprehensive framework for cost-effectiveness assessment of distributed energy resources including distributed generation, distributed storage, demand response, and energy efficiency. The NSPM-DER also provides guidance on addressing multiple DERs and rate impacts and cost shifts. In their order in the Kentucky Power Company Case No. 2020-00174, concerning net metering, the Commission adopted a series of principles to be used when establishing new net metering rates. These principles are consistent with those presented in the NSPM-DER and are applicable to evaluating the benefits and costs of all DER's, in addition to net metering.

- a. Is the Company aware of and familiar with the NSPM-DER?
- b. Has the Company utilized the NSPM-DER within the IRP process for evaluating DSM, energy efficiency, and distributed generation resources? Please explain in full.

1.71. Please provide any internal analysis and discussion materials used to forecast and consider the impact of the proposed Integrated Resource Plan

¹⁵ National Energy Screening Project, *National Standard Practice Manual For Benefit-Cost Analysis of Distributed Energy Resources* (Aug.2020), https://www.nationalenergyscreeningproject.org/wp-content/uploads/2020/08/NSPM-DERs_08-24-2020.pdf

(IRP) on low-income customers at 30%, 50%, and 80% Area Median Income (“AMI”), if any.

- 1.72. Please provide the historical data on low-income households considered in the preparation of the Integrated Resource Plan, if any, by census tract and zip code. If the requested data is unavailable at the requested scale, please provide the data in the most granular geographic scale available.
- 1.73. Please provide any internal analysis of Annual Use-per-Customer and Total Energy Sales correlated to impact on average customer bills as 30%, 50%, and 80% Area Median Income (“AMI”). Please provide data by census tract and zip code. If the requested data is unavailable at the requested scale, please provide the data in the most granular geographic scale available.
- 1.74. Please provide any analysis performed by the Company specifically concerning future low-income household customer demand for energy, if any. Please provide the data considered as a part of this process by census tract and zip code. If the requested data is unavailable at the requested scale, please provide the data in the most granular geographic scale available.
- 1.75. Please provide studies related to environmental and health impacts on low-income communities and communities of color considered as a part of the IRP process, if any, including any internal analysis and discussion materials from the Company of these studies.
- 1.76. Please provide, if any, studies related to the impact of economic disparities on low-income communities and communities of color considered as a part of the IRP process, including any internal analysis and discussion materials from the Company of these studies.
- 1.77. Please provide the energy burden analysis considered as a part of the IRP process, if any, including any internal analysis and discussion materials from the Company of such analyses.
- 1.78. Please provide data on the impact of electrifying large sectors of the U.S. economy over the period of the proposed IRP and the implications for low-income customer affordability and access. What steps is the Company

taking to ensure equitable distribution of benefits and costs on low-income customers? Please provide any and all analysis. Please provide data by census tract and zip code.

- 1.79. Please provide the following data, and any and all internal analysis and discussion materials, on how this influenced the preparation of the IRP and how COVID-19 pandemic data impacted the analysis in anticipating future pandemic instability:
- a. Please provide data for the number of people who are eligible for electric disconnection by census tract.
 - b. Please provide data on the number of people who are behind on their electric payments by census tract.
 - c. Please provide data on the average amount owed on past due bills by census tract.
 - d. Please provide data on the number of people who have a signed repayment plan by census tract.
 - e. Please provide data on the number of people who are behind on their payments, but do not have a signed payment plan in place by census tract.
 - f. Please provide data on the number of people who have a signed payment plan who are current on that payment plan by census tract.
 - g. Please provide data on the number of people who have a signed payment plan who have missed one or more payments by census tract.
 - h. Are the people who have missed one or more payments on their payment plan included in the overall number of people who are eligible for disconnection? Please explain.
 - i. Please provide data on the number of people who have received support from pandemic utility assistance programs by census tract.
 - j. Please provide data on the amount of money received by the Company from pandemic utility assistance programs.

Note: if data requested above is unavailable at the census tract level, please provide data at the most granular geographic scale available.

- 1.80. In their 2017 report "Lights Out in the Cold: Reforming Utility Shut-Off Policies as If Human Rights Matter," the NAACP "calls for concrete action toward establishing policies that protect the well-being of all utility

customers and the eventual elimination of utility disconnections.”¹⁶ They also provide “a collection of true stories about real people whose lives were cut short, or nearly cut short, by utility companies who were willing to pull the plug to protect profits,”¹⁷ and go on to state that “the establishment of a universal right to uninterrupted energy service would ensure that provisions are in place to prevent utility disconnection due to non-payment and arrearages.”¹⁸

Specific to Kentucky electric utilities, the Commission’s regulations establish certain circumstances under which an electric utility shall not terminate service for non-payment, 807 KAR 5:006(15)(2)-(3), and provide for winter hardship reconnection, 807 KAR 5:006(16).

- a. Please explain what concrete action(s) the Company is taking to ensure and increase universal access to electricity, especially to underserved communities such as low-income households and communities of color?
- b. What policies do you have in place that go above and beyond the legal rights codified in 807 KAR 5:006, if any?

1.81. Please provide data on charges and disbursements (incentives, rebates, and/or weatherization assistance) for the Targeted Energy Efficiency program, by census tract or zip code.

1.82. How has the Company engaged stakeholders, including residential customers, in the development of this IRP?

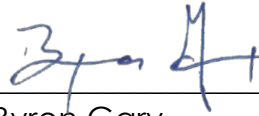
- a. Please provide copies of all materials shared with stakeholders at any stakeholder meetings held concerning the IRP.
- b. Please provide copies of any comments submitted to the Company by stakeholders during the IRP development process.

¹⁶ Marcus Franklin et al., *Lights Out in the Cold: Reforming Utility Shut-Off Policies as If Human Rights Matter*, NAACP, at iii (Mar. 2017), <https://naacp.org/resources/lights-out-cold>.

¹⁷ *Id.* at 3–5.

¹⁸ *Id.* at iv.

Respectfully submitted,

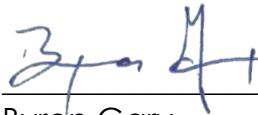


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as Joint Intervenors, Mountain Association,
Appalachian Citizens' Law Center,
Kentuckians for the Commonwealth, and
Kentucky Solar Energy Society*

CERTIFICATE OF SERVICE

In accordance with the Commission's July 22, 2021 Order in Case No. 2020-00085, *Electronic Emergency Docket Related to the Novel Coronavirus COVID-19*, this is to certify that the electronic filing was submitted to the Commission on May 22, 2023; that the documents in this electronic filing are a true representations of the materials prepared for the filing; and that the Commission has not excused any party from electronic filing procedures for this case at this time.



Byron Gary