COMMONWEALTH OF KENTUCKY BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC JOINT APPLICATION OF)	
KENTUCKY UTILITIES COMPANY AND)	
LOUISVILLE GAS AND ELECTRIC)	
COMPANY FOR CERTIFICATES OF)	CASE No. 2022-00402
PUBLIC CONVENIENCE AND NECESSITY)	
AND SITE COMPATIBILITY)	
CERTIFICATES AND APPROVAL OF A)	
DEMAND SIDE MANAGEMENT PLAN)	
AND APPROVAL OF FOSSIL FUEL-FIRED)	
GENERATING UNIT RETIREMENTS)	

SUPPLEMENTAL DATA REQUESTS OF JOINT INTERVENORS METROPOLITAN HOUSING COALITION, KENTUCKIANS FOR THE COMMONWEALTH, KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION [REDACTED VERSION]

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Dated: May 31, 2023

Counsel for Joint Intervenors, Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society, and Mountain Association

DEFINITIONS

1. Unless otherwise specified in each individual interrogatory or request, the terms "you," "your," "LG&E," "KU," "LG&E/KU," or "Companies" refer collectively to Louisville Gas & Electric Company and Kentucky Utilities Company, including any affiliated companies, predecessors-in-interest, employees, authorized agents, outside consultants or contractors, or other representatives.

2. "LG&E" means Louisville Gas & Electric Company and/or any of their officers, directors, employees or agents who may have knowledge of the particular matter addressed, and affiliated companies.

3. "KU" means Kentucky Utilities Company and/or any of their officers, directors, employees or agents who may have knowledge of the particular matter addressed, and affiliated companies including Pennsylvania Power and Light.

4. "The Companies" means LG&E and KU.

5. "Joint Intervenors" means the Metropolitan Housing Coalition, Mountain Association, Kentuckians for the Commonwealth, and Kentucky Solar Energy Society, who were granted the status of full joint intervention in this matter.

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

7. "KCA" means the Kentucky Coal Association.

8. 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.

9. 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.

10. 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.

11. "And" and "or" should be considered to be both conjunctive and disjunctive, unless specifically stated otherwise.

12. "Each" and "any" should be considered to be both singular and plural, unless specifically stated otherwise.

13. 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.

14. "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.

15. "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.

16. "Person" means any natural person, corporation, professional corporation, partnership, association, joint venture, proprietorship, firm, or the other business enterprise or legal entity.

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

- 18. "RFP" means Request for Proposals.
- 19. "RTO" means Regional Transmission Organization.

20. "EPA" means the United States Environmental Protection Agency.

21. "Senate Bill 4" and "SB4" refer to Senate Bill 4 enacted by the Kentucky Generally Assembly during its 2023 Regular Session, now 2023 Ky. Acts 118.

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 Intervenors. 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 Intervenors, 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 Intervenors 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 Intervenors 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.

SUPPLEMENTAL DATA REQUESTS PROPOUNDED TO LOUISVILLE GAS AND ELECTRIC COMPANY AND KENTUCKY UTILITIES COMPANY BY JOINT INTERVENORS

- 3-1. Please produce all redacted documents included in this filing in non-redacted, electronic versions (machine readable, unprotected, with formulas intact), to the extent such documents have not already been provided to the Joint Intervenors.
- 3-2. Please refer to Mr. Bellar's Direct Testimony, filed in Case No. 2023-00122, at 10-11. Please describe the anticipated benefits and value of the Companies' full right to dispatch the two Companies-owned solar facilities between their economic minimum and maximum outputs.
 - a. Please indicate how this value is represented in the Companies' Financial Model. If it is not considered to be a quantifiable financial benefit, please explain why not.
 - b. Please explain why the Companies have not negotiated for the right to control the solar PPA facilities' output ranges.
- 3-3. Please refer to Companies response to Staff Request 2-60, filed in Case No. 2022-00402, which states that, "The energy from the Companies-owned facilities in Mercer and Marion counties will be dispatchable within the output range allowed by solar irradiance. However, given that the marginal energy cost from the owned solar facilities is \$0/MWh, the Companies would not anticipate curtailing their output under normal operating conditions."
 - a. Please state whether the Companies anticipate that they will have the capability to operate their solar panels in downward dispatch or full flexibility operating mode. (These terms are defined in: Energy and Environmental Economics, *Investigating the Economic Value of Flexible Solar Power Plant Operation* (2018), available at: https://www.ethree.com/projects/investigating-the-economic-value-of-flexible-solar-plants/)
 - b. If the Companies' anticipated capability is confirmed in (a), please explain why the Companies would not choose to voluntarily curtail the output of solar facilities in order to obtain the value represented by flexible solar plant operation.
 - c. In response to Attorney General Request 1-49 in Case No. 2022-00402, Mr. Bellar states that, "The need for load-following dispatchable generation increases in conjunction with the increased penetration of intermittent renewable generation. Yes, the proposed J or H class NGCCs can conduct quicker and larger load following than the Cane Run Unit 7 installed nearly 9 years ago."
 - i. Please provide a comparison of the load-following capabilities of the Companies-owned solar generation with that of the proposed J or H class NGCCs.
 - ii. Please provide a comparison of the load-following capabilities of the Companies-owned solar generation with that of Cane Run 7 after completion of the upgrade from the OEM planned for spring 2024.

- 3-4. Please refer to Mr. Bellar's Direct Testimony, filed in Case No. 2023-00122, at 16-17. Please provide a list of all incidents over the past 20 years in which coal piles froze, resulting in reduced generation at any of the Companies' coal units or any coal unit that the Companies relied upon.
 - a. Please explain how the forced outage rates included in the Companies' SERVM reliability analysis account for the risk of coal piles freezing. Please provide all supporting analyses, in excel format where available, such as calculations of the expected risk of outage or reduced generation and the duration of such outages or reduced generation periods.
- 3-5. Please refer to Companies response to Staff Request 1-1(b), filed in Case No. 2022-00402, in which Mr. Bellar stated that LG&E/KU's current units with black start capabilities are Cane Run 7 and Brown CT units 5-11 (in conjunction with Dix Dam Hydro units 1-3). Among the proposed resources, which are black start capable, if any?
- 3-6. Please refer to Mr. Bellar's Direct Testimony, filed in Case No. 2023-00122, at 18. Please provide a comprehensive_summary of the services provided by TVA related to reliability coordination.
 - a. Please provide a copy of each relevant contract or agreement.
 - b. If the service agreement(s) with TVA were approved by the Commission, please provide relevant references to the dockets and decisions.
- 3-7. Please refer to Companies response to Staff Request 2-66(a), filed in Case No. 2022-00402, in which Mr. Wilson states that, "The Companies have not calculated ELCC values for any of their existing or proposed units. The Companies are not aware of cases where ELCC is computed for thermal resources. The capacity contributions computed for limited-duration resources (i.e., dispatchable DSM and battery storage) are similar to ELCC, but the calculation is not the same."
 - a. Is Mr. Wilson familiar with PJM's proposed Marginal Accreditation Framework (Marginal ELCC or Marginal Reliability Impact)? (See, PJM, Critical Issue Fast Path stakeholder process, *Capacity Market Reform: PJM's Initial Proposal*. Available at: <u>https://www.pjm.com/committees-and-groups/cifp-ra</u> - meeting materials, March 29, 2023, Item O4 – PJM CIFP-RA Initial Proposal, slide 9).
 - b. Does Mr. Wilson agree that it is a best practice to characterize generation resources' historical performance based on both of the following metrics:
 - i. Individual performance (forced outages, ambient de-rates, production capacity, etc.) as a function of temperature (and other weather for wind/solar back-casts).
 - ii. Class and fleet performance as a function of temperature (recognizing that correlated outages are observed in historical datasets).
 - c. Is Mr. Wilson familiar with the Astrape Report, *Accrediting Resource Adequacy Value to Thermal Generation* (2022)? (See, Astrape Consulting, *Accrediting*

Resource Adequacy Value to Thermal Generation, available at: <u>https://www.astrape.com/publications/</u>)

- d. Does Mr. Wilson agree that LG&E/KU and many other utilities' current methods do not account for a portion of the thermal resource uncertainty in an individual unit's capacity accreditation, but rather that "uncertainty is being socialized to load"? (Astrape, p. 8) If you disagree, please explain the basis for your disagreement in full.
- e. Does Mr. Wilson agree that accounting for uncertainty in categories such as outage variability, outage correlation, weather-dependent outages, and fuel availability would result in a more consistent approach for determining capacity accreditation between resources currently assessed via ELCC (wind, solar, storage) and thermal resources? If you disagree, please explain the basis for your disagreement in full.
- f. Does Mr. Wilson anticipate that LG&E/KU will calculate ELCC values, or perform some similar calculation, for thermal units as a part of future planning efforts? Please explain.
- Please refer to Mr. Bellar's Direct Testimony, filed in Case No. 2023-00122, at 16-17.
 - a. Please provide LG&E/KU's equivalent forced outage rates for each unit proposed for retirement for each year in the past decade.
 - b. Please provide LG&E/KU's assumptions regarding equivalent forced outage rates during the forecast period for each unit proposed for retirement. Please include all variations that may exist across the portfolios. (See, Exhibit SB4-1, Table 4, p. 12)
- 3-9. Please refer to Mr. Bellar's Direct Testimony, filed in Case No. 2023-00122, at 22. Mr. Bellar's testimony states that tax advantages for renewable generation resources "inure completely to the benefit of customers."
 - a. Please provide supporting evidence that such tax advantages inure *completely* to the benefit of customers. Please state whether this evidence precludes the possibility that a substantial portion of those tax advantages are captured in the form of transaction costs or retained by the solar developer or owner?
 - b. Please state whether the following Kentucky tax expenditures would also "inure completely [or partially] to the benefit of customers," provide an estimate of the benefit to customers, and provide a brief explanation for each response. (See, Office of the State Budget Director, *Tax Expenditure Analysis, Fiscal Years 2022-2024*, available at: https://osbd.ky.gov/Publications/Pages/Special-Reports.aspx).
 - i. Sales and Use Tax Expenditure for Coal Used in the Manufacture of Electricity (p. 54)
 - ii. Corporation Income and LLE Tax Expenditure for Cryptocurrency Incentives (pp. 107-108)
 - iii. Property Tax Expenditure for Clean Coal Incentive Credit (pp. 121)
 - iv. Coal Severance and Processing Tax Expenditure for Transportation

Expense Incurred in Transporting Coal (p. 163)

- v. Coal Severance and Processing Tax Expenditure for Thin Seam Tax Credit (p. 164)
- c. Please state whether the federal tax expenditure known as "excess of percentage over cost depletion" would also "inure completely [or partially] to the benefit of customers," provide an estimate of the benefit to customers, and provide a brief explanation. (See, Green Scissors, database entry available at: <u>https://greenscissors.com/program/excess-of-percentage-over-cost-depletion-other-fuels/</u>)
- 3-10. Please refer to Mr. Bellar's Direct Testimony, filed in Case No. 2023-00122, Table 1 at 7 and Table 3 at 11. Please provide the following information for each distinct investment activity modeled in the No Retirements portfolio for the units proposed for retirement.
 - a. Investment cost
 - b. Anticipated in-service date
 - c. The requirement associated with the investment activity (e.g., Good Neighbor Rule, facility reliability, etc.) – if more than one reason applies, please explain whether the reasons are cumulative or severable (e.g., if one of the reasons were to no longer apply, would the investment requirement still exist)
 - d. Documentation of alternatives analyses (if already provided in 2022-00402, please provide a reference).
- 3-11. Please refer to the Companies' response to Joint Intervenors' request No. 2-107, filed in Case No. 2022-00402.
 - a. Please confirm what level of hydrogen co-firing OEM's offer as part of their "standard package," and whether Companies believe that is sufficient to comply with EPA's proposed greenhouse gas new source performance standards.
 - b. Please confirm whether Companies have identified a commercial source of hydrogen. If so, please provide information regarding the hydrogen source, its production method (e.g. whether it is "green hydrogen" produced by renewable resources), and any information obtained related to costs, transportation, or storage relevant to the proposed NGCCs.
- 3-12. Please refer to the Companies' response to Joint Intervenors' request No. 2-108, filed in Case No. 2022-00402. Please confirm whether Companies are relying on approval of the Southeast Hydrogen Hub in any manner related to the NGCC proposals, such as for future hydrogen production, delivery, or budget estimates. If so, please explain in detail and explain how Companies' assumptions will change if the application is denied.
- 3-13. Please refer to the Companies' response to Staff request 1-5(a), filed in Case No.
 2022-00402. Please confirm the timeline Companies believe OEMs will be capable of hydrogen blending beyond 50% to 100%, and whether Companies believe that is

sufficient to comply with EPA's proposed greenhouse gas new source performance standards.

- 3-14. Please refer to the Companies' response to Staff request 1-5(b), filed in Case No. 2022-00402. Please confirm whether Companies intend to produce hydrogen on site at either of the proposed NGCCs? If so, please explain. If not, please provide any information regarding the potential transportation and delivery of hydrogen for use at either of the proposed NGCCs.
- 3-15. Please refer to the Companies' response to Staff request 1-5(c), filed in Case No. 2022-00402. Please explain whether and to what extent Companies anticipate having to make a capital investment to their current SCCT fleet to increase hydrogen combustion capabilities.
- 3-16. Please refer to the Companies' response to Staff request 1-93, filed in Case No. 2022-00402.
 - a. Please explain how Companies intend to comply with EPA's proposed greenhouse gas new source performance standards that are based on CCS and hydrogen co-firing technologies.
 - b. Have the Companies changed their position that EPA's proposed greenhouse gas new source performance standards will not make NGCCs uneconomical? If so, please explain. If not, please explain why not.
 - c. Have the Companies performed or do the Companies intend to perform an analysis to understand the economic impact of EPA's proposed greenhouse gas new source performance standards on the proposed NGCC plants?
- 3-17. Please refer to the Companies' response to Attorney General request 1-22 and KCA request 1-46, filed in Case No. 2022-00402.
 - a. Have Companies estimated the costs required for additional infrastructure and necessary modifications needed to accommodate hydrogen by the proposed NGCCs?
 - b. Please explain what future infrastructure the Companies anticipate will be necessary to accommodate hydrogen.
 - c. Please explain whether the Companies have evaluated any other costs associated with burning hydrogen. If not, please explain why not and when the Companies anticipate evaluating these costs.
- 3-18. Please refer to the Companies' response to Attorney General request 2-7(b), filed in Case No. 2022-00402.
 - a. Please explain whether the increase in nitrous oxide emissions expected from hydrogen combustion will impact the Companies' ability to comply with applicable environmental rules and how the Companies intend to mitigate any increases in emissions resulting from the combustion of hydrogen.

- b. Please explain whether the Companies have estimated the increase in cost that may result from burning hydrogen produced from renewable resources.
- c. Please confirm whether compliance with EPA's proposed greenhouse gas new source performance standards is expected to result in increased costs.
- 3-19. Please refer to the Companies' response to Walmart request 2-1(a), filed in Case No. 2022-00402. Please state whether the Companies expect the supply of commercially available hydrogen will be the primary limiting factor in adoption of hydrogen and not the capability of any selected OEM to blend hydrogen.
- 3-20. Please refer to the Companies' response to KCA request 2-34, filed in Case No. 2022-00402. Please explain whether the Companies understand the EPA's proposed greenhouse gas new source performance standards as requiring carbon capture or green hydrogen. If so, please explain the Companies plan for compliance.
- 3-21. Please refer to the Companies' response to KCA request 2-51, filed in Case No. 2022-00402.
 - a. Was hydrogen dual fuel capability requested in the April 25 Request for Proposals to NGCC unit vendors? If not, why not? If so, what do the Companies expect to require with regards to hydrogen dual fuel capability (e.g., blending capability, derates at maximum blending, and costs with and without blending)?
 - b. Would the contingency included in the estimates for the NGCC projects adequately address a hydrogen dual fuel option?
 - c. Please explain whether the cost of utilizing hydrogen as a fuel option will be addressed in this proceeding. If not, please explain why not and whether the Companies anticipate addressing the recovery of that cost in a future rate proceeding.
- 3-22. Please refer to the Companies' response to KCA request 2-52(a), filed in Case No. 2022-00402. Please confirm whether only green hydrogen would be viable for use at the proposed NGCCs to comply with applicable environmental rules. If not, please explain why not and whether Companies are evaluating other types of commercial hydrogen sources.
- 3-23. Please refer to the Companies' response to KCA request 2-52(d), filed in Case No. 2022-00402. Please confirm whether companies are currently seeking Firm Transportation of hydrogen. If so, please explain in detail.
- 3-24. Please refer to Exhibit SB4-1. With respect to Table 5, please answer the following:
 - a. Did the Companies use the same scarcity pricing given in Exhibit SAW-1?
 - b. Please provide the workbook with all formulas and links used to produce the scarcity pricing curve utilized in SERVM.
- 3-25. Please provide a copy of the Blue Oval contract mentioned in the response to PSC 2-

43(a).

- 3-26. Please refer to Exhibit SB4-1 and answer the following requests.
 - a. Did the Companies use the same load forecast in PLEXOS as given in "Load2023PlanCC_IRA_DSM_20221026" in Mr. Wilson's confidential workpapers in Case No. 2022-00402?
 - b. Please provide the workbook(s) with all formulas and links used to make the hourly adjustments to the load forecast for the energy efficiency savings.
- 3-27. Please refer to Exhibit SB4-1 and answer the following requests.
 - a. Did the Companies use the same firm gas transmission costs as were contained in Mr. Wilson's financial model workpapers in Case No. 2022-00402?
 - b. Are the firm gas transmission costs based on those given in response to KCA 1-51 in Case No. 2022-00402?
 - c. Please provide the workpaper(s) with all formulas and links intact used to calculate the firm gas transmission costs.
 - d. Did the letter from Texas Gas given in response to JI 2-66 influence the estimation of firm gas transmission costs? If so, how so?
 - e. Has any gas supplier indicated to the Companies that upgrades to interstate gas pipeline(s) would be needed to supply the Mill Creek and/or Brown NGCCs? If so, please provide any documents describing the upgrades needed and/or their costs.
- 3-28. Please refer to Exhibit SB4-1, Table 5. The LOLE of the current system with no retirements is 0.45. In Table 15 of the 2021 IRP Reserve Margin Analysis, the LOLE of the existing system is given as 1.42. With respect to these differences please answer the following:
 - a. Why, in the Companies opinion is the LOLE of the current system between these two analyses so different?
 - b. In addition to the DSM added to the current system and shown in Table 5 of Exhibit SB4-1, please list the changes between the SB application and the 2021 IRP that the Companies believe would have led to these differences.
- 3-29. Please refer to page 13 of Exhibit SB4-1 where it states "In this analysis, the Companies treat an LOLE of 3.57 as consistent with maintaining adequate reliability because this LOLE is aligned with the Companies' minimum reserve margin targets, i.e., any portfolio with a lower LOLE than 3.57 provides more than adequate reliability" and the Companies response to Joint Intervenors Question number 2-67 subpart a in Case No. 2022-00402, which states that "The Companies do not have a minimum LOLE standard."
 - a. Please explain how the Companies arrived at the LOLE of 3.57.
 - b. Please explain if the Companies consider an LOLE of 3.57 to be a minimum

LOLE standard.

- 3-30. Please refer to Table 5 on page 14 of Exhibit SB4-1 and Table 11 on page 32 of Witness Wilson's testimony in Case No. 2022-00402.
 - a. Please confirm that the only changes made to the SERVM database (provided in response to Staff Question 1-106 in Case No. 2022-00402) that resulted in the different LOLE for the Companies final CPCN portfolio are the hourly load inputs discussed in the Companies response to Joint Intervenors Question 2-60 in Case No. 2022-00402.
 - b. If any other changes were made to the SERVM database (provided in response to Staff Question 1-106 in Case No. 2022-00402) in order to produce the results shown in Table 5 of Exhibit SB4-1, please provide each change made and the supporting workbooks for those changes.

- 3-33. Please refer to the Companies response to JI Question 2-74 subpart a and b.
 - a. Please provide the years over which the Companies sent hourly weather data to the respondents.
 - b. Please confirm which year of weather data is used to develop the hourly profiles modeled in SERVM.

Respectfully submitted,

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Counsel for Joint Intervenors, Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association

CERTIFICATE OF SERVICE

This is to certify that the electronic filing was submitted to the Commission on May 31, 2023; that the document in this electronic filing is a true representations of the materials prepared for the filing in a redacted format; and that the Commission has not excused any party from electronic filing procedures for this case at this time.

Tom FitzGerald