

**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 PUBLIC ) CASE NO. 2022-00402  
CONVENIENCE AND NECESSITY AND SITE )  
COMPATIBILITY CERTIFICATES AND )  
APPROVAL OF A DEMAND SIDE MANAGEMENT )  
PLAN AND APPROVAL OF FOSSIL FUEL-FIRED )  
GENERATING UNIT RETIREMENTS )**

**RESPONSES OF JOINT INTERVENORS  
METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH, KENTUCKY SOLAR  
ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION TO  
JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY  
[DATED JULY 28, 2023]**

**FILED: August 4, 2023**

**VERIFICATION**

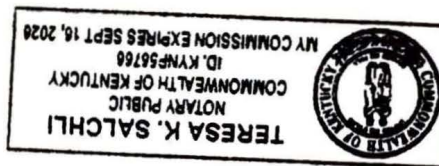
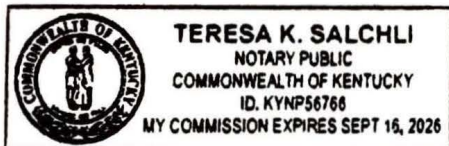
The undersigned, Andrew McDonald, being first duly sworn, deposes and says that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge, and belief, after reasonable inquiry.

*Andrew McDonald*

Subscribed and sworn to before me by Andrew McDonald this 4th day of Aug, 2023.

*Teresa K. Salchli*  
Notary Public

My commission expires: 9-16-2026



**VERIFICATION**

The undersigned, Anna Sommer, being first duly sworn, deposes and says that she has personal knowledge of the matters set forth in the responses for which she is identified as the witness, and the answers contained therein are true and correct to the best of her information, knowledge, and belief, after reasonable inquiry.

  
\_\_\_\_\_

Subscribed and sworn to before me by Anna Sommer this 4 day of August, 2023.

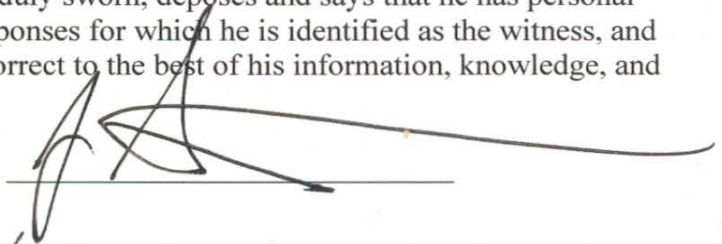
  
\_\_\_\_\_  
Notary Public

My commission expires: April 13 2027

JENNIFER E. GOLLINGER  
Notary Public, State of New York  
No. 01G06323115  
Qualified in St. Lawrence County  
Commission Expires April 13, 2027

**VERIFICATION**

The undersigned, James Grevatt, being first duly sworn, deposes and says that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge, and belief, after reasonable inquiry.



Subscribed and sworn to before me by James Grevatt this 4th day of August, 2023.

Denisse Aviles  
Notary Public

My commission expires: September 08 2023

DENISSE I AVILES  
NOTARY PUBLIC - STATE OF NEW YORK  
REGISTRATION NO. 01AV6330221  
QUALIFIED IN BRONX COUNTY  
COMMISSION EXPIRES SEPTEMBER 08, 2023

**VERIFICATION**

The undersigned, John D. Wilson, being first duly sworn, deposes and says that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge, and belief, after reasonable inquiry.



Subscribed and sworn to before me by John D. Wilson this 3 day of August, 2023.

**AMERAH RAYYAN**  
Notary Public - State at Large  
Kentucky  
My Commission Expires Mar. 12, 2025  
Notary ID KYNP25492

  
Notary Public

My commission expires: March 12, 2025

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.1**

- Q-1.1. In Excel spreadsheet or other format, with all formulas, columns and rows unprotected and fully accessible, please provide all workpapers and source documents not previously provided.

RESPONSE:

Please see McDonald's workpapers numbered 1 to 7. Note that McDonald Workpapers 1, 2, and 3 contain information from the Companies' confidential documents. These files are labelled "confidential" and in Workpapers 1 and 2 the specific confidential information referenced is highlighted in blue within the worksheets. "*Workpaper 3 - AMcDonald - CONFIDENTIAL\_Net Metering Cust-LGE-KU-2022-OCTOBER*" is an original Company document that Mr. McDonald worked with which is confidential in its entirety.

ATTACHMENTS:

01\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.1-AMcDonald- NM Scenarios  
CONFIDENTIAL 7-14-23\_Attach 1

02\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.1-AMcDonald - 17-  
JI\_DR2\_LGE\_KU\_Attach\_to\_Q83\_-\_NMS\_No\_Cap\_Scenario ANDY REV  
CONFIDENTIAL\_Attach 2

03\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.1-AMcDonald - CONFIDENTIAL\_Net  
Metering Cust-LGE-KU-2022-OCTOBER\_Attach 3

04\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.1-AMcDonald -  
small\_scale\_solar\_2023\_April\_EIA Modified AMc 7-14-23\_Attach 4

05\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.1-AMcDonald - Electric Utility Customer USA  
2021 - EIA\_Attach 5

06\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.1-AMcDonald - Total Sales to Electricity  
Customers by Utility USA - EIA 2021\_Attach 6

07\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.1-AMcDonald - Storage scenarios AMc 6-30-  
23\_Attach 7

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**Question No. 1.2**

- Q-1.2. Please provide all of Ms. Sommer's workpapers and relevant modeling files not already produced into the record of this proceeding.
- a. Please provide the supporting documentation and workpapers for Figure 12 on page 34 of Ms. Sommer's testimony including historical coal generation data by unit if available, documentation of the data source, and the chart in Excel format. If this information has already been provided, please provide direction to where it is located in the record. If it has not yet been provided, please explain why not.

**RESPONSE:**

Joint Intervenors previously provided all of Ms. Sommer's workpapers and relevant modeling files to the Companies, for distribution to the Commission and the other parties through counsel's system for sharing confidential files in this case. Ms. Sommer's SERVM database file was also provided to the Companies in response to an informal request and distributed to the Commission and the other parties through counsel's file sharing system. In response to this request, Joint Intervenors are also producing Ms. Sommer's public workpapers into the record of this proceeding.

- a. The supporting data was provided in "Figure 11. Coal Plant Generation – Confidential.xlsx". The file should have been labeled as "Figure 12..." The original source of the data is EIA Form 923. The figure compares only the generation from units that are retained through the planning horizon.

**ATTACHMENTS:**

08\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.2\_Figures 3 and 4\_Attach 1

09\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.2\_Figures 5 and 6\_Attach 2

10\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.2\_Figures 13 and 14\_Attach 3

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**Question No. 1.3**

- Q-1.3. Please provide a complete copy of all testimony (including transcripts of live testimony), interviews, articles, publications, or any other public writings or statements of any kind in which Ms. Sommer supported or advocated for any entity's construction or acquisition of any fossil-fuel fired electric generating unit. If a transcript of relevant live testimony, an interview, or other public non-written statement is unavailable, please provide a link to where the video may be found.

RESPONSE:

Ms. Sommer supported the testimony of David Schlissel in Arkansas Public Service Commission Docket No. 05-042-U, which recommended that the APSC approve Arkansas Electric Cooperative's proposal to purchase the 548 MW Wrightsville facility. A copy of that testimony is available on the APSC website. However, as a general matter, Ms. Sommer's services are requested when there is a perceived problem with a utility proposal, not typically because support for the proposal is needed.



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**Question No. 1.4**

Q-1.4. Please confirm that Ms. Sommer’s testimony shows that the portfolio she analyzed that included neither of the Companies’ proposed NGCC units (the “Renewables Plus MC2 Conversion” portfolio) had a higher PVRR than the Companies’ proposed portfolio by over \$1.2 billion in Table 5 and by over \$800 million in Table 6.

- a. Did Ms. Sommer include the cost of an SCR with the cost of converting Mill Creek 2 to gas?

RESPONSE:

Confirmed.

- a. No.

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**Question No. 1.5**

Q-1.5. Please confirm that the portfolio Ms. Sommer analyzed that included one of the Companies' proposed NGCC units (the "Renewables Plus One NGCC" portfolio) had a significantly lower PVRR than the Renewables Plus MC2 Conversion portfolio.

RESPONSE:

Confirmed.

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**Case No. 2022-00402**

**Question No. 1.6**

Q-1.6. Please explain how the lower PVRR of the Renewables Plus One NGCC portfolio compared to the Renewables Plus MC2 Conversion portfolio supports the Joint Intervenor's recommendation that the Commission deny both of the Companies' requested NGCC CPCNs.<sup>1</sup>

**RESPONSE:**

Joint Intervenor's recommendation that the Commission deny the Companies' requested NGCC CPCNs is based on the insufficiency of the Companies' evidence in support of a billion-dollar investment in two new combined cycle plants. The Companies have not put forward credible evidence sufficient to show a need for the requested NGCC CPCNs or to show an absence of wasteful duplication. That conclusion is supported by the totality of the evidence in this proceeding. The portfolios developed by Ms. Sommer are not intended as alternative portfolios that should be pursued. Rather, those portfolios test the sufficiency of the Companies' evidence by illustrating how even a limited number of improvements to the modeling yields informative results and demonstrates shortcomings in the Companies' planning.

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<sup>1</sup> McDonald Testimony at 4-5.

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**Case No. 2022-00402**

**Question No. 1.7**

- Q-1.7. Did Ms. Sommer evaluate other fuel and CO2 price scenarios besides the mid gas, mid CTG, zero CO2 scenario?
- a. If so, please provide the results of those evaluations and all supporting workpapers and modeling files.
  - b. If not, please explain why Ms. Sommer did not evaluate any other scenarios.

RESPONSE:

No.

- a. Not applicable.
- b. Ms. Sommer did not evaluate further scenarios due to the purpose of her testimony and the limited time available. The purpose of Ms. Sommer's testimony is not to present a fully-supported alternative portfolio for the Companies; rather, the purpose of Ms. Sommer's testimony is to test the reasonableness and sufficiency of the Companies' modeling in support of its requested relief. Robust evaluation of multiple scenarios certainly would be appropriate before committing customers to pay for new investments.

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**Case No. 2022-00402**

**Question No. 1.8**

Q-1.8. Please quantify the impact of each change Ms. Sommer made to the Companies' modeling of costs and resources that resulted in the Renewables Plus One NGCC portfolio.

RESPONSE:

It is not clear what is meant by “quantify”, since the impact of any change is always relative to another case. Please see the modeling files and workpapers provided with the filing of Ms. Sommer’s direct testimony. Ms. Sommer did not conduct production cost modeling or perform other analysis to test the impact of each individual change.

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**Question No. 1.9**

Q-1.9. Please explain if the Renewables Plus One NGCC portfolio would comply with the requirements of Senate Bill 4.

RESPONSE:

Joint Intervenors object to this request insofar as it misconstrues Ms. Sommer's testimony. Ms. Sommer's testimony does not include a recommendation that the Companies pursue the "Renewables Plus One NGCC portfolio." Joint Intervenors further object to this request to the extent that it calls for a legal conclusion. Subject to and without waiving these objections, Joint Intervenors' counsel respond as follows:

Yes, the Renewables Plus One NGCC portfolio would comply with the requirements of Senate Bill 4. Please refer to Joint Intervenors' response to Staff request 1-5.

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**Question No. 1.10**

- Q-1.10. How did Ms. Sommer decide on the specific step and chronology settings she used in PLEXOS, e.g., six-year rolling horizon and five blocks per day?
- a. What other settings did Ms. Sommer test?

**RESPONSE:**

Energy Futures Group (EFG) generally has a preference for chronological time sampling because chronology can have meaningful implications for the dispatch of limited duration resources such as demand response and storage. The choice of blocks per day was arrived at after testing of tradeoffs between run time and blocks chosen. EFG has conducted testing of rolling horizons in PLEXOS in another jurisdiction and arrived at the choice of six years based in part on that work.

- a. EFG did not test other PLEXOS settings.

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**Case No. 2022-00402**

**Question No. 1.11**

Q-1.11. Does Ms. Sommer agree there are many valid settings for use in PLEXOS, or does she contend that her method is the only valid or best method?

RESPONSE:

Ms. Sommer considers “valid settings” to be those that mimic actual dispatch of resources to the extent possible while keeping the problem size computationally tractable. She does not contend that her method is the only valid or best method, but rather that it is an improvement over the Companies’ settings. Indeed, that is why one of her recommendations is that LG&E/KU “perform further testing of PLEXOS time sampling setting(s) to determine which best represent battery storage dispatch.”



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**Question No. 1.12**

Q-1.12. Does Ms. Sommer agree it is reasonable for the Commission to assume for the purposes of this proceeding that the Companies must comply with the U.S. EPA's final Good Neighbor Plan?

RESPONSE:

Yes.

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**Question No. 1.13**

- Q-1.13. Ms. Sommer’s testimony states at page 50, lines 6-9, “[R]egardless of whether the Proposed New GHG Rules or some other form of requirement to reduce CO2 emissions is adopted in the U.S., the Companies’ failure to take that likely future scenario into account in their modeling is a significant weakness in their analysis.”
- a. Does Ms. Sommer acknowledge that the Companies modeled CO2 pricing of \$15 per ton and \$25 per ton as proxy costs of possible CO2 regulation?
  - b. Is Ms. Sommer aware that the Commission Staff’s Report in the Companies’ 2021 IRP proceeding states:

Commission Staff also disagrees, in part, with statements in LG&E/KU’s post-hearing comments indicating that recent developments support its assumption that carbon regulation is likely to be achieved through application of the NSPS alone. ... Given the urgency with which many view the need to address carbon emissions, Commission Staff believes such issues and potential delays in other forms of regulation raise the prospect, particularly over a timeline of 15 years or more, that a federal price or tax on CO2 emissions could be implemented .... Thus, Commission Staff believes that the regulatory risk or prospect of a tax on CO2 emissions should be seriously considered and discussed in detail in LG&E/KU’s next IRP ....<sup>2</sup>
  - c. How does Ms. Sommer reconcile her assertion that the Companies failed to account for “the Proposed New GHG Rules or some other form of requirement to reduce CO2 emissions is adopted in the U.S.” with her statement seven lines later, “Nevertheless, the Companies ‘stress test’ their portfolio by assuming a 50% capacity factor for the new NGCCs beginning in 2032 and a \$25 per ton carbon

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<sup>2</sup> Electronic 2021 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company, Case No. 2021-00393, Commission Staff’s Report at 61-62 (Ky. PSC Sept. 16, 2022)

price for existing coal in 2030,” which she characterizes as “a good faith attempt to model the EPA rule requirements on an extremely short timeframe”<sup>3</sup>

RESPONSE:

- a. Yes, the Companies modeled those costs, but a modeled cost does not necessarily equal inclusion of meaningful CO<sub>2</sub> regulation particularly if the spectrum of options to reduce CO<sub>2</sub> emissions are not included in the modeling and/or if the costs per ton are not good proxies for potential CO<sub>2</sub> regulation.
- b. Yes.
- c. The analysis conducted was merely summarized and the workpapers and modeling files supporting that analysis have not been produced. Please see also Joint Intervenors’ response to Staff request Q-1.4.

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<sup>3</sup> Sommer at 50 lines 16-19.

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**Question No. 1.14**

Q-1.14. Ms. Sommer's testimony states at page 49, line 18, through page 50, line 6:

If finalized, the Proposed New GHG Rules would require major, transformative changes in the Companies' supplyside resource portfolio. The Companies' reference to EPA's own modeling to support its contention that the Proposed New GHG Rules "support rather than undermine the Companies' proposals in this proceeding" is extremely speculative, given all of the uncertainties noted with how the Companies would be able to comply with the Proposed New GHG Rules, the macro nature of the modeling conducted by EPA, and the effects that it would have on their remaining supply-side resources.

- a. Please state in detail the extent to which Ms. Sommer had reviewed the U.S. EPA's modeling documentation and data associated with its New Source Performance Standards for Greenhouse Gas Emissions from New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas Emissions from Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule Proposal, Docket ID No. EPA-HQ-OAR-2023-0072 ("New GHG Rules") prior to filing her testimony.<sup>4</sup>
- b. Is Ms. Sommer aware that in all of EPA's updated modeling associated with the New GHG Rules (dated July 7, 2023), both in the baseline (reference) cases and in the cases in which the New GHG Rules are in effect, EPA's modeling shows between 2,134 MW and 3,207 MW of new NGCC capacity as being economically optimal to install in the SERC Central Kentucky region by 2028?<sup>5</sup>
- c. Does Ms. Sommer have any reason to believe that the same EPA that promulgated the Good Neighbor Plan, proposed the New GHG Rules, and conducted the

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<sup>4</sup> Available at <https://www.epa.gov/power-sector-modeling/analysis-proposed-greenhouse-gas-standards-andguidelines> (accessed July 20, 2023).

<sup>5</sup> See four updated .zip files dated July 7, 2023, available at <https://www.epa.gov/power-sector-modeling/analysisproposed-greenhouse-gas-standards-and-guidelines> (accessed July 21, 2023).

above-discussed modeling in support of the New GHG Rules has a pro-fossil fuel bias?

- d. Does Ms. Sommer contend that the “macro nature” of EPA’s modeling supporting the New GHG Rules makes the modeling results directionally inaccurate?
- e. Please state which, if any, of the following EPA modeling results for the proposed New GHG Rules for the SERC Central Kentucky region Ms. Sommer believes is directionally inaccurate. If she believes at least one of the following is directionally inaccurate but at least one is directionally accurate, please explain in detail what causes EPA’s modeling to result in the perceived directional inconsistency:
  - i. Building more than 2,000 MW of NGCC capacity by 2028;
  - ii. Adding thousands of MW of solar and wind resources over the modeling period;
  - iii. Adding hundreds of MW of battery resources over the modeling period; and
  - iv. Retiring all or nearly all coal capacity in the 2040-2050 timeframe

RESPONSE:

- a. Ms. Sommer read the majority of the rule published to the Federal Register prior to filing her testimony. Ms. Sommer has also reviewed several IPM modeling exercises supporting prior EPA power plant emission rules. Finally, Ms. Sommer read and took at face value the description of EPA’s modeling in the Companies’ response to Staff Q-5.2.
- b. The footnote link is broken. However, Ms. Sommer is aware that the Companies contended in their response to Staff Q-5.2 that, “In both cases the IPM model constructs much more NGCC capacity (about 3,000 MW) in 2028 than the Companies have proposed in this proceeding...”
- c. Ms. Sommer has formed no opinion on this question.
- d. Joint Intervenors find the phrase “directionally inaccurate” vague and unclear in this context, particularly in the absence of further definition by the Companies in making this request. Joint Intervenors understand “directional accuracy” in the context of utility modeling to refer to whether the modeling shows that a particular technology type will generally be retired, retained, or constructed. In that context, Ms. Sommer would expect that any non-coal based generation would be generally preferred and constructed.

Ms. Sommer contends that the macro nature of EPA's modeling cannot be relied upon as definitive evidence of the optimal plan to meet the requirements of any emissions rule for an individual utility. As the Companies have previously noted, not all of its load resides within in the LGE balancing authority and up to 700 MW of load that is not served by LGE is included in the BA. While the Companies contend that "Because these municipal entities have very little generation in the LKE-BA, the IPM model essentially reflects the Companies' generation fleet and EPA's projections of how that will change over time based on their modeling", Ms. Sommer disagrees. She knows of no reason that IPM would correctly reflect current contractual obligations from generators located in one region to serve load in another region. IPM is typically set up as a pipe and bubble model with transfer limits between regions as the only mechanism for transfer of power. As a prototypical optimization model, IPM would utilize those transfer limits to the extent they result in an optimal solution and build new generation to effect the same goal while observing constraints such as reserve margin requirements. In addition, Ms. Sommer would not expect the load requirements, reserve margin requirements, nor generator costs to accurately reflect the specifics of the LG&E/KU system. Therefore, Ms. Sommer would not expect EPA's modeling to provide the optimal compliance portfolio specifically and exclusively for LG&E.

- e. Please see response to part (d).

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**Question No. 1.15**

- Q-1.15. Prior to filing her testimony, was Ms. Sommer aware of the U.S. EPA's "Integrated Proposal Modeling and Updated Baseline Analysis, Memo to the Docket," dated July 7, 2023, concerning the New GHG Rules ("New GHG Rules IPM Memo")?
- a. Please state whether Ms. Sommer is aware that the New GHG Rules IPM Memo states at page 5, "[T]o better capture emission rate requirements as a function of annual capacity factor, model plants were allowed to switch to lower utilization levels in subsequent years and no longer co-fire hydrogen even if they selected hydrogen co-firing in earlier run years."
  - b. Does Ms. Sommer agree that transitioning a new, efficient NGCC unit from baseload to intermediate load operation by 2035 would comply with the proposed New GHG Rules?

RESPONSE:

No.

a. Yes.

b. No, Ms. Sommer is unable to agree, because she believes the proposed rule is subject to interpretation on this point and may be further clarified or modified by EPA at the time that the rule is finalized.

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**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.16**

Q-1.16. Please describe Ms. Sommer's experience conducting RFPs related to EPC contracts.

RESPONSE:

Ms. Sommer has not conducted an RFP for an EPC contract; instead, she has reviewed RFPs as part of IRP and certificate of need related cases.



**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.17**

Q-1.17. Please describe Ms. Sommer's experience negotiating EPC contracts.

RESPONSE:

Ms. Sommer has not negotiated an EPC contract; instead, she has reviewed those contracts as part of certificate of need and similar applications.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.18**

Q-1.18. Please describe Ms. Sommer's experience designing electric generating units.

RESPONSE:

Ms. Sommer has not designed an electric generating unit; instead, her expertise is in planning electric power systems.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.19**

Q-1.19. Please describe Ms. Sommer's experience participating in the construction of electric generating units.

RESPONSE:

Ms. Sommer has not constructed an electric generating unit; instead, her expertise is in planning electric power systems.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.20**

- Q-1.20. See Ms. Sommer's testimony at pages 25-35. For all portfolios Ms. Sommer modeled, please provide the information requested in the following subparts.
- a. Please identify and explain which of the Companies' existing resources Ms. Sommer permitted PLEXOS to select for retirement, which resources she forced PLEXOS to retire, and which resources she required PLEXOS to retain. Please explain her reasoning for these choices.
  - b. Please identify and explain all constraints Ms. Sommer placed on PLEXOS's ability to choose new resources to install, including without limitation the timing and sizing of new resources. Also, please identify and explain any forced resource additions.
  - c. Please provide a complete list of resources Ms. Sommer either required or gave PLEXOS the option to add, including all relevant parameters for such resources, including without limitation the cost, capacity, time required to install, and relevant performance characteristics of each resource.

**RESPONSE:**

- a. EFG sought to make a minimum of changes to the Companies' databases. In the partial resource optimization step, EFG used the same supply-side retirement inputs used by the Company. However, for the production costing step, retirement dates were kept consistent with the Companies' assumptions to permit the best apples to apples comparison of portfolios. After confirming that a change in PLEXOS' time sampling settings resulted in retention of the existing DR, EFG also changed the inputs to limit the problem size and remove the option to retire existing demand response resources.
- b. Fixed Resource Decisions in the PLEXOS Model:

<b>Resource</b>	<b>Rerun of Companies Plan</b>	<b>Renewables Plus Conversion</b>	<b>Renewables plus One NGCC</b>
Existing DR	X	X	X
Companies New DR	X	X	X
EFG Additional DR	-	X	X
2 NGCCs	X	-	-
1 NGCC	-	-	X
MC2 Conversion	-	X	-
Brown Storage	X	-	-
Owned Solar (Solar_20a-S and Solar_6g-SB_so)	X	-	-
Solar_14c-S	X	X	X
Solar_14f-SB_so	X	X	X
Solar_6j-SB_so	X	X	X
Solar_8d-S	X	X	X
Solar_16k-SB_so	-	X	-
Solar_17c-S	-	X	X
Solar_6p-SB_so	-	X	X
Solar_7b-SB_so	-	X	-
Solar_9a-SB_so	-	X	-
Solar_9b-SB_so	-	X	-
Wind 21a-W	-	X	X
Storage 10c-B	-	X	X
Storage_14f-SB_st	-	X	-
Storage 16k-SB_st	-	X	-
Storage 4b-B	-	X	X
Storage 6c-B	-	X	-
Storage 6p-SB_st	-	X	-
Storage 7b-SB_st	-	X	-
Storage 9a-SB_st	-	X	-
Storage 9b-SB_st	-	X	-

The timing and size of the RFP and demand response resources were governed by the data contained in the PLEXOS database and the information presented in Witness Stuart Wilson’s workpapers. The size and timing of the MC2 conversion was determined by the need to comply with the Good Neighbor Rule and the size of Mill Creek 2.

The Rerun of the Companies Plan contained all the resources that the Companies presented in the CPCN application for new resource builds up to 2028. The Brown storage and the two owned solar projects were not set up in the Companies' PLEXOS database, so they were added to the database and only allowed to be in the Rerun of the Companies Plan.

Renewables plus the MC2 conversion contain all the renewable and storage bids contained in Companies Portfolio 8 presented in the CPCN application with the addition of the MC2 conversion.

Renewables plus One NGCC contains the one NGCC to be located at the Mill Creek site and then a selection of the renewable and storage bids from the Companies Portfolio 8.

Resource additions post 2029 were optimized by PLEXOS in all three plans. The choice of which resources to force in was generally informed by a desire to develop portfolios that were different than those the Companies presented in their application, by our review of the Companies' modeling files, and by the goal to create portfolios that met or exceeded the 1 event in 10 years reliability standard.

- c. Please see the response to subpart (b) for the resources required in the three plans.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.21**

- Q-1.21. Ms. Sommer’s testimony at pages 26-27 describes certain changes she made to the PLEXOS database, including modeling “additional energy efficiency and demand response (DSM) [collectively, “Additional DSM-EE”] ... supported by Mr. Grevatt’s analysis and testimony.”
- a. Ms. Sommer’s PLEXOS files appear to show that the Additional DSM-EE she modeled resulted in the following reductions to the Companies’ projected annual energy requirements:

	<b>EE load reduction</b>
2022	0.00%
2023	0.00%
2024	0.00%
2025	0.15%
2026	0.40%
2027	0.74%
2028	1.03%
2029	1.32%
2030	1.62%
2031	1.49%
2032	1.49%
2033	1.49%
2034	1.49%
2035	1.49%
2036	1.49%
2037	1.42%
2038	1.25%
2039	1.01%
2040	0.74%
2041	0.00%
2042	0.00%
2043	0.00%
2044	0.00%
2045	0.00%
2046	0.00%
2047	0.00%
2048	0.00%
2049	0.00%
2050	0.00%

Please confirm or correct the reductions shown above, and please explain how Ms. Sommer determined which additional savings amounts to model in each year.

- b. Please confirm that the energy savings shown in the table in part a. above were equal in every hour of each year in which Additional DSM-EE energy savings appear. If not confirmed, please explain how the savings were allocated across the hours of each affected year.
- c. Please explain how the energy savings were modeled in both PLEXOS and SERVUM, including (1) whether they were modeled as an adjustment to load or as a resource and (2) for SERVUM specifically, how the hourly energy savings were differentiated from the base load for each weather year's unique load.
- d. Please confirm that Ms. Sommer's financial modeling assumed the cost of achieving the Additional DSM-EE energy savings to be \$30 per MWh nominal through 2040. If not confirmed, please explain and provide the correct modeled cost of the Additional DSM-EE energy savings Ms. Sommer used.
  - i. Why was this cost not assumed to escalate over this time period?
  - ii. How was the cost of Additional DSM-EE energy savings developed?
  - iii. Please provide all supporting evidence and workpapers associated with developing the \$30 per MWh cost of Additional DSM-EE energy savings (or any other cost of Additional DSM-EE energy savings Ms. Sommer used).
- e. Did Ms. Sommer use PLEXOS to model the Additional DSM-EE resources, or did she simply reduce load in each hour with an associated cost?
- f. How did Ms. Sommer reflect the Additional DSM-EE in the load for each weather year modeled in SERVUM?
- g. Please explain in detail what suite of Additional DSM-EE programs or measures could be added to result in the energy savings shown in Ms. Sommer's modeling at a cost of \$30/MWh nominal through 2040.

RESPONSE:

- a. These reductions are correct. The additional savings amounts were given to Ms. Sommer by Mr. Grevatt.
- b. Not confirmed. See Attachment 1 (11\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.21b\_EE to PLEXOS – Confidential).
- c. Energy savings in PLEXOS were modeled as an adjustment to load. Energy savings in SERVUM were modeled as a supply side resource with an hourly shape. Please see the workpapers "Load Forecast Input with EFG EE Confidential", "Weather Data", and "Weather Shape" that Ms. Sommer provided with her testimony. The same shape



was kept for each weather year because of lack of data to vary the savings from the included measures by weather.

- d. i. The cost was a nominal levelized cost produced by Mr. Grevatt.
- ii. See response to subpart (i).
- iii. Please see response to Companies Q-1.42.
- e. Please see the response to subpart (c).
- f. Please see the response to Companies Q-1.22(c).
- g. Please see the workpapers of Mr. Grevatt, provided with his direct testimony.

ATTACHMENT:

11\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.21b\_EE to PLEXOS - Confidential

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.22**

- Q-1.22. Ms. Sommer’s testimony states at page 25, lines 6-8, “After making some changes to the model inputs and settings, we used an iterative process of testing portfolios in SERVM and in PLEXOS to determine how resources contributed to reliability and to total system cost.”
- a. Provide a detailed explanation of the iterative process Ms. Sommer used to develop the two portfolios discussed and analyzed at pages 28-35, including how many iterations, which constraints Ms. Sommer used in each iteration in PLEXOS, and which forced retirements or resource additions Ms. Sommer used in each iteration in PLEXOS.

RESPONSE:

- a. Because we expected that the 1 event in 10 years standard would be the more binding constraint on any portfolio, the testing was primarily done in SERVM where different combinations of thermal and storage resources were added. The resources in Case 8 were generally the basis for that testing.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.23**

Q-1.23. Did the two resource portfolios analyzed in Ms. Sommer's financial models include renewable and battery PPA resources from the Companies' RFP responses in the 2030s and 2040s? If so, please explain why.

RESPONSE:

The PLEXOS modeling presented by the Companies and the underlying PLEXOS database indicated that the Companies allowed the RFP renewable and battery resources to be selected over the entire planning period. We followed this same convention to maintain alignment with the Companies' modeling in PLEXOS.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.24**

- Q-1.24. It appears that in the model provided in Ms. Sommer's workpapers the renewables and batteries selected in 2020s are forced in, not selected by PLEXOS, the coal units are forced to be retired, and no additional NGCC or SCCT units are allowed; only non-actionable RFP resources in later years are chosen by PLEXOS.
- a. Please confirm or correct these understandings and explain why Ms. Sommer imposed the resource and retirements requirements and constraints she did in her modeling.
  - b. Provide all workpapers and files supporting the iterations that caused Ms. Sommer to place the constraints she did on the portfolios and modeling described in her testimony.

**RESPONSE:**

It is not clear if the question refers to LT or ST settings and/or if it refers to all the runs conducted. Notwithstanding that ambiguity, EFG disagrees with this characterization and tended to keep the Companies' settings that either forced retirement and limited resource optimization unless changes were needed in the pre-2030 time period to create the portfolios presented. See also the response to Companies Q-1.21 as well as Ms. Sommer's workpapers, provided with her direct testimony.

- a. The timeframe available to conduct the modeling did not permit EFG to start fresh and conduct full re-optimization of resources. Instead, EFG set up the Companies' Case 8 in SERVM, determined that the portfolio resulted in an LOLE greater than 1 and then tested additions of thermal and battery resources to determine what choices might result in an LOLE below 1. See also the responses to Companies Q-1.21 and Q-1.23.
- b. Joint Intervenor object to this request as vague and ambiguous. Workpapers supporting the modeling described in Ms. Sommer's testimony have already been conveyed to the Companies. Joint Intervenor further object to this request to the

extent that it seeks production of privileged work product. Subject to and without waiving these objections, Joint Intervenors refer the Companies to the workpapers and files already conveyed.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.25**

Q-1.25. In Excel spreadsheet or other format, with all formulas, columns, and rows unprotected and fully accessible, provide all workpapers and source documents not previously provided.

RESPONSE:

All workpapers have been previously provided.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.26**

Q-1.26. Please provide a complete copy of all testimony (including transcripts of live testimony), interviews, articles, publications, or any other public writings or statements of any kind in which Mr. Grevatt supported or advocated for any entity's construction or acquisition of any fossil-fuel fired electric generating unit. If a transcript of relevant live testimony, an interview, or other public non-written statement is unavailable, please provide a link to where the video may be found.

RESPONSE:

Mr. Grevatt has not filed testimony in which he supported or advocated for any entity's construction or acquisition of any fossil-fuel fired electric generating unit.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.27**

Q-1.27. Does the list of the “Selective Projects” in Exhibit JG-1 to Mr. Grevatt’s testimony in this case include all testimony Mr. Grevatt has filed before regulatory commissions? Please provide a complete listing of every case before any regulatory commission in which Mr. Grevatt has presented testimony, in either written or oral format not contained in Exhibit JG-1 to Mr. Grevatt’s testimony. Please include the case or docket number, the date on which he submitted testimony, and on whose behalf he submitted testimony.

RESPONSE:

Please see Attachment.

ATTACHMENT:

12\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.27\_Grevatt Testimony List 07-14-2023



**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.28**

Q-1.28. Describe Mr. Grevatt’s understanding of the cost-effectiveness requirements for Kentucky DSM/EE programs.

RESPONSE:

The Companies state that they “analyzed the proposed DSM-EE programs using the four California Standard Practice Manual tests the Commission requires for DSM-EE programs. The Proposed DSM-EE Program Portfolio is cost-effective taken as a whole based on the Total Resource Cost test.” (Bevington Direct at 10-11). They cite to Case No. 1997-00083, Order at 20 (Ky. PSC Apr. 27, 1998) (“Any new DSM program or change to an existing DSM program shall be supported by ... [t]he results of the four traditional DSM cost-benefit tests [Participant, Total Resource Cost, Ratepayer Impact, and Utility Cost tests].”) and further indicate that in their view, the Commission “has repeatedly held that it does not have jurisdiction to consider the type of factors used in a Societal Cost Test.” (Bevington Direct at 11).

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.29**

Q-1.29. Confirm that Mr. Grevatt did not calculate the results of the four traditional DSMEE cost-benefit tests on the additional EE programs he recommends. If not confirmed, please explain and provide the results of such calculations with all supporting evidence and workpapers.

RESPONSE:

Confirmed.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.30**

Q-1.30. Has Mr. Grevatt ever calculated the results of the Participant Test, the Ratepayer Impact Measurement Test, the Total Resource Cost Test, and the Program Administrator Cost Test through original work performed by him or with the assistance of a colleague? If so, provide a list of the case number and regulatory commission of any testimony he has filed before any regulatory Commission regarding these calculations.

RESPONSE:

Mr. Grevatt has not personally performed cost-effectiveness calculations.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.31**

- Q-1.31. Did each of the following organizations, or a representative of the organization, participate in the Companies' DSM/EE Advisory Group? If an organization did not participate, state whether the organization was aware of the Companies' DSM/EE Advisory Group.
- a. Metropolitan Housing Coalition
  - b. Kentuckians for the Commonwealth
  - c. Kentucky Solar Energy Society, and
  - d. Mountain Association

**RESPONSE:**

Yes. Representatives from each of the above-referenced organizations participated in the Companies' DSM/EE Advisory Group.

Participation by representatives from each of the above-referenced organizations should be known to the Companies, whether through its own meeting minutes or the correspondence from a number of DSM/EE Advisory Group participants listing each of the above-referenced organizations along with several other Advisory Group participants.

**ATTACHMENTS:**

13\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.31-September 15, 2022 Letter from DSM-EE Advisory Group participants\_Attach 1

14\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.31-November 10, 2022 Letter from DSM-EE Advisory Group participants\_Attach 2

15\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.31-December 14, 2022 Letter from DSM-EE Advisory Group participants\_Attach 3.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.32**

- Q-1.32. Refer to Table 3 of the Grevatt Direct Testimony.
- a. How did you select the six utility potential studies used for comparison?
  - b. Did Mr. Grevatt submit Direct and Surrebuttal Testimony in South Carolina Public Service Commission Docket Nos. 2019-224-E and 2019-225-E? Why did Mr. Grevatt not include the potential studies for Duke Energy filed in that case in Table 6?

**RESPONSE:**

- a. The six potential studies were not selected using any criteria other than convenience, as they are studies that Mr. Grevatt or EFG colleagues have reviewed on behalf of clients and thus were easily accessible to him.
- b. Mr. Grevatt did submit testimony in the referenced case. Assuming the intended reference is Table 3, there is no particular reason that Mr. Grevatt did not include that Duke Energy potential studies. Upon receipt of this discovery request Mr. Grevatt added the DEC SC potentials to Table 3 – Revised below, and the resulting change is not material to the conclusion that the LG&E-KU study found a much lower ratio of economic to technical potential than the average of now seven other studies. In his testimony Mr. Grevatt stated “Cadmus found that only one third as much potential passed cost-effectiveness testing for LGE & KU as did on average for six other studies.” (Grevatt at 28, lines 3-5). With the addition of DEC SC that finding would change to 36% rather than one third.

Table 3 – Revised to Include DEC SC

	Technical	Economic	Economic % of Technical	Study Firm
Ameren IL 2020	12,426,726	10,848,372	87%	GDS
IN-MI Power 2016	3,957,000	3,165,000	80%	AEG
Dominion VA 2021	23,428,000	10,732,000	46%	DNV
EmPOWER MD 2023	5,242,000	4,434,000	85%	AEG
Vectren IN 2019	1,400,000	1,240,000	89%	GDS
Consumers MI 2021	10,527,202	10,333,188	98%	Cadmus
DEC SC	4,338,000	1,773,000	41%	Nexant
<b>Average: Economic as a % of Technical</b>			<b>78%</b>	
<b>KU-LG&amp;E 2017</b>	<b>7,072,000</b>	<b>1,988,000</b>	<b>28%</b>	<b>Cadmus</b>

ATTACHMENT:

16\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.32\_JG DR Responses Workpapers 08-02-2023

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.33**

- Q-1.33. Refer to “rapidly improving technologies” as referenced on Page 30 of the Grevatt Direct Testimony.
- a. Provide the definition for “rapidly improving technologies.”
  - b. Provide the names and detailed descriptions of rapidly improving technologies you have identified.

RESPONSE:

- a. Mr. Grevatt’s use of the words “rapidly improving technologies” is self-evident in the context of his testimony and is illustrated by the example of cold climate heat pumps. For example, a decarbonization study performed by Energy + Environmental Economics for BGE stated “[i]n the early years, the heat pumps modeled by E3 reflect commonly installed technologies and current installation practices. However, E3 assumes that over time...the installed performance of heat pumps increase due to the effects of technology improvements and changes to installation practices.” (Clark, Tory, et.al. BGE Integrated Decarbonization Strategy, October, 2022, Energy + Environmental Economics, p.70: [https://www.ethree.com/wp-content/uploads/2022/10/BGE-Integrated-Decarbonization-White-Paper\\_2022-11.04.pdf](https://www.ethree.com/wp-content/uploads/2022/10/BGE-Integrated-Decarbonization-White-Paper_2022-11.04.pdf)).
- b. Mr. Grevatt did not conduct a survey of rapidly improving technologies. Rather, his point is that Cadmus should have done so in updating its potential study. However, see, e.g., <https://www.energy.gov/eere/buildings/articles/bto-announces-its-buildings-energy-efficiency-frontiers-innovation>, a posting by the U.S. Department of Energy (DOE) announcing “nearly \$83 million in funding to 44 projects that will lower Americans’ energy bills by investing in new energy-efficient building technologies, construction practices, and the U.S. buildings-sector workforce.”

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.34**

- Q-1.34. Refer to “emerging technologies” as referenced on Page 30 of the Grevatt Direct Testimony.
- a. Provide the definition for “emerging technologies.”
  - b. Provide the names and detailed descriptions of emerging technologies you have identified.

**RESPONSE:**

- a. Mr. Grevatt does not use the term “emerging technologies” on p. 30 of his Direct Testimony. However, Mr. Grevatt would define emerging technologies in this context as those energy-saving technologies that are potentially cost-effective at scale and that are either commercially viable but do not yet have a significant market share or that are likely to soon become commercially viable.
- b. Not applicable.



**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.35**

Q-1.35. Mr. Grevatt's testimony states at page 34, lines 1-3: "The problem is that program selection was not informed by a fulsome potential study update, and several potentially high-impact programs were thus omitted from consideration." Does Mr. Grevatt construe the potential study as directing the selection of programs? Please explain in detail.

RESPONSE:

No. The cited statement is that "program selection was not informed by a fulsome potential study update" by which Mr. Grevatt means that program selection was conducted without the benefit of a full understanding of the economic potential.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.36**

Q-1.36. Mr. Grevatt's testimony at page 34, lines 16-17 states that because the Companies' process to select DSM/EE programs "was not informed by a meaningful potential study, it was highly subjective rather than evidence-based." Explain in detail how the Companies' selection process was subjective.

RESPONSE:

Subsequent to the cited statement Mr. Grevatt's testimony says that "the Companies identified – but did not assess – the primary program types that are implemented in the jurisdictions in which I have worked. However, I cannot understand how the Companies and Cadmus determined not to assess the cost-effectiveness of several program types that are prevalent in utility EE portfolios. Specifically, the Companies determined not to conduct cost-effectiveness testing on "Midstream HVAC Rebates," "Downstream Rebates," Home Energy Reports," "New Home Construction Rebates," and "Strategic Energy Management." Based on the evidence provided in the instant case describing the selection process, in Mr. Grevatt's view it was a subjective, rather than evidence-based decision to omit these programs from consideration for the 2024-2030 DSM-EE plan.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.37**

- Q-1.37. Refer to Mr. Grevatt's testimony at page 35, lines 1-3.
- a. Did Mr. Grevatt review the Companies' responses to PSC 1-20 and PSC 2-38?
  - b. Is Mr. Grevatt aware that the Companies did conduct cost-effectiveness testing for Midstream HVAC Rebates, Downstream Rebates, Home Energy Reports, New Home Construction Rebates, and Strategic Energy Management?
  - c. Does knowing these programs are not cost-effective change Mr. Grevatt's estimation of the additional energy efficiency savings the Companies should achieve?

**RESPONSE:**

- a. Yes.
- b. Yes.
- c. No. Mr. Grevatt stands by his recommendation that "the Commission...require the Companies to develop a revised 2024–2030 DSM-EE Plan that broadly reflects [his] recommended levels of savings and that the Companies iterate the program designs to identify cost effective approaches." (Grevatt at 47, lines 7-10). Mr. Grevatt notes that the Companies' May 11, 2023 supplemental response to PSC 2-38 states "The results shown in the attachment represent an initial, preliminary analysis of each requested program. If the Companies were preparing these analyses without the time constraint of discovery, the Companies would spend additional time to create, review, collaborate with DSM Advisory Stakeholders, validate, and further refine the program inputs and results." Mr. Grevatt agrees with the Companies that these results are preliminary and does not believe that these program approaches should be discarded based on the initial analyses. Iteration to identify cost-effective approaches should be pursued.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.38**

Q-1.38. Confirm that Mr. Grevatt is aware that states assess cost-effectiveness differently by using different inputs into cost-effectiveness calculations.

RESPONSE:

Confirmed.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.39**

Q-1.39. Confirm that, all else being equal, lower avoided costs of energy and capacity decrease the cost-effectiveness of DSM/EE programs.

RESPONSE:

Confirmed, all else being equal.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.40**

Q-1.40. Is Mr. Grevatt aware of how often the Companies have filed mid-plan DSM/EE updates? If so, please explain Mr. Grevatt's understanding of when the Companies have filed DSM-EE Program Plans and when the Companies have filed for midplan portfolio updates or adjustments.

RESPONSE:

No, Mr. Grevatt is not aware of how often the Companies have filed mid-plan DSM/EE updates.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.41**

- Q-1.41. Joint Intervenors witness Anna Sommer states at page 27, lines 9-10 of her testimony, “The additional energy efficiency and demand response (DSM) included is supported by Mr. Grevatt’s analysis and testimony.” Apparently based on Mr. Grevatt’s testimony and analysis, Ms. Sommer appears to have included in her resource modeling energy efficiency savings equivalent to up to 1.6% of the Companies’ projected load around the clock at a cost of \$30/MWh nominal through 2040.
- a. Please identify all energy-efficiency programs and measures identified by Mr. Grevatt that could provide Ms. Sommer’s projected levels of around the clock energy savings at a cost of \$30/MWh through 2040.
  - b. Please provide all of Mr. Grevatt’s analysis of such programs and their cost-effectiveness, as well as all workpapers supporting such analysis.
  - c. Please provide any and all information not otherwise provided in response to the subparts above that would support the claim that the Companies could achieve actual energy savings of up to 1.6% of load in all hours for \$30/MWh through 2040.

**RESPONSE:**

Joint Intervenors object to this request as vague and ambiguous, particular with respect to the meaning of “around the clock” energy efficiency savings. Joint Intervenors also object to the request’s mischaracterization of Mr. Grevatt’s testimony. Mr. Grevatt does not state in his testimony that “the Companies could achieve actual energy savings of up to 1.6% of load in all hours for \$30/MWh through 2040.” Subject to and without waiving objections, Mr. Grevatt provides the following answers.

- a. Mr. Grevatt developed recommendations including increased levels of EE savings and the associated program costs for programs implemented in 2024-2030, corresponding to the Companies’ DSM-EE Plan period. Please see, e.g., Table 8: 2028 Gross EE Savings (Incremental MWh per year) in Mr. Grevatt’s Direct Testimony (Grevatt at 41) for a listing of the program areas he identified as providing

high levels of savings in other jurisdictions that could be applicable for the Companies DSM-EE portfolio. A target level of gross annual incremental EE savings for each program area in 2028 is also provided in the table. Please also see tab “Proposed Savings % of Sales” in file “EFG – 1 DSM-EE Workpapers 07-13-2023” which provides the basis of the proposed savings for each program type. In the scenario developed by Mr. Grevatt the Companies would achieve gross savings that increase to just over 1.0% of 2021 sales in 2027 and 2028.

Because most of these programs include EE measures that will last more than a single year, the savings persist beyond 2030; however EE costs are only assumed for the 2024-2030 program years. Mr. Grevatt estimated the persisting savings for each year based on estimated useful life (“EUL”) assumptions which were derived from reported data that formed the basis of the VA Pathways report. These EULs can be found in Column J of tab “Proposed Savings % of Sales” in the previously provided file “EFG - 2 DSM-EE Workpapers Annual Persisting Savings 05-25-2023.”

While program costs were only assumed for 2024-2030, because the savings persist for as long as 18 years the program costs were apportioned across the savings that will occur through the full 2024-2040 plan period. The \$30/MWh saved referenced above is the approximate cost per lifecycle MWh saved by the programs Mr. Grevatt proposes for 2024-2030. The weighted average cost per first year MWh saved for the 2027 program year is roughly \$268/MWh.

Mr. Grevatt’s proposed additional 2024-2030 budgets and their derivation are provided on tab “Additional and Total Budgets” and tab “Cost Worksheet” in file “EFG – 1 DSM-EE Workpapers 07-13-2023.”

- b. All workpapers have been previously provided with Mr. Grevatt’s direct testimony.
- c. Not applicable.



**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.42**

Q-1.42. Mr. Wilson's testimony states at page 2, line 22, through page 3, line 2 that he reviewed certain documents. Please provide a copy of each such document that is not already in the record of this proceeding.

RESPONSE:

The referenced documents reviewed by Mr. Wilson are materially identical to documents that have been filed in the record of this proceeding.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.43**

Q-1.43. Please provide a complete copy of all testimony (including transcripts of live testimony), interviews, articles, publications, or any other public writings or statements of any kind in which Mr. Wilson supported or advocated for any entity's construction or acquisition of any fossil-fuel fired electric generating unit. If a transcript of relevant live testimony, an interview, or other public non-written statement is unavailable, please provide a link to where the video may be found.

RESPONSE:

Mr. Wilson has not "advocated for any entity's construction or acquisition of any fossil-fuel fired electric generating unit." Mr. Wilson notes that he has not frequently "advocated" for the construction of specific generation units.

The only instance Mr. Wilson recalls where he took a position specifically in favor of a fossil-fuel fired electric generating unit is:

South Carolina PSC Docket No. 2013-392-E, direct and surrebuttal testimony with Hamilton Davis in Duke Energy Carolinas need certification case on behalf of the South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. Need for capacity, adequacy of energy efficiency and renewable energy alternatives, and use of solar power as an energy resource.

As Mr. Wilson and his co-witness Mr. Davis testified,

We are making three recommendations to the Commission. First, we recommend that the Commission condition any certification of the Lee NGCC unit on an in-service date of 2018, rather than 2017 as proposed in the Application. Second, we recommend that, in its review of IRPs and certification applications, the Commission ensure that DEC and DEP have exhausted cost-effective opportunities to defer or avoid the additional

NGCC plants through lower-cost, lower-risk resources. Third, to take advantage of potential synergies between NGCC generation and solar generation and hedge against the risk of higher-than-projected fuel costs, we recommend that the Commission direct DEC to solicit developer interest in a 375 MW solar facility located at or near the Lee site at a cost consistent with the cost to operate the Lee NGCC unit. (Direct Testimony, p. 4).

<https://dms.psc.sc.gov/Attachments/Matter/b0cd9424-155d-141f-23c329aafd8b7b6d>

<https://dms.psc.sc.gov/Attachments/Matter/414375a2-155d-141f-23d5511a0d5cafb0>

In other cases, Mr. Wilson’s research and testimony has supported processes and outcomes that would include the possibility of constructing fossil-fuel fired electric generating units. Mr. Wilson has identified the following items from his CV as responsive to the requested material.

- (i) “Cleaner Energy for Southern Company: Finding a Low Cost Path to Clean Power Plan Compliance,” Southern Alliance for Clean Energy, July 2015. <https://cleanenergy.org/blog/low-cost-path-for-southern-company-to-comply-with-epas-clean-power-plan/> and attached.
- (ii) “Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement,” with Mike O’Boyle, Ron Lehr, and Mark Detsky, Energy Innovation Policy & Technology LLC and Southern Alliance for Clean Energy, April 2020. <https://cleanenergy.org/news-and-resources/making-the-most-of-the-power-plant-market-best-practices-for-all-source-electric-generation-procurement-2/>
- (iii) “Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement,” Southeast Energy and Environmental Leadership Forum, Nicholas Institute for Environmental Policy Solutions, August 2020 (attached).
- (iv) “Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement,” Indiana State Bar Association, Utility Law Section, Virtual Fall Seminar, September 2020 (attached).
- (v) “Review of Nova Scotia Power’s 2020 Integrated Resource Plan,” prepared for the Nova Scotia Consumer Advocate, NSUARB Matter No. M08059, with Paul Chernick, January 2021. <https://resourceinsight.com/wp-content/uploads/2021/04/RII-Report-on-NS-Power-2020-IRP.pdf>
- (vi) “Implementing All-Source Procurement in the Carolinas,” prepared for Natural Resources Defense Council, Sierra Club, Southern Alliance for Clean Energy, South Carolina Coastal Conservation League and Upstate Forever, for submission in NCUC Docket E-100, Sub 165, and SCPS Dockets 2019-224-E and 2019-225-E, February 2021. <https://resourceinsight.com/wp-content/uploads/2021/03/RII-Report-on-Duke-All-Source-Procurement-Feb-2021.pdf>
- (vii) South Carolina PSC Docket Nos. 2011-08-E and 2011-10-E, allowable ex parte briefing on behalf of Southern Alliance for Clean Energy, South Carolina Coastal

- Conservation League, and Upstate Forever. Adequacy of Progress Energy Carolinas and Duke Energy Carolinas' 2011 integrated resource plans, including resource mix, sensitivity analysis, alternative supply and demand side options, cost escalation, uncertainty of nuclear and economic impact modeling.
- <https://dms.psc.sc.gov/Attachments/Matter/16f7a544-155d-2817-1048edf8b27f9f37>
- (viii) Georgia PSC Docket Nos. 42310 and 42311, direct testimony with Bryan A. Jacob in Georgia Power's 2019 integrated resource plan and demand side management plan on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of renewable energy in IRP, retirement of uneconomic plants, and use of all-source procurement process. Shareholder incentive mechanism for both renewable energy and DSM plan. <https://psc.ga.gov/search/facts-document/?documentId=176698>
- (ix) South Carolina PSC Docket Nos. 2019-224-E and 2019-225-E, surrebuttal testimony on 2020 Integrated Resource Plans filed by Duke Energy Carolinas and Duke Energy Progress. All-source procurement process. Process for resolution of disputed issues in IRP proceedings. <https://dms.psc.sc.gov/Attachments/Matter/3d193cf9-1fec-422a-bdad-ff318af7fbd7>
- (x) Nova Scotia UARB Matter No. M11017, opening statement and direct testimony on Nova Scotia Power's Annual Capital Expenditure Plan for 2023 on behalf of the Nova Scotia Consumer Advocate. Capital projects with risk. Reliability investments. Cost minimization practices, including project contingency, total cost of ownership, project delivery model, and post-project reviews. Analysis of specific projects. Please see two documents attached.

ATTACHMENTS:

- 17\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.43-i\_Cleaner Energy for Southern Company - July 2015
- 18\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.43-iii\_All Source Procurement Webinar Presentation - SEELF Aug 2020
- 19\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.43-iv\_All Source Procurement Webinar Presentation - Indiana Bar Sept 2020
- 20\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.43-x\_M11017 - Opening Statement of John D Wilson (CA)
- 21\_LGE-KU\_DR\_1\_JI\_R\_Attach to Q-1.43-x\_M11017 - Direct Evidence of Wilson - CA

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.44**

- Q-1.44. Mr. Wilson's testimony states at page 5, lines 3-5, "The Companies should plan and contract for renewable energy facilities that include the technical and contractual opportunity to operate in downward dispatch or full flexibility operating modes and should generally avoid strict must-take contracts."
- a. Does Mr. Wilson construe net metering to be a "strict must-take contract" arrangement? If not, please explain in detail how net metering in Kentucky can be anything other than "strict must-take," including what right, if any, the Companies have to operate customers' net metering facilities "in downward dispatch or full flexibility operating modes."
  - b. Please answer the same questions posed in a. above regarding qualifying facilities (i.e., customers taking service under the Companies' SQF and LQF tariff provisions).

**RESPONSE:**

- a. No. Net metering is a tariff available to a utility's customers, and is not a contract resulting from a procurement and potentially subject to review and approval by the Commission. I am unaware of any utility in Kentucky or elsewhere that has the authority to operate *any* behind-the-meter equipment owned by a customer except by voluntary consent of the customer, such as enrollment in a demand response program.
- b. Yes. While Mr. Wilson has not reviewed the Companies' SQF or LQF tariff provisions in developing this testimony, under PURPA, a standard offer contract available to a qualified facility is generally considered a strict must-take contract.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.45**

Q-1.45. At page 5, line 10, please explain the meaning of “advanced operational practices” and provide examples, and at page 22, footnote 39, please explain the meaning of “grid-enhancing technologies” and provide examples.

RESPONSE:

On page 5, line 10, “advanced operational practices” is a reference to provision of ancillary services. Examples of the provision of ancillary services that could be better planned for using updated resource adequacy methods include the use of downward dispatch or full flexibility operating modes or the use of renewable or battery storage resources to provide voltage support for purposes of managing power flow on the transmission system.

On page 22, footnote 39, the meaning of “grid-enhancing technologies” is described in the referenced document. Another relevant document is: Brattle Group, *Unlocking the Queue with Grid-Enhancing Technologies: Case Study of the Southwest Power Pool*, prepared for Working for Advanced Transmission Technologies (WATT) Coalition (Feb. 2021), [https://watt-transmission.org/wp-content/uploads/2021/02/Brattle\\_\\_Unlockingthe-Queue-with-Grid-Enhancing-Technologies\\_\\_Final-Report\\_Public-Version.pdf90.pdf](https://watt-transmission.org/wp-content/uploads/2021/02/Brattle__Unlockingthe-Queue-with-Grid-Enhancing-Technologies__Final-Report_Public-Version.pdf90.pdf). See p. 4 of this report for a similar definition. FERC Order No. 2023 uses the term “alternative transmission technologies” as roughly equivalent to “grid-enhancing technologies.” US Federal Energy Regulatory Commission, *Improvements to Generator Interconnection Procedures and Agreements*, Order No. 2023 (July 28, 2023). The equivalencing of this term is demonstrated on p. 52, footnote 146 and in Commissioner Clements’ concurrence on p. 19.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.46**

Q-1.46. At page 5, lines 10-11, please identify any instance in which the Companies have not achieved “accuracy in the contribution of new resources.”

RESPONSE:

Regarding the need to ensure accuracy in the contribution of new resources, please see the discussion of weather- and load-correlated performance on pages 19-22 and page 41. During Winter Storm Elliot, the Companies experienced a correlated or “common mode” outage event. A key failure mode during this event was the Texas Gas Transmission Pipeline pressure falling below the required minimum. The Texas Gas problem resulted in derates at the Cane Run and Trimble County plants; the Companies also reported weather-related derates at Paddy’s Run 13, Haefling 2 and Mill Creek 4. The Companies were also affected by weather-related shortfalls in energy deliveries and contingency reserves from OVEC and TVA to the Companies. AG-1, Question 13(I), Attachment 1, pages 1-2, 4-5. These capacity shortfalls meet the definition of a weather-correlated reliability event. Astrapé RA Report (cited in FN 34), pp. 13-16.

The Companies acknowledge that outages on December 23, 2022 caused by the drop in pressure on Texas Gas (Cane Run and Trimble County) represent a correlated outage, although they do not appear to explicitly view the other weather-related outages on that date as part of the correlated outage. Nevertheless, the Companies maintain that it is appropriate to “not model correlated outages,” including weather-related outages, because of “firm gas transportation contracts and cold weather operating procedures that limit the potential for correlated outages.” LGE & KU Response to Joint Intervenors Third Request Q7(b)(ii). As Mr. Wilson’s testimony explains on pages 21-22, he is skeptical that assuming that thermal resources have a 100% capacity contribution accurately reflects the contribution of new (and existing) thermal resources to system reliability.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.47**

Q-1.47. At page 5, line 11, please explain the meaning of “all-source procurement” and identify any instance in which the Companies have not supported all-source procurement.

RESPONSE:

“All-source procurement means that whenever a utility (and its regulators) believe it is time to acquire new generation resources, it conducts a unified resource acquisition process. In that process, the requirements for capacity or generation resources are neutral with respect to the full range of potential resources or combinations of resources available in the market.” John D. Wilson, Mike O’Boyle, Ron Lehr, and Mark Detsky, *Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement*, prepared for Energy Innovation Policy & Technology LLC and Southern Alliance for Clean Energy (Apr. 2020), p. 1. <https://cleanenergy.org/news-and-resources/making-the-most-of-the-power-plant-market-best-practices-for-all-source-electric-generation-procurement-2/>

Mr. Wilson did not evaluate the Companies’ procurement practices and his testimony does not state whether the Companies have or have not supported all-source procurement. Mr. Wilson understands that the procurement process that led to the Companies’ proposed portfolio utilized a technology-neutral RFP, which may meet the definition of an all-source procurement as supplied above. Mr. Wilson’s view is that in order to ensure that the requirements for capacity or generation resources are neutral, it is essential to have resource adequacy methods that treat all resources on an equitable basis. Mr. Wilson testifies to skepticism regarding whether equity in evaluation of resources has been achieved by the Companies for reasons described on pages 19-21 of his testimony.



**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.48**

Q-1.48. Please provide a complete copy of all testimony (including transcripts of live testimony), interviews, articles, publications, or any other public writings or statements of any kind in which Mr. McDonald supported or advocated for any entity's construction or acquisition of any fossil-fuel fired electric generating unit. If a transcript of relevant live testimony, an interview, or other public non-written statement is unavailable, please provide a link to where the video may be found.

RESPONSE:

No such documents or records exist.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.49**

Q-1.49. Refer to pp. 11-13 of Mr. McDonald's testimony. Identify all information and inputs used to support Scenario D – No Cap, Historic Growth Forecast. If Mr. McDonald has assumed annual future growth will mirror historical growth of solar capacity at net metering rates, state the basis for that assumption.

RESPONSE:

Please see "Workpaper 1- AMcDonald- NM Scenarios CONFIDENTIAL 7-14-23," tab "Solar Growth AMc." Historical net metering customer and capacity data for 2010 - 2022 from Company Response to JI Q83, filename: "17-JI\_DR2\_LGE\_KU\_Attach\_to\_Q83\_-\_NMS\_No\_Cap\_Scenario," included in "Workpaper 2 - AMcDonald - 17-JI\_DR2\_LGE\_KU\_Attach\_to\_Q83\_-\_NMS\_No\_Cap\_Scenario ANDY REV CONFIDENTIAL."

Scenario D assumes distributed solar capacity will continue to grow at the average historic growth rate observed from 2010 - 2022 until 2030, when the growth rate is reduced to 5% annually. If we assume that LGE-KU will continue to offer net metering service to customers after reaching the 1% threshold (which is the premise of this scenario), it is plausible to assume that growth beyond 1% will mirror growth prior to 1%, based on the following considerations:

- The Federal Investment Tax Credit was increased to 30% and extended through 2032 in the Inflation Reduction Act of 2022. This means a larger tax credit is available over the next 9 years than was available from 2020 – 2022, when the ITC was 26% for residential and commercial taxpayers.
- Costs for solar PV systems are expected to continue their historical decline in future years (as indicated in NREL's Annual Technology Baseline 2023). See <https://atb.nrel.gov/electricity/2023/data>
- Multiple incentive programs are being deployed by the Federal government to support the expansion of distributed solar, including but not limited to the US EPA's Solar For All program aimed at increasing solar adoption in low-income and

environmental justice communities (<https://www.epa.gov/greenhouse-gas-reduction-fund/solar-all>) and the USDA's Rural Energy For America Program (REAP) which provides 50% matching grants for farms and rural small businesses that install solar (<https://www.rd.usda.gov/programs-services/energy-programs/rural-energy-america-program-renewable-energy-systems-energy-efficiency-improvement-guaranteed-loans/ky>). The REAP program's grant amounts were increased from 25% to 50% in the IRA.

- In the Companies' response to Joint Intervenor's Supplemental Request, Question 83, which asked for a forecast projecting DER growth assuming energy exports would continue to be compensated at the NMS-2 rate beyond the 1% threshold, the Companies responded, in part, "instead of changing the customer growth rate when the 1% cap is hit, this alternate NMS-2 scenario continues to grow at what was the near-term rate for the duration of the forecast period." Notwithstanding that this forecast actually used a growth rate significantly lower than the historic rate (17% compared to 57%), the stated basis for the Companies' forecast was the near-term historic rate.
- The historic growth of distributed solar has occurred with little to no encouragement from the Companies (and to be frank, a good deal of resistance as the Companies worked for years to pass legislation to restrict net metering and limit the growth of distributed solar). My testimony attempts to suggest what could happen if the Companies' recognized distributed solar as a valuable resource and proactively worked to promote its growth, through policies discussed in my testimony. With the active support of the Companies, combined with the numerous resources listed above, I believe it is entirely plausible that solar growth could at least match its historic pace over the next 10 years.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
AND LOUISVILLE GAS AND ELECTRIC COMPANY**

**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.50**

Q-1.50. Refer to Figure 2 on p.12 of Mr. McDonald's testimony. Please provide the source dataset that was used to develop this chart.

RESPONSE:

Please see "*Workpaper 1- AMcDonald- NM Scenarios CONFIDENTIAL 7-14-23,*" tab "*Solar Growth AMc.*" Historical net metering customer and capacity data for 2010 - 2022 from Company Response to JI Q83, filename: "*17-JI\_DR2\_LGE\_KU\_Attach\_to\_Q83\_-\_NMS\_No\_Cap\_Scenario,*" included in "*Workpaper 2 - AMcDonald - 17-JI\_DR2\_LGE\_KU\_Attach\_to\_Q83\_-\_NMS\_No\_Cap\_Scenario ANDY REV CONFIDENTIAL.*"

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
KENTUCKIANS FOR THE COMMONWEALTH,  
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**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
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**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.51**

Q-1.51. Refer to Table 2 on p.15 on Mr. McDonald's testimony. Describe whether there are weather, environmental, policy, retail electric rate, economic, or regulatory differences between the listed states and Kentucky that influence the rate of adoption of Small-Scale PV capacity. If yes, state whether Mr. McDonald has attempted to quantify the impact of those differences or attempted to control for them in his comparison.

RESPONSE:

There are indeed differences between the states listed in Table 2 and Kentucky with regards to weather, environmental conditions, policy, retail electric rates, economics, and regulations. For example, Kentucky has greater solar resources than Maine, Vermont, and New Hampshire, but lower solar resources than Hawaii and New Mexico. Some of these states have harsher winters than Kentucky, while Hawaii's winters are milder. There are a diversity of policy, economic, and regulatory differences between all of these states and Kentucky. I did not attempt to quantify or control for these differences in this comparison. The purpose of the comparison offered in Table 2 was to illustrate that the potential growth of distributed solar in the absence of a 1% limit has a precedent in many other states of comparable size to LGE-KU's territory. The historical experience in LGE-KU's territory is that solar has grown at an average rate of 57% per year for the past 12 years, under the conditions that exist within Kentucky. In the absence of new barriers, it is plausible that solar could continue to grow at a similar pace for the next ten years, and if it did, we would achieve a deployment of distributed solar on par with what has already been achieved in these other states. Furthermore, this outcome could be encouraged by the adoption of new supportive policies such as I described in my testimony.

**JOINT INTERVENORS METROPOLITAN HOUSING COALITION,  
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KENTUCKY SOLAR ENERGY SOCIETY, AND MOUNTAIN ASSOCIATION**

**RESPONSE TO JOINT DATA REQUESTS OF KENTUCKY UTILITIES COMPANY  
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**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.52**

Q-1.52. Refer to Table 4 on p.35 of Mr. McDonald's testimony. Please identify all information used to support an assumed 50% annual growth rate in residential customer-sited battery systems after 2025.

RESPONSE:

Table 4 was presented as an illustration of how much battery storage capacity could be deployed at customer locations through 2030. The initial deployment of 500 customers in 2024, growing to 1,500 in 2026, was based on Green Mountain Power's (GMP) experience. GMP, with about one-third as many customers as LGE-KU, has deployed batteries with 500 customers per year. The scenario in Table 4 provides two years for LGE-KU to scale up to GMP's deployment rate in terms of batteries-per-customer. The annual growth rate of 50% from 2025 to 2030 was selected for illustrative purposes, based on the experiences of Massachusetts, Connecticut, and GMP. Note that Table 4 only accounts for residential customer deployment, whereas the commercial and industrial sectors have an even greater potential for battery capacity deployment, as evidenced by the experience in Massachusetts and Connecticut (see Table 3, p.35, showing Massachusetts deployed 286 MW of batteries in the C&I sector in the first two years of their program).

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**Dated July 28, 2023**

**Case No. 2022-00402**

**Question No. 1.53**

- Q-1.53. Mr. McDonald’s testimony provides a summary of the Joint Intervenors’ recommendations at page 4 line 11, through page 5, line 1. This request refers to the resource portfolio resulting from all of the Joint Intervenors’ recommendations as the “JI Portfolio.”
- a. Please explain why the Joint Intervenors did not include in their testimony or workpapers any PLEXOS, SERVIM, or financial modeling of the JI Portfolio or any results of such modeling. If the Joint Intervenors have provided such modeling files, databases, workpapers, or results regarding the JI Portfolio, please identify where they are in the record of this proceeding.
  - b. Please provide the present value revenue requirement for the JI Portfolio, including all supporting modeling files, databases, and workpapers.
  - c. Please provide the same reliability metrics for the JI Portfolio that the Companies provided in response to PSC 5-8(b), i.e., LOLE, LOLH, and EUE, including all supporting modeling files, databases, and workpapers.

**RESPONSE:**

Joint Intervenors object to this request insofar as its premise misrepresents the applicable legal standards and incorrectly implies that any intervenor in this proceeding has the same burden as the Companies. The Companies’ application defines the requested relief in this proceeding, each one a discrete request with an applicable legal standard. For each certificate of need request, the Companies—not any intervenor—bear the burden of showing need and the absence of wasteful duplication. The Commission may issue the certificate, refuse to issue, or issue in part and refuse in part. Recommending denial of a requested CPCN is not the equivalent of recommending a specific alternative. Rather, recommending denial of a requested CPCN reflects a judgment that the Companies have not met their legal burden with respect to a particular project.

Subject to and without waiving the foregoing objection, Joint Intervenors respond as follows:

- a. Joint Intervenors did not include in their testimony or workpapers any PLEXOS, SERVM, or financial modeling of the JI Portfolio or any results of such modeling.
- b. The requested analysis has not been performed.
- c. The requested analysis has not been performed.