COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC 2024 JOINT INTEGRATED RESOURCE PLAN OF LOUISVILLE GAS AND ELECTRIC COMPANY AND KENTUCKY UTILITIES COMPANY	**)** **)** **)** **)**	**CASE NO. 2024-00326**

RESPONSE OF LOUISVILLE GAS AND ELECTRIC COMPANY AND KENTUCKY UTILITIES COMPANY TO JOINT INTERVENORS METROPOLITAN HOUSING COALITION, KENTUCKIANS FOR THE COMMONWEALTH, KENTUCKY SOLAR ENERGY SOCIETY AND MOUNTAIN ASSOCIATION'S, INITIAL REQUEST FOR INFORMATION DATED NOVEMBER 22, 2024

FILED: December 18, 2024

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Lonnie E. Bellar**, being duly sworn, deposes and says that he is Senior Vice President Engineering and Construction for PPL Services Corporation and he provides services to Louisville Gas and Electric Company and Kentucky Utilities Company, and 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.

Lonnie E. Bellar

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of December 2024.

Notary Public

Notary Public ID No. KYNP63286

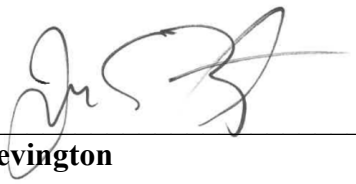
My Commission Expires:

January 22, 2027

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **John Bevington**, being duly sworn, deposes and says that he is Senior Director – Business and Economic Development for PPL Services Corporation and he provides services to Louisville Gas and Electric Company and Kentucky Utilities Company, and 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.



John Bevington

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 17th day of December 2024.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Robert M. Conroy**, being duly sworn, deposes and says that he is Vice President, State Regulation and Rates, for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and 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.

Robert M. Conroy

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of December 2024.

Notary Public

Notary Public ID No. KYNP61560

My Commission Expires:

November 9, 2026

TAMMY J. ELZY
COMM EXPIRES 11/09/2026
NOTARY PUBLIC
ID # KYNP61560
STATE AT LARGE, KENTUCKY

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Michael E. Hornung**, being duly sworn, deposes and says that he is Manager of Pricing/Tariffs for LG&E and KU Services Company, and 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.

Michael E. Hornung

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of December 2024.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Philip A. Imber**, being duly sworn, deposes and says that he is Director – Environmental Compliance for PPL Services Corporation and he provides services to Louisville Gas and Electric Company and Kentucky Utilities Company, and 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.

Philip A. Imber

Philip A. Imber

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16 day of December 2024.

Caroline J. Davison

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

CAROLINE J. DAVISON
COMM EXPIRES 01/22/2027
NOTARY PUBLIC
ID # KYNP63286
STATE AT LARGE, KENTUCKY

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Lana Isaacson**, being duly sworn, deposes and says that she is Manager – Energy Efficiency for LG&E and KU Services Company, and 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.

Lana Isaacson

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of December 2023.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

CAROLINE J. DAVISON
COMM. EXPIRES 1/22/2027
NOTARY PUBLIC
ID # KYNP63286
STATE AT LARGE, KENTUCKY

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Tim A. Jones**, being duly sworn, deposes and says that he is Manager – Sales Analysis and Forecast for LG&E and KU Services Company, and 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.

Tim A. Jones

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of December 2024.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

CAROLINE J. DAVISON
NOTARY PUBLIC
ID # KYNP63286
COMM EXPIRES 01/22/2027
STATE AT LARGE, KENTUCKY

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Elizabeth J. McFarland**, being duly sworn, deposes and says that she is Vice President, Transmission for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and 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.

Elizabeth J. McFarland

Elizabeth J. McFarland

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of December 2024.

Caroline J. Davison

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Shannon L. Montgomery**, being duly sworn, deposes and says she is the Vice President, Customer Services for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and 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.

Shannon L. Montgomery

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of December 2024.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

CAROLINE J. DAVISON
COMM EXPIRES 01/22/2027
NOTARY PUBLIC
ID # KYNP63286
STATE AT LARGE, KENTUCKY

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Charles R. Schram**, being duly sworn, deposes and says that he is Director – Power Supply for LG&E and KU Services Company, and 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.

Charles R. Schram

Subscribed and sworn to before me, a Notary Public in and before said County and State this 13th day of December 2024.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

CAROLINE J. DAVISON
COMM EXPIRES 01/22/2027
NOTARY PUBLIC
ID # KYNP63286
STATE AT LARGE, KENTUCKY

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Michael S. Sebourn**, being duly sworn, deposes and says that he is Manager – Generation Planning for LG&E and KU Services Company, and 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.

Michael S. Sebourn

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of December 2024.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

CAROLINE J. DAVISON
COMM EXPIRES 01/22/2027
NOTARY PUBLIC
ID # KYNP63286
STATE AT LARGE, KENTUCKY

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **David L. Tummonds**, being duly sworn, deposes and says that he is Senior Director - Project Engineering for LG&E and KU Services Company, and 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.

David L. Tummonds

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of December 2024.

Notary Public

Notary Public, ID No. KYNP4577

My Commission Expires:

April 1, 2028

VENITA M. DEFRENZE
NOTARY PUBLIC
KYNP4577
MY COMMISSION EXPIRES
04/01/2028
KENTUCKY, STATE AT LARGE

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Peter W. Waldrab**, being duly sworn, deposes and says that he is Vice President, Electric Distribution, for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and 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.

Peter W. Waldrab

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of December 2024.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Stuart A. Wilson**, being duly sworn, deposes and says that he is Director, Energy Planning, Analysis & Forecasting for LG&E and KU Services Company, and 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.

Stuart A. Wilson

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of December 2024.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

CAROLINE J. DAVISON
NOTARY PUBLIC
ID # KYNP63286
STATE AT LARGE, KENTUCKY
COMM EXPIRES 01/22/2027

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.1

Responding Witness: Lonnie E. Bellar

Q-1.1. Do the Companies anticipate the filing of any Certificate of Public Convenience and Necessity applications related to a supply-side resource, or resources, in the three-year period 2025-2027?

a. If so, please list and explain each potential CPCN application.

b. For each potential CPCN application listed in response to subpart a, please identify how each project was analyzed as part of this integrated resource planning process.

A-1.1. Yes.

a. The Companies anticipate filing a CPCN application in the first quarter of 2025. At this time, the Companies have not made final decisions on the resources or projects to be included in that application, but it will be consistent with the resources described in Integrated Resource Plan the Companies have already filed in this case. Beyond that CPCN application, there are no definite plans regarding future CPCN applications.

b. See the response to part (a). To the extent possible, the projects to be included were considered as part of the broader and overall integrated resource planning process the Companies have described in this case.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.2

Responding Witness: Lonnie E. Bellar

Q-1.2. Do the Companies anticipate the filing of any retirement notices with the Energy Planning and Inventory Commission, as prescribed by KRS 164.2807, in the three-year period 2025-2027? Please explain.

A-1.2. The Companies do not anticipate filing any such notices in the first half of 2025. Beyond that, there are no definite plans regarding any such retirement notices.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.3

Responding Witness: Lana Isaacson

Q-1.3. Do the Companies anticipate the filing of any updates to their DSM-EE plan in the three-year period 2025-2027? Please explain.

a. If so, please list and explain each potential DSM-EE plan update.

b. For each potential DSM-EE plan update listed in response to subpart a, please identify how each project was analyzed as part of this integrated resource planning process.

A-1.3. It is premature to answer definitely at this time as the Companies are only in year one of a seven-year DSM-EE plan. Whether the Companies will file updates to their DSM-EE plan depends on 1) customer response and participation in the current programs, 2) possible DSM pilot successes and failures, and 3) the success of economic development efforts related to data centers.

a. Not applicable.

b. Not applicable.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.4

Responding Witness: Lana Isaacson / Elizabeth J. McFarland / Charles R. Schram / Peter W. Waldrab

Q-1.4. Since the 2021 IRP was filed with the Commission in 2021, please list and describe each Request for Proposals issued by the Companies in relation to:

a. Demand-side management;

b. Energy and/or capacity resources;

c. Distribution resources; and

d. Transmission resources.

A-1.4.

a. Since the 2021 IRP, the Companies have issued six DSM-related RFPs.

1. DSM platform software as a service, incentive fulfillment services, customer care center, partner network software as a service, and Online Transactional Marketplace.

2. Software as a Service ("SaaS") for the Bring-your-own-device ("BYOD"), Optimized EV Charging, Residential Online Audit and Rebates, and Peak Time Rebates programs.

3. Program services for WeCare, Small Business Audit and Direct Install, and Business Rebates.

4. In 2024, program services for the Business Demand Response program.

5. In 2024, for the selection of a vendor to complete a new Potential Study across all sectors (Residential, Commercial, and Industrial) for both energy efficiency and demand response.

6. In 2024, for the selection of an Evaluation, Measurement, and Verification ("EM&V") vendor for the Companies EE/DSM Programs.

b. See the response to Question No. 1.5.

c. The Companies do not issue RFPs for distribution resources, i.e., distribution projects.

d. The Companies do not issue RFPs for transmission resources, i.e., transmission projects.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.5

Responding Witness: Lonnie E. Bellar / Charles R. Schram

Q-1.5. Please produce Requests for Proposals issued, and responses thereto, in relation to generation-related projects that may be pursued by the Companies in the three-year period 2025-2027.

A-1.5. See attached for responsive documents concerning the two RFPs the Companies issued for generation-related projects that could be pursued by the Companies in the three-year period 2025-2027.[1] Certain information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

[1] The Companies also seek competitive bids for services and materials for generation-related projects they have already chosen to pursue (e.g., battery providers for the Commission-approved Brown BESS). The Companies assume such bidding processes and results for projects the Companies *are* pursuing, rather than RFPs for projects "that *may* be pursued," are not within the scope of this request.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.6

Responding Witness: Tim A. Jones / Michael S. Sebourn

Q-1.6. Please provide supporting workpapers and modeling files, including (not limited to) all input files, output files, and pre- and post-processing of said inputs and outputs for all resource portfolios and scenarios/sensitivities and for all years modeled, in machine-readable Excel format with formulae intact.

A-1.6. See the documents provided with

- KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--CONFIDENTIAL.zip
- KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip

The files provided are in their native formats, which is not necessarily Excel.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.7

Responding Witness: Michael S. Sebourn

Q-1.7. Please provide a table of the annual resource additions and retirements (in MW) in machine-readable Excel format with formulae intact for:

a. All resource portfolios and scenarios/sensitivities modeled (i.e., 60 resource plans comprised of three load scenarios, four environmental scenarios, and five fuel price scenarios); and

b. The Companies' Recommended Resource Plan.

A-1.7.

a. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--PUBLIC.zip at "PLEXOS\20240925\Results\20241009_2024IRP_PlexosResults.xlsm".

b. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--PUBLIC.zip at "Tables\20241001 Resource Assessment RM Need Tables_D02.xlsx".

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.8

Responding Witness: Michael S. Sebourn / Stuart A. Wilson

Q-1.8. Please provide the annual revenue requirements and present value revenue requirement (PVRR) in machine-readable Excel format with formulae intact for:

a. All resource portfolios and scenarios/sensitivities modeled (i.e., 60 resource plans comprised of three load scenarios, four environmental scenarios, and five fuel price scenarios); and

b. The Companies' Recommended Resource Plan.

A-1.8.

a. See the response to KIUC 1-3 and KIUC 1-3(a).

b. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at "FinancialModel\CONFIDENTIAL_20231001_FinancialModel_05_RefCase_0328.xlsx".

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.9

Responding Witness: Michael S. Sebourn / Stuart A. Wilson

Q-1.9. Please provide the Companies' Financial Model in machine-readable Excel format with formulae intact.

A-1.9. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the "FinancialModel" folder. See also the responses to KIUC 1-3, 1-4, 1-6, 1-7, 1-8, 1-9, and 1-10.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.10

Responding Witness: Lonnie E. Bellar

Q-1.10. With regard to resource planning and retirement timelines, in the Companies' estimation, approximately how many months before a target retirement date would the Companies need to (a) provide notice of a proposed retirement to the Energy Planning and Inventory Commission, and (b) seek and receive approval for a proposed retirement from the Public Service Commission.

A-1.10. KRS 164.2807(7)(b) requires the Companies to provide notice of a proposed retirement to the Energy Planning and Inventory Commission at least 180 days prior to submitting an application to the Public Service Commission for a retirement pursuant to KRS 278.264(1). Applications made under KRS 278.264(1) require 30 days' notice to the Public Service Commission and the Public Service Commission is required to issue an Order on that application within 180 days after receiving an administratively complete application. Beyond those legal timelines and deadlines, any number of factors can affect the timing of a retirement.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.11

Responding Witness: Shannon L. Montgomery

Q-1.11. Please list all city franchise agreements, including fees, method of collection from ratepayers, and expiration dates for each.

A-1.11. Franchise fees are collected from customers on behalf of the city and included on customer bills. The amount collected from customers is provided to the individual city imposing the franchise fee. See attachment being provided in a separate file.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.12

Responding Witness: Lonnie E. Bellar / Robert M. Conroy / Counsel

Q-1.12. Please refer to Vol. I at 5-3, which states "The Companies' overarching resource planning objective is straightforward: Develop a resource plan that will enable the Companies to serve all customers safely, reliably, and at the lowest reasonable cost at all times, day or night, and in all seasons and weather conditions," and answer the following requests:

a. How does this objective comport with the aims of KRS 278.016:

i. To avoid wasteful duplication of distribution facilities?

ii. To avoid unnecessary encumbering of the landscape of the Commonwealth of Kentucky?

iii. To prevent the waste of materials and natural resources?

b. How does this objective comport with the goals or purposes of the Companies and their parent Company as stated in their respective corporate Articles of Incorporation?

c. How does this objective comport with the corporate sustainability goals of the Companies and/or their parent company?

d. How does this objective compare to the statement at Vol. I, 5-9 that "[t]he primary focus of resource planning is risk management"?

A-1.12.

a. The Companies object to this request insofar as it seeks a legal conclusion or opinion. Without waiving that objection, KRS 278.016 speaks for itself, including concerning its purpose and intent:

> It is hereby declared to be in the public interest that, in order to encourage the orderly development of retail electric service, to avoid wasteful duplication of distribution facilities, to avoid unnecessary encumbering of the landscape of the Commonwealth of Kentucky, to prevent the waste of materials and natural resources, for the public convenience and necessity and to minimize disputes between retail electric suppliers which may result in inconvenience, diminished efficiency and higher costs in serving the consumer, the state be divided into geographical areas, establishing the areas within which each retail electric supplier is to provide the retail electric service as provided in KRS 278.016 to 278.020 and, except as otherwise provided, no retail electric supplier shall furnish retail electric service in the certified territory of another retail electric supplier.

b. The Companies object to this request as irrelevant and unlikely to lead to the discovery of relevant evidence and insofar as it seeks a legal conclusion or opinion. Without waiving these objections, the Companies' articles of incorporation speak for themselves. Kentucky Utilities Company's articles of incorporation state:

> The purpose for which the corporation is organized is to engage, directly or through ownership of other corporations, partnerships, joint ventures or other entities, in the transaction of any and all lawful business for which corporations may be incorporated under the Kentucky Business Corporation Act, and except as modified by Article Fourth hereof, the Virginia Stock Corporation Act.

Louisville Gas and Electric Company's articles of incorporation state:

> The purpose of the Company is the transaction of any or all lawful business for which corporations may be incorporated under the Business Corporation Law of Kentucky, as amended.

c. It is unclear to which "corporate sustainability goals" this request intends to refer or how they would be relevant to this proceeding. Regardless, any such goals would be secondary to the Companies' obligation to provide their customers safe and reliable service at the lowest reasonable cost.

d. Having risk management be the primary focus of resource planning is consistent with safe and reliable service, which the Companies have the objective of providing at the lowest reasonable cost.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.13

Responding Witness: Lonnie E. Bellar / Philip A. Imber / Elizabeth J. McFarland

Q-1.13. Please refer to Vol. I at 5-3, n.7, regarding the increase in capacity at Cane Run 7, and answer the following requests:

a. How was the increase in capacity accomplished?

b. Is the increased capacity accounted for in Section 8(3) of the IRP? Please describe.

c. Did LG&E apply for or receive any permits or regulatory approvals for this project? Please provide such applications and permits or approvals.

d. Did the increase in capacity require expansion of gas transport capacity to Cane Run? Please explain.

e. Has the Company begun a transmission study? If so, what stage is that study in, and when is it expected to be completed?

A-1.13.

a. The capacity increase results from a turbine upgrade that increases the efficiency of the unit. This results in an increased capacity without increasing the heat input, i.e. additional gas, to the unit.

b. Yes. See note 2 on Table 8-4 in Section 8.(3).(b). The Companies included the capacity increase on Cane Run 7 in their IRP modeling.

c. The Companies did not apply for or receive any environmental permits or regulatory approvals for the project. The project was evaluated by the Companies for New Source Review applicability. The project evaluation did not result in the need for revision to the Title V operating permit.

d. No. See the response to part (a).

e. Yes, via LG&E/KU's Independent Transmission Operator ("ITO"), TranServ. The Cane Run 7 project is part of the current and ongoing TranServ Transitional Cluster Study ("TCS"). Below is the schedule for the Generation Interconnection Transitional Cluster Study that includes the Cane Run 7 capacity increase request:

- TCS Kickoff Meeting: August 1, 2024
- TranServ and Company Kickoff Meeting: November 12, 2024
- TCS draft report: May 28, 2025
- Customer comment period: May 29-June 27, 2025
- Final report: July 25, 2025

The Cane Run 7 capacity increase request must also go through the Transmission Service Request ("TSR") process. The System Impact Study for the increase was finalized on October 28, 2024. The Facilities Study is ongoing and is expected to be complete by January 24, 2025.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.14

Responding Witness: Stuart A. Wilson

Q-1.14. Please refer to Vol. I, page 6-5, Table 6-4, providing the "Capital Costs ($/kW) and Sum of Capital and Non-Fuel O&M ($/kW-yr) for Selected Resources." Absent from the table are customer-owned solar and battery storage. Please provide the capital costs, fuel, and non-fuel O&M costs to the utility for these resources.

A-1.14. The capital, fuel, and non-fuel O&M costs for customer-owned solar do not result in utility revenue requirements. The Companies compensate Rider NMS-2 customers $0.07089/kWh ($70.89/MWh) and $0.07534/kWh ($75.34/MWh), respectively, for energy produced onto the electric grid. The Companies did not model distributed solar as a supply-side resource option because this cost is higher than the assumed cost of utility-scale solar ($60.18/MWh).

The capital, fuel, and non-fuel O&M costs for customer-owned battery storage also do not result in utility revenue requirements. The Companies evaluated a potential enhancement to their Bring Your Own Device ("BYOD") DSM program that includes customer-owned battery storage as a measure for participating in the program.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.15

Responding Witness: Lonnie E. Bellar / Charles R. Schram / David L. Tummonds

Q-1.15. Please refer to Vol. I at 6-6, n.38, and answer the following requests:

a. Please identify the project "canceled by the developer due to interconnection issues," including but not limited to the project's queue number in the Companies' Generation interconnection queue.

b. Please describe the "significant price increases" that led to one PPA being canceled by the developer and another PPA being canceled by the Companies' unwillingness to proceed at a higher price.

c. Please provide further explanation as to why the "remaining three PPAs appear unlikely to proceed under their approved terms." Please identify which specific PPAs are being referred to, the reasons they are unlikely to proceed, and what conditions would enable them to proceed.

d. The 2022 CPCN included approval for the Companies to build the Mercer County Solar Facility and acquire the Marion County Solar facility. Please explain the status of each of these projects, whether they are still expected to be developed, the expected operational dates, any significant obstacles to project development that exist, and if they are included within the IRP's resource plan.

A-1.15.

a. The Clearway Song Sparrow project was terminated by the developer due to their inability to obtain land control for the required interconnection. Song Sparrow's Generation Interconnection queue number was LGE-GIS-2019-002.

b. The Ragland PPA was terminated by the developer because they could not construct it for the 2021 agreement price. The five Green Tariff Option 3 customers contracting for Ragland's output would not agree to the

developer's new price that was over two times the original price. The Gage PPA contained a price reopener that was exercised by the developer, but after negotiations in accordance with the PPA, the Companies would not agree to the proposed price that was approximately 60 percent higher than the original price.

c. See the response to PSC 1-3.

d. See the response to KCA 1-11.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.16

Responding Witness: John Bevington

Q-1.16. According to PPL's Second Quarter 2024 Investor Update presentation,[2] "active data center requests" to the Companies "have increased to more than 2 GWs over 2027-2033, with about 350 MW in advanced stages."

a. Please define "active request" as used in the referenced presentation.

b. Please define "advanced stages" as used in the referenced presentation.

c. Please describe each "stage" that a data center request would progress through from initial contact with the Companies to delivery of electric services.

d. Please state the number of combined load of active data center requests currently before the Companies, if any, as well as the stage of each.

A-1.16.

a. "Active request" as referenced in the presentation is defined as a project that is exchanging information with the Companies on a regular and ongoing basis.

b. "Advanced stages" as referenced in the presentation is defined as a project that has gone through formal studies to determine transmission capacity at a project site and has entered into an agreement with the Companies that allow for engineering, procurement, and potentially construction work such that the Companies will be reimbursed for said work if the project does not come to fruition.

[2] Available at https://filecache.investorroom.com/mr5ir_pplweb2/1143/PPL_2024_Q2_Investor_Update_Final.pdf

c. Data center projects are tracked the same way as other economic development projects. The Companies' project manager assigns stages, or phases, according to the level of activity (communication, information exchange, due diligence, etc.) that a project is engaged in with the Companies, the state, or the local community. The phases used for project tracking, in order of probability from lowest to highest, are inquiry, suspect, prospect, imminent and announced.

   Inquiry indicates a request for high level information, may involve a few meetings, and is generally in the early stages of evaluation.

   Suspect indicates that there is a likelihood of, or evidence of, continued follow up. The project is likely engaged in continued information exchange and is on the verge of more formal processes and information exchange.

   Prospect indicates very regular exchange of information, more detailed evaluation of a site and site characteristics that likely include detailed evaluation of infrastructure capabilities and capacities, costs of doing business, in person site visits, and incentive negotiation.

   Imminent indicates a high probability for the project to announce and locate in the Companies' service territory. An imminent project likely has all the information necessary from the Companies and the state and local communities to make a decision and may only be finalizing its own business plan or internal processes before proceeding.

   Announced means the project has made a formal public decision that it will locate in the Companies' service territory and proceed with all actions determined through the process of evaluation in the phases above.

d. As of November 25, 2024, the Companies are working with 16 data center projects with a potential load of over 4.2 GW peak capacity need. Of those projects, 1 is imminent, 7 are prospects, 1 is in suspect phase, and 7 are inquiries.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.17

Responding Witness: Stuart A. Wilson

Q-1.17. Please refer to Vol. I at 8-2, n.71, and explain the basis for assuming (a) a 100% capacity contribution for Brown BESS, and (b) an 85% capacity contribution for additional 4-hour BESS additions.

A-1.17. To determine minimum reserve margins for resource planning, the Companies estimated the loss of load expectation ("LOLE") for a fixed portfolio over a range of load levels to determine the load level at which the LOLE was 1 day in 10 years. Minimum reserve margins are then computed by dividing the total summer and winter capacities of the portfolio by the summer and winter peak demands, respectively. Brown BESS was included as a resource in this analysis, and 100% of its capacity was included in the calculation of minimum reserve margins. Then, in a subsequent analysis, the Companies determined the capacity contributions for new limited-duration resources, and the capacity contribution for 4-hour battery storage is 85%. In the referenced table, the "capacity contribution" for Brown BESS is 100% so the calculation of reserve margin in the table is aligned with the calculation of minimum reserve margin. Thus, the Companies should not have used "capacity contribution" to describe the 100% value for Brown BESS. The modeled operating characteristics for Brown BESS and new BESS resources are the same.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.18

Responding Witness: John Bevington / Shannon L. Montgomery

Q-1.18. In the last five years, has LG&E-KU entered into economic development contract, or other special contract, for new large load customers (>25 MW) or large additions of incremental load from existing customers? If so, please identify each.

A-1.18. Yes. KU entered into an economic development rider contract with Phoenix Paper Wickliffe, LLC, which the Commission accepted with an effective date of August 23, 2019.[3] KU also entered into a special contract for new load with Blue Oval SK, LLC, which the Commission approved by Order dated December 18, 2023, in Case No. 2023-00123.

[3] https://psc.ky.gov/tariffs/Electric/Kentucky%20Utilities%20Company/Contracts/Current/Phoenix%20Paper%20Wickliffe,%20LLC/2019-08-23_Contract%20for%20Electric%20Service.pdf

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.19

Responding Witness: Peter W. Waldrab

Q-1.19. Please refer to Vol. I at 8-10, "Advanced data analytics tools and resources are now allowing LG&E and KU to more wisely invest in areas of concern based on outage history, geo-spatial characteristics, and environmental factors."

a. Please identify the outage history criteria enabled by advanced data analytics and informing LG&E and KU investments.

b. Please identify the ten worst performing circuits for each of LG&E and KU in the last three years in terms of the duration of outages.

i. Please provide a map illustrating where the circuits identified in response to subpart b are located.

c. Please identify the ten best performing circuits for each of LG&E and KU in the last three years in terms of the duration of outages.

i. Please provide a map illustrating where the circuits identified in response to subpart c are located.

d. Please identify planned investments over the next three years in the reliability or resilience of the circuits identified in response to subparts b and c.

A-1.19.

a. Historical LG&E and KU investment strategies have been informed by sustained outage events as defined by IEEE Std. 1366. Advanced analytic tools continue to utilize similar outage data along with other system and environmental characteristics to prioritize areas of concern. No circuit is the same; by evaluating circuits based on characteristics such as mileage, conductor type and age, vegetation exposure, and weather alongside historical reliability performance, risk models can be made to inform future investments.

b. Worst performing circuits based on 3-year average (2021-2023) Customer Minutes Interrupted:

Utility	Op Center	Substation	Circuit
LGE	EOC	BRECKENRIDGE	BR1185
LGE	EOC	HURSTBOURNE	HB1148
LGE	AOC	SOUTH PARK	SP1116
LGE	EOC	BRECKENRIDGE	BR1186
LGE	EOC	FAIRMOUNT	FM1257
LGE	EOC	WATTERSON	WT1210
LGE	AOC	MANSLICK	MK1296
LGE	EOC	LYNDON	LY1111
LGE	EOC	OXMOOR	OX1274
LGE	AOC	CANAL	CA1346

Utility	Op Center	Substation	Circuit
KU	LEXOC	LANSDOWNE SWITCHING	126
KU	LEXOC	VERSAILLES BYPASS	509
KU	LEXOC	LANSDOWNE SWITCHING	106
KU	LEXOC	LAKESHORE	135
KU	LEXOC	CLAYS MILL	145
KU	LEXOC	CLAYS MILL	147
KU	LEXOC	LANSDOWNE SWITCHING	24
KU	LEXOC	LEXINGTON WATER COMPANY 1	130
KU	LEXOC	PICADOME 12KV	112
KU	LEXOC	HALEY	45

i. See attachment being provided in a separate file.

c. Best performing circuits based on 3-year average (2021-2023) Customer Minutes Interrupted:

Utility	Op Center	Substation	Circuit
LGE	AOC	BROOK	BK0003
LGE	AOC	BISHOP	BI1222
LGE	AOC	SEMINOLE	SM1363
LGE	AOC	WATERSIDE WEST	WS1310
LGE	AOC	PADDYS RUN	PR1386
LGE	AOC	ASHBOTTOM	AS1415
LGE	AOC	WATERSIDE	WS1308
LGE	AOC	PADDYS RUN	PR1383
LGE	AOC	PADDYS RUN	PR1387
LGE	AOC	GRADY	GR1466

Utility	Op Center	Substation	Circuit
KU	LEXOC	BRYANT ROAD	150
KU	LEXOC	UK MED CENTER	119
KU	MAYOC	EWINGTON	970
KU	ELIOC	ELIZABETHTOWN INDUSTRIAL	2463
KU	RICOC	OKONITE	335
KU	MAYOC	AUGUSTA	930
KU	RICOC	RICHMOND INDUSTRIAL	344
KU	ELIOC	BLACK BRANCH ROAD	2478
KU	LEXOC	LEMONS MILL	442
KU	EAROC	MARION 4KV	1713

Note: 128 LG&E and KU circuits with customers did not experience an outage over the past 3 years.

i. See the attachment provided in the response to part (b)(i).

d. Planned investments are evaluated annually to ensure prudent investments are made with most recent data available. In 2025, there are planned reliability investments on BR1185, SP1116, WT1210, MK1296, LY1111, Lansdowne 0126, and Lansdowne 0024. These investments primarily consist of further segmentation by installation of electronic reclosers and replacement of small copper conductor.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.20

Responding Witness: Lonnie E. Bellar / Tim A. Jones / Peter W. Waldrab

Q-1.20. Please refer to Vol. I at 8-10, "For customers with heavy resistive loads, such as baseboard heating, this results in energy savings for customers and reduced fuel consumption for generators."

a. Please explain whether the Companies can estimate the number of customers on their systems that would have the "heavy resistive loads" described above, and the aggregate energy demand of such loads.

b. Please explain whether and how the Companies are working to identify other loads that are likely to result in energy savings for customers and reduced fuel consumption for generators.

c. Please provide an estimated magnitude of savings on a system and average cost per kwh.

A-1.20. The context of the quoted sentence, which concerns savings created by conservation voltage reduction, is important:

> VVO [Volt-VAR Optimization] will also support implementation of conservation voltage reduction ("CVR"). CVR is a subset of the VVO functionality focused on intentionally lowering the distribution system voltages on targeted system components to reduce resistive load. For customers with heavy resistive loads, such as baseboard heating, this results in energy savings for customers and reduced fuel consumption for generators.

a. No. The Companies are not able to do this at this degree of specificity at this time. The baseboard heating example was only meant to be a high-level example of what a resistive load could be.

b. It is not necessary to do so to obtain savings from CVR. For a more complete explanation of CVR and its savings potential, see Exhibit LEB-3 to the Direct Testimony of Lonnie E. Bellar in Case Nos. 2020-00349 and 2020-00350.[4]

c. See the response to part (b). For CVR reductions assumed in the load forecast, see the response to Question No. 1.59(b).

[4] Available at https://psc.ky.gov/pscecf/2020-00350/rick.lovekamp%40lge-ku.com/11252020085918/10-LGE_Testimony_1of4%28Thompson_Blake_Bellar_Sinclair_Wolfe_Saunders%29.pdf.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.21

Responding Witness: Charles R. Schram / Michael S. Sebourn

Q-1.21. Please refer to Vol. I at 8-20, Table 8-11. Confirm that the referenced table reflects forecasted electricity purchases and sales from the Companies' mid energy requirements forecast. If anything but confirmed, please explain.

a. Were purchases and sales forecasted as part of the resource expansion or production cost modeling? Please explain.

b. Do the values in 2024 reflect actuals or a model output?

c. Provide actual market purchases and off-system sales in each of the last ten years.

A-1.21. Confirmed. Consistent with past IRPs, to focus the resource planning analysis on serving native load customers and avoid speculation regarding future market electricity prices, the Companies do not model off-system sales and purchases.

a. OVEC purchases were modeled in the screening of resource plans as well as the analysis of these plans with detailed production costs. The forecast of OVEC purchases in Table 8-11 is based on detailed production cost modeling. Market purchases and sales were not modeled.

b. The 2024 values reflect actual OVEC purchases and market sales and purchases for January through June and forecasted OVEC purchases in July through December.

c. This information is included in the Companies' FERC Form 1 filings. See attachments being provided in separate files. Sales and purchase information is shown on pages 310-311 and 326-327, respectively, of each annual filing.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.22

Responding Witness: Tim A. Jones

Q-1.22. Please provide the Companies' actual energy requirements in years 2020 to 2024, on an individual and combined basis, disaggregated by customer class.

A-1.22. See attachment being provided in a separate file.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.23

Responding Witness: Elizabeth J. McFarland / Stuart A. Wilson

Q-1.23. Please refer to page 4 of the Long-Term Firm Transfer Analysis – Impact to the LG&E-KU Transmission System in IRP Vol. III, and answer the following requests:

a. Please provide LG&E-KU's 2024 Transmission Expansion Plan.

b. For the cost estimates provided at page 4-5, please identify which are newly-developed planning level cost estimates and which project cost estimates "already existed."

c. For each project identified in the referenced analysis, please provide the estimated timeline for construction, including regulatory approvals, if any.

d. Please specify which among the identified projects was included in the LG&E-KU 2024 Transmission Expansion Plan, if any.

e. Have any of the projects identified in the referenced analysis been included in the 2024 IRP? Please explain.

f. Have any of the projects identified in the referenced analysis been studied, identified, or otherwise included in previous Transmission Expansion Plans? Please explain.

A-1.23.

a. See attachment being provided in a separate file.

b. An existing cost estimate was used for the installation of a reactor on the Clifty to Carrollton 138kV line project. All other cost estimates were newly-developed and were based on the table included on Page 5 of the report.

c. See the table below.

CONFIDENTIAL INFORMATION REDACTED

Project Description	**High-Level Estimated Timetable for Implementation**
[redacted]	30 months
	24 months
	30 months
	30 months
	30 months
	30 months
	30 months
	36 months
	36 months
	24 months

d. None of the projects identified in this study are existing 2024 Transmission Expansion Plan ("TEP") projects.

e. The Companies conducted a "High ATC" sensitivity case in their Resource Adequacy Analysis based on the Long-Term Transfer Analysis where the Companies pay approximately $101 million per year plus losses to have a minimum of 700 MW of ATC at all times. See Section 3.1 of Volume III, 2024 IRP Resource Adequacy Analysis.

f. It is possible that some these projects were identified in previous TEPs. However, since none of the projects are included in the 2024 TEP, they would have been determined to no longer be required and thus cancelled.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.24

Responding Witness: Michael S. Sebourn / Stuart A. Wilson

Q-1.24. Please refer to page 43 of the 2024 IRP Resource Assessment: Generation Planning & Analysis report in IRP Volume III, in which the Companies discuss the least-cost resource plans for all fuel price scenarios: "[T]he Companies evaluated each resource plan with detailed production costs over each of the five fuel price scenarios to determine which resource plan for a given load and environmental scenario has the lowest PVRR on average across all fuel price scenarios."

a. Please describe in detail the Companies' method for determining the least-cost plan for each load and environmental scenario across the five fuel price scenarios.

b. Please provide the calculations and/or analysis conducted by the Companies to determine the least-cost plan for each load and environmental scenario across the five fuel price scenarios in machine-readable Excel format with formulae intact.

A-1.24.

a. See the response to KIUC 1-3.

b. See the response to Question No. 1.9.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.25

Responding Witness: Stuart A. Wilson

Q-1.25. Please refer to page 49 (including Table 29) of the 2024 IRP Resource Assessment: Generation Planning & Analysis report in IRP Volume III, in which the Companies discuss their recommended resource plan: "To develop the Recommended Resource Plan, the Companies started with this resource plan and modified it to (1) support the potential for high economic development load growth and CO2 regulations and (2) have no regrets should high load or CO2 regulations not come to fruition."

a. Please describe in detail the Companies' method for developing their Recommended Resource Plan, including their rationale for each resource decision. Within this description, please specify why the Companies chose to modify the timing of certain resource decisions from those selected in their Least-Cost Resource Plans (as shown in Table 29) to construct their Recommended Resource Plan.

b. Please confirm that the resource decisions within Companies' Recommended Resource Plan are not a direct result of least-cost capacity expansion modeling. If denied, please explain.

c. Did the Companies model the Recommended Resource Plan (that is, modeling fixed assumptions used to represent the Recommended Resource Plan)?

d. If so, please provide all input files, output files, pre- and post-processing of said inputs and outputs, background materials, and source citations for the Companies' modeling of their Recommended Resource Plan.

A-1.25.

a. The development of the least-cost resource plan for the Mid Load, Ozone NAAQS + ELG scenario is summarized in Sections 4.4.1.3 and 4.4.2.3 of Volume III, Resource Assessment. To support the potential for high economic

development load growth and CO_2 regulations, the additions of the Ghent 2 SCR and 400 MW of battery storage are accelerated to 2028, the addition of the second NGCC is accelerated to 2031, and the retirement of Brown 3 is deferred to 2035. A Ghent 2 SCR in 2028 will drive self-compliance to NO_x reductions that support Kentucky's obligations to 2015 Ozone NAAQS attainment and provides assurance the unit will be available to support economic development load growth. Battery storage is the most economic resource for supporting economic development load growth prior to 2030, and 900 MW of battery storage is ultimately needed in the Mid load scenario. The 2031 commissioning year for the second NGCC aligns with the High load scenario, and a second NGCC is needed in the Mid load scenario if high load or CO_2 regulations do not come to fruition. As noted in the referenced section, 500 MW of solar is added in 2035 after prices fall to hedge natural gas price volatility and future CO_2 regulation risk.

b. Not confirmed. The Recommended Resource Plan is the direct result of the modeling summarized in the Resource Assessment for 12 load and environmental scenarios. Given the uncertainty in load and environmental regulations, this is a prudent way to develop a "no regrets" resource plan that is least-cost across a range of futures.

c. Yes. The Recommended Resource Plan is the focal point for Sections 8 and 9 of Volume I.

d. Regarding input files, see KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the "PROSYM\ModelInputs" folder. Regarding output files and post-processing files, see KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the "PROSYM\05_RefCase" folder and "FinancialModel\CONFIDENTIAL_20241001_FinancialModel_05_RefCase_0328.xlsx".

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.26

Responding Witness: Lonnie E. Bellar

Q-1.26. Please provide the following annual historical data for each of LG&E-KU's gas- and coal-fired units from 2019 through the latest date available, in machine-readable Excel format with formulae intact:

a. Nameplate capacity (MW)

b. Generation (MWh)

c. Fuel usage (MMBtu)

d. Heat rate (MMBtu/MWh)

e. Forced outage rate (%)

f. Planned outage rate (%)

g. Equivalent availability factor (%)

h. Capacity value (%) (also referred to as capacity credit, effective load carrying capacity, etc.)

i. Variable O&M ($)

j. Fixed O&M ($)

k. Fuel costs ($)

l. Non-environmental capital spending ($)

m. Environmental capital spending ($), including corresponding regulation

n. Market revenues ($) (e.g., capacity, energy, and/or ancillary services)

o. Capital revenue requirements/costs to customers ($), including any supporting calculations

p. NOx emissions

q. Particulate matter (PM) emissions

r. SO2 emissions

s. CO2 emissions

A-1.26.

a. See attachment being provided in a separate file.

b. See attachment provided in the response to part (a).

c. See attachment provided in the response to part (a).

d. See attachment provided in the response to part (a).

e. See the response to SC 1-32(a).

f. The Companies do not utilize/track this metric.

g. See attachment provided in the response to part (a).

h. The Companies do not utilize/track this metric.

i. See attachment provided in the response to part (a).

j. See attachment provided in the response to part (a).

k. See attachment provided in the response to part (a).

l. See attachment provided in the response to part (a).

m. See attachment provided in the response to part (a).

n. The Companies are not part of an RTO; the Companies' generation units are categorized as Designated Network Resources to serve native load. Therefore, there is not market revenue attributed to each generating unit.

o. Revenue requirement information by unit/plant is not readily available as revenue requirements are determined on a company-wide basis in a base rate proceeding and not determined by unit or plant on a historical basis.

p. See attachment provided in the response to part (a).

q. See attachment provided in the response to part (a).

r. See attachment provided in the response to part (a).

s. See attachment provided in the response to part (a).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.27

Responding Witness: Lonnie E. Bellar

Q-1.27. Please provide the following annual historical data for each of LG&E-KU's solar (i.e., E.W. Brown Solar and Simpsonville Solar) and wind (i.e., E.W. Brown Wind) resources from 2019 through the latest date available, in machine-readable Excel format with formulae intact:

a. Nameplate capacity (MW)

b. Generation (MWh)

c. Capacity value (%) (also referred to as capacity credit, effective load carrying capacity, etc.)

d. Fixed O&M ($)

e. Capital spending ($)

f. Market revenues ($) (e.g., capacity, energy, and/or ancillary services)

g. Capital revenue requirements/costs to customers ($), including any supporting calculations

A-1.27.

a. The current nameplate capacities are shown in Table 8-4 of on page 8-14 of Volume I. Simpsonville Solar's nameplate capacity increased as each of its five phases were added as follows.

- 2019 – Phase 1: 0.42 MW
- 2020 – Phases 1-2: 0.84 MW
- 2021 – Phases 1-4: 1.68 MW
- 2022 – Phases 1-5: 2.1 MW

b. See the table below.

Year	E.W. Brown Solar (MWh)	E.W. Brown Wind (MWh)	Simpsonville Solar (MWh)
2019	17485.79	0	309.16
2020	16604.04	0	1185.76
2021	16527.07	0	2256.46
2022	17042.34	0	3276.09
2023	16410.98	0	3606.29
2024	14957.18	55.69	3178.11

c. See the response to Question No. 1.26 (h).

d. See the table below.

Facility	Fixed O&M ($)
E.W. Brown Solar	736,221
E.W. Brown Wind	50,000
Simpsonville Solar	363,744

e. See the table below.

Facility	Capital Spending ($)
E.W. Brown Solar	70,549
E.W. Brown Wind	793,000
Simpsonville Solar	5,818,328

f. See the response to Question No. 1.26(n).

g. Revenue requirement information by unit/plant is not readily available as revenue requirements are determined on a company-wide basis in a rate proceeding and not determined by unit or plant on a historical basis.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.28

Responding Witness: Michael S. Sebourn

Q-1.28. Please provide the Companies' forecasts for the following for each of LG&E-KU's generating units (or plant-level if unit-level is unavailable) for all resource portfolios, scenarios, and years modeled within the 15-year modeling period (2024 through 2039), in machine-readable Excel format with formulae intact:

a. Nameplate capacity (MW)

b. Generation (MWh)

c. Fuel usage (MMBtu)

d. Heat rate (MMBtu/MWh)

e. Forced outage rate (%)

f. Planned outage rate (%)

g. Equivalent availability factor (%)

h. Capacity value (%) (also referred to as capacity credit, effective load carrying capacity, etc.)

i. Variable O&M ($)

j. Fixed O&M ($)

k. Fuel costs ($)

l. Non-environmental capital spending ($)

m. Environmental capital spending ($), including corresponding regulation

n. Market revenues ($) (e.g., capacity, energy, and/or ancillary services)

o. Capital revenue requirements/costs to customers ($), including any supporting calculations

p. NOx emissions

q. Particulate matter (PM) emissions

r. SO2 emissions

s. CO2 emissions

A-1.28.

a. The Companies did not use nameplate capacity as part of the 2024 IRP. In lieu of nameplate capacity, the 2024 IRP utilized net seasonal capacities. See Table 14 of the Resource Adequacy Analysis in Volume III.

b. These values vary by model run. Model runs are segregated by environmental scenario, and outputs are available in "CONFIDENTIAL_out_unityr.csv" files. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the "PROSYM" folder. See the response to KIUC 1-3(b) regarding model run naming conventions. Generation is labeled as 'Energy' and is in GWh.

c. See the response to part (b). Fuel usage is labeled as 'FuelBurn' and is in GBtu.

d. See the response to part (b). Average annual heat rate is labeled as 'HeatRate' and is in Btu/kWh.

e. See Table 14 of the Resource Adequacy Analysis in Volume III.

f. The Companies did not calculate planned outage rates as part of the 2024 IRP.

g. The Companies did not calculate equivalent availability factors for every resource plan as part of the 2024 IRP but did do so for the Recommended Resource Plan. See Table 8-6 of Volume I.

h. See the table below. The capacity contributions for Ohio Falls are a function of run of river and are derived by taking expected contributions at seasonal peaks divided by station nameplate capacity. The capacity contributions for solar are discussed in Section 3.2.1 of the Technology Update in Volume III. The capacity contributions for BESS and DSM are discussed in Section 4 of the Resource Adequacy Analysis in Volume III.

Resource	Summer Capacity Contribution	Winter Capacity Contribution
Fully Dispatchable Resources	100%	100%
Dix Dam Hydro	100%	100%
Ohio Falls Hydro	64%	40%
Solar	84%	0%
4-hr BESS	85%	85%
8-hr BESS	93%	93%
Dispatchable DSM	39%	39%

i. See the response to part (b). Variable O&M is labeled as 'VOM' and is in thousands of dollars.

j. Capital and O&M data varies by resource plan and is available in the Financial Model. Within the Financial Model, capital and O&M are available aggregated by unit in the Model tab, while individual cost components are available on the Detail tab, and inputs are available on the FixTime tab. See the response to KIUC 1-3(a) regarding location of Financial Model and how to select different model runs.

k. See the response to part (b). Fuel costs are labeled as 'FuelCost' and are in thousands of dollars.

l. See the response to part (j).

m. See the response to part (j).

n. See the response to Question No. 1.26(n).

o. See the response to KIUC 1-4.

p. These values vary by model run. Model runs are segregated by environmental scenario, and outputs are available in "out_emissyr.csv" files. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the "PROSYM" folder. See the response to KIUC 1-3(b) regarding model run naming conventions. NO_x emissions are labeled as 'NOX' where Units = 'ton/lb' and are in thousands of US tons.

q. The Companies did not model particulate matter emissions as part of the 2024 IRP.

r. See the response to part (p). SO_2 emissions are labeled as 'SO2' where Units = 'ton/lb' and are in thousands of US tons.

s. See the response to part (p). CO_2 emissions are labeled as 'CO2' where Units = 'ton/lb' and are in thousands of US tons.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.29

Responding Witness: Michael S. Sebourn / Stuart A. Wilson

Q-1.29. Regarding the Companies' cost forecasts for new supply-side resources:

a. Please provide all cost forecasts (including sensitivities), in machine-readable Excel format with formulae intact, of new supply-side resource builds, including capital, O&M and fuel costs for each relevant resource:

i. Solar PV

ii. Battery Storage

iii. Wind

iv. Gas CC

v. Gas CT

vi. Any other new supply-side resources modeled

b. Please identify the source for each cost provided, any calculations or processing of those sources' costs used prior to modeling, the supporting analyses and/or documentation for any adjustments made to the primary sources of these forecasts, and federal tax credit assumptions applied in each year for each relevant resource.

A-1.29.

a. See the response to SREA 1-18.

i. See the response to part (a).

ii. See the response to part (a).

iii. See the response to part (a).

iv. See the response to part (a).

v. See the response to part (a).

vi. See the response to part (a).

b. See the IRP, Volume III, Technology Update, especially the Executive Summary and Section 4.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.30

Responding Witness: Michael S. Sebourn / Stuart A. Wilson

Q-1.30. Did the Companies perform any sensitivity analysis on the cost forecasts of new supply-side resource builds?

a. If so, please specify which cost forecast sensitivities were assessed in all resource portfolios and scenarios modeled (i.e., 60 resource plans comprised of three load scenarios, four environmental scenarios, and five fuel price scenarios) for each relevant resource:

i. Solar PV

ii. Battery Storage

iii. Wind

iv. Gas CC

v. Gas CT

vi. Any other new supply-side resources modeled

b. If not, please explain why not.

A-1.30. Yes. The Companies included a sensitivity on solar escalation rates. See Section 4.4.1.3 in the IRP, Volume III, Resource Assessment.

a. See the response to Question No. 1.29.

i. See the response to part (a).

ii. See the response to part (a).

iii. See the response to part (a).

iv. See the response to part (a).

v. See the response to part (a).

vi. See the response to part (a).

b. Not applicable.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.31

Responding Witness: Stuart A. Wilson

Q-1.31. Refer to page 24 of the 2024 IRP Resource Assessment: Generation Planning & Analysis report in IRP Volume III, in which the Companies discuss the key constraints and uncertainties of analysis: "The earliest new NGCC or SCCT can be added is 2030, and the earliest a small modular nuclear reactor can be added is assumed to be 2039. All other resources are assumed to be available in 2028."

a. On what basis did the Companies determine their assumed availability dates for each resource type? Please provide supporting documentation, background materials, and analysis.

A-1.31.

a. See the paragraph beginning, "The earliest that new…" on page 18 in Section 3.1 in the IRP, Volume III, Resource Assessment. See also the response to PSC 1-34.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.32

Responding Witness: Michael S. Sebourn

Q-1.32. Refer to page 24 of the 2024 IRP Resource Assessment: Generation Planning & Analysis report in IRP Volume III, in which the Companies discuss the key constraints and uncertainties of analysis: "Solar generation is limited to 20% of total energy requirements and the sum of solar and wind generation is limited to 25% of total energy requirements."

a. On what basis did the Companies determine their assumed limitations on solar generation (i.e., 20 percent of total energy requirements) and solar and wind generation (i.e., 25 percent of total energy requirements)? Please provide supporting documentation, background materials, and analysis.

b. Are any of the resource portfolios and scenarios modeled by the Companies impacted by these limitations on renewable energy resources? If so, please identify all resource portfolios and scenarios where the limitations are met and in what year(s).

A-1.32.

a. See the response to PSC 1-14.

b. See the response to SREA 1-4.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.33

Responding Witness: Lonnie E. Bellar / Stuart A. Wilson

Q-1.33. Have the Companies considered federal assistance available through the Inflation Reduction Act's Energy Infrastructure Reinvestment (EIR) program (administered by the U.S. Department of Energy's Loan Programs Office) when modeling supply-side resources?

a. If so, please describe how the EIR program was considered in the Companies' modeling.

b. If not, please explain why the Companies did not consider the EIR program.

c. In either case, please describe the Companies understanding of the EIR program.

i. Do the Companies agree that the EIR program provides an opportunity for lower-cost financing of eligible energy projects?

ii. If so, please explain why.

iii. If not, please explain why not.

A-1.33. No. For clarity, the Companies are aware of the EIR program and have previously engaged with the U.S. Department of Energy's Loan Programs Office ("LPO") concerning possible eligibility for Commission-approved projects from the 2022 CPCN (Case No. 2022-00402).

a. Not applicable.

b. First, EIR financing is not guaranteed; rather, there is a formal application process for a limited pool of loan guarantees and related credit subsidy.[5]

Second, there are eligibility requirements for EIR financing.[6] EIR-eligible projects that "retool, repower, repurpose, or replace Energy Infrastructure that has *ceased* operations" are also subject to a proximity requirement that significantly constrains the scope of eligible projects:

> **Proximity Requirement.** The new or updated Title 17-financed infrastructure should be at or near the site of the legacy Energy Infrastructure, to credibly retool, repower, repurpose, or replace the Energy Infrastructure that has ceased operations. Applications that are replacing Energy Infrastructure must show a clear relationship between new services and benefits provided by the Title 17 financed infrastructure and services, and benefits lost from the legacy infrastructure that ceased operations, such as grid capacity, reliability, and workforce retention and opportunities, including if the replacement plan differs from the legacy infrastructure physically and/or geographically.[7]

Projects for *operating* energy infrastructure must "[e]nable[] operating Energy Infrastructure to avoid, reduce, utilize, or sequester air pollutants or anthropogenic emissions of greenhouse gases." Concerning the second portion of the eligibility requirement, the Companies do not consider carbon capture and storage to be a viable option in Kentucky during the IRP study

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[5] *See, e.g.,* https://www.energy.gov/lpo/energy-infrastructure-reinvestment-financing (accessed Dec. 7, 2024).

[6] 10 CFR 609.3(e):

An eligible Energy Infrastructure Reinvestment Project is a project that:

(1) Is located in the United States;

(2) Either:

(i) Enables operating Energy Infrastructure to avoid, reduce, utilize, or sequester air pollutants or anthropogenic emissions of greenhouse gases; or

(ii) Retools, repowers, repurposes, or replaces Energy Infrastructure that has ceased operations; provided that if such project involves electricity generation through the use of fossil fuels, such project shall be required to have controls or technologies to avoid, reduce, utilize, or sequester air pollutants and anthropogenic emissions of greenhouse gases; and

(3) May include the remediation of environmental damage associated with Energy Infrastructure.

[7] U.S. Department of Energy Loan Programs Office, "Program Guidance for Title 17 Clean Energy Financing Program" at 27 (May 19, 2023), available at https://www.energy.gov/lpo/articles/program-guidance-title-17-clean-energy-program#page=1 (accessed Dec. 7, 2024) ("LPO Program Guidance") (emphasis original).

period.[8] Concerning the first part, although the text suggests that projects such as SCR might be eligible, it is noteworthy that none of the "EIR Project Examples" or "Possible EIR Project Areas" included in LPO's "Program Guidance for Title 17 Clean Energy Financing Program" include SCR.[9]

Thus, due to the limited scope of projects to which EIR could apply and the uncertainty of eligible projects receiving an EIR loan guarantee, it was appropriate to use the Companies' cost of capital for modeling purposes in this IRP rather than assume EIR financing.

c. The Title 17 Clean Energy Financing Program offers loan guarantees to support clean energy deployment and energy infrastructure reinvestment and enable borrowers to access long-term, senior debt for the construction of clean energy projects. EIR is one of the categories that determines eligibility of the projects that qualify for the lower-cost loans. EIR projects must retool, repower, repurpose, or replace energy infrastructure that has ceased operations; or enable operating energy infrastructure to avoid, reduce, utilize, or sequester air pollutants or emissions of greenhouse gases. The projects must undergo a rigorous evaluation process by the DOE, including environmental and technical assessments. The application process can take 6-18 months.

   i. The Companies agree that the EIR program provides a credit spread of 37.5 basis points plus the applicable US treasury rate, which is currently lower than the Companies' credit spread. However, there are additional costs that need to be considered in determining whether the EIR program provides an opportunity for lower cost financing. As a result, more diligence is required to make an appropriate determination.

   ii. Not applicable.

   iii. The EIR program offers loans at 37.5 basis points credit spread, which is currently lower than the Companies' credit spread. However, there are additional costs that need to be considered in determining whether the EIR program provides an opportunity for lower cost financing. These costs include, but are not limited to, the engagement of external consultants for environmental studies and assessments, additional borrowing fees, technical and legal due diligence during the application process, and ongoing compliance and monitoring. The Companies would need to evaluate all of these costs to determine whether the loans under the EIR program offer a lower cost financing.

[8] IRP Vol. III, 2024 Technology Update at 17-18.
[9] LPO Program Guidance at 28-30.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.34

Responding Witness: Michael S. Sebourn

Q-1.34. Please refer to Vol. I at 5-12, in which the Companies describe their assumptions related to the coal unit retirements: "For the 2024 IRP, at the Commission's request, the Companies configured PLEXOS to evaluate the economics of all coal unit retirements."

a. Please explain in detail how coal retirement dates were determined for the Companies' resource plans.

b. Please list the retirement dates that were tested in the Companies' IRP modeling for each coal unit and identify which resource portfolios and scenarios tested these retirement dates.

A-1.34.

a. In all scenarios, the Companies' PLEXOS model evaluated coal unit retirements on an economic basis for all units starting in 2030. Brown 3 and Mill Creek 3 and 4 were modeled as required to retire on or before a certain date due to landfill storage constraints as discussed in Section 5.3.4 of the IRP, Volume III, Resource Assessment.

b. See the response to part (a).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.35

Responding Witness: Philp A. Imber / Michael S. Sebourn

Q-1.35. Regarding the Good Neighbor Plan for the 2015 Ozone National Ambient Air Quality Standards ("Ozone NAAQS"):

a. Do all of the Companies' portfolios and scenarios/sensitivities modeled in the 2024 IRP meet the requirements of the rule?

i. If so, please provide a list of the modeling runs that meet the rule's requirements.

ii. If so, please explain how compliance is achieved for each of the Companies' coal-fired units in each compliant plan.

iii. If not, explain why not.

iv. If not, please provide a list of the modeling runs that do not meet the rule's requirements.

b. Please provide the Companies' understanding of the compliance requirements for each of their coal-fired units.

c. Please provide the most recent capital and O&M cost estimates for Good Neighbor Rule compliance at each of the Companies' coal-fired units.

i. To the extent these capital and O&M costs were included in the IRP, please specify in what scenario(s).

d. Please provide forecasts of NOX allowance prices reviewed by the Company in the past two years.

e. Please provide forecasts of NOX allowance prices and costs for each of the Companies' coal-fired units for all portfolios modeled in the 2024 IRP.

A-1.35.

a. No. In one of four environmental scenarios, the Companies assumed the GNP would not take effect.

   i. All resource plans under three of four environmental scenarios achieve compliance with the GNP: Ozone NAAQS, Ozone NAAQS + ELG, and Ozone NAAQS + ELG + GHG.

   ii. All units in the Companies' fleet besides Mill Creek Unit 1, Mill Creek Unit 2, and Ghent Unit 2 operate selective catalytic reduction ("SCR") that can achieve the NOx emissions rate requirement of the GNP. Mill Creek Unit 1 and Unit 2 are anticipated to cease operation prior to the compliance need for an SCR. In the environmental scenarios reference in part (a)(i), Ghent Unit 2 achieves GNP compliance through one of three methods: installation of SCR by 2030, retirement by 2030, or by operating only in the non-ozone season (i.e., October through April) beginning in 2030.

   iii. The Companies evaluated a No New Regulations environmental scenario that assumes the Good Neighbor Plan (related to the National Ambient Air Quality Standards ("NAAQS") for ozone, "Ozone NAAQS"), 2024 Effluent Limit Guidelines ("ELG"), and recent Clean Air Act ("CAA") Section 111(b) and (d) Greenhouse Gas ("GHG") Rules or their equivalents do not take effect over the IRP planning period, and no new regulations are implemented through the end of the IRP planning period (2039) that require significant investment for environmental compliance.

   iv. All resource plans under the No New Regulations environmental scenario do not achieve compliance with the GNP.

b. As currently written and stayed from implementation, the expectation of the GNP for all coal-fired units owned by the Companies, except Ghent Unit 2, and Mill Creek Units 1 and 2, is to achieve an emission rate of 0.080 pounds of nitrogen oxide ("NOx") per million British thermal units ("lb/MMBtu") or lower during the ozone season. This can be achieved through the use of their SCR equipment. The GNP's NOx allowance trading mechanisms will issue an initial set of allowances based on the 0.080 lb/MMBtu emission rate and historic operation of each unit. As with all emission allowance trading programs, annual reconciliation of unit emissions with that unit's bank of allowances will occur to ascertain whether the unit was in or out of compliance with the GNP requirements.

   After the initial allocation period, additional allowances will be issued by EPA under the GNP's dynamic budgeting process based on recent operation

of the unit. The annual reconciliation of emissions and allowances continue. However, the GNP's bank recalibration mechanism may reduce a unit's bank of allowances based on EPA's target for the allowed amount of banked allowances. Additionally, the GNP set a *daily* backstop limit of 0.14 lb/mmBtu which units must meet or be required to surrender additional allowances.

Regarding Ghent Unit 2, all of the above would also apply except, for continued operation of the unit, an SCR would need to be installed. With a new SCR installation, the GNP expects a NOx emission rate of 0.05 lb/mmBtu to be achieved. Initial allocations would be set on that expectation. The remainder of the GNP would be run the same as previously mentioned.

Regarding Mill Creek Units 1 and 2, their impending retirements will likely not require implementation of the GNP. Mill Creek Unit 1 will retire before January 1, 2025. Therefore, Mill Creek Unit 1 will not be required to implement the GNP if and when the stay is lifted. If the stay of the GNP were lifted, the initial compliance timelines would likely be extended to a period beyond the retirement of Mill Creek Unit 2 in 2027.

c. As stated in Section 5.3.2 of the Resource Assessment in Volume III, the capital cost of an SCR for Ghent 2 is estimated at $137.8 million for a 2030 commissioning, with ongoing incremental capital and O&M costs of approximately $1.3 million in 2030 dollars. The Companies do not anticipate any GNP compliance costs for coal units other than Ghent 2.

    i. See Tables 12-14, Tables 17-20, and Tables 22-24 of the Resource Assessment in Volume III. These costs were considered in all these environmental scenarios and were incurred in resource plans with 'Add GH2 SCR' in 2030.

d. In addition to the forecast referenced in the response to part (e), see the attachment being provided in a separate file. Certain information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

e. See Table 40 on page 69 of Volume III, Resource Assessment.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.36

Responding Witness: Lonnie E. Bellar / Philip A. Imber / Michael S. Sebourn

Q-1.36. What analysis, research, or other considerations have the Companies performed regarding the early retirement of any of their coal-fired units to avoid Effluent Limitation Guidelines (ELG), Coal Combustion Residual (CCR), Mercury Toxics Standards (MATS) or Regional Haze compliance costs?

a. Please provide supporting documentation, background materials, and analysis (in machine-readable Excel format with formulae intact).

b. For each coal-fired unit*:* Has it been considered for early retirement for any of the listed rules? Why or why not? Include what specific rules led to that consideration.

c. For each coal-fired unit*:* Please provide the costs of compliance with each of these rules that were modeled in the IRP and supporting documentation for those costs.

d. Please provide the costs of compliance with each of these rules developed by or for the Companies in the past two years.

A-1.36. Among these regulations, the Companies evaluated compliance with the 2024 ELG as part of this IRP.

a. See Sections 4.4.1.3 and 4.4.2.3 of the Resource Assessment in Volume III.

b. To date, Regional Haze has not been a driver for early retirements of the Companies' coal-fired units. Mill Creek is the Companies' primary asset historically impacted by Regional Haze. The Companies' units are all in compliance with the rule, and Kentucky is on track to achieve the Regional Haze standards' long-term goal of restoring natural visibility conditions by 2064. Mill Creek Units 1 and 2 have scheduled retirements, and Mill Creek Units 3 and 4 have state of the art air quality control systems that address

emissions related to the Regional Haze Rule. The Companies do not anticipate additional capital or operating expenses that drive early retirement dialog on these units.

The MATS rule does not appear to be a driver for early retirements. All the Companies' coal-fired units have state of the art pulse jet fabric filters for particulate matter control and continuous emissions monitoring systems that achieve MATS compliance.

The CCR Rule does not impact generation decisions until there is a shortage of landfill space. Although not specifically as a result of the CCR Rule, landfill space is a constraint and factors into the retirement of Brown and Mill Creek units in the Recommended Resource Plan.

For ELG, Brown Unit 3 and Mill Creek Units 3 and 4 are candidates for executing the early retirement option because of landfill space and compliance costs. The remaining units in the fleet at Trimble County and Ghent are not being considered for early retirement given that continued operation is a lower cost option across all modeled fuel price scenarios.

c. Capital and O&M associated with ELG compliance is in rows 148-183 of the FixTime tab of the Financial Model. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at "FinancialModel\CONFIDENTIAL_20241001_FinancialModel_03_ELG_0328.xlsx". For supporting documentation, see the response to SC 1-9(b).

d. See the response to part (c). The 2024 ELG was promulgated in 2024, so no compliance cost estimates were developed prior to the IRP.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.37

Responding Witness: Philip A. Imber / Michael S. Sebourn / Stuart A. Wilson

Q-1.37. In April 2024, U.S. EPA issued final new Clean Air Act carbon pollution standards for coal- and gas-fired power plants ("section 111(d)") that will require these resources to employ capacity factor limitations, co-firing, and/or carbon capture and storage (CCS) to continue operations into the future.

a. Which of the Companies' portfolios meet the requirements of the U.S. EPA's proposed CO2 emission limits?

i. For each portfolio, please explain how compliance is achieved for each coal- and gas-fired unit, including: timing of compliance, constraints imposed on those units, and costs of compliance (where appropriate).

ii. For any portfolios and scenarios/sensitivities not in compliance with section 111(d), please explain why not and the costs of non-compliance anticipated by the Companies.

b. Please explain the Companies' rationale for including environmental regulation scenarios that do not comply with section 111(d).

c. Please explain how scenarios that assumed 111(d) provisions would be stayed or appealed accounts for regulatory risk of carbon emitting generating sources.

A-1.37.

a. All resource plans under the Ozone NAAQS + ELG + GHG environmental scenario meet the requirements of the 111(d) requirements for coal- and gas-fired power plants.

i. Regarding the timing of compliance and constraints imposed, see Sections 4.4.1.4 and 4.4.2.4 of the Resource Assessment in Volume

III. The costs of compliance vary by resource plan and cannot be precisely calculated by unit – in some instances, coal-fired units are retrofitted to co-fire natural gas or converted to fully burn natural gas, while in other instances, coal-fired units are retired and replaced with varying amounts of NGCC, SCCT, and SMR capacity. The costs of co-firing and conversion retrofits are available in rows 184-291 of the FixTime Tab of the Financial Model. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at "FinancialModel\CONFIDENTIAL_20241001_FinancialModel_04_111_0328.xlsx".

ii. Resource plans associated with the No New Regulations, Ozone NAAQS, or Ozone NAAQS + ELG environmental scenarios do not comply with section 111(d). The Companies assume no cost of non-compliance as these scenarios assume 111(d) is not implemented.

b. There is uncertainty in environmental regulations, particularly with regard to carbon regulations, as past iterations such as the Clean Power Plan were not ultimately implemented. To account for this uncertainty, the IRP models four scenarios that are bookended by the concept of no new environmental regulation requirements (the new rules do not take effect, resulting in continuation of status quo operation) and the concept of compliance to the emissions reductions requirements of each of the existing rules (Ozone NAAQS, ELG, and GHG). The rationale of choosing scenarios that bookend a *do nothing* construct and a *do everything* construct is to convey the full range of environmental regulation impacts on generation planning and support the development of a "no regrets" Recommended Resource Plan.

c. The development of a "no regrets" Recommended Resource Plan requires an analysis of scenarios that assume the 111(d) provisions do not take effect. The near-term resources in the Recommended Resource Plan are needed regardless of whether GHG regulations take effect and therefore provide a foundation for GHG compliance if they do. For example, the least-cost resource plans in the Ozone NAAQS + ELG + GHG scenario include at least two NGCCs by 2032 and between six to eight NGCCs through the analysis period, even though NGCCs are limited to a 40% capacity factor in 2032. The development of the Recommended Resource Plan is especially prudent given the sizeable $5.6 billion incremental cost of the GHG regulations (see Section 4.4.2.4 of the Volume III, Resource Assessment).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.38

Responding Witness: Philip A. Imber / Charles R. Schram / David L. Tummonds / Stuart A. Wilson

Q-1.38. Please refer to page 25, of the *2024 IRP Resource Assessment: Generation Planning & Analysis* report in IRP Volume III, in which the Companies discuss their *Ozone NAAQS + ELG + GHG* environmental regulation scenario: "Retiring generation is a compliance alternative for the GHG Rules, but retirements require reliable replacement capacity. Replacing generation at the scale necessary for compliance is not reasonable on the GHG Rules' timeline. Therefore, the Companies assign a low likelihood to this scenario."

a. On what basis did the Companies determine that replacing generation at the scale necessary for compliance is not reasonable on the GHG Rules' timeline? Please provide supporting documentation, background materials, and analysis.

b. Please provide a detailed explanation of the decision-making behind assigning a low likelihood to the Ozone NAAQS + ELG + GHG.

c. Please provide a discussion of the Companies' understanding of whether or not Ozone NAAQS + ELG + GHG is unique among the scenarios modeled in the 2024 IRP in terms of meeting Clean Air Act requirements.

d. What are the consequences to the Companies of the assumed low likelihood of the Ozone NAAQS + ELG + GHG scenario?

    i. Do the Companies anticipate a failure to comply with certain federal requirements? If so, please explain.

    ii. Do the Companies anticipate non-compliance costs? If so, please explain.

A-1.38.

a. Of the three noted GHG compliance strategies (carbon capture and storage, natural gas co-firing, and unit retirement and replacement), the one requiring "replacing generation" requires coal assets to be retired by end of 2031. The least-cost replacement asset compliant with GHG and KRS 278.264 would be NGCC limited to a 40% capacity factor. Replacing the energy produced by the retiring coal units would require eight to twelve MC5-sized units to enter commercial operation by end of 2031. Given increased market demand for both the original equipment manufacturer ("OEM") power island products and the required EPC construction to accompany that purchase, appropriate OEM production slots have become substantially more difficult to secure with increasingly longer lead times. Specifically, production slots for units entering commercial operation by end of 2030 are expected to be exhausted by March 31, 2025, and similar exhaustion is expected for units entering commercial operation by end of 2031 by March 31, 2026. Given the preference to gain greater certainty on the outcome of current legal challenge to the rule, the overwhelmingly likely further demand pressure on the largely inelastic OEM supply to follow an unfavorable ruling on the noted legal challenge, and the time required for the regulatory approval to follow, securing the referenced eight to twelve MC5-sized units and completing construction and commissioning by December 31, 2031, is highly unlikely. Furthermore, securing gas transportation services for eight to twelve additional NGCC units will likely require interstate pipeline upgrades that will take at least four years to complete.

b. Assigning a low likelihood of GHG surviving is based on the evaluation of the Companies' environmental and regulatory experts, the evaluation of comments submitted to the proposed rule, and the evaluation of the litigation positions on the final rule. Simply put, attempting to achieve the best system of emission reduction scenarios of the GHG rule while maintaining reliable service is risky. As stated in the Companies' comments to the proposed rule in 2023, the rule poses significant grid reliability risks due to premature generation retirements and potential generation shortfalls. Load growth developments that surfaced after these comments exacerbate the reliability concerns and the increase of the quantity of generating units required to replace capacity and achieve the load demand. The Companies' assertion of low likelihood is supported by the supply chain, construction and infrastructure concerns addressed in the response to part a. above, as well as the statement of Justices Kavanaugh and Gorsuch accompanying the U.S. Supreme Court's denial of applications to stay the GHG Rules while on appeal, in which Justices Kavanaugh and Gorsuch stated:

> [T]he applicants have shown a strong likelihood of success on the merits as to at least some of their challenges to the Environmental Protection Agency's rule. But because the applicants need not start compliance work until June 2025,

> they are unlikely to suffer irreparable harm before the Court of Appeals for the D.C. Circuit decides the merits. So this Court understandably denies the stay applications for now. Given that the D.C. Circuit is proceeding with dispatch, it should resolve the case in its current term. After the D.C. Circuit decides the case, the nonprevailing parties could, if circumstances warrant, seek appropriate relief in this Court pending this Court's disposition of any petition for certiorari, and if certiorari is granted, the ultimate disposition of the case.[10]

Finally, in the alternative world that the GHG rule survives, Companies would need the generation requested, "no regrets," and accelerate implementation of additional generation to support transitioning the overall fleet to lower carbon emitting resources.

c. As of the date of the Companies' 2024 IRP filing, the Ozone NAAQS + ELG + GHG scenario was the only environmental scenario that would satisfy all final Clean Air Act requirements then promulgated by the U.S. Environmental Protection Agency irrespective of the court-imposed stays or legal challenges pending concerning such requirements. Given the results of the recent federal elections, the future of such requirements is unclear.

d. See the response to Question No. 1.37(c). The consequence is low given that the near-term resources in the Recommended Resource Plan support GHG compliance.

   i. No, compliance is a core value of the Companies.

   ii. No, the Companies will comply with all federal operating requirements.

[10] *West Virginia v. Environmental Protection Agency*, 604 U.S. ___ (2024), available at https://climatecasechart.com/wp-content/uploads/case-documents/2024/20241016_docket-24A95_order.pdf (accessed Dec. 14, 2024). Justice Thomas noted that he would have granted the stay. *Id.*

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.39

Responding Witness: Tim A. Jones

Q-1.39. Please refer to "Key Forecast Assumptions and Uncertainties" in Section 5 of IRP Volume I, in which the Companies provide brief descriptions of a set of load components that influence their three load forecast scenarios.

a. Please further explain the Companies' methodological approach for developing its Low, Mid, and High load scenarios for each of the following load impact components, including but not limited to data sources, assumption explanations, detailed tables of assumption values, and justifications for the selected assumptions. Please include background materials and citations for data and assumption sources:

i. Customer growth

ii. Heating electrification

iii. Electric Vehicles

iv. Distributed generation

v. Major accounts

vi. Efficiency gains

vii. Economic development

A-1.39.

a. For all additional portions of this response below, see the response to SC 1-10.

i. See Section 7.(7).(b) of IRP Volume I (5. Customer Growth).

ii. See Section 7.(7).(b) of IRP Volume I (9. Space Heating Electrification).

iii. See Section 7.(7).(b) of IRP Volume I (8. Electric Vehicles).

iv. See Section 7.(7).(b) of IRP Volume I (7. Distributed Generation and Battery Storage).

v. See the response to SREA 1-27.

vi. See Section 7.(7).(b) of IRP Volume I (4. Energy Efficiency).

vii. See Section 7.(7).(b) of IRP Volume I (1. Economic Development).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.40

Responding Witness: Tim A. Jones

Q-1.40. Please refer to Figures 5-12, 5-13 and 5-14 on pages 5-23 and 5-24 in Section 5 of IRP Volume I, in which the Companies provide differences between their Low and High load forecast scenarios and their Mid load forecast scenario.

a. For each of the Companies' Low, Mid, and High load forecast scenarios (2024 through 2039), please provide the following data, in machine-readable Excel format with formulae intact including supporting analyses and/or documents. Include KU, LG&E, and combined data, disaggregated by load impact components (i.e., customer growth, heating electrification, electric vehicles, distributed generation, major accounts, efficiency gains, and economic development):

i. Energy requirements forecast (in GWh), disaggregated by load components

ii. Summer peak forecast (in MW), disaggregated by load components

iii. Winter peak forecast (in MW), disaggregated by load components

A-1.40.

a.

i. See the responses to SC 1-10 and SC 1-20.

ii. See the responses to SC 1-10 and SC 1-20.

iii. See the responses to SC 1-10 and SC 1-20.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.41

Responding Witness: Tim A. Jones

Q-1.41. Please refer to Figure 5-8 and "1. Economic Development" on page 5-16 and 5-17 in Section 5 of IRP Volume I, in which the Companies show their economic development growth projections for the Low, Mid, and High load scenarios. Please clarify whether the data shown in Figure 5-8 is measured in megawatts (MW)—as stated in the y-axis label—or gigawatt-hours (GWh)—as stated in the figure caption.

A-1.41. The correct measurement for the data shown in Figure 5-8 is megawatts (MW).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.42

Responding Witness: Tim A. Jones

Q-1.42. Please refer to "5. Cost of Service" on page 5-19 in Section 5 of IRP Volume I, in which the Companies describe how electricity prices are considered in the electric load forecasts: "[T]he Mid load forecast represents the Companies' view of the most likely development in end-use saturations and efficiencies, electric vehicle adoption, distributed energy resources, and economic conditions in the service territory, all of which are impacted by electricity prices. Electricity prices are assumed to increase by 2.3 percent per year, consistent with long-term inflation expectations."

a. Please confirm that the increase in electricity prices "by 2.3 percent per year" is applied to all three of the Companies' load forecast scenarios.

b. If so, please explain why the Companies did not consider different electricity price assumptions among its Low, Mid, and High load forecast scenarios.

c. If not, please provide electricity price forecasts by load scenario.

A-1.42.

a. Confirmed.

b. See the IRP at 5-19. Electricity demand is relatively inelastic. Higher or lower prices relative to overall inflation would result in a lower or higher load forecast, but forecast changes would be small. Importantly, for such price changes to have an effect on demand, they would have to depart significantly from general inflation, which includes changes in wages and costs of other goods; *relative* price changes are relevant, not *absolute* price changes considered in isolation.

While not modeled as a function of electricity prices, the construction of the low load scenario with high distributed solar, low EVs, accelerated energy efficiency, and low space heating electrification is consistent with high prices.

Similarly, high EV adoption alongside low distributed solar and EE adoption in the high load forecast is consistent with low electricity prices.

c. Not applicable. See the response to part (b).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.43

Responding Witness: Tim A. Jones

Q-1.43. Please refer to "5. Cost of Service" on page 5-19 in Section 5 of IRP Volume I, in which the Companies describe the negative price elasticities within their forecasting models: "If higher-than-expected prices materialize, the Companies anticipate a decline in sales as compared to the current forecast (all else equal) due to the negative price elasticities incorporated into the forecasting models."

a. Please describe and provide the values of the Companies' assumed negative price elasticities between electricity prices and electric sales.

A-1.43.

a. See "5. Cost of Service" in Section 7.(7).(b) of IRP Volume I.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.44

Responding Witness: Tim A. Jones

Q-1.44. Please refer to "6. Customer Growth" on page 5-19 in Section 5 of IRP Volume I, in which the Companies describe their customer growth assumptions: "A potential for [sic] upside for Kentucky's economy is rapid growth in the state's housing market. S&P Global is forecasting total housing starts in Kentucky to be the eighteenth highest in the United States during 2024. Further, the forecasted 2024-2039 growth rate averages tenth in the US as compared to the average rate over the previous ten years."

a. Please provide the following data for the Companies' customer growth projections, in machine-readable Excel format with formulae intact, for the Low, Mid, and High load scenarios (2024 through 2039), including KU, LG&E, and combined:

i. Customer counts (# of customers), disaggregated by customer class

ii. Average annual use-per-customer (kWh), disaggregated by customer class

A-1.44.

a.

i. Only residential customer growth changes by scenario. See KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers—PUBLIC.zip at IRP_Workpapers\Vol_I_Data\RS_Cust_Growth_CAGR.xlsx

ii. See attachment being provided in a separate file for residential use-per-customer by scenario.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.45

Responding Witness: Tim A. Jones

Q-1.45. Please refer to "7. Distributed Generation and Battery Storage" on page 7-19 in Section 7 of IRP Volume I, in which the Companies describe their forecasts related to distributed generation: "While batteries may be the most feasible of all options in terms of physical location, their LCOE is not competitive when compared to solar under the Companies' current rate design."

a. Is the Companies' assessment of energy storage based on its utility as an energy resource (like solar) rather than a capacity resource? Please explain the Companies direct comparison of the competitiveness of solar versus storage.

b. Please provide the quantitative comparison of solar and storage resources assumed capabilities and limitations used by the Companies in developing the 2024 IRP. Please include analysis, background materials, and detailed citations.

c. What external factors (economic outlook, market forecasts, existing or expected policies, etc.) have the Companies considered in developing their predictions related to energy storage that could result in increased adoption rates within their service territories?

i. If so, please describe which external factors were considered.

ii. If not, please explain why not.

A-1.45.

a. "LCOE" in the quoted text should be "ROI" ("return on investment"). ROI more accurately reflects the metric that customers would use if comparing distributed batteries to distributed solar.

Energy storage will only increase a residential customer's total electricity consumption due to round-trip losses associated with charging and discharging. Most residential customers today are served on a rate that currently does not have a demand component, so there is no financial value of capacity to most residential customers. Additionally, for customers served on the Residential Time-of-Day Energy rate, the cost differential between on- and off-peak hours does not provide a significant battery arbitrage opportunity. The NMS-2 rate is similar in that the costs of offsetting electricity is not materially different than the rate paid for selling electricity back to the grid, so once again there is no significant arbitrage opportunity that a battery provides to NMS-2 customers.

Distributed solar, however, serves to reduce electricity consumed from the grid and gets a credit for energy sold back to the grid. For this reason, solar is a better option than batteries when compared head-to-head for residential customers.

b. For the blended compensation analysis for solar under RS, GS, and PS rates, see KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers—PUBLIC.zip at IRP_Workpapers\Vol_I_Data\PV\Price Needed for Energy Exported to Grid to Meet Total Project Costs_SAW_25BP_GP_IRP.xlsx.

   For the Companies' most recent quantitative analysis of distributed storage, see the Companies' response to PSC 1-35 in Case No. 2022-00402, filed March 10, 2023.[11]

c. No external factors were considered.

   i. See the response to part (c)(ii).

   ii. The Companies work to develop forecasts that reflect customer behaviors based upon the economics of end-uses given available incentives. Based on data available to the Companies through net metering applications, battery storage is not widely adopted in the Companies' service territories today despite the Inflation Reduction Act providing credits for battery storage. Based on that same data, since IRA incentives have been available to customers, the rate of battery storage adoption has actually slowed (from its already low level), as demonstrated in IRP Volume I, page 7-19, Figure 7-3.

[11] Available at https://psc.ky.gov/pscecf/2022-00402/rick.lovekamp%40lge-ku.com/03102023102544/02-PSC_DR1_LGE_KU_Responses.pdf.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.46

Responding Witness: Tim A. Jones

Q-1.46. Please refer to "8. Electric Vehicles" on page 5-22 in Section 5 of IRP Volume I, in which the Companies describe the primary factors that influence EV electric consumption: "The primary factors impacting total electricity consumption by EVs are the number of EVs and the distance driven per vehicle, though the timing of EV charging is at least equally important for resource planning."

a. Please provide the following data, in machine-readable Excel format with formulae intact, for the Low, Mid, and High load scenarios (2024 through 2039):

i. Number of electric vehicles in operation

ii. Average distance driven per vehicle

iii. Assumed consumption (kWh) per unit of distance

A-1.46.

a.

i. See the response to SC 1-18(c).

ii. See provided workpaper "KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath Electric_Load_Forecast\Electric\Forecasts\EV\EV_forecast_results_25BP_final.xlsx". Specifically, tabs "Base_sales", "High_sales", and "Low_sales".

iii. See the response to part (a)(ii).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.47

Responding Witness: Tim A. Jones

Q-1.47. Please refer to "7.(7).(f) Research and Development" on page 7-37 of IRP Volume I, stating: "Customer behavior is a key component to robust load forecasting. Since the last IRP, the Companies have surveyed their residential customers to see the kinds of decisions they are making when it comes to home appliances, distributed generation, and other energy-related topics." Please describe and provide the results of each such survey effort.

A-1.47. See attachments being provided in separate files.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.48

Responding Witness: Tim A. Jones

Q-1.48. Please refer to "9. Space Heating Electrification" on page 7-31 in Section 7 of IRP Volume I, in which the Companies describe their forecasts related to space heating electrification.

a. Please provide detailed data, justification, and citations for the Companies' assumptions on space heating electrification as it relates to their load forecasts.

b. Please provide the Companies' forecasts of space heating electrification by technology type and customer type in the Low, Mid, and High load scenarios (2024 through 2039)?

c. What electric space heating technologies (e.g., electric resistance, air-source heat pumps, ground-source heat pumps, networked geothermal, etc.) are being modeled in the Companies' load forecasts?

d. What assumptions regarding customers' heating with electric resistance heating are included in the Companies' load forecasting? Please provide the following in machine-readable Excel format with formulae intact:

   i. Customer counts

   ii. Costs

   iii. Operating characteristics

e. What assumptions regarding customers' heating and cooling with heat pump technologies are included in the Companies' load forecasting? Please provide the following in machine-readable Excel format with formulae intact:

   i. Customer counts

ii. Costs

iii. Operating characteristics

f. What assumptions regarding load impacts due to increased adoption of air conditioning over time are included in the Companies' load forecasting? Please describe how this is included in the Companies' modeling.

A-1.48.

a. Forecasted changes in space heating electrification are driven primarily by electric heating saturation inputs to the Companies' statistically-adjusted end-use ("SAE") models. Specifically, forecasted changes are explained by the rates of change in these inputs over the forecast period relative to history. For the inputs to the SAE models see KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers—CONFIDENTIAL.zip at:

- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\KU\Data\CONFIDENTIAL_KU EastSouthCentralRes23.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\KU\Data\IRP\CONFIDENTIAL_KU EastSouthCentralRes23_HP_HighCase.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\KU\Data\IRP\CONFIDENTIAL_KU EastSouthCentralRes23_HP_LowCaseHalve.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\LE\Data\CONFIDENTIAL_LE EastSouthCentralRes23.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\LE\Data\IRP\CONFIDENTIAL_LE EastSouthCentralRes23_HP_HighCase.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\LE\Data\IRP\CONFIDENTIAL_LE EastSouthCentralRes23_HP_LowCaseHalve.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\ODP\Data\CONFIDENTIAL_OD EastSouthCentralRes23.xlsx

b. The SAE modeling framework does not provide this information. See the response to part (a).

c. The SAE modeling framework considers electric furnaces, air-source heat pumps, ground-source heat pumps, and unspecified secondary heating. See the response to part (a).

d. Electric end-uses are modeled primarily through saturation and efficiency inputs to the Companies' SAE models. See the response to part (a).

i. Customer counts by end-use are not inputs to the SAE modeling framework.

ii.-iii. See the response to part (a). The cost and operating characteristics of electric resistance heating are presumably reflected in the EIA's end-use saturation and efficiency forecasts.

e. See the responses to part (d).

i. See the responses to part (d).

ii. See the responses to part (d).

iii. See the responses to part (d).

f. The impact of changes in air conditioning adoption is forecasted primarily by saturation inputs to the Companies' SAE models. See the response to part (a).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.49

Responding Witness: John Bevington / Tim A. Jones / Elizabeth J. McFarland / Michael S. Sebourn

Q-1.49. Please refer to page 7-12 through 7-13 in Section 7 of IRP Volume I, in which the Companies describe the benefits of data centers: "Given the nature of their operations, data centers have extremely high load factors – upwards of 95%. Energy intensive data centers are crucial to consumers, businesses, and the safety and security of our nation. They support critical business applications, store valuable business and personal data, keep data safe from threats, and serve as a foundation for modern business and government applications."

a. Please describe how these benefits associated with data centers are relevant to ratepayers.

b. What transmission planning and/or analyses have the Companies conducted in relation to anticipated load growth from data centers? Please provide supporting documentation, background materials, and analysis (in machine-readable Excel format with formulae intact).

c. What reliability planning and/or analyses have the Companies conducted in relation to anticipated load growth from data centers? Please provide supporting documentation, background materials, and analysis (in machine-readable Excel format with formulae intact).

d. What requirements for curtailable potential are assumed in the Companies modeling in relation to anticipated load growth from data centers? Please provide supporting documentation, background materials, and analysis (in machine-readable Excel format with formulae intact).

e. What requirements for data centers investment in on-site battery energy storage systems (BESS) are assumed in the Companies' modeling in relation to anticipated load growth from data centers? Please provide supporting

documentation, background materials, and analysis (in machine-readable Excel format with formulae intact).

A-1.49.

a. The quoted text is taken out of context. The paragraph in which this text appears begins with the sentence, "Multiple sources are projecting significant data center growth in the United States through 2030." The purpose of the paragraph, including the cited text, is to demonstrate that data centers and their energy consumption are likely to grow rapidly due to their importance to a variety of key consumer, business, and governmental functions and needs. Notably, this paragraph appears in the IRP section "Load Forecasting Methodology Description and Discussion," and in the portion of the subsection "Key Assumptions and Judgments" that addresses economic development, including data centers, as being among "key energy requirement forecast assumptions and uncertainties."[12] Importantly, the quoted text does not assert that any of the listed attributes of data centers are benefits to utility customers *as ratepayers*, contrary to the implication of the request.

Moreover, unlike the position certain intervenors have taken in other proceedings involving the Companies,[13] nowhere in the IRP do the Companies advocate for quantifying non-energy benefits of any kind and including them alongside energy-related benefits and costs in the Companies' quantitative analysis. The Companies' approach to non-energy benefits is consistent with the Commission's long-held position on this issue.[14]

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[12] IRP Vol. I at 7-12.

[13] *See, e.g., Electronic Joint Application of Kentucky Utilities Company and Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Site Compatibility Certificates and Approval of a Demand Side Management Plan and Approval of Fossil Fuel-Fired Generation Unit Retirements*, Case No. 2022-00402, Order at 164 (PSC Ky. Nov. 6, 2023) ("Joint Intervenors requested that the Commission require LG&E/KU to include nonenergy benefits in the DSM-EE cost/benefit analysis."). Notably, the Commission did not grant the Joint Intervenors' request. *See id.* at 168-69.

[14] *See, e.g., Electronic Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for Review, Modification, and Continuation of Certain Existing Demand-Side Management and Energy Efficiency Programs*, Case No. 2017-00441, Order at 28-29 (Ky. PSC Oct. 5, 2018); *The 2011 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company*, Case No. 2011-00140, Order at 5 (Ky. PSC June 10, 2011); *Application of Kentucky Utilities Company for Certificates of Public Convenience and Necessity and Approval of its 2009 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2009-00197, Order at 8 (Ky. PSC Dec. 23, 2009); *Joint Application Pursuant to 1994 House Bill No. 501 for Approval of Kentucky Power Company Collaborative Demand-Side Management Programs, and for Authority to Recover Costs, Net Lost Revenues and Receive Incentives Associated with Implementation of Three New Residential Demand-Side Management Programs Beginning January 1, 2009*, Case No. 2008-00349, Order at 4 (Ky. PSC Dec. 4, 2008), Order at 1, 3-4 (Ky. PSC Dec. 16, 2008), Order at 2-4 (Ky. PSC Jan. 12, 2009); *The 2008 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company*, Case No. 2008-00148, Order at 5-6 (Ky. PSC July 18, 2008).

b. The Companies have not conducted transmission planning or analyses concerning the generic load growth from data centers modeled in the IRP. (See the response to PSC 1-21.) Transmission planning and related costs for such large potential customers is highly location-specific. For transmission planning and analyses conducted by the Companies for specific potential data center loads, see attachment being provided in a separate file. Note that the files are being provided in their native format, not necessarily in Excel because exporting to Excel either is not possible or would result in inoperable or incomprehensible files. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection. See the response to Question No. 1.61 for the procedures for interconnecting a new customer.

c. The Companies developed minimum reserve margins for resource planning in the context of the Mid load forecast, which includes 1,050 MW of data center load. See Volume III, 2024 IRP Resource Adequacy Analysis and supporting work papers.

d. None. See the response to SC 1-12(e).

e. None.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.50

Responding Witness: John Bevington

Q-1.50. The following requests concern the service requirements of potential new data center customers.

a. To the extent known, what level of interest in participation in the "Green Tariffs" do the Companies expect from potential new data center customers? Please explain.

i. If unknown, please explain at what stage in the process of negotiating with a potential new data center customer that the Companies would be aware of interest in the Green Tariffs?

b. To the extent known, what is the likelihood that a new data center customer would be interested in participating in demand response programs.

i. If unknown, please explain at what stage in the process of negotiating with a potential new data center customer that the Companies would be aware of interest in demand response programs?

c. To the extent known, what is the likelihood that a new data center customer will rely on behind-the-meter resources, including solar, battery storage, and fuel-dependent generators.

i. If unknown, please explain at what stage in the process of negotiating with a potential new data center customer that the Companies would be aware of a customer's interest in behind-the-meter generation?

A-1.50.

a. Unknown

i. Prior to the "announced" phase of the project.

b. Active data center projects are indicating very high load factors. Therefore, it seems unlikely that they will be interested in demand response programs generally. Certain projects may be an exception, but it is unknown how to project the likelihood. See the response to SC 1-12(e).

    i. Prior to the "announced" phase of the project.

c. Unknown. See the response to SC 1-12(e).

    i. Prior to the "announced" phase of the project.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.51

Responding Witness: Tim A. Jones

Q-1.51. Please provide a breakdown of peak MW and MWH of industrial load by sector and season. This could be provided using NAICS or SIC or a comparable segmentation.

A-1.51. The Companies do not forecast industrial load by sector using NAICS, SIC, or a comparable segmentation.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.52

Responding Witness: Lana Isaacson / Michael S. Sebourn / Stuart A. Wilson

Q-1.52. Please refer to page 19 of the 2024 IRP Resource Assessment: Generation Planning & Analysis report in IRP Volume III, in which the Companies discuss their dispatchable DSM programs: "The dispatchable DSM programs in the 2024-2030 DSM-EE Program Plan are modeled as existing resources and are assumed to grow throughout the 15-year planning horizon. In addition to these resources, the new dispatchable DSM program measures in Table 4 provide alternative means for customers to participate in existing programs."

a. What are the growth assumptions for existing dispatchable DSM programs associated with the 2024-2030 DSM-EE Program Plan throughout the 15-year planning horizon?

b. Are the dispatchable DSM programs available for model selection in portfolio modeling separate from and additional to the Companies' expected distributed generation and energy efficiency measures included in their load forecasts? Please explain.

c. Please clarify how the Companies distinguish between existing and new dispatchable DSM in their modeling by listing for each resource type:

i. What DSM resources are modeled as supply and modeled as demand;

ii. What DSM resources are classified as existing and as new dispatchable;

iii. Providing costs and other functional characteristics.

A-1.52.

a. The forecasted capacity growth for each dispatchable DSM program is shown in Table 8-16 on page 8-26 of IRP Volume I.

b. Yes. While the combined impact of company-sponsored energy efficiency programs and customer-initiated energy efficiency improvements is reflected in the load forecast, dispatchable DSM programs are modeled as resources in PLEXOS.

c. Existing dispatchable DSM programs include all dispatchable programs either already in place before the 2024-2030 DSM-EE Program Plan or those included in the 2024-2030 DSM-EE Program Plan. New dispatchable DSM programs are those that are incremental to the existing programs.

   i. All dispatchable DSM programs are modeled as supply resources.

   ii. See the response to part (a). New DSM programs are marked in Table 8-16 with an asterisk as noted.

   iii. The program characteristics for existing programs are briefly summarized on page 8-22, Section 8.(3)-(e).1. For a more detailed description of each existing program, see Sections 3 and 4 in Exhibit JB-1 to the Direct Testimony of John Bevington in Case No. 2022-00402.[15] For the three new programs, their characteristics are provided in the middle of page 8-21. As explained, because these potential new offerings originated from the DSM Advisory Groups, they were not fully reviewed and developed as part of a DSM-EE plan filing. Thus, complete program cost information is not available, but preliminary enrollment and saving assumptions were estimated. See attachments being provided in separate files.

[15] Available at https://psc.ky.gov/pscecf/2022-00402/rick.lovekamp%40lge-ku.com/12152022012325/19-Bevington_Direct_Testimony_2022-00402.pdf.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.53

Responding Witness: Tim A. Jones / Stuart A. Wilson

Q-1.53. Please refer to "2. Normal Weather" on page 5-17 in Section 5 of IRP Volume I, in which the Companies describe their assumption that weather will be average or "normal" every year. Does the 2024 IRP model the effects of climate change on weather and load in the future?

a. If so, please explain in detail how the Companies' load forecasts account for climate change impacts.

b. If not, please explain why not.

A-1.53. Different aspects of weather impact the Companies' planning process differently, and the Companies' weather assumptions fully support planning a generation portfolio that can reliably serve customers at the lowest reasonable cost across a broad range of weather scenarios. Generation resource planning is significantly focused on the ability to reliably serve customers during extreme hot and cold weather events. Figures 2 and 3 on page 7 of Volume III, 2024 IRP Resource Adequacy Analysis demonstrate that annual high and low temperatures have fallen within a fairly consistent range over the past 50+ years, and the trend in annual high and low temperatures has been fairly flat over the last 20+ years. Therefore, the Companies assess resource adequacy and minimum reserve margins based on historical weather scenarios through the Weather Years forecasts described in IRP Volume II, Electric Sales and Demand Forecast Process at Section 5.2.2. See also the response to SC 1-8(c).

For forecasting monthly energy requirements under "normal" weather conditions, the Companies assume weather in each month will be the average of weather over the past 20 years and update their weather assumptions annually to account for the most recent 20-year period. The Companies do not use a trended normal or trended average temperatures for this purpose for two reasons. First, the historical trends in 20-year normals and 20-year average temperatures are increasing for some months and decreasing for other months (see table below). Second, and

most importantly, average temperatures have very little impact on resource planning; as noted above, resource planning is significantly focused on serving customers during extreme temperature events. For these reasons, a trended normal or trended average temperature would add undo complexity to the Companies' forecasting process and not improve the quality of resource planning decisions. See also the response to PSC 1-4(b)(c).

CAGR for 20-Year Normal Trends and Average Temperature Trends (LEX Weather Station)

Month	CAGR for 20-Year Normal Trends	CAGR for Average Temperature Trends (2004-2023)
January	(0.1%)	0.3%
February	(0.2%)	0.9%
March	0.2%	0.2%
April	0.2%	(0.1%)
May	0.1%	0.1%
June	0.1%	0.0%
July	0.0%	0.2%
August	0.0%	0.0%
September	0.1%	0.2%
October	0.1%	0.3%
November	0.0%	(0.1%)
December	0.3%	0.9%
All Months	0.1%	0.2%

a. See above.

b. See above.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.54

Responding Witness: Stuart A. Wilson

Q-1.54. Please provide energy burden analyses conducted or considered as a part of the 2024 IRP process, if any.

A-1.54. The Commission's IRP regulation does not define, specify, or require such an analysis. Therefore, the Companies did not conduct or consider such an analysis as part of their 2024 IRP process.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.55

Responding Witness: Shannon L. Montgomery / Stuart A. Wilson

Q-1.55. Please provide the following data over the most recent three-year period available, and related internal analysis considered as part of the 2024 IRP:

a. Monthly number of customers that received a disconnection notice by zip code;

b. Monthly number of disconnections for nonpayment by zip code;

c. Monthly average number of customers with a past due balance;

d. Monthly average past due balance amount;

e. Monthly average number of participants in a payment assistance program

A-1.55. None of the items requested were considered in the preparation of the IRP.

a. See attachment being provided in a separate file.

b. See attachment being provided in a separate file.

c. and d. See the table below.

	2021	2022	2023
c. Monthly average number of customers with a past due balance	99,335	103,142	103,199
d. Monthly average past due balance amount	$ 199.46	$ 202.72	$ 188.12

e. See the table below.

2021 Monthly Total		2022 Monthly Total		2023 Monthly Total		Average Monthly Total	
Jan-21	12,825	Jan-22	13,203	Jan-23	15,389	Jan	13,806
Feb-21	13,506	Feb-22	15,058	Feb-23	15,804	Feb	14,789
Mar-21	15,394	Mar-22	17,755	Mar-23	15,817	Mar	16,322
Apr-21	9,753	Apr-22	7,559	Apr-23	13,957	Apr	10,423
May-21	9,370	May-22	14,213	May-23	9,069	May	10,884
Jun-21	8,160	Jun-22	5,993	Jun-23	1,143	Jun	5,099
Jul-21	14,005	Jul-22	10,371	Jul-23	10,449	Jul	11,608
Aug-21	15,061	Aug-22	10,527	Aug-23	16,207	Aug	13,932
Sep-21	12,421	Sep-22	6,448	Sep-23	10,417	Sep	9,762
Oct-21	6,984	Oct-22	4,678	Oct-23	4,902	Oct	5,521
Nov-21	10,799	Nov-22	11,863	Nov-23	11,911	Nov	11,524
Dec-21	5,387	Dec-22	5,637	Dec-23	5,198	Dec	5,407

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.56

Responding Witness: Peter W. Waldrab

Q-1.56. Please refer Vol. I, page 8-10, stating, "[i]ncreasingly, customer outages are being driven by extreme weather conditions. Since 2020, outage duration and frequency during major even days, defined by IEEE 1366, have increased. LG&E and KU's territory experiences tornadoes, severe thunderstorms, ice storms, and occasional hurricanes."

a. Please specify the outage duration experienced on each of LG&E and KU's systems over the last ten years on a monthly basis. If that level of granularity is not available, please provide the information on the most granular time scale available.

b. Please specify the outage frequency experienced on each of LG&E and KU's systems over the last ten years on a monthly basis. If that level of granularity is not available, please provide the information on the most granular time scale available.

c. In each of LG&E and KU's territories, for each of the last three years, please identify the ten census tracts that experienced the longest outage durations.

d. In each of LG&E and KU's territories, for each of the last three years, please identify the ten census tracts that experienced the shortest outage durations.

e. In each of LG&E and KU's territories, for each of the last three years, please identify the ten census tracts that experienced the highest frequency of outages.

f. In each of LG&E and KU's territories, for each of the last three years, please identify the ten census tracts that experienced the lowest frequency of outages.

A-1.56.

a. LG&E and KU SAIDI by month over past 10 years: See attachment being provided in a separate file.

b. LG&E and KU SAIFI by month over past 10 years: See attachment being provided in a separate file.

c. Outage data is unavailable by census tract. LG&E and KU circuits experiencing longest outage duration (Customer Minutes Interrupted) by year:

LGE

2021	2022	2023
DX1222	FM1262	BR1185
OX1274	JT1126	HB1148
AB1207	FM1257	BR1186
SK1128	BR1176	SP1116
DE1410	HL1157	MK1296
HL1157	TA1134	WT1210
FV1141	TA1130	LY1111
AK1290	TA1133	CA1346
WT1210	DA1240	OX1274
WT1151	ML1282	WH1115

KU

2021	2022	2023
1609	24	126
147	2313	509
1529	75	106
819	147	135
1526	97	145
148	277	112
1554	45	130
822	130	45
837	451	24
1530	100	44

d. Outage data is unavailable by census tract. LG&E and KU circuits that experienced outages having shortest outage duration (Customer Minutes Interrupted) by year:

LGE

2021	2022	2023
CO1193	BK0003	KE1162
SM1397	BI1222	PI0004
HC1434	SH1457	SM1363
FV1476	TT3314	WS1310
BI1218	CA1306	PR1380
LO1191	AS1415	TE1246
BI1221	HC1434	WS1308
PR1386	MD1457	GR1466
HI1473	DU0001	SM1361
PR1383	HI1474	HC1434

KU

2021	2022	2023
1202	813	514
203	119	344
970	814	150
912	2463	1805
207	89	403
2476	543	335
344	798	523
588	2478	930
2118	922	2152
543	774	644

e. Outage data is unavailable by census tract. LG&E and KU circuits experiencing highest frequency of outages (Customer Interrupted) by year:

LGE

2021	2022	2023
OX1274	FA1148	LY1111
BR1177	IN1291	HB1148
DE1410	HL1157	DA1242
FV1135	SY1252	FM1257
CL1226	JT1126	BR1186
BB1103	HN1200	BR1181
CF1204	CW1222	PV1256
DX1222	TE1245	FH1213
CO1197	FM1257	LS1245
CA1304	FV1142	IN1291

KU

2021	2022	2023
2515	2313	130
1609	106	135
182	97	106
311	24	501
308	23	509
33	308	481
126	147	73
106	130	126
507	3418	2313
580	501	410

f. Outage data is unavailable by census tract. LG&E and KU circuits that experienced outages having lowest frequency of outages (Customers Interrupted) by year:

LGE

2021	2022	2023
CA1306	GR1464	CY1487
HI1473	AL1443	PI0004
PL1273	BK0003	BY1276
CO1193	MD1457	OR0002
BY1276	FH1215	BY1277
BI1218	LO1191	KE1162
EI0001	SH1457	SH1457
BY1277	BI1222	IN1298
FV1476	DU0001	TE1246
BI1221	CR1421	SM1363

KU

2021	2022	2023
3412	17	3412
746	646	343
123	10	292
542	543	523
207	872	2152
203	2125	150
2305	773	1498
251	922	167
588	320	168
912	2461	644

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.57

Responding Witness: Elizabeth J. McFarland / Peter W. Waldrab / Stuart A. Wilson

Q-1.57. Do the Companies agree that extreme weather conditions challenge, and sometimes negatively impact, the reliability and resilience of their system? If not, please explain why not.

A-1.57. This request is too vague to offer a substantive response. Different kinds of "extreme weather conditions" could affect different utility systems differently. Without more definition and specificity, the Companies can say only that they have historically made investments to improve performance and maintain reliable and resilient service during all weather conditions, and they will continue to make such investments.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.58

Responding Witness: Elizabeth J. McFarland / Peter W. Waldrab / Stuart A. Wilson

Q-1.58. Do the Companies agree that the risk of extreme weather conditions imposes new costs in order to maintain reliability and resilient service? If so, please describe those costs, and produce any analysis of those costs and/or weather-related cost risks considered by the Companies in integrated resource planning. If not, please explain why not.

A-1.58. See the response to Question No. 1.57.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.59

Responding Witness: Tim A. Jones / Charles R. Schram / Stuart A. Wilson

Q-1.59. Please refer to Vol. I, Table 5-2, at page 5-13, and answer the following requests.

a. Please describe the methodology analysis undertaken by the Companies in order to determine reasonable values, including any underlying assumptions, for each of the three load scenarios with respect to each of:

   i. Data center growth;

   ii. The timing of data center growth (i.e., 2032);

   iii. Distributed generation in 2032; and

   iv. Energy efficiency, CVR, AMI, and other energy reductions in 2032.

b. Please provide the calculations and assumptions underlying the values in the table for each of the three "key differences" between the low, mid, and high load scenarios.

c. For the values provided in the far right column of Table 5-2, please disaggregate the contributions to the total provided from each of:

   i. Energy Efficiency;

   ii. CVR;

   iii. AMI; and

   iv. "Other Energy Reductions"

d. Please explain why the Companies forecast reduced adoption of distribution generation as system-wide load increases in the mid- and high-load scenarios.

e. Please explain why the Companies forecast reduced savings from "Energy Efficiency, CVR, AMI, and Other Energy Reductions in 2032" as system-wide load increases in the mid- and high-load scenarios.

f. Please confirm that, all else being equal, as system-wide load increases, avoided cost benefits of energy savings will generally increase. If anything but confirmed, please explain.

g. Please identify where the "Electric Sales & Demand Forecast Process" report included in Vol. II explains the process for incorporating data center load growth in the IRP forecast. If the data center load forecast adjustments are not discussed therein, please explain why not.

A-1.59. In preparing this response, the Companies observed that the distributed solar GWh reduction was understated in the original Table 5-2 due to aggregating only KU values instead of both KU and LG&E. To be clear, the error was made in creating the table; the load forecasts used for resource planning require no changes. A corrected Table 5-2 is below:

Corrected Table 0-1: 2024 IRP Load Forecast Scenarios—Key Differences

Load Scenario	Data Centers in 2032	Distributed Generation in 2032	Energy Efficiency, CVR, AMI, and Other Energy Reductions in 2032
Low	0 MW	275 MW	2,300 GWh
Mid	1,050 MW	150 MW	1,575 GWh
High	1,750 MW	125 MW	770 GWh

a.

i. See the response to PSC 1-21.

ii. See the response to PSC 1-21.

iii. See Volume I, Section 7.(7).(b).7.

iv. See Volume I, Section 7.(7).(b).4. See also the response to part (c).

b. For the assumptions, see the response to part (a).

For data center calculations, see the response to KIUC 1-2(g).

For energy efficiency calculations, see the response to SC 1-10.

For CVR calculations, see KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers— PUBLIC.zip at Electric_Load_Forecast\Electric\Forecasts\Topside_Adjustment_Work\20240624_CVREnergyReductions_2025BP.xlsx.

For AMI calculations, see KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers— CONFIDENTIAL.zip at Electric_Load_Forecast\Electric\Forecasts\Topside_Adjustment_Work\CONFIDENTIAL_20240624_AMI_EPortal_Savings_Adjustments_2025BP.xlsx.

For solar energy, see provided workpaper "KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath IRP_Workpapers\Vol_I_Data\Scenarios\Scenario_Input_Files\PV_scenarios_20240719.xlsx

For solar capacity, see the attached file being provided in Excel format.

c. For all subparts for the table as originally filed, see KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers—PUBLIC.zip at IRP_Workpapers\Vol_I_Data\Reductions_To_Load_Forecast_Scenarios.xlsx.

   For all subparts of Revised Table 5-2, see attachment being provided as a separate file.

d. See the response to SREA 1-30. The Companies produced mid, low, and high solar adoption forecasts to create a range of reasonable distributed generation adoption scenarios. See also the response to JI 1-59(a)(iii) for discussion of distributed generation load forecast process. Compared to the Mid load scenario, the Companies used reduced adoption of distributed generation (low solar scenario) in the High load scenario and increased adoption (high solar scenario) in the Low load scenario. Reduced distributed generation adoption results in less load reduction from solar, and increased distributed generation results in more load reduction. If there is less load reduction, then load will be higher (High load scenario), and if there is increased load reduction, then load will be lower (Low load scenario).

e. See the response to part (d).

f. Generally speaking with a fixed generation portfolio, yes, because the Companies economically dispatch their resources to the extent reasonably practicable, increasing energy usage tends to increase the value of avoiding additional marginal energy usage. But adding new, efficient resources to

serve increasing load in the long run might *reduce* avoided energy costs relative to having less load and not adding the new, efficient resources.

g. See Sections 4.2 and 5.2.1 of IRP Volume II, Electric Sales & Demand Forecast Process. More specifically, see the portions of these sections discussing economic development.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.60

Responding Witness: Tim A. Jones

Q-1.60. Please refer to Vol. I, page 5-18, stating: "the Companies' Mid load forecast includes nearly 1,500 GWh of reductions by 2032 from customer-initiated energy efficiency improvements, AMI-related conservation load reduction and ePortal savings, distributed generation, and the energy efficiency effects of the Companies' proposed 2024-2030 DSM-EE Program Plan as well as new programs beyond 2030."

a. Please confirm that this refers to the same information conveyed in Table 5-2. If anything but confirmed, please explain.

b. If not already provided in response to the previously numbered request (JI 1.59) concerning Table 5-2, please provide all worksheets and explain how these savings estimates were derived for each of the above components.

c. If not already provided in response to the previously numbered request (JI 1.59), for each of the Low, Mid, and High Load Forecasts, identify the energy savings provided by each of these components: customer-initiated energy efficiency improvements, AMI-related conservation load reduction, ePortal savings, distributed generation, the 2024-2030 DSM-EE Program, and new programs beyond 2030.

d. If not already provided in response to the previously numbered request (JI 1.59), please provide all worksheets and explain how these savings estimates were derived for each of the above components.

e. How many KW of installed distributed solar generation were assumed in these estimates and did this include net metering and Qualifying Facilities?

f. For each energy-saving component, calculate the percent savings relative to the Companies' total forecast energy sales.

g. What were the demand (MW) savings achieved by each of these energy-saving components?

A-1.60.

a. Confirmed for the original filing. See the response to Question No. 1.59 for Corrected Table 5-2 that contains the updated total.

b. See the response to Question No. 1.59(b)-(c).

c. See the response to Question No. 1.59(b)-(c). Energy efficiency comprises customer-initiated energy efficiency improvements and the impacts of the Companies' DSM-EE programs.

d. See the response to Question No. 1.59(b)-(c).

e. Yes, these estimates included net metering and qualifying facilities. See the response to SC 1-17 for forecasted distributed solar generation capacity by year.

f. See the response to Question No. 1.59(c).

g. For the Mid scenario, the Companies have not quantified the demand impact from these components apart from distributed generation. For distributed generation and High/Low scenario incremental impacts, see the response to SC 1-10.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.61

Responding Witness: Elizabeth J. McFarland

Q-1.61. Please refer to the process for interconnecting new load in each of the Companies' territories.

a. Please describe and provide documentation that details the Companies' policy and procedures for interconnecting a new customer with load of at least 25 MW. To the extent that the Companies policy and procedures for interconnecting a new (e.g., 100 MW, 400 MW, etc), please specify each such load level and explain differences in policy and procedure.

b. Please describe each step of the process for interconnecting a new customer load of at least 25 MW (e.g., what studies are conducted, how long do those take, what negotiations are conducted, etc.). To the extent that the process changes at higher load levels, please specify each such load level and explain differences.

c. Please describe and estimate the range of total interconnection costs for a prospective new customer load of 100 MW or larger.

A-1.61.

a. Policies and procedures to interconnect a load to the LG&E/KU transmission system can be found on LG&E/KU's public Open Access Same-Time Information System ("OASIS") at the following link: https://www.oasis.oati.com/LGEE/index.html. These policies and procedures adhere to the requirements outlined in LG&E/KU's Open Access Transmission Tariff ("OATT"). Several key procedures that detail the interconnection process are the *NERC FAC-001 Facility Interconnection Requirements* procedure (FAC-001_Facility_Interconnection_Requirements_Procedure_2024-01-01.pdf), the *Transmission Service Request Study Criteria* document (TSR_Study_Criteria_Document_effective_10-29-2019.pdf) and the

Transmission Service and Scheduling Business Practices (Business_Practices_-_Transmission_Service_and_Scheduling_-_Effective_10-21-24.pdf) document, all of which can be found on OASIS. The process for connecting a load to the LG&E/KU transmission system is standard and is not dependent upon the size of the load.

b. The process for connecting a new load to the LG&E/KU transmission system, regardless of size, is relatively standard. The Network Customer providing retail service for the new load (i.e., whichever of the Companies will serve the retail customer) submits the Transmission Service Request ("TSR") on OASIS and supplies additional details via the NITS Application spreadsheet (posted publicly on OASIS and attached as a separate document to SC 1.40). The Companies' Independent Transmission Organization ("ITO") performs a System Impact Study and identifies any constraints associated with providing the transmission service. This study typically takes sixty (60) calendar days. The ITO then works with the Transmission Owner ("TO") to perform a Facilities Study which determines mitigation plans for all identified constraints detailed in the System Impact Study Report. The Facilities Study also confirms the necessary facilities to interconnect the new delivery point to the transmission system (as was initially identified in the System Impact Study Report). The Facilities Study typically takes sixty (60) calendar days to complete.

c. Estimated total interconnection costs for a prospective new customer load of 100 MW or larger (or any size for that matter) is dependent upon many factors including, but not limited to, the service location the customer is requesting, including the proximity of the load to existing transmission infrastructure, any right-of-way requirements, the delivery voltage at the point of interconnection, and the available capacity on the transmission system. However, it is important to note that the majority of costs associated with a new load interconnecting to the LG&E/KU transmission system are ultimately borne by the Transmission Owner if the new load comes to fruition. LG&E/KU's *Allocation of Costs for End-User Interconnections* can be found on OASIS (oasis.oati.com/woa/docs/LGEE/LGEEdocs/Allocation_of_Costs_for_End-User_Interconnections_-_FINAL_2-1-22.pdf).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.62

Responding Witness: John Bevington / Robert M. Conroy

Q-1.62. Please provide all analyses conducted by or at the direction or supervision of LG&E and/or KU to analyze the potential impact(s) of new large loads on:

a. LG&E and/or KU revenue;

b. LG&E and/or KU net income or profit;

c. LG&E and/or KU cost of service study results, including cost allocation to customer classes;

d. LG&E and/or KU cost-shifting or cross-subsidization among customer classes; and

e. LG&E and/or KU residential rate or bill impacts;

A-1.62.

a. See attachments being provided in separate files. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

b. The Companies have not conducted such an analysis.

c. The Companies have not conducted such an analysis.

d. The Companies have not conducted such an analysis.

e. The Companies have not conducted such an analysis.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.63

Responding Witness: Charles R. Schram

Q-1.63. Please produce documents, presentations, and communications to the Companies' Independent Transmission Operator by the Companies in the last twelve months related to the possibility of connecting new large load customers, including data centers, cryptocurrency mining operations, and other industrial sectors, in the Companies' service territory.

A-1.63. The Companies assume this request is for all Transmission Service Requests ("TSRs") submitted to the Independent Transmission Organization ("ITO") by the Companies for study concerning potential large load customers. See attachments being provided as separate files for the communications by the Companies to the ITO for new large load customer TSRs submitted in the last twelve months. The information requested in Attachment 2 is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.64

Responding Witness: John Bevington

Q-1.64. Please provide an electronic copy of all presentations made by or given to PPL leadership team in the last 12 months, that identifies, summarizes, analyzes, or evaluates the impacts of data centers or other new large load facilities to PPL, the Companies' or its customers, including, but not limited to, factors considered by such facilities in making siting decisions, load growth, energy consumption, revenue generation, rate impacts, bill impacts, subsidies or cross-subsidies associated with such facilities, use of special contracts, modifications to applicable rates or tariffs, electric interconnection agreements, economic development, and inquiries received by the Companies' for interconnection.

A-1.64. The Companies object to this request on the basis that it is overbroad and unduly burdensome. Without waiving that objection, the Companies are producing the readily accessible presentations of which they are aware. See attachments being provided in separate files. Certain information requested in Attachment 1 is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection. The information requested in Attachment 2 is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.65

Responding Witness: Lana Isaacson / Tim A. Jones / Stuart A. Wilson

Q-1.65. These questions pertain to the impacts of the IRP on residential customers with low- and fixed-incomes.

a. Please provide any and all internal analysis and discussion materials used to forecast and consider the impact of the proposed IRP on low-income customers at 30%, 50%, and 80% Area Median Income (AMI).

b. Please provide any historical data on low-income households considered in the preparation of the IRP by census tract and zip code.

c. Please provide any internal analysis of Annual Use-per-Customer and Total Energy Sales correlated to impact on average customer bills as 30%, 50%, and 80% Area Median Income (AMI). Please provide data by census tract and zip code if possible

d. Please provide any analysis conducted on residential end-use trends and the impact on low-income customers at 30%, 50%, and 80% Area Median Income (AMI) by census tract and zip code.

e. Please explain how the Companies propose to create equitable models for collecting survey data and direct feedback for residential, small customers as is repeatedly mentioned in regard to large, nonresidential, commercial customers.

f. Please provide any analysis performed by the Companies specific to future low-income household customer demand for energy.

g. Please provide any analysis and discussion materials from this IRP process pertaining to the planning and development of new DSM programs targeted at low-income households at 30%, 50%, and 80% Area Median Income (AMI). Please provide any data considered as a part of that analysis and discussions by census tract and zip code.

h. Please provide any analysis of the impact of the preferred portfolio of resources on low-income customers, and of how those concerns were considered as part of the Integrated Resource Plan (IRP) process.

i. Please provide any studies related to environmental and health impacts on low-income communities and communities of color considered as a part of the Integrated Resource Plan (IRP) process. Please provide any and all internal analysis and discussion materials from the Companies of these studies.

j. Please provide any and all studies related to the impact of economic disparities on low-income communities and communities of color considered as a part of the Integrated Resource Plan (IRP) process. Please provide any and all internal analysis and discussion materials from the Companies of these studies.

A-1.65. The Companies' resource planning objective is to provide all customers, irrespective of income or other demographic criteria, with safe and reliable service at the lowest reasonable cost. The Companies' IRP reflects this objective.

a. The Companies did not perform such analysis. Additionally, the Companies do not have access to customer-specific income data.

b. The Companies did not consider this in the preparation of the IRP.

c. The Companies have not performed this analysis.

d. The Companies have not performed this analysis.

e. The Companies surveyed residential customers in 2022 with quotas for low-income customers to ensure they were properly represented. See the response to Question No. 1.47.

f. The Companies have not performed this analysis.

g. The Companies have not performed this analysis and do not track customer income data.

h. The Companies have not performed this analysis.

i. The Companies have not performed this analysis. The Companies develop resource plans to comply with all environmental laws and regulations.

j. The Companies have not performed this analysis.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.66

Responding Witness: Lonnie E. Bellar

Q-1.66. Please provide the most recent condition assessment report for each of E.W. Brown Unit 3 and Ghent Unit 2.

A-1.66. See attachments being provided in separate files. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

The Companies routinely inspect and maintain individual pieces of equipment associated with each generating unit and maintain documentation associated with such equipment. To the extent that the boiler drum and turbine/generator are identified as the components for which a catastrophic failure would be consideration for retirement, the Companies are providing inspection reports and summaries for this equipment.

The most recent major turbine-generator inspection and repair effort for E.W. Brown Unit 3 and Ghent Unit 2 occurred in the fall of 2019. There have been no major subsequent inspection or repair efforts on these units.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.67

Responding Witness: Lonnie E. Bellar / Stuart A. Wilson

Q-1.67. Please refer to the 20214 IRP Long-Term Resource Planning Analysis.

a. Did the Companies conduct or cause to be conducted any economic analysis, under any of the scenarios, of when existing units would have costs (fixed costs and variable costs) that exceed their revenues? If so, please provide any such analyses. If not, please explain in detail why not.

b. Did the Companies conduct or cause to be conducted any economic analysis, under any of the scenarios, of when it would be economic to retire any existing generating units? If so, please provide any such analyses. If not, please explain in detail why not.

c. Within the last five years, have the Companies prepared or caused to be prepared any analysis of whether to continue to operate or retire any of their existing generating units? If so, please produce any such analyses. If not, please explain in detail why not.

d. Have the Companies prepared or caused to be prepared any analysis of the reliability impacts of retiring existing units? If so, please produce any such analyses, including all supporting workpapers and modeling input and output files. If not, please explain in detail why not.

A-1.67. The reference specified in this question is unclear. The Companies assume it refers to the 2024 IRP Resource Assessment.

a. No. The Companies do not evaluate units in this manner.

b. Yes. See Volume III, Resource Assessment.

c. Yes. See Volume III, Resource Assessment; the Companies' 2022 Resource Assessment filed with the Commission as Exhibit SAW-1 to the Direct

Testimony of Stuart A. Wilson in Case No. 2022-00402;[16] and the Companies' October 2020 Analysis of Generating Unit Retirement Years filed with the Commission as Exhibit LEB-2 to the Direct Testimony of Lonnie E. Bellar in Case Nos. 2020-00349 and 2020-00350.[17]

d. Yes. See the response to part (c).

[16] Available at https://psc.ky.gov/pscecf/2022-00402/rick.lovekamp%40lge-ku.com/12152022012325/17-Wilson_Direct_Testimony_2022-00402.pdf.

[17] Available https://psc.ky.gov/pscecf/2020-00350/rick.lovekamp%40lge-ku.com/11252020085918/10-LGE_Testimony_1of4%28Thompson_Blake_Bellar_Sinclair_Wolfe_Saunders%29.pdf.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.68

Responding Witness: Stuart A. Wilson

Q-1.68. In comparing and evaluating possible resource additions and retirements (including distributed generation) do the companies include the costs of pollutants and environmental damage, negative health impacts, and the potential avoided costs of these (such as those costs quantified in: https://www.epa.gov/statelocalenergy/estimating-health-benefits-kilowatt-hour-energy-efficiency-and-renewable-energy; and https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf)?

A-1.68. No. The Companies consider utility revenue requirements, which include the cost to comply with applicable environmental requirements. Consistent with longstanding Commission precedent, the Companies do not evaluate non-energy costs or benefits.[18] See the response to Question No. 1.49(a).

[18] See, e.g., *Electronic Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for Review, Modification, and Continuation of Certain Existing Demand-Side Management and Energy Efficiency Programs*, Case No. 2017-00441, Order at 28-29 (Ky. PSC Oct. 5, 2018); *The 2011 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company*, Case No. 2011-00140, Order at 5 (Ky. PSC June 10, 2011); *Application of Kentucky Utilities Company for Certificates of Public Convenience and Necessity and Approval of its 2009 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2009-00197, Order at 8 (Ky. PSC Dec. 23, 2009); *Joint Application Pursuant to 1994 House Bill No. 501 for Approval of Kentucky Power Company Collaborative Demand-Side Management Programs, and for Authority to Recover Costs, Net Lost Revenues and Receive Incentives Associated with Implementation of Three New Residential Demand-Side Management Programs Beginning January 1, 2009*, Case No. 2008-00349, Order at 4 (Ky. PSC Dec. 4, 2008), Order at 1, 3-4 (Ky. PSC Dec. 16, 2008), Order at 2-4 (Ky. PSC Jan. 12, 2009); *The 2008 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company*, Case No. 2008-00148, Order at 5-6 (Ky. PSC July 18, 2008).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.69

Responding Witness: Tim A. Jones

Q-1.69. Please explain how the Companies' approach to evaluating distributed generation adoption rates as part of the load forecast analysis has changed in comparison to the approach used in the 2021 IRP, if at all.

A-1.69. See Volume I, Section 7.(7).(b).7. The description of the distributed generation forecasting process highlights expanded discussion and changes from the 2021 IRP forecast, as recommended by Commission Staff in the 2021 IRP.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.70

Responding Witness: Tim A. Jones

Q-1.70. Please provide the data underlying the following Figures in Section 7 of IRP Vol. I:

a. Figure 7-3 "Adoption of battery storage devices by net-metering customers";

b. Figure 7-4 "Cumulative Net Metering Customer and Capacity Adoption";

c. Figure 7-5 "Distributed Generation Forecast Scenarios"; and

d. Figure 7-8 "Incremental Net Metering Customer Adoption by Month (Jan. 2019 -Jun 2024)."

A-1.70.

a. See provided workpaper "KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath IRP_Workpapers\ Vol_I_Data\PV\Solar and batteries.xlsx."

b. See provided workpaper "KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath IRP_Workpapers\ Vol_I_Data\PV\Net_Metering_History.xlsx."

c. See provided workpaper "KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath IRP_Workpapers\ Vol_I_Data\PV\PV_EV_highLowBase_capacity2024.xlsx."

d. See provided workpaper "KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath IRP_Workpapers\ Vol_I_Data\PV\Net_Metering_History.xlsx."

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.71

Responding Witness: Shannon L. Montgomery

Q-1.71. To the extent available in calendar year 2024, please provide the number of customers with distributed solar and battery systems, and the average battery installation size.

A-1.71. There have been 295 accepted applications of LG&E/KU customers submitted in Kentucky for distributed solar and battery storage systems to date, 32 of which occurred in calendar year 2024. The average battery installation size for those customers is 8.4 kW.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.72

Responding Witness: Michael E. Hornung / Shannon L. Montgomery

Q-1.72. Please refer to Vol. I, page 7-20, stating "Currently, the Companies do not have access to data concerning how these customers are using their batteries. The Companies are also unsure to what extent non-net metering customers have battery storage as there is no mechanism to track this today outside of net metering. Due to the low rates of energy storage adoption, uncertainty around charging and discharging patterns, and unknown adoption numbers of battery storage for non-net metering customers, the Companies do not explicitly forecast distributed battery adoption, but will continue to monitor. For now, the distributed generation forecast implicitly assumes the level of battery storage increases with customer growth."

a. When do the Companies expect to be able to access data on customer battery usage. Please explain.

b. What possible mechanisms to track stand-alone behind-the-meter storage adoption have the Companies considered? Please explain.

c. Please explain how the Companies monitor distributed battery adoption, and how that monitoring process and/or capability may change over the next three years.

A-1.72.

a. The Companies do not have an expectation concerning when or if they might have access to customer battery usage. Because the Companies lack the ability to control distributed storage, it is unclear what, if any, resource planning value having such historical data would offer.

b. The Companies are aware of distributed behind-the-meter storage through net metering applications,[19] which collect such information in accordance with the net metering application requirements established in Administrative Case No. 2008-00169.[20] The Companies have not considered other mechanisms to track such adoption; see the response to part a above.

c. See the response to part b. Currently, the Companies do not know how their distributed battery adoption monitoring process or capability may change over the next three years.

[19] Kentucky Utilities Company, P.S.C. No. 20, Original Sheet No. 108.5; Louisville Gas and Electric Company, P.S.C. Electric No. 13, Original Sheet No. 108.5.

[20] *Development of Guidelines for Interconnection and Net Metering for Certain Generators with Capacity up to Thirty Kilowatts*, Admin. Case No. 2008-00169, Order (Ky PSC Jan. 8, 2009).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.73

Responding Witness: Tim A. Jones / Shannon L. Montgomery

Q-1.73. Please refer to Vol. I, page 7-20, Figure 7-3, and answer the following requests.

a. Please identify the data sources relied on with respect to customer adoption of batteries.

b. Are net metering customers required to report batteries if included in their solar project? Please explain why or why not.

c. Does the net metering application ask customers if a battery is included in their system? Please explain why or why not.

A-1.73.

a. Customer battery installations are identified through self-reporting to the Companies by the customer on the customer "Application for Interconnection and Net Metering". That is the Companies' data source regarding customers' battery adoption.

b. Yes. See the response to Question No. 1.72(b).

c. Yes. See the response to Question No. 1.72(b).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.74

Responding Witness: Shannon L. Montgomery / Peter W. Waldrab

Q-1.74. The following requests concern the AMI meters being deployed by the Companies.

a. Are the AMI meters capable of providing data on how customers use batteries? Please explain.

b. If the AMI meters do have the capability of providing data on how customers use batteries, are the Companies presently tracking or monitoring that data? If not, when will the Companies begin to do so?

c. Are the AMI meters capable of providing data on the location and size of stand-alone batteries? Please explain.

d. If the AMI meters do have the capability of providing data on the location and size of stand-alone batteries, do the Companies presently track or monitor that data? If not, when will the Companies begin to do so?

e. Are AMI meters required for the utility to use a customer-owned battery as a demand response resource? Please explain.

A-1.74.

a. No.

b. Not applicable. See the response to part (a).

c. No. See the response to part (a).

d. Not applicable. See the response to part (a).

e. Yes. The AMI meters provide critical feedback of power flows and voltage on the electric distribution system, which is used to optimize system performance during demand response events.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.75

Responding Witness: Robert M. Conroy / Michael E. Hornung

Q-1.75. Please refer to Vol. I, page 7-22, stating: "The high solar (Low load) scenario assumes the 1% cap on total installed net metering capacity is removed, which would most likely occur due to a change in law at the state or federal level."

a. Can the Companies cite any federal or state statute which requires the utility to cap net metering service at 1% of the Companies annual peak load (or at any other threshold)?

b. Please describe any internal discussions the Companies have had about whether to allow net metering to continue beyond the 1% threshold?

c. Please produce any studies, presentations, reports, or other analyses that the Companies have created, or caused to be created, regarding the ability to integrate greater amounts of net metering capacity in the Companies' respective or combined territories.

d. Is it the Companies' position that they will impose a cap on net metering upon reaching the 1% threshold unless a change in law at the state or federal level prevents them from doing so? If so, please produce any analyses, studies, reports, or other evaluations undertaken by or for the Companies in the last three years to determine ratepayer benefits, utility net revenue and profit, and/or specific operating cost implications of that position.

A-1.75.

a. No. KRS 278.466(1) allows, but does not require, a utility to implement a 1% cap on net metering capacity. The quoted statement reflects the Companies' IRP modeling assumption, not their established policy or final business decision on this issue.

b. The Companies have had numerous discussions about this issue. Their consistent concern has been to ensure non-net-metering customers are not adversely affected by net metering rates and related costs while also appropriately compensating net metering customers for actually avoided costs. The Companies anticipate addressing this issue further in future rate cases.

c. No such studies have been performed.

d. No. The Companies have not established their policy or final business decision on this issue. See the response to part (a).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.76

Responding Witness: Tim A. Jones

Q-1.76. Please refer to Vol. I, pages 7-21 and 7-22, Figure 7-4 "Cumulative Net Metering Customer and Capacity Adoption" and Figure 7-5 "Distributed Generation Forecast Scenarios."

a. What was the annual growth rate of new net metering customers and capacity each year for 2013 through 2024?

b. Referencing Figure 7-5, for each scenario, what is the forecast annual growth rate of new net metering customers and capacity each year for 2024 – 2039?

c. In the High Solar forecast, why does the annual growth rate after 2024 decline so dramatically relative to the historic growth rate?

d. Please provide a "Revised High Solar" forecast of net metering customers and solar capacity for 2024 – 2039 assuming future growth rates are similar to the average annual growth rates for 2013 - 2024. Provide data in a table including solar's percent of the Companies' annual peak demand for each year. Please reproduce Figure 7-5 including the "Revised High Solar" forecast.

e. Referencing Figure 7-7 at page 7-23 of Volume I of the IRP, please produce an Hourly Forecast Profile for August 26 for the years 2030, 2032 and 2034, using the *Revised High Solar* forecast.

A-1.76. See attachment being provided as a separate file.

a. See the table below.

Year	Net Metering Cumulative Customers	Net Metering Cumulative Capacity (kW)	YOY Growth Rate: Customers	YOY Growth Rate: Capacity
2013	187	828	25%	45%
2014	223	1,213	19%	46%
2015	307	1,947	38%	60%
2016	386	2,620	26%	35%
2017	458	3,396	19%	30%
2018	585	4,774	28%	41%
2019	764	6,778	31%	42%
2020	1,181	10,773	55%	59%
2021	2,013	18,794	70%	74%
2022	3,411	31,359	69%	67%
2023	4,732	48,802	39%	56%
2024	5,955	59,759	26%	22%

b. See the tables below.

Year	NM Cumulative Customers - Mid	NM Cumulative Customers - Low	NM Cumulative Customers - High	YOY Growth Rate - Mid	YOY Growth Rate - Low	YOY Growth Rate - High
2024	6,861	6,861	6,861	45%	45%	45%
2025	8,238	8,069	9,181	20%	18%	34%
2026	8,913	8,425	11,527	8%	4%	26%
2027	9,587	8,781	13,904	8%	4%	21%
2028	10,242	9,115	16,278	7%	4%	17%
2029	10,890	9,439	18,692	6%	4%	15%
2030	11,538	9,763	21,255	6%	3%	14%
2031	12,186	10,087	24,241	6%	3%	14%
2032	12,834	10,411	26,998	5%	3%	11%
2033	13,482	10,735	29,835	5%	3%	11%
2034	14,131	11,059	32,335	5%	3%	8%
2035	14,779	11,383	34,958	5%	3%	8%
2036	15,427	11,707	37,848	4%	3%	8%
2037	16,075	12,031	40,890	4%	3%	8%
2038	16,723	12,355	44,090	4%	3%	8%
2039	17,371	12,679	47,422	4%	3%	8%

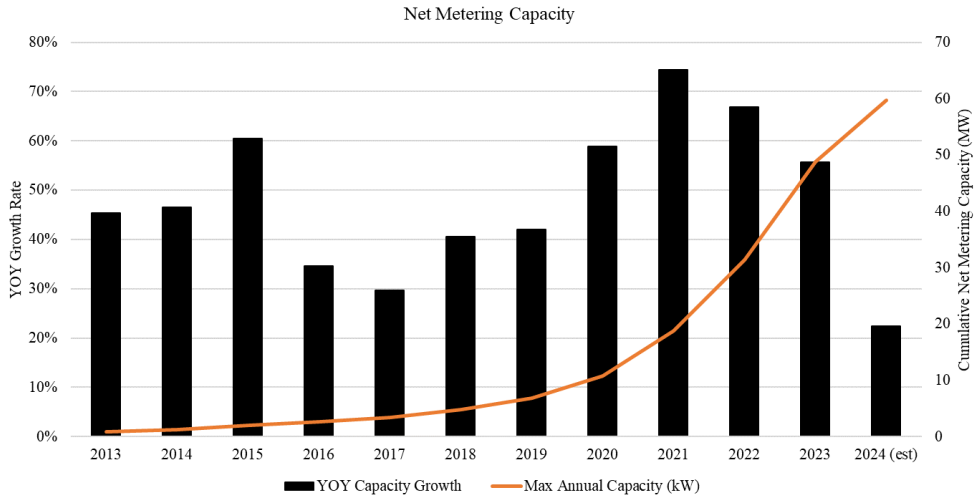
Year	NM Cumulative Capacity (kW) - Mid	NM Cumulative Capacity - Low	NM Cumulative Capacity - High	YOY Growth Rate - Mid	YOY Growth Rate - Low	YOY Growth Rate - High
2024	69,445	69,445	69,445	45%	45%	45%
2025	87,684	86,135	94,671	20%	18%	34%
2026	97,007	92,326	120,007	8%	4%	26%
2027	106,461	98,647	145,788	8%	4%	21%
2028	115,513	104,536	171,345	7%	4%	17%
2029	123,168	108,991	195,972	6%	4%	15%
2030	130,822	113,447	221,843	6%	3%	14%
2031	135,477	114,902	248,335	6%	3%	14%
2032	140,132	116,357	272,934	5%	3%	11%
2033	144,787	117,813	298,246	5%	3%	11%
2034	149,441	119,268	320,658	5%	3%	8%
2035	154,096	120,724	344,261	5%	3%	8%
2036	158,751	122,179	370,099	4%	3%	8%
2037	163,406	123,635	397,245	4%	3%	8%
2038	168,060	125,090	425,752	4%	3%	8%
2039	172,715	126,546	455,419	4%	3%	8%

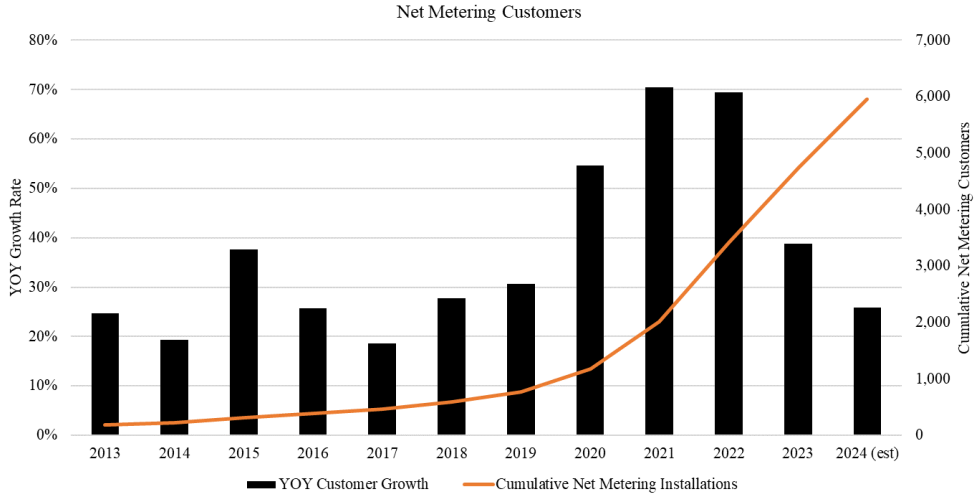
c. The Companies disagree with the assertion that the growth rate in the forecast declines "dramatically." As seen in the response to part (a), the year over year ("YOY") growth for both customers and capacity peaked in 2021 and has been decreasing each year since then. Forecasted growth is consistent with this declining YOY growth trend, although the forecasted YOY capacity growth rate in 2025 is about double what has actually occurred in 2024. Actual installed capacity in the second half of 2024 has been below the Companies' forecast.

The mid and high distributed generation scenarios assume a compound annual growth rate ("CAGR") of about 7.3% and 14.5%, respectively, from estimated December 2024 levels, and each reflects current estimates for distributed solar costs. However, there are other factors to consider when thinking about solar adoption rates. These factors include impacts of the assumed 1% net metering cap in the mid and low distributed generation ("DG") scenarios, the limited number of homes that can support rooftop solar, the number of customers in the Companies' service territory, the cost of panels relative to other consumer goods, electric rates, and incentive availability.

It is also reasonable to assume that as the denominator grows (i.e., total installed DG capacity or total number of DG customers), it becomes more difficult to maintain the same growth rate because doing so requires increasingly large amounts of new installed DG capacity or new DG customers. For example, the year-over-year number of customers added in 2021-2024 were 832, 1,398, 1,321, and 1,223, yet their year-over-year growth

rates were 70%, 69%, 39%, and 26% due to the increasingly large denominator each year (i.e., the growing total number of DG customers at the end of each year).





d. Using the average monthly growth rate for installed net metering capacity experienced between January 2013 and October 2024 causes the solar forecast to grow to impossible levels. In 2039, this method would result in over 21,000 MW of installed solar capacity—*almost three times the total installed capacity of the Companies' generation resources today*. Using an average of 10 kW per installation (higher than the recent average installation size of less than 9 kW),[21] this would suggest that over 2.1 million customers would have solar installed by the end of 2039, which is around double the

[21] IRP Vol. I at 7-26 ("[T]he average net metering installation prior to September 2021 had a capacity of about 9.3 kW, whereas the average net metering installation from October 2021 through June 2024 had a capacity of about 8.5 kW.").

total number of customers projected in the Companies' service territories in 2039.

Rather than provide an impossible DG capacity forecast in response to this request, the Companies instead applied the growth rate associated with net metering *customers* for 2013-2024 to project DG capacity growth through 2039 (the "JI High Alternative"). This results in a forecast of nearly 6,100 MW of DG capacity by the end of 2039—about 80% of the total installed capacity of the Companies' generation resources today—and over 600,000 DG customers, well over half of the total number of customers the Companies project having in 2039. While this is still a highly implausible forecast, it is at least possible in that the total number of customers adopting solar in the JI High Alternative scenario is less than the total number of customers in the service territory. However, as shown in the table in response to Question No. 77, Kentucky would not just have to close the significant gap that exists today versus California in terms of percentage of residential customers adopting solar to achieve this JI High Alternative solar forecast – Kentucky would have to more than double California's current levels of residential adoption. Compared to California, Kentucky has lower electricity rates, less sunlight annually, and fewer incentives, so it seems highly unlikely that this JI High Alterative solar forecast will even get close to being achieved.

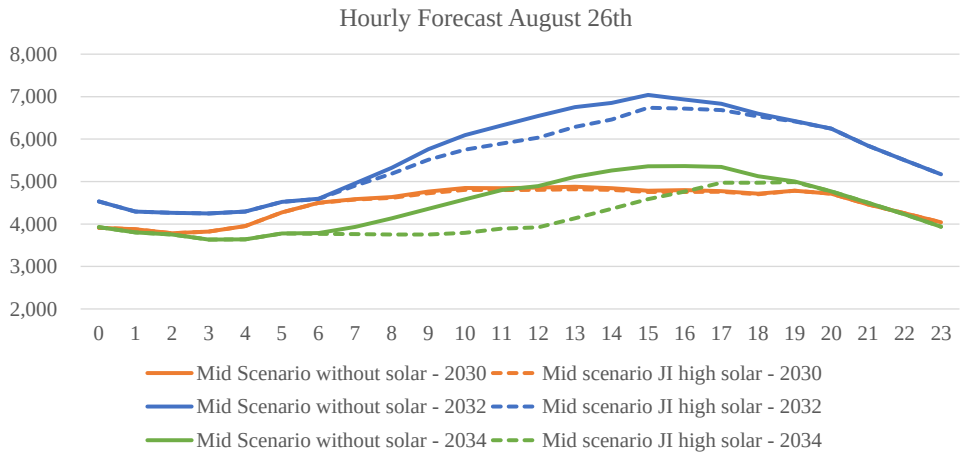
Using this method also does not consider other factors, such as the number of solar-viable homes, the number of customers that own versus rent, the number of customers in multi-family residences, etc. This approach also does not consider *any* factors that have impacted and may impact customer adoption, such as the avoided cost-to-LCOE ratio that is used in the Companies' solar model.

As discussed in part (c), another issue with using the average annual growth rate from 2013-2023 until 2039 is the ever-increasing number of new adoptions that need to happen each year to experience the same level of growth. It is easier to attain high YOY growth percentages when the denominator is small. For example, going from 1,213 kW in 2014 to 1,947 kW in 2015 results in a high growth rate even though the increase is only 734 kW. The average growth rate used for the JI High Alternative solar forecast is lower than that year's increase but would require 21,585 kW of adoption for 2024 to 2025 alone because 2024 is starting at a much higher number than 2014. The increase in the JI High Alternative forecast from 2038 to 2039 would require 1,618,439 kW—more than 1,600 MW—of adoption *in one year* to maintain that level of growth. With only 365 days in that year, it seems unlikely that this could occur.

Year	NM Cumulative Capacity (kW) - Mid	NM Cumulative Capacity - Low	NM Cumulative Capacity - High	NM Cumulative Capacity - High (JI 1-76 Using Capacity Growth Rate)	NM Cumulative Capacity – High Alternative (JI 1-76 Using Customer Growth Rate)
2025	87,684	86,135	94,671	89,482	81,344
2026	97,007	92,326	120,007	132,176	110,726
2027	106,461	98,647	145,788	195,240	150,721
2028	115,513	104,536	171,345	288,394	205,163
2029	123,168	108,991	195,972	425,994	279,269
2030	130,822	113,447	221,843	629,246	380,143
2031	135,477	114,902	248,335	929,475	517,453
2032	140,132	116,357	272,934	1,372,950	704,360
2033	144,787	117,813	298,246	2,028,019	958,780
2034	149,441	119,268	320,658	2,995,638	1,305,098
2035	154,096	120,724	344,261	4,424,932	1,776,509
2036	158,751	122,179	370,099	6,536,177	2,418,197
2037	163,406	123,635	397,245	9,654,751	3,291,666
2038	168,060	125,090	425,752	14,261,273	4,480,639
2039	172,715	126,546	455,419	21,065,683	6,099,078

Year	NM Cumulative Customers - Mid	NM Cumulative Customers - Low	NM Cumulative Customers - High	NM Cumulative Customers – High (JI 1-76 Using Capacity Growth Rate)	NM Cumulative Customers – High Alternative (JI 1-76 Using Customer Growth Rate)
2025	8,238	8,069	9,181	8,921	8,106
2026	8,913	8,425	11,527	13,178	11,035
2027	9,587	8,781	13,904	19,466	15,020
2028	10,242	9,115	16,278	28,753	20,446
2029	10,890	9,439	18,692	42,472	27,831
2030	11,538	9,763	21,255	62,736	37,884
2031	12,186	10,087	24,241	92,669	51,568
2032	12,834	10,411	26,998	136,884	70,194
2033	13,482	10,735	29,835	202,195	95,549
2034	14,131	11,059	32,335	298,668	130,062
2035	14,779	11,383	34,958	441,170	177,041
2036	15,427	11,707	37,848	651,663	240,989
2037	16,075	12,031	40,890	962,587	328,036
2038	16,723	12,355	44,090	1,421,862	446,525
2039	17,371	12,679	47,422	2,100,268	607,813

e. A key focus of the IRP is the winter peak. Distributed solar alone does not reduce winter peak significantly, and most often it does not impact the winter peak at all. Therefore, distributed solar's contribution to load reduction of summer peak is of little importance to planning a reliable system in the winter. That said, see the figure below for the shapes requested which were calculated using capacity from the JI High Alternative scenario.



LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.77

Responding Witness: Tim A. Jones

Q-1.77. Please refer to Vol. I, page 7-27, comparing the solar resource and the rate of solar adoption in Kentucky to that in California and Arizona. To the extent known to the Companies, please identify the rate of solar adoption and average solar resource in the following states: Massachusetts, Maine, New Jersey, North Carolina, and Vermont. Please present the data in a table including data for Kentucky, Arizona, and California for reference.

A-1.77. As discussed in Vol. I, page 7-27, there are a variety of factors that influence adoption of distributed solar resources. Along with the cost of a solar installation after available incentives, an important economic factor is retail rate paid for electricity, which customers consider when evaluating the ROI/payback period on a solar installation.

State	Solar Adoption Rate (% residential customer population)[22]	Average daily solar irradiance (kWh/m2)[23]	Average Residential Electricity Price (cents per kWh)[24]
Massachusetts	2.3%	4 - 4.5	29.17
Maine	0.8%	4 - 4.5	26.39
New Jersey	2.0%	4 - 4.5	19.32
North Carolina	0.5%	4.5 - 5.4	15.16
Vermont	1.5%	< 4.0 – 4.4	22.62
Arizona	14%	5.25 and up	13.40
California	23%	5.25 and up	27.66
Kentucky	0.6%	4 - 4.5	10.35

[22] Annual Electric Power Industry Report, Form EIA-861 detailed data files (2023). https://www.eia.gov/electricity/data/eia861/
[23] US Annual Solar DNI, https://www.nrel.gov/gis/solar-resource-maps.html
[24] Electric Power Monthly, Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, September 2024 and 2023 (Cents per Kilowatthour). https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.78

Responding Witness: Robert M. Conroy / Tim A. Jones

Q-1.78. Have the Companies studied, or caused to be studied, possible rates of adoption for distributed solar (with or without a battery), under rate structures other than the Companies' current Net Metering Service rider for new net metering customers (NMS-2) and qualifying facility riders (SQF and LQF). If so, please produce any such studies. If not, please explain why not.

A-1.78. No, the Companies have not studied or caused to be studied possible rates of adoption for distributed solar (with or without a battery) under rate structures other than the Companies' current Net Metering Service rider for new net metering customers (NMS-2) and qualifying facility riders (SQF and LQF). The Companies have not done so because NMS-2, SQF, and LQF are the only rate options available to new distributed generation customers today, and the Companies do not currently anticipate adding any other such options.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Joint Intervenors Metropolitan Housing Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy Society and Mountain Association's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1.79

Responding Witness: Lana Isaacson

Q-1.79. Please refer to Vol. I, Section 8.(3).(e) at 8-21, and answer the following requests.

a. Please describe the work of the DSM advisory group since the Companies' most recent DSM plan approval.

b. Please produce written communications (including electronic communications) received or sent by the Companies concerning the DSM advisory group.

c. Please provide any recommendations from the DSM Advisory Group.

d. Provide a list of meetings and attendees of the DSM Advisory Group.

e. What is the current status of the DSM Advisory Group? What meetings are planned?

f. Were the specific DSM programs analyzed in this IRP provided to the DSM Advisory Group for input or feedback?

A-1.79.

a. After the recent DSM Approval in late 2023, two meetings were held in 2024 to update stakeholders, gather input on ongoing programs, and gather ideas for consideration for the 2024 IRP. The DSM Advisory Groups comprise representatives of the Office of the Attorney General and various customer groups, including residential, commercial, industrial, and low-income, as well as representatives of environmental advocacy organizations and metro governments. Specific activities of the DSM Advisory Groups include the following: respond to survey requests to outline areas important to Advisory group constituencies, review the progress and performance of the current energy efficiency programs, offer suggestions to improve the programs'

productivity and effectiveness, and provide consultation for the development of potential future programs.

b. All the correspondence with the DSM Advisory Groups is in the attached file.

c. See attachment being provided as a separate file with recommendations from the DSM Advisory Groups' members. In summer 2024, the Companies added to their website (https://lge-ku.com/dsm) two new features to aid in the communication of possible new programs, pilots, measures, or technologies. These are: 1) an online DSM suggestion form as well as 2) an online and searchable summary list for any previously submitted items from stakeholders.

d. See attachment being provided as a separate file for the list of attendees and dates of the 2024 DSM Advisory Groups' meetings.

e. The last meeting was held on July 16, 2024. The Companies plan to have the next meeting in 2025.

f. Yes.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

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Dated November 22, 2024

Case No. 2024-00326

Question No. 1.80

Responding Witness: Lana Isaacson / Michael S. Sebourn

Q-1.80. Please refer to page 21 and 22 of the 2025 IRP Technology Update: Generation Planning & Analysis" report in IRP Vol. III, Section 3.3.2, addressing "Dispatchable Demand-Side Management." For each of the three DSM program enhancements modeled, please provide the assumptions and calculations used to characterize customer participation, energy and demand savings, and net system benefits.

A-1.80. See the response to Question No. 1.52 (c)(iii).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

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Dated November 22, 2024

Case No. 2024-00326

Question No. 1.81

Responding Witness: Lana Isaacson

Q-1.81. Please refer to page 8-21 of Vol. I, discussing new demand response measures, including dispatchable customer-owned battery storage (BYOD-Energy Storage) and expanded Business Demand Response; as well as Table 8-16 on page 8-26 of Vol. I, providing forecast peak demand impacts for these new programs through 2039, and assuming that the BYOD-Energy Storage program enhancement producing 0.48 MW peak reductions in 2027 with savings rising to 2.41 MW in 2039.

a. Have the Companies prepared a market potential study for customer-sited battery storage as a demand response resource? If so, please produce the most recent such study. If not, please explain why not?

b. Please provide citations for all studies and resources the Companies have referenced regarding the use of customer-sited batteries as a demand response resource.

c. What was the basis for determining the peak demand savings achievable by the BYOD-Energy Storage program in Table 8-16? Provide all analysis and workpapers used to determine these figures.

d. During development of the IRP and the BYOD-Energy Storage program component, did the Companies reference testimony presented on this topic by Joint Intervenor's witness Andy McDonald, in the LGE-KU CPCN Case No. 2022-00402 (pages 24-38)? Did the Companies consider, for example, that utilities in Massachusetts had deployed 288 MW of customer-sited batteries within the first two years of their battery storage demand response program, which is 120 times more capacity than LG&E-KU forecast to deploy after 15 years?

e. Would the "BYOD- Whole House Generator" program include batteries as generators or what generator technologies are envisioned?

f. Would the Business Demand Response program include batteries as a measure to enable businesses to achieve their peak demand reductions?

g. Have the Companies evaluated a battery storage program available to commercial and industrial customers? Please explain why no commercial or industrial battery storage program is included in the forecast.

A-1.81.

a. The Companies have recently begun a new EE/DSM Potential Study that should be complete in 2025.

b. The Companies obtained data on residential battery storage programs at three utilities from E Source: Xcel Energy Colorado, Hawaiian Electric Company, and Rocky Mountain Power.

https://insights.esource.com/documents/Xcel CO - 7.1.2020 - 2021-2022 DSM Plan - 20A-00287EG.pdf

https://insights.esource.com/documents/Xcel CO - 7.1.2022 - 2023 DSM and BE Plan - 22A-0315EG.pdf

https://insights.esource.com/documents/Xcel CO - 12.1.2023 - 2024-2026 DSM BE Plan 23A-0589EG.pdf

https://insights.esource.com/documents/HECO - 3.28.2024 - 2023 DSM Annual Report - 2007-0341.pdf

https://insights.esource.com/documents/Rocky%20Mountain%20Power%20-%20UT%20-%206.1.2023%20-%202022%20Annual%20Report%20-%2023-025-26.pdf

c. The peak demand savings achievable by the BYOD-Energy Storage is the forecast number of participants each year multiplied by the demand reduction per participant and a 90% availability factor. The number of participants each year is based on the average annual participation growth target from year 1 through 4 of the Xcel Colorado program and adjusted for the number of residential customers in the Companies' service territory. The Companies assumed each participant would provide battery energy capacity of 13.5 kWh and produce 3.4 kW over a 4-hour event. This is detailed in JI DR1 LGE KU Attach to Q52(c)(iii) – BYOD Home Gen.xlsx and JI DR1 LGE KU Attach to Q52(c)(iii) – Dispatch Limits and Incentives.xlsx.

d. No.

e. No. Generator technologies include dispatchable equipment that can convert a fuel like natural gas, gasoline, propane, or diesel into electricity.

f. Yes. The Business Demand Response program is technology agnostic.

g. Commercial customers with energy storage can participate in the Business Demand Response program.