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 THE SIERRA CLUB'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

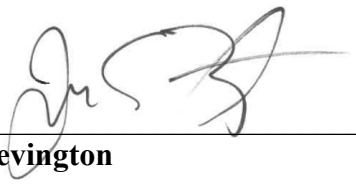
My Commission Expires:

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, **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 Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-1

Responding Witness: Robert M. Conroy

Q-1-1. Provide all LG&E/KU responses to data requests from all parties in this proceeding, including confidential responses. Continue to provide any such documentation, until this docket is closed, on a regular basis.

A-1-1. Under 807 KAR 5:001 Section 8, the Companies requested, and the Commission approved, the use of electronic filing procedures in this proceeding. On November 22, 2024, Sierra Club consented to the use of those procedures. All documents are filed electronically and provided to all parties of record. On November 25, 2024, Sierra Club and the Companies executed a confidentiality agreement and the Sierra Club was granted access to an encrypted file-share site to access the confidential information and public files.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-2

Responding Witness: Robert M. Conroy

Q-1-2. To the extent not already provided, please provide any redacted documents included in the Companies' initial filing in non-redacted, electronic versions (machine readable, unprotected, with formulas intact).

A-1-2. See the response to Question No. 1-1.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-3

Responding Witness: Robert M. Conroy

Q-1-3. Please provide supporting workpapers and modeling files, including (not limited to) all input files, output files, and pre- or post-processing of said inputs and outputs for all portfolios and scenarios for all years modeled, in electronic spreadsheet format with formulas intact, supporting each of the statements, testimonies, exhibits, and attachments included in the Cooperative's initial filing and direct testimonies.

A-1-3. See the response to Question No. 1-1.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-4

Responding Witness: Michael S. Sebourn

Q-1-4. For all PLEXOS modeling runs referenced in the IRP filing, please provide the following:

a. The PLEXOS database (.xml).

b. The zipped output solution files for each run and associated portfolio containing the log files and other relevant output.

c. The settings that the Companies used within PLEXOS for the capacity expansion modeling, including the step size, chronology, duration curve, blocks in each duration curve, and slicing method.

d. The planning period over which the capacity expansion modeling was conducted.

A-1-4.

a. See KPSC Case No 2024-00326 – LGE-KU 2024 IRP Resource Planning Workpapers—PUBLIC.zip at filepath "PLEXOS\20240925\2024IRP_D23 (10.000 R06).xml".

b. See KPSC Case No 2024-00326 – LGE-KU 2024 IRP Resource Planning Workpapers—CONFIDENTIAL.zip at filepath "PLEXOS\20240925\Results\CONFIDENTIAL_Solutions".

c. The LT Plan in the Companies' PLEXOS model utilizes a six-year rolling horizon with one year of overlap, fitted chronology, and six blocks per day with a Peak/Off-peak Bias slicing method.

d. The Companies' PLEXOS model utilized a horizon from 2028 through 2050.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-5

Responding Witness: Michael S. Sebourn

Q-1-5. For the PLEXOS capacity expansion modeling performed in PLEXOS, please answer the following:

a. Please explain if the capacity expansion plans were optimized to meet a summer reserve margin, a winter reserve margin, or both a summer and winter reserve margin, and how the Company did so.

b. Please confirm if the Companies are modeling the thermal resources on a UCAP or ICAP basis.

c. Please provide the supporting workbooks, with all formulas and links intact, used to develop the summer and winter capacity contributions modeled for the existing and new thermal resources

A-1-5.

a. The Companies' PLEXOS model is optimized to meet both a summer and winter reserve margin by meeting both a winter and summer minimum capacity reserves requirement annually.

b. Expansion NGCC and SCCT resources were modeled on an ICAP basis for meeting minimum capacity reserves and on a UCAP basis for capacity dispatch ratings, which allowed for the modeling of average planned maintenance on units with undetermined in-service years. All other thermal resources were modeled on an ICAP basis.

c. See KPSC Case No 2024-00326 – LGE-KU 2024 IRP Resource Planning Workpapers—PUBLIC.zip at filepath "PLEXOS\Support\20240917_WinterMinReserves_LoadScenarios.xlsx".

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-6

Responding Witness: Michael S. Sebourn

Q-1-6. If they have not been previously provided, please provide all SERVM files necessary to execute runs within the SERVM software, including the SERVM .bak file, the SERVM release, and the executable file.

A-1-6. Astrapé Consulting, the entity that licenses the SERVM software, has denied the Companies permission to disclose the native file format (.bak) of the Companies' SERVM database to any person or party who lacks an active SERVM license. Therefore, the Companies will provide a .bak file to any party to this proceeding who has an active SERVM license and enters into a confidentiality agreement with the Companies.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club'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 refer to page 5-9 of the IRP

a. Please provide the PROSYM input and output modeling files for each resource portfolio modeled.

b. Please provide the Financial Model supporting workbook, with all formulas and links intact, used to develop the costs for each of the resource portfolios modeled.

c. Please provide the present value of revenue requirements ("PVRR") results for each of the modeling runs performed for this IRP

A-1-7.

a. For PROSYM inputs, see KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the "PROSYM\ModelInputs\" folder. PROSYM outputs are segregated by environmental scenario, and individual model runs are available in the CaseFolders subfolders. See the response to KIUC 1-3(b) regarding file naming conventions. PROSYM output files are aggregated using a SAS program into csv files for each environmental scenario. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the "PROSYM" folder.

b. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the "FinancialModel" folder. Financial Model results are segregated by environmental scenario.

c. See the response to part (b). PVRR values are calculated in column E of the ModelCounter tab of the Financial Model files.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-8

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

Q-1-8. Please refer to pages 5-9 to 5-10 of the IRP where it states "the Companies produced 51 hourly load forecasts for 2032 based on weather in each of the last 51 years (1973- 2023)."

a. Please explain the process the Companies used to develop the 51 hourly load forecasts.

i. If the Companies are using a neural network approach to develop the historical hourly profiles, please provide the historical years that are used to develop the neural network.

b. Please provide the supporting analysis, including any workbooks, with all formulas and links intact, used to develop the 51 hourly load forecasts.

c. Please explain why the Companies chose to model the last 51 year instead of some smaller number of weather years.

A-1-8.

a. See Section 5.2.2 of Volume II, Electric Sales & Demand Forecast Process. In summary, the Companies use multivariable linear regression to model the current system's load response to significant variables such as temperature, hour of day, and day of week. This modeling is done at an hourly level with a model specified for each month of the year. These models are then used to predict load for the current system based on weather in each of the last 51 weather years. To ensure consistency with the Companies' long-term load forecast, all hourly loads are adjusted so that the mean monthly energy and mean seasonal peaks equal those in the Mid long-term load forecast.

i. The Companies are not using a neural network model. The Companies have considered evaluating a neural network for this analysis, but they currently use multivariable linear regression, which is consistent with prior filings.

b. See KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath Electric_Load_Forecast\Electric\Demand_Forecasts\1_Hourly_Demand\jdl_weather_year.

c. Fifty-one years are used because 1973 is the first year for which Companies have reliable hourly weather data. An assessment of resource adequacy is significantly focused on the ability to serve load during extreme temperature events. As seen in Figures 2 and 3 on page 7 of Volume III, 2024 IRP Resource Adequacy Analysis, annual high and low temperatures have fluctuated within a fairly consistent range over time. The Companies assess resource adequacy based on all available weather data to consider as many weather scenarios as possible. In addition to temperature, factors such as the duration of an extreme weather event can vary from one event to the next, so the use of all available weather data results in a more robust analysis.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-9

Responding Witness: Lonnie E. Bellar / Michael S. Sebourn

Q-1-9. Please refer to page 5-11 of the IRP and the four environmental regulation scenarios.

a. For each of the Companies' existing coal-fired units, please provide the capital and O&M costs projected to be incurred each year to comply with the Effluent Limit Guidelines ("ELG").

b. Please provide the supporting analysis and workbooks, with all formulas and links intact, used to develop the costs to comply with ELG.

c. Please explain how the Companies evaluated the cost of ELG compliance in the PLEXOS capacity expansion modeling.

A-1-9.

a. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at "FinancialModel/CONFIDENTIAL_20241001_FinancialModel_03_ELG_0328.xlsx". ELG capital costs are available in rows 150-157 of the FixTime tab, and ELG O&M costs are available in rows 168-175 of the FixTime tab.

b. 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.

c. See Section 4.4.1.3 of Volume III, Resource Assessment. Compliance with the ELG regulations can be achieved one of three ways: convert to zero-liquid discharge by the end of 2029, convert to burn 100% natural gas by the end 2034, or retire by the end of 2034. To properly model ELG compliance within PLEXOS, the Companies modeled the cost of ELG compliance through 2035 as a future value lump sum in 2035 and let PLEXOS determine if incurring those costs to continue operations through 2035 and beyond is cost-justified versus retirement or converting to burn 100% natural gas.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-10

Responding Witness: Tim A. Jones

Q-1-10. Please refer to page 5-15 of the IRP. Please provide the supporting workbooks, with all formulas and links intact, used to develop the Low, Mid, and High Load Scenarios.

A-1-10. See 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" for hourly inputs. See filepath "IRP_Workpapers\Vol_I_Data\Scenarios\Scenario_Input_Files\Scenario_Aggregation.R" for the R script which aggregates the inputs files. See files "Smoothing_Work_D05.R" and "HighLowCase_PeakSmoothing_D05.xlsx" at filepath "IRP_Workpapers\Vol_I_Data\Scenarios\Smoothing" for files which smooth the seasonal peaks across the forecast period.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-11

Responding Witness: John Bevington / Tim A. Jones

Q-1-11. Please refer to page 5-16 of the IRP where it references 1,050 MW of data center load by 2032 in the Mid scenario and 1,750 MW of data center load in the High scenario.

a. Please provide the supporting calculations, with all formulas and links intact, used to develop the assumption of 1,050 MW of data center load by 2032 in the Mid scenario and 1,750 MW in the High Scenario.

b. Please explain how the data center load assumptions for the Mid and High load scenarios compare to the level of requests the Companies have received from potential new customers.

c. Please explain what assumptions the Companies made around the hourly shape used to include the data center load in the load forecasts modeled in PLEXOS and ProSym.

A-1-11.

a. See the responses to PSC 1-21 and KIUC 1-2(g).

b. See the response to PSC 1-21. The values of 1,050 MW and 1,750 MW are a fraction of the total data center load in the queue, as discussed in response to KCA 1-15 and JI 1-16(d).

c. See the response to PSC 1-21.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-12

Responding Witness: John Bevington / Tim A. Jones

Q-1-12. Please refer to pages 5-16 and 5-17 if the IRP and the discussion of the three economic development load growth scenarios. For each scenario, please provide the following information:

a. The number of new customers included in the forecast.

b. For each new customer included in the load forecast, please provide the peak demand, ramp schedule, annual energy requirements, load factor, hourly shape, anticipated date the customer expects to receive service, the commercial activity of the customer (i.e. data center, cryptocurrency, or EV manufacturing), and whether the customer has entered into any agreements or contracts with the Companies.

c. For each new customer that has executed an agreement indicating an intention to obtain service from the Companies, please provide the date of the agreement.

    i. The service agreement signed by the customer;

    ii. If agreement(s) have not been executed, please explain if any of the new customers are considering locating their facility outside of the Companies' service territory or in another state.

d. Please give the new customers, by size, that have commenced site construction activities.

e. Please detail the conversations, if any, that the Companies have had with new customers about arrangements for curtailable load, standby on-site generation, behind the meter generation, participation in energy efficiency programs, or any other approaches to offset the capacity need of the new customers.

f. For the potential new customers that the Companies have engaged in conversations with, please confirm if any of those customers have made

modifications to the announced load or ramp schedule. If yes, please provide the initial numbers provided to the Companies and modifications made by the customer.

A-1-12.

a. See the response to PSC 1-21. In addition to data center load, the Companies also included 20 MW from an economic development prospect in the auto industry and 19.4 MW from an existing customer's expansion in all load scenarios. In the High scenario, 120 MW from BOSK Phase 2 is also included.

b. For prospective data center customers, see the response to PSC 1-21 and KIUC 1-2(g).

See KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--CONFIDENTIAL.zip at filepath Electric_Load_Forecast\Electric\Forecasts\ CONFIDENTIAL_Major_Accounts\Analysis\IRP_Scenario_Files.

For details on the prospective auto industry customer, see "Auto_Manuf_LF_Adjust.xlsx" and "Auto_Manuf_MA_Shaping.xlsx" at the filepath stated above.

For details on BOSK Phase 2, see "Large_Auto_Manuf_LF_Adjust.xlsx" and "Large_Auto_Manuf_MA_Shaping.xlsx" at the filepath stated above.

c.

i. See attachment being provided in a separate file. This attachment is confidential and provided pursuant to a Petition for Confidential Protection.

ii. See the response to KCA 1-3(e).

d. All three of the customers listed in response to part (a) have commenced site construction activities.

e. The Companies have primarily been responding to requests for infrastructure and capacity from potential customers needing around the clock energy, every day of the year. Those potential customers have not asked about or expressed interest to the Companies concerning curtailable service, standby on-site generation, behind the meter generation, participation in energy efficiency programs, or any other approaches to offset needed capacity.

f. There have not been any projects that have made formal announcements to date, including an announced load or ramp schedule.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-13

Responding Witness: Tim A. Jones

Q-1-13. Please refer to page 5-17 of the IRP where it states "The Companies assign a low likelihood to the Low Scenario".

a. Please explain what this statement means to the Companies.

b. Please explain if this means that the Companies applied probabilities or any stochastic modeling to the load forecasts modeled.

A-1-13.

a. Based upon the current data center demand nationally and the conversations the Companies have had with specific customers, the Low load scenario with zero data centers locating in the Companies' service territories is improbable.

b. No, the Companies have not applied probabilities or any stochastic modeling to the load forecasts modeled.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-14

Responding Witness: Tim A. Jones

Q-1-14. Please refer to Figure 5-8 on page 5-17 of the IRP. Please provide the supporting workbook, with all formulas and links intact, used to develop Figure 5-8.

A-1-14. See KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--CONFIDENTIAL.zip at filepath IRP_Workpapers\Vol_I_Data\EconDev_ColumnChart_20241008.xlsx

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-15

Responding Witness: Lana Isaacson / Tim A. Jones

Q-1-15. Please refer to page 5-18 of the IRP where it states "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. These reductions are in addition to significant reductions observed historically from customers' actions to use electricity more efficiently."

a. Please explain how the Companies developed the DSM-EE savings beyond the proposed 2024-2030 DSM-EE Program plan.

b. Please explain what programs are included in the "new programs beyond 2030" and provide the breakdown of assumed energy and summer and winter peak savings by program.

c. Please provide the supporting workbooks, with all formulas and links intact, used to develop the costs included in the financial modeling for each of the DSM and EE programs included in the resource portfolios.

A-1-15.

a. The Companies model the combined impact of the Companies' DSM-EE programs and customer-initiated energy efficiency improvements through the statistically adjusted end-use ("SAE") modeling framework described in IRP Volume II and in the attachment to the responses to PSC 1-9 and PSC 1-10. In the SAE modeling framework, this combined impact is modeled as a function of end-use efficiencies from Itron and the U.S. Energy Information Administration ("EIA"), which have improved historically and are assumed to continue to improve over the forecast period. While incremental end-use efficiency improvements are expected to diminish over time, this continued improvement causes the combined impact of DSM-EE programs and

customer-initiated energy efficiency improvements to increase beyond 2030 in the forecast.

The Companies do not attempt to adjust their historical load data to remove estimated effects of the Companies' DSM-EE programs, forecast sales without DSM-EE, and then add back forecasted DSM-EE impacts.

b. See the response to part (a). The increasing impact of Company-sponsored DSM-EE is modeled implicitly in the Companies' forecast and not explicitly through specific programs..

c. For workpapers supporting the overall energy efficiency assumptions used in the Companies' load forecasts used in resource modeling, 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_FlatEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\KU\Data\IRP\CONFIDENTIAL_KU EastSouthCentralRes23_DecelEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\KU\Data\IRP\CONFIDENTIAL_KU EastSouthCentralRes23_AccEff.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_FlatEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\LE\Data\IRP\CONFIDENTIAL_LE EastSouthCentralRes23_DecelEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\LE\Data\IRP\CONFIDENTIAL_LE EastSouthCentralRes23_AccEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\ODP\Data\CONFIDENTIAL_OD EastSouthCentralRes23.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\ODP\Data\IRP\CONFIDENTIAL_OD EastSouthCentralRes23_FlatEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\ODP\Data\IRP\CONFIDENTIAL_OD EastSouthCentralRes23_DecelEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\ODP\Data\IRP\CONFIDENTIAL_OD EastSouthCentralRes23_AccEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Commercial\Data\CONFIDENTIAL_EastSouthCentralCom23_20240610.xlsx

- Electric_Load_Forecast\Electric\Forecasts\Commercial\Data\CONFIDENTIAL_EastSouthCentralCom23_20240610_FlatEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Commercial\Data\CONFIDENTIAL_EastSouthCentralCom23_20240610_DecelEff.xlsx
- Electric_Load_Forecast\Electric\Forecasts\Commercial\Data\CONFIDENTIAL_EastSouthCentralCom23_20240610_AccEff.xlsx

For DSM demand response programs included as supply-side resources in the resource planning process, see the response to JI 1-52(c) iii.

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Question No. 1-16

Responding Witness: Tim A. Jones

Q-1-16. Please refer to Figure 5-9 on page 5-19 of the IRP

a. Please provide the supporting workbook, with all formulas and links intact, used to develop Figure 5-19.

b. Please explain how energy efficiency savings were modeled in PLEXOS and ProSym.

i. If the energy efficiency savings were modeled as a reduction to the load forecast, please provide the 8,760 hourly shape that was used to develop hourly energy efficiency savings.

c. Please confirm that this was the only level of energy efficiency savings modeled in the resource portfolios. If not confirmed, please explain what other levels of energy efficiency savings were evaluated.

d. Please explain how existing DSM programs were incorporated into the load forecast, (i.e. were savings from historical programs added back to the load forecast to get a "no DSM" forecast or was a DSM variable included as an independent variable in the regression model).

A-1-16.

a. See attachment being provided in a separate file.

b. The combined impact of company-sponsored DSM-EE programs and customer-initiated energy efficiency improvements is reflected in the load forecast, which is an input to PLEXOS and PROSYM. See also the response to Question No. 1-15.

i. Not applicable for the Mid load forecast. See the response to part (b). For the High and Low load scenarios' change in energy efficiency savings from the Mid scenario, see the response to Question No. 1-10.

c. Confirmed.

d. See the response to Question No. 1-15.

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Question No. 1-17

Responding Witness: Tim A. Jones

Q-1-17. Please refer to Figure 5-10 on page 5-20 of the IRP. Please provide the supportingworkbook, with all formulas and links intact, used to develop Figure 5-10.

A-1-17. See provided workpaper "KSPC 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."

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Question No. 1-18

Responding Witness: Tim A. Jones

Q-1-18. Please refer to Figure 5-11 on page 5-21 of the IRP.

a. Please provide the supporting workbook, with all formulas and links intact, used to develop Figure 5-11.

b. Please provide the annual summer and winter peak and energy impacts from electric vehicle load included in the load forecast.

c. Please provide the total annual number of electric vehicles assumed in the Companies' load forecast for each year in the forecast period.

d. Please provide the EV load shape assumed for the Low, Mid, and High forecast broken out by light-, medium- and heavy-duty vehicles.

e. Please provide the hourly charging profile the Companies assumed in each forecast.

f. Please provide the historical charging profiles for EVs in the Companies' service territory.

A-1-18.

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\EV\EV_IRP_forecast.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\Scenarios\Aggregated_Scenarios_CC_Seasonal_Peaks.csv" and "KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath IRP_Workpapers\Vol_I_Data\Scenarios\Aggregated_Scenarios_Wide.csv."

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\EV\EV_IRP_forecast.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\EV\EV\managedChargingEVs_summerWinterPeak.xlsx." The same load shape was applied to create the hourly energy for the Low, Mid, and High scenarios. See the response to part (e) for hourly energy for each scenario. The Companies' EV forecast includes only light-duty vehicles. Usage for medium and heavy EVs is implicit in the base electric forecast; the Companies do not separately forecast their usage. Thus, the entire EV forecast is for light-duty vehicles.

e. 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\EV_scenarios_20240719.xlsx."

f. The Companies do not have this data.

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Question No. 1-19

Responding Witness: Lana Isaacson

Q-1-19. For the DSM-EE programs included in the IRP, please answer the following:

a. Please identify each DSM-EE program evaluated for implementation during the planning period and provide the data and analysis used to evaluate each such DSM-EE program.

b. Please provide the Companies' most recent study of demand response and energy efficiency potential among each of the customer classes.

c. Please provide the most recent three full years of reported DSM-EE data (including program planned budgets and savings, actual spending and savings, and planned and actual participation) by program, in executable Excel format with formulae intact. Please also provide any energy efficiency or demand response Annual Reports prepared during this period.

d. Please provide the measure life and measure savings for each of the existing DSM programs.

e. Please explain the companies' cost benefits analyses of DSM programs (including energy efficiency programs).

f. Please provide all data and analysis performed regarding all DSM programs considered for implementation during the planning period. Please include all Benefit-Cost analyses and all cost tests utilized for each program and identify each program that was evaluated.

g. Please explain if the cost benefit analyses include potential avoided transmission or distribution investments? If not, why not?

    i. If the analyses did include potential avoided transmission or distribution investments, please provide the value of the avoided transmission or distribution investments.

A-1-19.

a. See the response to JI-1.52.c.iii.

b. See Exhibits LI-1 and LI-2 to the Direct Testimony of Lana Isaacson in Case No. 2022-00402 for the most recent Potential Studies of demand response and energy efficiency.[1]

c. See the response to JI-1.52.c.iii.

d. See the attached file for actual spend, savings, and metrics by program and year. For the various corresponding forecasted values, refer to Sections 1.8 to 3 in Exhibit GSL-1 of Case No. 2017-00441.

e. See the attached file.

f. See Section 1.5.1 of Exhibit JB-1 of Case No. 2022-00402 for a detailed explanation of the cost / benefits analyses process and tests.

g. See the response to JI-1.52.c.iii.

[1] Available at https://psc.ky.gov/pscecf/2022-00402/rick.lovekamp%40lge-ku.com/12152022012325/20-Isaacson_Direct_Testimony_2022-00402.pdf.

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Question No. 1-20

Responding Witness: Tim A. Jones

Q-1-20. Please refer to Figures 5-12 through Figure 5-14 of the IRP. Please provide the supporting workbooks, with all formulas and links intact, used to develop Figures 5-12, Figure 5-13, and Figure 5-14.

A-1-20. See files "Energy Stacked Scenarios.xlsx" and "Peak Stacked Scenarios.xlsx" at KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath IRP_Workpapers\Vol_I_Data for charts. Supporting work is completed in KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Load Forecasting Workpapers--PUBLIC.zip at filepath IRP_Workpapers\Vol_I_Data\Scenarios.

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Case No. 2024-00326

Question No. 1-21

Responding Witness: Michael S. Sebourn

Q-1-21. Please refer to Table 6-4 on page 6-5 of the IRP.

a. Please provide the supporting workbook, with all formulas and links intact, used to develop the numbers presented in Table 6-4.

b. Please provide the source of the capital costs reported for each technology included in Table 6-4.

c. Please explain if the capital costs reported for each technology include the costs for transmission.

    i. If transmission costs are included, please provide the transmission costs modeled for each technology type.

d. Please provide the firm gas transportation costs assumed for the SCCT and NGCC resources.

e. Please confirm if the $2,049/kW capital cost reported in the 2024 IRP column for 4-hr BESS is before or after the inclusion of the Investment Tax Credit ("ITC").

f. Please provide the ITC value that was applied to the solar and battery storage resources.

g. Please explain if the Companies assumed any level of the solar or battery storage resources modeled in PLEXOS would qualify for the 10% community bonus adder.

    i. If the Companies did not make any assumption for the community bonus adder, please explain why not.

h. Please explain if the Companies assumed any level of the solar or battery storage resources modeled in PLEXOS would qualify for the 10% domestic content bonus adder.

A-1-21.

a. The values in Table 6-4 come from the respective Screening Model workbooks for each analysis. See attachments being provided in separate files for the 2021 IRP and 2022 RFP Screening Models. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection. The 2024 IRP Screening Model was provided in KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at filepath Screening/CONFIDENTIAL_20240901_ResourceScreeningModel_2024IRP_0328.xlsx.

b. The capital costs in the 2021 IRP were based on NREL's 2021 ATB. The capital costs in the 2022 RFP were based on the Companies' RFP responses and estimates. As discussed in the first paragraph of the Executive Summary in the IRP, Volume III, Technology Update, the capital costs in the 2024 IRP are based on NREL's 2024 ATB, updated cost estimates for resources contemplated in the 2022 RFP, and the Companies' own analysis.

c. No firm transmission costs were included for any of the resources in Table 6-4, as the Companies assumed they would be installed in the Companies' territory. Also, as noted in Section 3.1 of the IRP, Volume III, Resource Assessment, no costs for transmission system upgrades are included in the Companies' capital cost estimates and assumptions.[2]

    i. Not applicable.

d. The 2024 IRP firm gas transportation cost assumptions are shown in Table 1 in the IRP, Volume III, Technology Update. The table below shows firm gas cost assumptions from the 2021 IRP and 2022 RFP as well.

Firm Gas Cost Assumptions ($/kW-yr)

Resource	2021 IRP 2026 $	2022 RFP 2026/2027 $	2024 IRP 2030 $
SCCT	22	15	19
NGCC	19	13	15

e. The $2,049/kW in capital cost does not reflect the impact of the ITC.

f. Section 3.2.1 and 3.3.1 in the IRP, Volume III, Technology Update detail the PTC and ITC assumptions for solar and BESS resources in the 2024 IRP. The

[2] Interconnection costs are included in capital cost assumptions.

table below shows PTC and ITC assumptions from the 2021 IRP and 2022 RFP as well.

PTC and ITC Assumptions

Resource	2021 IRP	2022 RFP	2024 IRP
Solar	26% ITC	$30.25/MWh PTC for 10 years	$30.25/MWh PTC for 10 years
BESS	N/A	50% ITC	50% ITC

g. Yes, as noted in Sections 3.2.1 and 3.3.1 of the IRP, Volume III, Technology Update, the Companies assumed solar and BESS resources would qualify for the IRA's energy community bonus.

   i. Not applicable.

h. Yes, as noted in Section 3.3.1 of the IRP, Volume III, Technology Update, the Companies assumed BESS resources would qualify for the IRA's domestic content bonus.

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Question No. 1-22

Responding Witness: Tim A. Jones

Q-1-22. Please refer to Figures 7-14 and 7-15 on page 7-30 of the IRP. Please provide the supporting workbooks, with all formulas and links intact, used to develop Figure 7-14 and 7-15.

A-1-22. See provided workpaper "KSPC Case No 2024-00326 – LGE-KU 2024 IRP Load Forecasting Workpapers – PUBLIC.zip at filepath IRP_Workpapers\Vol_I_Data\EV\ managedChargingEVs_summerWinterPeak.xlsx."

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Question No. 1-23

Responding Witness: Michael S. Sebourn

Q-1-23. Please refer to Section 2.2 in the 2024 IRP Technology Update at pages 11-13

a. Please provide the supporting workbooks, with all formulas and links intact, used to develop the analysis of computing the cost of replacing Mill Creek 3's generation with renewables and BESS in the Excel model referenced on page 11.

b. Please provide the source that the Companies used to develop the solar and wind hourly profiles.

A-1-23.

a. See the response to SREA 1-38.

b. See the response to SREA 1-38.

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Question No. 1-24

Responding Witness: Michael S. Sebourn

Q-1-24. Please refer to footnote 49 on page 20 of the 2024 IRP Technology Update. Please provide a copy of the study referenced in this link.

A-1-24. The study is currently available at the link provided.

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Question No. 1-25

Responding Witness: Michael S. Sebourn

Q-1-25. Please refer to the 2024 IRP Technology Update at page 20 where it states: "For the Resource Assessment, the Companies have allowed for maximizing renewables penetration in the study period by limiting solar generation to 20% of total energy requirements and the sum of solar and wind generation to 25% of total energy requirements".

a. Please explain how this limit translated into the build limits modeled in PLEXOS.

b. Please provide the annual build limits applied to solar and wind resources in PLEXOS.

A-1-25.

a. The Companies modeled this limit in PLEXOS through two constraints, named "Max_Solar" and "Max_Wind".

b. The Companies' PLEXOS model does not apply an annual build limit to solar and wind resources. However, the model does restrict installed solar capacity to 2,803 MW, 3,764 MW, and 4,490 MW in low, mid, and high load scenarios respectively. Additionally, the Companies' PLEXOS model constrains annual generation from the sum of solar and wind resources to approximately 25% of total energy requirements as calculated in the workpaper located in KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the following file path: "PLEXOS\Support\Renewable_Expansion_Limits.xlsx".

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Case No. 2024-00326

Question No. 1-26

Responding Witness: Lonnie E. Bellar

Q-1-26. Please refer to pages 28 – 30 in the Direct Testimony of Witness David Sinclair in Case No. 2022-00402 and page 23 of the 2024 IRP Technology Update.

a. On pages 28 – 30 of Witness Sinclair's testimony, Witness Sinclair discusses the pumped hydro facility that was bid into the RFP and reported that "the proposal was viewed as not far enough along in its development to be a viable resource to address the timing of the Companies' current energy and capacity needs." Please explain if the Companies are aware of any updates regarding the development of the resource that was bid into the RFP.

i. If there have been updates on the development of the resource, please explain why pumped hydro was not considered as a resource in the IRP modeling.

A-1-26.

a. Yes, the Companies are aware that the Lewis Ridge Pump Storage project submitted a Draft License Application to the Federal Energy Regulatory Commission ("FERC") on September 30, 2024.

i. See the response to PSC 1-15.

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Question No. 1-27

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

Q-1-27. Please refer to the 2024 IRP Resource Adequacy Analysis at page 4 where it states: "Importantly, like in prior reserve margin analyses, these reserve margins were developed with the assumption that the Companies can purchase power from TVA, PJM, or MISO when generation and transmission capacity are available."

a. Please provide the assumption that was modeled in SERVM for the interchange between the Companies and TVA, PJM, and MISO.

b. Please explain how the interchange assumptions were developed.

c. Please provide the Companies' historical hourly purchases and sales separated out for TVA, PJM, and MISO, for the past five years.

A-1-27.

a. See KPSC Case No 2024-00326 – LGE-KU 2024 IRP Resource Planning Workpapers—PUBLIC.zip at file path "SERVM\ SERVM Data CSV Files\ Transmission Capability.csv".

b. They were developed based on daily available transmission capacity ("ATC") between the Companies' system and neighboring regions on weekdays during the summer and winter months of 2022, 2023, and 2024.

c. See attachment being provided in a separate file.

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Question No. 1-28

Responding Witness: Tim A. Jones

Q-1-28. Please refer to Figure 2 and Figure 3 on page 7 of the 2024 IRP Resource Adequacy Analysis. Please provide the supporting workbooks, with all formulas and links intact, used to develop Figure 2 and Figure 3.

A-1-28. See attachment being provided in a separate file.

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Question No. 1-29

Responding Witness: Stuart A. Wilson

Q-1-29. Please refer to page 17 of the 2024 IRP Resource Adequacy Analysis and the discussion of the "High ATC" case.

a. Based on the results from this case, are the Companies planning on pursuing the "Approximately $101 million per year plus losses to have a minimum of 700 MW of ATC at all times"?

i. If the Companies do pursue the "High ATC" case, in what year would the Companies be able to secure the 700 MW of ATC at all times?

A-1-29.

a. No. The purchase of firm transmission does not ensure that generation will be available in neighboring markets when needed, as experienced during Winter Storm Elliott.

i. See the response to part (a).

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Question No. 1-30

Responding Witness: Michael S. Sebourn

Q-1-30. Please refer to page 18 of the 2024 IRP Resource Adequacy Analysis.

a. Please explain if the 85%, 93% and 29% capacity contributions for 4-hour BESS, 8-hour BESS, and dispatchable DSM, remain constant throughout the planning horizon at these values. If not, please provide the capacity contributions modeled across the planning period.

b. For the 300 MW of dispatchable DSM modeled to determine the 39% contribution, please explain how the 300 MW of dispatchable DSM was modeled in SERVM, including limits or constraints on when the resource could be dispatched.

A-1-30.

a. Yes, the capacity contributions remain constant throughout the planning horizon.

b. The limits for the dispatchable DSM are 100 hours per year, 4 hours per day, and one dispatch per day.

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Question No. 1-31

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

Q-1-31. For the SERVM modeling conducted and discussed in the 2024 IRP Resource Adequacy Analysis, please answer the following:

a. Please explain how the Companies included the forecasted economic development load in their hourly historical load profiles and projected peak demand and energy in SERVM.

b. Please explain how the Companies included the forecasted electric vehicle load in their hourly historical load profiles and projected peak demand and energy in SERVM.

c. Please explain how the Companies included the forecasted energy efficiency savings in their hourly historical load profiles and projected peak demand and energy in SERVM.

d. Please explain if the Companies performed any analysis in SERVM that did not include the projected economic development load.

i. If any studies were performed, please provide the SERVM modeling outputs for those studies.

A-1-31.

a. Because the economic development loads are not weather-sensitive, the same economic development hourly load profiles are included in all weather year forecasts. This process is summarized in Section 5.2.2 of IRP Volume II, Electric Sales and Demand Forecast Process (see post-modeling step 3). The hourly load profiles are developed as described in response to PSC 1-21.

b. See Section 5.2.2 of IRP Volume II, Electric Sales and Demand Forecast Process (post-modeling step 3). The hourly load profiles are developed as described in response to Question No. 1-18(d)(e).

c. See the responses to Question Nos. 1-15 and 1-16. The impact of energy efficiency savings is reflected in the long-term energy requirements forecast and is projected to increase over time. This increase is captured in the weather year forecasts by aligning mean monthly energy requirements and mean seasonal peaks in the weather year forecasts with monthly energy requirements and seasonal peaks in the long-term energy requirements forecast.

d. No, the Companies have not done such analysis.

    i. See the response to part (d).

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Question No. 1-32

Responding Witness: Michael S. Sebourn

Q-1-32. Please refer to page 23 of the 2024 IRP Resource Adequacy Analysis where it states: "For each unit, the scenarios are developed to target the annual EFOR values in Table 14, which are based on the medians of historical EFORs from 2009 to 2024."

a. Please provide the EFOR for each of the Companies' generating units between 2009 and 2024.

b. Please provide the supporting workbooks, with all formulas and links intact, used to develop the outage distributions modeled in SERVM for each of the thermal generators.

A-1-32.

a. See attachment being provided in a separate file.

b. See KPSC Case No 2024-00326 – LGE-KU 2024 IRP Resource Planning Workpapers—PUBLIC.zip at file paths "SERVM\Inputs\ 20240822_ForcedOutages_0328D02.xlsx" and "SERVM\Inputs\ 20240822_ForcedDerates_0328D02.xlsx".

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Question No. 1-33

Responding Witness: Stuart A. Wilson

Q-1-33. Please refer to page 23 of the 2024 IRP Resource Adequacy Analysis where it states: "In developing these annual EFOR values, the Companies updated their analysis from the 2022 CPCN proceedings to compute the correlation between forced outages and temperature over this same time period (2009-2024)." Please provide the supporting workbooks, with all formulas and links intact, used to develop the analysis that computed the correlation between forced outages and temperature.

A-1-33. See attachment being provided in a separate file. This file was inadvertently omitted from the Companies' workpapers filed with the IRP.

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Question No. 1-34

Responding Witness: Stuart A. Wilson

Q-1-34. Please refer to page 23 of the 2024 IRP Resource Adequacy Analysis where it states, "For each neighboring region, Astrapé added a negative generating unit with higher output at lower temperatures to model the effects of correlated outages."

a. Please confirm if this means that the neighboring regions configured in the SERVM studies performed by the Companies include the negative generating unit.

b. Please confirm that the negative generating unit modeled in the neighboring regions is representative of additional forced outages from lower temperatures.

c. Please explain how the size of the negative generating unit was determined for each of the neighboring regions.

d. Please provide the supporting analysis and any workbooks, with all formulas and links intact, used to develop the correlation between forced outages and temperature in the neighboring regions modeled in SERVM.

A-1-34.

a. Confirmed.

b. Confirmed.

c. According to Astrapé Consulting, the size of the unit for PJM West was based on outages observed in PJM during Winter Storm Elliott. The size of the MISO and TVA units was based on historical outages.

d. The negative generating units for neighboring regions were developed by Astrapé Consulting (the developer of SERVM). The Companies do not possess any workbooks.

LOUISVILLE GAS AND ELECTRIC COMPANY
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Response to Sierra Club's Initial Request for Information
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Case No. 2024-00326

Question No. 1-35

Responding Witness: Stuart A. Wilson

Q-1-35. Please refer to pages 25 to 26 of the 2024 IRP Resource Adequacy Analysis where it states that "the Companies can curtail CSR customers only in hours when more than ten of the Companies' large-frame SCCTs are being dispatched, the ability to utilize this program is limited." Please explain how this limit was modeled in SERVM.

A-1-35. A high curtailable price is used to ensure that CSR is dispatched after large-frame SCCTs.

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Response to Sierra Club's Initial Request for Information
Dated November 22, 2024

Case No. 2024-00326

Question No. 1-36

Responding Witness: Michael S. Sebourn

Q-1-36. Please refer to Table 18 on page 27 of the 2024 IRP Resource Adequacy Analysis. Please provide the supporting workbooks, with all formulas and links intact, used to develop Table 18.

A-1-36. See KPSC Case No 2024-00326 – LGE-KU 2024 IRP Resource Planning Workpapers—PUBLIC.zip at file path "SERVM\Inputs\ 20240820_HistoricalATCD02.xlsx".

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Dated November 22, 2024

Case No. 2024-00326

Question No. 1-37

Responding Witness: Michael S. Sebourn

Q-1-37. Please refer to page 5 of the 2024 IRP Resource Assessment. Please provide the supporting workbooks, with all formulas and links intact, used to develop the five fuel price scenarios.

A-1-37. See files located in KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the following file path: "2025PlanInputs\ CONFIDENTIAL_CommodityPriceForecasts ".

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Dated November 22, 2024

Case No. 2024-00326

Question No. 1-38

Responding Witness: Michael S. Sebourn

Q-1-38. Please refer to page 14 of the 2024 IRP Resource Assessment where it states: "Specifically, the Companies added constraints in PLEXOS to ensure (for cases where coal unit retirements are economic) that coal units are replaced over the analysis period by an equal or greater amount of fully dispatchable resources." Please explain which new resources were allowed to be selected within PLEXOS to meet this constraint.

A-1-38. The new resources that were allowed to be selected within PLEXOS to meet this constraint are natural gas combined-cycle ("NGCC") units, large-frame simple-cycle combustion turbine ("SCCT") units, and small modular nuclear reactors ("SMR").

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Case No. 2024-00326

Question No. 1-39

Responding Witness: Lonnie E. Bellar / Michael S. Sebourn / David L. Tummonds

Q-1-39. Please refer to Table 32 on page 55 of the 2024 IRP Resource Assessment.

a. Please provide the pipeline modifications that are included in the co-firing and gas conversion capital column for each of the units.

b. Please provide the firm gas transportation cost modeled for each of the coal to gas conversions shown in Table 32.

c. Please provide the source of the conversion costs.

A-1-39.

a. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at "FinancialModel/Support/40% Co-Firing" and "FinancialModel/Support/100% Conversion" folders. Within the confidential cost estimate Excel files, pipeline modifications are the line item "Gas Supply".

b. See KPSC Case No. 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at "FinancialModel/CONFIDENTIAL_20241001_FinancialModel_04_111_0328.xlsx". Firm gas transportation costs for co-firing are available in rows 222-230 of the FixTime tab, and firm gas transportation costs for full gas conversion are available in rows 276-284 of the FixTime tab.

c. Babcock Power Services ("BPS") provided budgetary estimates of the conversion costs. BPS has appreciable market share and a thorough familiarity with the boilers targeted for potential conversion.

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Case No. 2024-00326

Question No. 1-40

Responding Witness: John Bevington / Elizabeth J. McFarland / Shannon L. Montgomery / Stuart A. Wilson

Q-1-40. Please describe LG&E/KU's load interconnection queue process and answer the following:

a. What criteria or requirements, if any, do potential large load customers have to meet for entry to LG&E/KU's load interconnection queue?

b. What data sharing requirements does LG&E/KU have in place for large load customers to describe their operational characteristics, both in terms of steady-state and dynamic performance?

c. What transmission studies does LG&E/KU conduct of a potential, new large load customer?

d. What is the transmission study process for large load customers? Is a serial or cluster study approach used? What specific studies (powerflow, contingency analysis, transient stability, EMT, etc.) are conducted for large loads? What size thresholds or other criteria, if any, are used to differentiate the types of studies performed?

e. What information is required/requested to develop a load model representation in powerflow, positive sequence dynamics, and EMT? Does LG&E/KU require the large load customer to provide a dynamic model? Does LG&E/KU require the provision of any information that would help inform the creation of a dynamic load model? If so, do all potential, new large load customers provide this data?

f. If LG&E/KU does not receive dynamic load data from a potential, new large load customer, what assumptions with respect to the load of the potential customer does LG&E/KU make when conducting EMT and/or transient stability studies?

g. What requirements, if any, does LG&E/KU impose on the length of time in which a customer can remain in its load interconnection queue?

h. Provide a copy of any contracts that govern the recovery of transmission study costs from potential large load customers.

i. What types of power flow cases and scenarios does LG&E/KU run when assessing the impacts of new large load customers?

j. How are new large load customers grouped, if at all, for purposes of transmission planning studies?

k. What information serves as the basis for the commitment and dispatch represented in LG&E/KU's transmission modeling?

l. What assumption does LG&E/KU make with respect to imports/exports of energy to or from its transmission system for purposes of power flow simulations as part of its large load interconnection planning process?

m. Does LG&E/KU have any restrictions or requirements in place regarding fast ramping of large load customers such as AI data center loads that could impact bulk power system conditions?

n. Does LG&E/KU have documented criteria for assessing what is considered acceptable versus unacceptable performance of the bulk power system when studying the reliability impacts of large load interconnection requests? If so, please provide those criteria.

o. What is the process and criteria for incorporating large load interconnection requests into load forecasts used for integrated planning, resource planning, transmission planning, etc.?

A-1-40.

a. For potential large load KU or LG&E retail customers connecting to the transmission system, the LG&E and KU State Tariffs (Sheet 97 in the Terms and Conditions) describe the application for service process. Once those state tariff requirements are met with the potential large load KU or LG&E retail customer, either KU or LG&E, as the Load Serving Entity (LSE), will submit to the Independent Transmission Organization (ITO) a Transmission Service Request for the new load. To be clear, the potential large load retail customer may not initiate the TSR process because LG&E and KU are the transmission customers, not the potential large load retail customer. The formal load interconnection queue that exists is the Transmission Service Request queue. For more information concerning interconnecting a load to the Companies' transmission system, see the response to JI 1-61.

b. All data requirements for any Transmission Service Request, including large load customers, are specified in the Network Integrated Transmission Service

("NITS") Application. A copy of this form can be found on the LG&E/KU OASIS site (https://www.oasis.oati.com/LGEE/index.html) under "Transmission Customer Registration and Agreements", then "Network Customer Forms".

c. For any Transmission Service Request ("TSR"), which are studied by the ITO, including for large load customers, steady state power flow (thermal) and voltage analyses are completed in the System Impact Study. For further information, please see Section 5.1 of the "Transmission Service Request Study Criteria" document. Additionally, the Transmission Service Request Facilities Study determines mitigation plans for all identified constraints detailed in the System Impact Study Report. During the Facilities Study, it may be deemed necessary to complete stability or short-circuit analyses due to topology changes or expected projects in the study area that would not have been captured in the System Impact Study. For further information, please see Section 8 of the "Transmission Service Request Study Criteria" document. A copy of this document can be found on the LG&E/KU OASIS site (https://www.oasis.oati.com/woa/docs/LGEE/LGEEdocs/TSR_Study_Criteria_Document_effective_10-29-2019.pdf). LG&E/KU periodically performs similar studies as the ITO to identify potential impacts that may result from a yet to be completed TSR study. Also, as stated in Section 5.11 of the "Transmission Service Request Study Criteria" document, performance of the LG&E/KU Transmission system must meet the latest versions of NERC TPL-001, applicable SERC standards, and the LGE/KU Transmission System Planning Guidelines.

d. TSRs are performed serially. The study process and specific study requirements can be found in the "Transmission Service Request Study Criteria" document. There are no size thresholds used to differentiate the types of studies performed. See the response to part (c) regarding the performance of other types of analysis.

e. See the response to part (b).

f. If LG&E/KU determine that EMT or transient stability studies are required for a large load, then LG&E/KU will coordinate with the customer to develop a model that sufficiently represents the characteristics of the load under study.

g. If a TSR must be submitted to the ITO for the load, thus entering the formal queue process, it must adhere to the timing requirements and study requirements as specified in the Open Access Transmission Tariff ("OATT"). After all necessary studies have been completed, the Companies in their capacity as Load Serving Entity must confirm the TSR.

h. There are no contracts for the recovery of transmission study costs. As a standard business practice, LG&E and KU require customers, such as data centers or projects that have not been formally or publicly announced, to pay for the studies in advance, such that if the load does not materialize, other customers are not financially impacted.

i. The scenarios and power flow cases developed for all TSRs, including large loads, can be found in the "Transmission Service Request Study Criteria" document. See the response to part (c).

j. All TSRs are performed serially in the order they are submitted to the ITO.

k. As stated on page 8 of the Transmission Service Request Study Criteria found on the LG&E/KU OASIS site under "Transmission Service Information", "The generation dispatch for all models will be based on the generation capacities provided by Transmission Customers in their annual 10 year forecast of loads and resources." Further information on generation dispatch can be found in Sections 5.5 and 5.6 of that document.

l. As stated on page 8 of the Transmission Service Request Study Criteria found on the LG&E/KU OASIS site under "Transmission Service Information", "Certain confirmed status TSRs and higher queued study TSRs will be added to the pre-TSR model to the extent the TSRs are not already included…." Further information about which transfers are included and how, can be found in Sections 5.5 and 5.6 of that document.

m. LG&E/KU does not have any specific restrictions or requirements in place regarding fast ramping loads. How fast a large load can ramp without causing transmission issues can vary based on several factors and must be studied on a case-by-case basis as needed. Such additional studies may include dynamic/stability analysis, power quality analysis, and short circuit analysis. LG&E/KU works with the load customer if any disturbances are found for the purpose of mitigating the disturbances with engineering solutions (e.g. STATCOMs or harmonic filters).

n. As stated on page 12 of the "Transmission Service Request Study Criteria" document, "The objective of the steady-state contingency analysis is to identify overloads on all monitored facilities on which the TSR has a significant impact." Further information about performance criteria can be found in Section 5.11 "Performance Criteria" of that document.

o. Once any TSR is complete, including one for a large load, the TSR is included in all subsequent Transmission Expansion Plan studies unless the TSR is later terminated. The Companies do not have a fixed policy for including large loads with interconnection requests in their load forecast. For example, the level of economic development load growth in the Mid load forecast is less

than the sum of large loads with TSRs. Given the uncertainty in economic development load growth, the IRP considers a range of economic development load growth scenarios to understand the impact of this uncertainty on resource planning.

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Dated November 22, 2024

Case No. 2024-00326

Question No. 1-41

Responding Witness: Stuart A. Wilson

Q-1-41. Please refer to the workbook named "20240901_RevenueRequirementProfiles_2024IRP_0328," worksheet named "RR," and rows labeled "% of Option 1 Ownership for ITC Normalization," "ITC Normalization," and "ITC Normalization Opt-Out."

a. Please explain how the information in worksheet "RR" is used to model new resource options in PLEXOS.

b. Please explain if the Companies are assuming that the Investment Tax Credit ("ITC") is taken as a reduction to the capital cost in the first year that the project is online or if the Companies are normalizing the ITC over the project life.

i. If normalized, please explain the Companies' justification for this assumption.

A-1-41.

a. The referenced workbook is used to develop capital revenue requirements profiles for all resources based on their book life, tax life, insurance rate, property tax rate, federal and state tax rates, equity and debt costs and makeup, capital spend profile, and, where applicable, ITC eligibility. Rows 262-334 of the RR worksheet contain a data table with all capital revenue requirement profiles. The value in each year of a capital revenue requirement profile is computed as the ratio of the resource's capital revenue requirement in that year and the sum of nominal capital costs over the construction period. Thus, each capital revenue requirement profile reflects the capital revenue requirements for $1 of capital spend. Capital revenue requirement profiles are used in the Resource Screening Model to develop cost inputs for the new resource options modeled in PLEXOS, which include fixed O&M as well as

capital revenue requirements.[3] Capital revenue requirements are also used in the Financial Model to develop inputs for existing resources modeled in PLEXOS.[4] In both cases, capital revenue requirements are computed as the product of the resource's capital cost and the capital revenue requirement profile.

b. Battery storage and nuclear options are modeled with ITC in PLEXOS. (For solar and wind options, PTC results in lower revenue requirements, so PTC is modeled in PLEXOS.)[5] Under the Inflation Reduction Act, regulated utilities may opt out of IRS normalization rules for battery storage ITC. For battery storage options, the Companies assumed normalization opt out and included both a reduction to capital costs and a reduction to cost of service. For nuclear options, the Companies apply the ITC normalization rules over the life of the project. The normalization rules are dependent on the applicable ITC normalization option used by the Companies per IRS Code Section 46(f). KU uses Option 1. Option 1 utilities reduce rate base for the unamortized balance of ITC, but the reduction to income tax expense due to amortizing the ITC is not included in the determination of cost of service. LG&E uses Option 2. Option 2 utilities do not reduce rate base by the unamortized balance of ITC. Rather, the amortization of the ITC over the book life of the related asset is treated as a reduction of the cost of service.

    i. The Companies are required to follow IRS normalization rules for ITC unless opt out provisions are available, as is the case for battery storage ITC.

[3] See KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at Screening\ CONFIDENTIAL_20240901_ResourceScreeningModel_2024IRP_0328.xlsx.

[4] See KPSC Case No 2024-00326 -- LGE-KU 2024 IRP Resource Planning Workpapers--CONFIDENTIAL.zip at the "FinancialModel" folder.

[5] For further details regarding ITC and PTC assumptions, see the IRP, Volume III, Technology Update.

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Case No. 2024-00326

Question No. 1-42

Responding Witness: Lonnie E. Bellar / David L. Tummonds

Q-1-42. With respect to the Mercer and Marion County solar facilities, please answer the following:

a. Have either of these projects experienced a delay in projected in-service? If so, please explain the circumstances that have led to the delay.

b. Have either of these projects experienced increases in projected cost? If so, please give the increase and explain the circumstances that have led to the projected increase.

A-1-42.

a. Neither project has experienced a delay. See the response to KCA 1-11.

b. See the response to KCA 1-11.

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Case No. 2024-00326

Question No. 1-43

Responding Witness: Lana Isaacson / Tim A. Jones

Q-1-43. Page 3 of the Executive Summary of the IRP states: "The Companies' load forecasting process continues to account for important macroeconomic data, customer usage history and trends, and other energy usage drivers such as projected end-use efficiency and saturation data (e.g., the saturation of high-efficiency heat pumps for residential customers)."

a. Please provide the specific assumptions related to saturation of high-efficiency heat pumps assumed in the load forecast.

b. Please explain what factors, in the Company's view, will lead to adoption of high efficiency heat pumps over less efficient heat pumps.

c. Have the Companies explored the possibility of incentivizing high efficiency heat pumps within their service territories? If so, please provide the documents that summarize that assessment.

A-1-43.

a. The Companies' load forecast inputs do not differentiate between high-efficiency heat pumps and low-efficiency heat pumps. Rather, "high-efficiency" is intended to differentiate heat pumps generally from electric furnaces, room space heaters, or other forms of resistance heating. The statistically-adjusted end-use modeling framework incorporates historical and forecasted heat-pump saturations for both air-source and ground-source heat pumps. For assumptions related to historical and forecasted increases in heat pump saturations, 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\LE\Data\CONFIDENTIAL_LE EastSouthCentralRes23.xlsx

- Electric_Load_Forecast\Electric\Forecasts\Residential\Work\ODP\Data\CONFIDENTIAL_OD EastSouthCentralRes23.xlsx

b. See the response to part (a). Factors impacting the adoption of more efficient heat pumps include heat pump cost, performance during extreme cold weather, financing options, impact on electricity consumption, the availability of incentives, household income, how long a customer plans to stay in a home, and other customer preferences.

c. The Companies will begin incentivizing high efficiency heat pumps in 2025 as part of their Residential Online Audit Program, which the Commission approved in Case No. 2022-00402. For a full list of all the rebated equipment available to customers, see Section 3.2 of Exhibit JB-1 attached to the Direct Testimony of John Bevington in that proceeding.[6]

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

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Case No. 2024-00326

Question No. 1-44

Responding Witness: Tim A. Jones

Q-1-44. Page 5 of the Executive Summary of the IRP states: "The Companies' system is now consistently dual-peaking. Figure 3 above shows that the Companies' system peaks routinely occur in the winter, and the highest peaks in the last ten years have all occurred in the winter." Please provide any studies conducted in the past five years of the factors that have led to winter peaks occurring at levels similar to or higher than the Companies' summer peaks.

A-1-44. No such studies exist, but Volume I of the IRP discusses known factors that have contributed to this shift. Very cold temperatures in the winter combined with a higher incidence of electric space heating in new builds over the last decade are the most significant contributors to this. Additionally, distributed generation, which is predominantly in the form of solar, typically contributes to reducing the summer peak but not the winter peak.

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Case No. 2024-00326

Question No. 1-45

Responding Witness: Michael S. Sebourn

Q-1-45. Please provide the workbook with all formulas and links intact used to create Table 2 of the Executive Summary.

A-1-45. See the response to Question No. 1-21.

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Case No. 2024-00326

Question No. 1-46

Responding Witness: Tim A. Jones

Q-1-46. Page 5-10 of the IRP states: "electric heating systems consume significantly more energy during extreme cold weather when the need for backup resistance heating is triggered." With respect to this statement please answer the following:

a. Does this statement apply exclusively to heat pump-based heating or to other heating appliances as well? If yes, to which does the statement apply?

b. What information do the Companies have, if any, about the temperature at which resistance heating is triggered?

c. How many customers, in the Companies' estimation, and across which customer classes would experience a triggering of resistance heating during cold weather?

A-1-46.

a. The statement applies to heat pumps with resistance heating backup as well as resistance-only heating systems.

b. Resistance heating needs vary greatly based on factors such as heat pump efficiency and age, equipment size relative to heating requirements, home weatherization, and personal temperature preference. Some systems are sized and rated to handle outdoor temperatures of 15 degrees or cooler, but supplemental resistance heating may be needed for some homes at temperature as high as 40 degrees.

c. The Companies do not have an estimate of how many customers by class would experience a triggering of resistance heating during cold weather events. The Companies have a good understanding of how the system in aggregate responds in cold weather conditions. The Companies anticipate that AMI data will provide them a more refined understanding of how customers' energy usage changes during cold weather.

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Question No. 1-47

Responding Witness: Tim A. Jones

Q-1-47. Please refer to Tables 7-25 and 7-26. For each year, please provide the estimated electric heating penetration broken down by equipment type.

A-1-47. The Companies do not have estimated electric heating penetration broken down by equipment type. The electric heating estimates by new premise cohort only contemplate heating fuel source (i.e., electricity versus natural gas) and do not provide any estimates of heating equipment type.

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Case No. 2024-00326

Question No. 1-48

Responding Witness: Tim A. Jones

Q-1-48. Page 7-38 of the IRP states: "The addition of AMI will provide a valuable source of data to understand residential end-use trends. Thus far, AMI data has been used to analyze impacts of Winter Storm Elliot and direct load control events." Please provide any studies, slidedecks, or other materials that relate to the uses of AMI data referred to in these sentences.

A-1-48. See attachments being provided in separate files.

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Case No. 2024-00326

Question No. 1-49

Responding Witness: Peter W. Waldrab

Q-1-49. Please refer to page 8-10 of the IRP. When does the Company anticipate starting a VVO program? How many circuits does the Company intend to initially treat with VVO?

A-1-49. The Company started a VVO equipment installation pilot in July 2020 and began full deployment in 2023, which will continue through 2029. The Company intends to install VVO equipment on 404 circuits.