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 COMMISSION STAFF'S SECOND REQUESTS FOR INFORMATION DATED JANUARY 22, 2025

FILED: February 11, 2025

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 4th day of February 2025.

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, **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 5 day of February 2025.

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, **Lana Isaacson**, being duly sworn, deposes and says that she is Manager – Energy Efficiency Programs 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

Lana Isaacson

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 4th day of February 2025.

Caroline J. Davison

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

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 5th day of February 2025.

Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Michael S. Sebourn**, being duly sworn, deposes and says that he is Sr. 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

Michael S. Sebourn

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 5th day of February 2025.

Caroline J. Davison

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, **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 an State, this 5th day of February 2025.

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

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 1

Responding Witness: Lana Isaacson

Q-1. Refer to the Integrated Resource Plan (IRP), Volume I, pages 8–21. Provide an in-depth explanation, including projected program costs and projected energy savings, for the potential Demand-Side Management and Energy Efficiency program enhancements included in the IRP.

A-1. The Companies included three potential Demand-Side Management and Energy Efficiency program enhancements in the IRP that have the potential to provide cost-effective demand response capability. The projection of demand savings for each of the potential program enhancements is included in attachment previously submitted in response to JI 1-52(c)(iii) titled "JI DR1 LGE KU Attach to Q52(c)(iii) - DemandResponseCapacityForecast.xlsx." The calculations and assumptions for the demand savings projections of the BYOD Energy Storage and BYOD Home Gen program enhancements are included in attachments titled "JI DR1 LGE KU Attach to Q52(c)(iii) - BYOD Energy Storage.xlsx" and "JI DR1 LGE KU Attach to Q52(c)(iii) - BYOD Home Gen.xlsx."

The Companies' projection of participation for BYOD Energy Storage is based on Xcel Colorado's Residential Battery Demand Response program plan. Demand savings per participant in the BYOD Energy Storage program is equal to the usable energy of a Tesla Powerwall (13.5 kWh) divided by an assumed demand response event duration of four hours.

The Companies' projection of participation for BYOD Whole Home Generator is based on the participation of DTE Energy's recently opened (July 2023) Home Generator offering and San Diego Gas & Electric's Whole House Generator Program. The Companies' projected demand reduction per participant is based on Generac Response Series.

The demand savings projection for each small business participant in the Business Demand Response program is assumed to be 10% of the value for the participants in Business Demand Response program with 200 kW or more of measured base demand.

The Companies did not solicit costs from third-party contractors for any of the three potential program enhancements.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 2

Responding Witness: Lana Isaacson

Q-2. Refer to the IRP, Volume I, pages 8–22. Regarding the Business Demand Response program, explain the assumption that, by expanding eligible participation to customers between 50 kW and 200 kW, the number of customer opt-outs will increase.

A-2. The Companies believe it is possible that the number of demand response event opt-outs will be relatively higher among customers with 50 kW to 200 kW of measured base demand than among customers with 200 kW or more of measured base demand because customers in the latter group may be more likely to have staff trained in energy management, have control systems that can be used to reduce load by stopping processes, and have load that can be reduced or shifted to another period without negatively impacting their customers.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 3

Responding Witness: Stuart A. Wilson

Q-3. Refer to IRP, Volume III, 2024 RTO Membership Analysis, pages 13–14. Explain whether LG&E/KU conducts an Effective Load Carrying Capacity (ELCC) study for each type of resource (wind, solar, and thermal). If not, explain what methodology LG&E/KU uses for capacity accreditation and how it differs from the ELCC analysis.

A-3. The Companies have no need for an ELCC study because they do not operate in an RTO with a capacity market. Capacity accreditation is a concept that is applicable only to RTOs, and PJM conducts an ELCC study to support this process. An ELCC study is needed for an RTO's capacity accreditation process because capacity markets disassociate capacity from generation technologies' ability to provide energy. The Companies' planning process directly focuses on each generation technology's physical ability to provide capacity and energy in all hours.

PJM uses its capacity accreditation process to determine a load serving entity's capacity requirement and what portion of a system UCAP capacity need a particular resource can be credited for meeting. Each resource's UCAP is computed as a function of its ELCC. In an RTO, where "capacity" is a concept that is separate and distinct from a technology's energy generating capability and economics (i.e., a MW is a MW regardless of generation technology), a process like "capacity accreditation" is needed to account for the fact that different generation technologies have different operating characteristics and contribute differently to system reliability. In PJM, ELCC ratings are computed for different technologies to account for these differences. Unsurprisingly, PJM's capacity accreditation process assigns resources like solar, which cannot be available in all hours, a lower capacity credit and ELCC than resources that can be available in all hours.

As vertically integrated utilities outside an RTO, the Companies do not have a use for a capacity accreditation process, and the concepts of ELCC and UCAP

are not applicable to the Companies' planning process.[1] However, the Companies' planning process is no less sophisticated. The Companies use SERVM, a resource adequacy model, to develop seasonal reserve requirements and capacity contributions for limited-duration resources as inputs to PLEXOS, a resource planning model. PJM uses a similar but different resource adequacy model to develop system UCAP capacity needs and ELCC ratings for capacity accreditation. In both resource adequacy models, the operating characteristics of different resources are evaluated based on their seasonal net capacities over a range of weather and unit availability scenarios. Thus, the modeling frameworks are similar, but their applications are necessarily different.

Whereas PJM relies on market participants to meet their capacity and energy needs with resources the market participants deem favorable based on market pricing signals (e.g., ELCC ratings and renewable energy goals), the Companies evaluate changes to their resource portfolio based on the economics and operating characteristics of available resource options with the singular focus of serving customers reliably at the lowest reasonable cost across all hours of the year. For example, PJM is projecting lower ELCC values for solar as the system is expected to add increasing amounts of solar. Thus, PJM is trying to signal to generation developers that solar is declining in value to system reliability in order to discourage further development and to promote the value of other generation technologies. Because the Companies manage their own generation portfolio, they can directly assess both the reliability and economic value of incremental resources on the system without having to go through a capacity accreditation or ELCC process.

As noted above, seasonal reserve requirements and capacity contributions are key inputs for screening resource plans in PLEXOS. In PLEXOS, fully dispatchable resources are assumed to contribute 100% of their seasonal net capacity to meeting reserve requirements, which are specified on a net capacity basis. Thus, the capacity contribution for fully dispatchable resources is 100%. Because limited-duration resources such as battery storage and dispatchable DSM programs cannot contribute to reliability the same way fully dispatchable resources do, their capacity contributions are less than 100%. The Companies develop capacity contributions for limited-duration resources in SERVM by comparing their impact on LOLE to that of a fully dispatchable SCCT. This approach ensures the capacity contribution is an indication of the resource's ability to contribute to a seasonal net capacity reserve requirement.

Therefore, capacity contribution is similar in concept to ELCC because both concepts assess the capacity value (or reliability contribution) of a resource based on LOLE, but their applications are different. Whereas capacity contribution indicates a resource's ability to contribute to a seasonal net capacity reserve

[1] The Companies' use of "UCAP" in the Companies' response to SC 1-5(b) is not the same as the use of "UCAP" in a PJM context. See the response to Question No. 14.

requirement, ELCC indicates a resources' ability to contribute to a system UCAP capacity need in the context of capacity accreditation.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 4

Responding Witness: Stuart A. Wilson

Q-4. Explain whether LG&E/KU finds PJM Interconnection LLC's (PJM) ELCC methodology reasonable.

A-4. For capacity accreditation, a process not applicable to the Companies, the Companies find PJM's ELCC methodology reasonable. However, the assumptions PJM makes in their ELCC study to discount the availability of coal and natural gas resources during extreme weather events are not appropriate for the Companies' coal and natural gas resources.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 5

Responding Witness: Stuart A. Wilson

Q-5. Refer to IRP, Volume III, Generation Planning and Analysis, October 2024, page 2, footnote 13.

a. Explain why the contribution to peak for solar in winter is set to zero.

b. Explain whether LG&E/KU would continue to assign a zero percent capacity factor to solar energy at E.W. Brown once the Battery Energy Storage System (BESS) is installed and operational.

A-5.

a. Solar's contribution to winter peak is set to zero because the winter peak most commonly occurs in the morning hours before sunrise or in the evening hours after sunset, at which time solar irradiation (and therefore solar production) is zero. A zero percent winter capacity contribution for solar at or near peak load conditions is consistent with the Companies' actual experience during Winter Storm Elliot in December 2022, Winter Storm Heather in January 2024, and Winter Storm Enzo in January 2025. The Companies' evaluation of historical data supporting this conclusion is discussed at the end of Section 3.2.3, p. 21 of the 2024 IRP, Volume III, Technology Update.

b. The Companies will continue to assign a zero percent *capacity contribution* to solar at E.W. Brown once the Brown BESS is in service.[2] The solar and BESS will operate independently. The BESS will be charged from the Companies' system as a whole, not specifically from Brown Solar, and the operation of the BESS will not affect Brown Solar's operation.

[2] Based on the context of the question, the Companies assumed that the question was intended to refer to capacity *contribution* rather than capacity *factor*. The Companies do not assign a zero percent capacity factor to Brown Solar.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 6

Responding Witness: Stuart A. Wilson

Q-6. Refer to IRP Volume III, Generation Planning and Analysis, October 2024, Table 2: Renewable Resources (2030 Installation; 2030 Dollars). Provide the unforced capacity (UCAP) for Kentucky Solar, Kentucky Wind, and Indiana Wind through the year 2039.

A-6. The Companies have not computed UCAP for these resources. UCAP is a measure of capacity that stems from an RTO's capacity accreditation process. See the response to Question No. 3.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 7

Responding Witness: Tim A. Jones

Q-7. Refer to the following news article, Developers unveil plans for large tech data center in Louisville, the 1st of its kind in Kentucky[4] describing the development of a new, large scale data center.

A-7. No response is requested. The Companies assume Question Nos. 8 and 9 were intended to be subparts of a single request for which the text above would serve as context.

[4] Developers Unveil Plans for Large Tech Data Center in Louisville, the 1st of Its Kind in Kentucky, In-depth, wdrb.com.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 8

Responding Witness: Tim A. Jones

Q-8. Explain whether the three load forecast scenarios were created with the new large-scale data center in mind. If not, explain how incorporating the new, large scale data center would affect LG&E/KU's load forecasting.

A-8. The generic data center loads in the Companies' Mid and High load forecast scenarios are consistent with this data center and many other prospective data centers. The Low load forecast scenario does not include data center load. Therefore, incorporating this data center would only increase the Low load scenario. See the response to PSC 1-21 and KCA 1-15.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 9

Responding Witness: Robert M. Conroy

Q-9. Would LG&E/KU expect to file a special contract for Commission approval under LG&E's current Economic Development Rider if plans for the new, large scale data center were to be finalized? If not, explain why not.

A-9. The developers and ultimate customer have not communicated an interest in LG&E's Economic Development Rider. Therefore, it is premature to determine the type of contract or rate schedule for a new, large scale data center. See also the response to KIUC 1-2(j).

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 10

Responding Witness: John Bevington

Q-10. Refer to LG&E/KU's response to Commission Staff's First Request for Information (Staff's First Request), Item 2. In addition to the 16 different data center projects that LG&E/KU's economic development team (Team) is involved, provide the number of large manufacturing facilities that the Team is working on.

A-10. The Companies are working with 42 manufacturing projects that have indicated a peak load requirement of 1 MW or more. Of those 42 projects, 14 have indicated a peak load requirement of more than 10 MW. These projects include existing customer expansion projects and new projects evaluating Kentucky for new locations. In addition, there are several other large, non-manufacturing projects in the project pipeline that encompass community benefit projects like hospitals, university facilities, etc. Those projects have peak loads ranging from 3 MW to 15 MW.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 11

Responding Witness: John Bevington

Q-11. Refer to LG&E/KU's response to Staff's First Request Item 2, Item 20, and Item 21.

a. In addition to the five transmission service requests (TSRs) for data centers submitted by LG&E/KU to Transerv, explain whether there have been any TSRs submitted for large manufacturing facilities.

b. For each TSR related project issued to-date, provide the date the each TSR was submitted, the projected number of MW needed to serve the applicant, and the projected number of construction and permanent jobs associated with each project.

A-11.

a. One TSR for a large manufacturing facility has been submitted in the last year.

b. Data center 335 MW submitted on 3/1/2024

Manufacturing 20 MW submitted 6/1/2024

Data center 67 MW submitted on 7/15/2024

Data center 100 MW submitted 10/25/2024

Data center 100 MW submitted 9/6/2024

Data center 650 MW submitted 9/6/2024

The projected number of construction and permanent jobs is unknown for the projects at this point. The project related to the manufacturing TSR submission anticipates the creation of 260 permanent, full-time jobs.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 12

Responding Witness: John Bevington

Q-12. Explain whether any of the project owner/developers have presented an Engineering, Procurement, and Construction contract.

A-12. Yes. The Companies have an executed Engineering, Procurement, and Construction contract with the developers of the data center project recently announced to be built at Camp Ground Rd. in Louisville. See the confidential attachment submitted in response to SC 1-12 c (i).

LOUISVILLE GAS AND ELECTRIC COMPANY
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KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 13

Responding Witness: Stuart A. Wilson

Q-13. Refer to LG&E/KU's response to Staff's First Request, Item 7. Explain what actions LG&E/KU have taken to achieve the target winter and summer reserve margin deficits.

A-13. The Companies have not taken actions to meet the new reserve margin targets prior to 2027. With this IRP, the Companies are transitioning from economic reserve margins for resource planning to 1-in-10 LOLE reserve margins (i.e., higher reserve margins that reduce the likelihood of a loss-of-load event to 1 day in 10 years), and the Companies will complete this transition in 2027. Until then, the Companies' portfolio will be no less reliable than it would have otherwise been. Notably, the forecasted reserve margin deficits referenced in the response to PSC 1-7 reflect the assumed 2025 retirement of the Companies' small-frame CTs and are diminished by the small-frame CTs' continued operation.[4]

[4] Due to their age and relative inefficiency, the Companies do not perform major maintenance on their small-frame SCCTs, Paddy's Run Unit 12 and Haefling Units 1-2, but continue to operate them until they are uneconomic to repair. The IRP reasonably assumes that they will be retired in 2025 for planning purposes.

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Commission Staff's Second Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 14

Responding Witness: Michael S. Sebourn

Q-14. Refer to LG&E/KU's response to the Sierra Club's First Request for Information (Sierra Club's First Request), Item 5b. Because unforced capacity (UCAP) is a measure of the capacity the natural gas combined cycle unit and simple cycle combustion turbine will actually provide, explain the rationale for modeling on an installed capacity basis for meeting minimum capacity reserves when for capacity dispatch an UCAP basis is employed.

A-14. See the response to Question No. 3. On further review, the Companies recognize that additional explanation would have improved the response to SC 1-5(b). The Companies' use of "UCAP" in SC 1-5(b) is not the same as the use of "UCAP" in a PJM context. The concept of UCAP as defined by PJM is not applicable to the Companies' planning process.

A more complete and accurate response to SC 1-5(b) and this question would be that PLEXOS uses different capacity-related inputs to specify a resource's (a) contributions to minimum reserve requirements and (b) monthly net capacities for dispatch. The Companies' minimum reserve requirements are specified on a net capacity basis, and all thermal resources are assumed to contribute 100% of their net capacity to meeting these requirements. Except for expansion NGCC and SCCT units, all thermal resources' monthly net capacities for dispatch are also specified on a net capacity basis, and the Companies modeled the resources' availability for producing energy based on their monthly net capacities for dispatch, a forced outage rate, and planned maintenance inputs. However, unlike existing thermal units, the planned maintenance schedule for expansion NGCC and SCCT units varies depending on the units' in-service year.[5] Therefore, the Companies modeled these resources' availability for producing energy based only on monthly net capacities for dispatch that are reduced to account for assumed unplanned outage rates and average planned maintenance weeks. Thus, the differences in the specification of these resources' net capacities for dispatch

[5] For example, planned maintenance in 2034 is two weeks for a NGCC commissioned in 2030 but five weeks for a NGCC commissioned in 2031.

exist to account for unique aspects of the resources' planned maintenance schedule.