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 SOUTHERN RENEWABLE ENERGY ASSOCIATION'S SUPPLEMENTAL REQUESTS FOR INFORMATION DATED JANUARY 22, 2025

FILED: February 11, 2025

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 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, **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 4th day of February 2025.

Notary Public

Notary Public ID No. KYNP63286

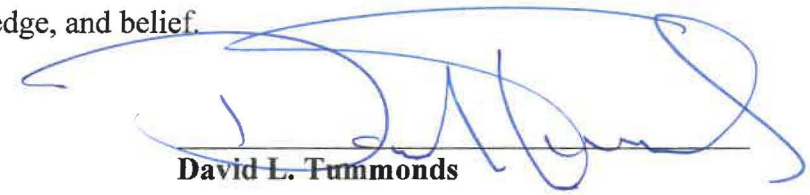
My Commission Expires:

January 22, 2027

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **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 7th day of February 2025.

Notary Public

Notary Public, ID No. KYNP4577

My Commission Expires:

April 1, 2028

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

LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY

Response to Southern Renewable Energy Association's Supplemental Requests for Information
Dated January 22, 2025

Case No. 2024-00326

Question No. 1

Responding Witness: Stuart A. Wilson

Q-1. Reference, Application, Volume III, Resource Assessment, Section 4.5 ("Stage Two: Recommended Resource Plan for IRP Reporting") Table 29 [PDF 113 of 259]. Please identify and confirm which solar cost estimates were relied upon in developing the Recommended Resource Plan.

A-1. The Recommended Resource Plan is based on the least-cost resource plans for the Mid Load, Ozone NAAQS + ELG scenario and the High Load, Ozone NAAQS + ELG scenario. These resource plans do not include solar, so the Companies did not "rely" on a particular solar cost estimate when developing the Recommended Resource Plan. The referenced section states generally that, "500 MW of solar is added in 2035 *after prices fall* to hedge natural gas price volatility and future CO_2 regulation risk."[1] For the purpose of computing annual revenue requirements in Table 9-1 of Volume I, for example, the Companies based solar costs on NREL's projections.

[1] IRP Vol. III, Resource Assessment at 49 (emphasis added).

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Question No. 2

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

Q-2. Reference, Application, Volume III, Resource Assessment, Section 4.4.1.3 ("Ozone NAAQS + ELG Environmental Scenarios") [PDF 98 of 259]. Please provide any data or analysis the Companies have conducted (beyond their determination that costs will remain "uncertain") that supports the basis for a 0.2% per year cost increase for solar technology between now and 2036.

A-2. As discussed in the referenced section, 0.2 percent is simply the average rate at which solar is assumed to escalate from 2036 to 2050. Unlike the cost of other technologies, NREL's 2024 ATB projects solar costs to decline by more than 30 percent through 2035, so the Companies included a sensitivity where solar costs were assumed to escalate from the beginning of the analysis period to understand the impact of this assumption on the results.

Notably, solar prices have increased dramatically since 2020. Consistent with the pricing issues the Companies have encountered concerning their previously executed solar PPAs, the May 2024 RFP respondents' solar PPA offer prices were generally 50% higher than similar offers the Companies received in response to their June 2022 RFP. The offers the Companies received in response to their June 2022 RFP were generally at least 30% higher than similar offers the Companies received in response to their 2021 RFP despite the intervening enactment of the federal Inflation Reduction Act.

This steady upward trend in solar PPA pricing being offered to the Companies is consistent with broader market trends since 2020. One such measure of broader solar PPA market trends is LevelTen Energy's PPA Price Index for North America, which reports solar P25 PPA prices.[2] (P25 prices represent the 25th

[2] Note that LevelTen's P25 North American index includes PPAs from areas that are much sunnier than Kentucky, such as Arizona, which tend to have lower-priced PPAs because there is more energy production over which to spread the cost of PPA facilities. That factor, in addition to the nature of P25 prices as discussed in the body of the text, makes the LevelTen North American average index price lower than PPA prices typically available to the Companies. But the *relative* changes in LevelTen North American index prices are still relevant to show that the Companies' recent solar PPA relative pricing change experience is not unique.

percentile of price quotes, i.e., 75 percent of price quotes are above the P25 price level.) According to LevelTen, solar P25 PPA prices reached their lowest point, $27.26/MWh, in the first quarter of 2020.[3] More recently, those prices rose by 5.4% during the third quarter of 2024 and 10.4% year-over-year,[4] with typical solar PPA prices at $56.58/MWh—a 108% increase in less than four years.[5] Those prices remained high in the fourth quarter of 2024, with the LevelTen solar P25 PPA price index reaching $56.76.[6] Therefore, the relative price increases reflected in the May 2024 RFP responses the Companies received are consistent with market trends and the Companies' own experience.

Finally, President Trump recently implemented an additional 10% tariff on all imports from China.[7] Assuming the tariff remains in effect, given China's global dominance in all stages of manufacturing solar panels,[8] the new tariff would tend to put upward pressure on U.S. solar prices.

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[3] LEVELTEN ENERGY, *Q1 2020 PPA Price Index* at 12, available at https://go.leveltenenergy.com/l/816793/2020-04-23/2dgx2/816793/11709/LevelTen_Energy_Q1_2020_PPA_Price_Index.pdf (accessed Jan. 10, 2024).

[4] *See* LEVELTEN ENERGY, *Q3 2024 PPA Price Index Executive Summary North America* at 7, available at https://www.leveltenenergy.com/ppa.

[5] Emma Penrod, UTILITY DIVE, *Renewable PPA Prices Continue to Rise — and May Do So Through 2030, Say LevelTen, Ascend Analysts* (Oct. 22, 2024), available at https://www.utilitydive.com/news/ppa-power-purchase-prices-wind-solar-levelten-ascend-analytics/730245.

[6] LEVELTEN ENERGY, *Q4 2024 PPA Price Index Executive Summary North America* at 7, available at https://go.leveltenenergy.com/l/816793/2025-01-27/3bgwky/816793/1738016621gyDcd5S8/2024Q4_NA_PPAPriceIndex_ES.pdf (accessed Jan. 30, 2025).

[7] *See, e.g.*, "Fact Sheet: President Donald J. Trump Imposes Tariffs on Imports from Canada, Mexico, and China," (Feb. 1, 2025) ("Until the crisis is alleviated, President Donald J. Trump is implementing a 25% additional tariff on imports from Canada and Mexico and a 10% additional tariff on imports from China."), available at: https://www.whitehouse.gov/fact-sheets/2025/02/fact-sheet-president-donald-j-trump-imposes-tariffs-on-imports-from-canada-mexico-and-china/ (accessed Feb. 2, 2025).

[8] *See, e.g.*, https://www.iea.org/reports/solar-pv-global-supply-chains/executive-summary ("Today, China's share in all the manufacturing stages of solar panels (such as polysilicon, ingots, wafers, cells and modules) exceeds 80%."); https://www.iea.org/data-and-statistics/charts/solar-pv-manufacturing-capacity-and-production-by-country-and-region-2021-2027 (both accessed Feb. 2, 2025).

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Question No. 3

Responding Witness: David L. Tummonds / Stuart A. Wilson

Q-3. Reference:
CONFIDENTIAL_20240901_ResourceScreeningModel_2024IRP_0328.xlsx, [FixTime] tab, cells F12 and F13.

On what date did the Companies finalize the cost estimates for "2030 Brown 12" and "2024 SCCT Cost"?

A-3. The "2030 Brown 12" estimate was developed in July 2024, and the "2024 SCCT Cost" cost estimate was developed in August 2024. They reflect the market at the time they were developed. The Companies routinely engage with original equipment manufacturers and engineering, procurement, and construction contractors to monitor trends related to the gas turbine market to ensure the Companies' estimates reflect the market.

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Question No. 4

Responding Witness: David L. Tummonds

Q-4. Reference: Response to KCA DR1, A-1-11. Do the Companies have an updated estimate for the Mercer County Solar costs based on the EPC bids due on December 20, 2024? If so, please provide the information.

A-4. The Companies received and commenced analysis of the EPC bids on December 20, 2024, as expected in the response to KCA 1-11. The Companies continue to clarify those bids with the bidders. Assuming reasonable completion of the noted clarification process, the bids are consistent with the response to KCA 1-11.

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Question No. 5

Responding Witness: David L. Tummonds / Stuart A. Wilson

Q-5. Reference: Application, Volume III, Technology Update, Section 4 ("Converting NREL Costs from Real to Nominal Dollars"), Table 10 and the surrounding text, [PDF 33 of 259]. The Companies describe several adjustments to the NREL 2024 ATB cost assumptions:

a. What evidence do the Companies have to support that the Mercer County Solar project reflects the typical costs for a utility-scale solar project in the region?

b. Did the Companies make any attempts to identify additional sources to estimate the market cost of solar projects beyond only using the Mercer County Solar project estimate as representative of solar project costs? If so, what additional sources did the Companies identify?

c. Did the Companies make any attempts to identify any sources to estimate the market cost of wind projects? If so, what additional sources did the Companies identify?

A-5.

a. Mercer County Solar provides an adequate estimate because the land utilized is representative of land suitable for a similar solar installation, and the EPC market is recently assessed as noted in response to Question No. 4.

b. No.

c. No.

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Question No. 6

Responding Witness: Stuart A. Wilson

Q-6. Reference: Application, Volume III, Resource Adequacy Analysis, Section 5.4.1 ("Unit Availability Inputs") [PDF 57 of 259]. In modeling the "uncertainty in timing and duration of forced outages," did the Companies consider the coincident outages of thermal units during extreme weather events in the winter?

A-6. Yes, the Companies considered the potential for coincident outages of thermal units during extreme winter weather based on data from 2009 to 2024. The results showed that there is no correlation between forced outages and cold temperatures (i.e., less than 20 degrees Fahrenheit). This lack of correlation is neither surprising nor accidental because the Companies have long taken and continue to take steps to ensure their units can function reliably in a wide variety of cold weather conditions. See the response to SC 1-33.

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Question No. 7

Responding Witness: Lonnie E. Bellar

Q-7. Reference: Response to JI DR1, A-1.1. Have the Companies made final decisions on the resources or projects included in the Certificate of Public Convenience and Necessity application that is planned to be filed in this first quarter of 2025? Is the CPCN application consistent with the resources in the Recommended Resource Plan?

A-7. Yes and yes.

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Question No. 8

Responding Witness: Lonnie E. Bellar

Q-8. The Kentucky Public Service Commission's November 6, 2023 Order in Case No. 2022-00402 (*Electronic Joint Application of Kentucky Utilities Company and Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Site Compatibility Certificates and Approval of a Demand Side Management Plan and Approval of Fossil Fuel-Fired Generation Unit Retirements*) states, (page 95) at pertinent part: The Commission expects our vertically integrated utilities, in furtherance of their service, and now reliability, obligations to replace generation capacity with "steel in the ground" or a Purchase Power Agreement.

a. In their planning for generation and capacity replacement, do the Companies recognize any **difference(s)** in risk (financial risk, implementation risk, compliance-related risk, rate risk, etc.) between "steel in the ground" projects and purchase power agreements? If yes, identify the difference(s) and explain how the Companies incorporate the quantitative and/or qualitative risk **difference(s)** into their planning? Please fully explain. If no, then why not?

b. In their planning for generation and capacity replacement, do the Companies recognize any **difference(s)** in risk (financial risk, implementation risk, compliance-related risk, rate risk, etc.) between self-build projects and nonself-build projects? If yes, identify the **difference(s)** and explain how the Companies incorporate the quantitative and/or qualitative risk difference(s) into their planning? Please fully explain. If no, then why not?

A-8.

a. The Companies assume that the phrase "steel in the ground" refers to a physical power plant and that the Commission's reference to a "Purchase Power Agreement" ("PPA") refers to the procurement of capacity and energy that is tied to a particular generating asset. Examples of Company PPAs that meet this assumption include: i) OVEC which is tied to capacity

and energy from 11 coal-fired generating units, ii) Rhudes Creek, Grays Branch, and Nacke Pike solar contracts are tied to the output of specific solar generation plants that are yet to be built, and iii) the gas-tolling agreement the Companies had from 2015 to 2019 for the use of EKPC's Bluegrass Unit 3. In an IRP, the Companies are evaluating generation technology performance and economics and not potential differences in risks that can occur between self-build/ownership of generation assets and PPAs tied to a specific generating unit(s). These potential risk differences are addressed in a CPCN analysis where decisions are being made between actual generation resources rather than the generic technologies that are being evaluated in an IRP. The Companies have a long history of considering the differences in risk and the cost of risk mitigation in a CPCN context. For two examples of discussions associated with the risk of self-build/ownership versus PPAs see:

- KPSC case 2011-00375, Rebuttal Testimony of Mr. David S. Sinclair, Section 3, pp. 18-21, and

- KPSC case 2022-00402, Direct Testimony of Mr. David S. Sinclair, Sections 4 and 5, pp. 17-24.

Finally, it is important to note that in order to procure network integrated transmission service to move the power from the generation source to the Companies load, a specific generation source must be identified regardless of whether it is owned or a PPA.

b. See response to (a). Also, the Companies are currently in the process of working with the developer of the Marion County solar facility for a build-transfer project that was approved in KPSC case 2022-00402. For a discussion of the Marion County project see the Direct Testimony of Lonnie E. Bellar, pp. 20-22. The Companies identify the following risk differences between build-transfer agreements ("BTA") and self-build projects.

- Financial – The BTA contractor holds risk associated with project costs and financing, in exchange for the Companies' commitment to the agreed upon BTA price. However, the BTA contractor may terminate the agreement if project costs exceed the contracted BTA price.

- Implementation – The contractor holds both the risk and the control associated with and the authority to control implementation prior to transfer of ownership to the Companies. The Companies are not obligated to take ownership of the facility if not constructed per the BTA, but they do not have the contractual authority to control that construction.

- Compliance – The BTA contractor holds risk associated with securing and complying with all project approval and permits as a merchant generator

including obtaining a construction permit per KRS 278.704 prior to transfer of ownership. The Companies are responsible to secure necessary approval to purchase the asset.

- Ownership Transfer – Under a BTA arrangement, transfer of ownership must occur prior to the asset having ability to generate to comply with FERC and Inflation Recovery Act requirements. Transfer of ownership prior to online testing presents risk to the Companies, as the Companies have limited ability to ensure asset functionality at the time of transfer.