

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC TARIFF FILINGS OF)	
LOUISVILLE GAS AND ELECTRIC COMPANY)	
AND KENTUCKY UTILITIES COMPANY TO)	
REVISE PURCHASE RATES FOR SMALL)	CASE NO. 2023-00404
CAPACITY AND LARGE CAPACITY)	
COGENERATION AND POWER PRODUCTION)	
QUALIFYING FACILITIES AND NET)	
METERING SERVICE-2 CREDIT RATES)	

RESPONSE OF
KENTUCKY UTILITIES COMPANY
AND
LOUISVILLE GAS AND ELECTRIC COMPANY
TO
THE ATTORNEY GENERAL'S INITIAL REQUEST FOR INFORMATION
DATED JANUARY 10, 2024

FILED: January 25, 2024

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Michael E. Hornung**, being duly sworn, deposes and says that he is Manager of Pricing/Tariffs for LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge, and belief.


Michael E. Hornung

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 16th day of January 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, 220 West Main Street, Louisville, KY 40202, 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 17th day of January 2024.



Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027



**KENTUCKY UTILITIES COMPANY
AND
LOUISVILLE GAS AND ELECTRIC COMPANY**

**Response to Attorney General’s Initial Request for Information
Dated January 10, 2024**

Case No. 2023-00404

Question No. 1

Responding Witness: Michael E. Hornung / Stuart A. Wilson

- Q1. With regard to the Companies’ proposal to include a generation capacity avoided cost amount in its NMS-2 credit:
- a. Confirm that the credit is based on an assumed avoidance of generation capacity over the period 2025 to 2044, using a combustion turbine levelized carrying cost.
 - b. To the extent that an NMS-2 customer elects a 7-year credit:
 - i. What are the consequences to the Companies if the customer decides at the end of year 3, for example, to abandon the customer’s on-site solar facility. In particular, who would be responsible for the loss due to the payment of capacity credits for years 1 through 3 that would no longer provide generation capacity in the remaining 4 years of the 7-year period?
 - ii. Does an NMS-2 customer who terminates a 7-year rate in year 4 face any penalties associated with having received capacity payments that are based on an assumed avoidance over a 20-year period?
- A1. Note that Commission orders *require* including an avoided generation cost component in NMS-2 bill credits;¹ it is not merely a proposal the Companies are making.
- a. Not confirmed. The NMS-2 generation capacity credit is computed assuming a 2032 capacity need as the average of avoided capacity rates for fixed-tilt solar Qualifying Facility PPAs beginning in 2024 and 2025. For PPAs beginning in 2024, the avoided capacity rate reflects the deferral of capacity from 2032 to 2044; the avoided capacity rate for PPAs beginning in 2025 reflects the deferral of capacity from 2032 to 2045. The methodology used to compute avoided capacity rates is summarized in Section 3.3 of the “2024-2025 Qualifying Facilities Rates & Net Metering

¹ See, e.g., Case Nos. 2020-0049 and 2020-00350, Order (Ky. PSC Sept. 24, 2021).

Service-2 Bill Credit” report. This calculation utilizes the economic carrying charge for a combustion turbine, but this cost is adjusted downward to reflect the fact that solar and wind technologies are not fully available during the peak hour in all months.

- b. Rider NMS-2 does not allow or require customers to choose a term of years. Therefore, the Companies assume the subparts of this request intend to refer to Riders SQF and LQF.
 - i. Not applicable to NMS-2 customers; see the response to b. above. The Companies do not currently have any SQF or LQF customers with seven-year power purchase agreements (“PPAs”). The Companies would anticipate including in any such PPA a provision to address early termination by the customer.
 - ii. See the response to i. above.

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Question No. 2

Responding Witness: Stuart A. Wilson

- Q2. Refer to "LGE-KU Qualifying Facilities Rates & Net Metering Service-2 Bill Credit, Generation Planning & Analysis, October 2023." Table 1 on page 4 reports QF capacity factors for four types of renewable resources. What is the source for these capacity factors?
- A2. The capacity factor assumptions were held consistent with those assumed in Case Nos. 2020-00349 and 2020-00350.

For single-axis tracking solar, 26.0% is the capacity factor of a solar generation profile developed by a respondent to the Companies' 2021 RFP for their proposed single-axis tracking solar facility in Hopkins County.

For fixed-tilt solar, 16.7% reflects the capacity factor forecast for distributed residential solar in the National Renewable Energy Laboratory's 2020 Annual Technology Baseline.

For wind, 25.3% is the capacity factor of a wind generation profile developed by the Companies based on historical wind speeds in Clark County, KY. Wind speed data for Clark County were collected by the Kentucky Mesonet at Western Kentucky University.² Clark County was selected because of relatively strong wind resources representative of Central Kentucky and because of the availability of data from the Kentucky Mesonet. Wind speeds were extrapolated to 110 meter hub heights using the logarithmic wind profile law.³ Wind generation was modeled using a generic wind turbine power curve.

See also the response to KYSEIA 1-1.

² See Kentucky Mesonet at Western Kentucky University at <https://www.kymesonet.org/map.html>.

³ Bañuelos-Ruedas, Francisco, César Ángeles Camacho, and Sebastián Ríos-Marcuello. "Methodologies Used in the Extrapolation of Wind Speed Data at Different Heights and Its Impact in the Wind Energy Resource Assessment in a Region." https://www.researchgate.net/profile/Cesar-Angeles-Camacho/publication/221912731_Methodologies_Used_in_the_Extrapolation_of_Wind_Speed_Data_at_Different_Heights_and_Its_Impact_in_the_Wind_Energy_Resource_Assessment_in_a_Region/links/605ca647458515e8346fcd7e/Methodologies-Used-in-the-Extrapolation-of-Wind-Speed-Data-at-Different-Heights-and-Its-Impact-in-the-Wind-Energy-Resource-Assessment-in-a-Region.pdf.

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Question No. 3

Responding Witness: Stuart A. Wilson

- Q3. Refer to “LGE-KU Qualifying Facilities Rates & Net Metering Service-2 Bill Credit, Generation Planning & Analysis, October 2023.” On page 4 it states “Then, for each hour and generation technology, the avoided cost of energy was computed with the assumption that the highest-cost energy would be avoided first. For example, in an hour where the QF technology was assumed to produce 40 MWh, the Companies sorted each MWh from highest to lowest cost and computed the avoided cost of energy as the sum of decremental energy costs for the top 40 MWh.”
- a. Please provide an example of the Company’s analysis for a single hour, showing the development of the avoided energy cost in the hour for an 80 MW QF (the example can be hypothetical). Include all assumptions in the example.
 - b. With regard to the methodology used by the Company (as described on page 4), please explain how the results would differ, if any, from running two production cost analysis; 1) a base case and 2) a case in which load during the hour was reduced by 40 MW.
- A3.
- a. Relevant data and calculations for hour 16 of August 28, 2024 from the Companies’ analysis are attached. Columns A through I show the 100 most expensive dispatchable MWs online in that hour, along with the generating unit (labeled “Unit”) and energy cost (labeled “Gen_Cost”) for each MW. Columns K through O show the calculation of avoided energy costs for each technology type, by MW and in total. Expected generation in that hour by technology type are shown in row 3. All underlying assumptions and supporting files are included in the Attachment 5 provided in response to JI 1-3, and are located at the filepath: \02_03_04\03_SAS.
 - b. The Companies compute avoided energy costs with the assumption that QFs will not impact the way other resources are committed. This is a reasonable assumption given the small size of QFs and the uncertainty in

forecasting their output. If the Companies were to compare two separate runs as suggested, the resulting avoided energy costs may differ due to potential differences in unit commitment between runs.

The attachment is being provided in a separate file in Excel format.

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Question No. 4

Responding Witness: Stuart A. Wilson

- Q4. Refer to “LGE-KU Qualifying Facilities Rates & Net Metering Service-2 Bill Credit, Generation Planning & Analysis, October 2023.” Please provide, in Excel with formulas, the calculations for the levelized 2 and 20-year avoided energy costs used in the 2-year and 7-year contracts.
- A4. See Attachment 5 provided in response to JI 1-3 at the filepath: \\02_03_04\04_Report\PUBLIC_20230821_QFModel_2024BP_D06.xlsx.

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Question No. 5

Responding Witness: Stuart A. Wilson

- Q5. Refer to “LGE-KU Qualifying Facilities Rates & Net Metering Service-2 Bill Credit, Generation Planning & Analysis, October 2023.” On page 5, the report states: “this limit recognizes that the Companies’ avoided cost studies will likely need to be refined to address energy needs throughout the year and not just in peak hours.” Please provide a more detailed explanation of what the Company means by this statement.
- A5. The “Levelized Cost of CT” methodology used in this proceeding to compute avoided capacity costs was adopted by the Commission in Case Nos. 2020-00349 and 2020-00350.⁴ With this approach, the carrying cost of a CT is adjusted to reflect each QF technology’s ability to meet monthly peak demands, and each month is weighted equally. This may not be a reasonable approach moving forward depending on the Companies’ resource mix. For example, all other things equal, if the solar PPAs approved in Case No. 2022-00402 are constructed, the Companies’ need for capacity will shift to primarily winter and off-peak hours where the capacity contribution of solar generation is lower.

⁴ Case Nos. 2020-00349 and 2020-00350, Order at 32 (Ky. PSC Sept. 24, 2021) (“Based upon the evidence of record, the Commission adopts the use of a simple cycle CT as the proxy for estimating avoided generation capacity costs.”).

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Question No. 6

Responding Witness: Stuart A. Wilson

Q6. Please provide copies of the most recently developed LGE-KU Effective Load Carrying Capability ("ELCC") studies. If the response is that no such studies have been developed, does LGE-KU believe that the ELCC computed by PJM are representative of LGE-KU ELCCs? Please include an explanation for your response.

A6. The Companies have not developed such studies. PJM uses ELCC in its capacity accreditation process to indicate how much of its total capacity need a particular resource is credited for meeting, but neither ELCC nor capacity accreditation is applicable to the Companies. In their most recent CPCN filing (Case No. 2022-00402), the Companies computed the "capacity contribution" of battery storage and DSM resources to properly account for these resources' limited duration in resource planning analyses.⁵ Like ELCC, capacity contribution is computed in the context of a resource adequacy study, but capacity contribution is a measure of a resource's impact on LOLE compared to a SCCT, whereas ELCC is computed specifically for capacity accreditation. The Companies could use capacity contribution instead of an average availability factor to compute the avoided capacity cost for solar and wind QFs, but the result for solar QFs would almost certainly be lower due to the planned addition of solar resources approved in Case No. 2022-00402.⁶ Given the uncertainty associated with permitting and constructing the approved solar PPAs, the Companies do not recommend changing the basis for adjusting the cost of a SCCT at this time.

ELCC and capacity contribution will vary over time depending on customer load and resource mix. The Companies would expect ELCCs computed for PJM's load and resource mix to be similar to ELCCs computed for the Companies. For example, the attached file contains PJM's preliminary ELCC class ratings for the 2025/2026 base residual auction reflecting the proposed capacity market reforms

⁵ The Companies' most recent capacity contribution study is summarized in Appendix D of the May 2023 update to Exhibit SAW-1 (see Attachment 2 to JI 2-60 in Case No. 2022-00402).

⁶ All other things equal, the addition of these resources will shift the Companies' need for capacity to primarily winter and off-peak hours where the capacity contribution of solar generation is lower.

filed by PJM in FERC Docket No. ER24-99. ELCC values for fixed-tilt solar, tracking solar, and onshore wind are 15%, 25%, and 21%, respectively.

Preliminary ELCC Class Ratings for the 25/26 BRA reflecting the proposed capacity market reforms filed by PJM in FERC Docket No. ER24-99

The following table provides estimated and preliminary ELCC class ratings for the 2025/2026 BRA that were calculated under the proposed methodology filed with FERC in Docket No. [ER24-99](#). Please note the following with regard to this information:

- the proposed reforms are still pending before the Commission and subject to FERC approval
- if approved, the official ELCC class ratings for the 2025/26 BRA will be calculated reflecting updated information, including updated load forecast information and notice of intent to offer submissions for planned generation capacity resources
- these values are only intended to provide a preliminary estimate of the ELCC class ratings, are subject to change before the final values are posted, and should not be relied upon to form any settled expectations

ELCC Class	Preliminary 2025/26 BRA Class Rating
Onshore Wind	21%
Offshore Wind	39%
Fixed-Tilt Solar	15%
Tracking Solar	25%
Landfill	56%
Hydro Intermittent	41%
4-hr Storage	76%
6-hr Storage	85%
8-hr Storage	89%
10-hr Storage	92%
Solar 4-hr Storage Hybrid Closed Loop ^{*^}	44%
Solar 4-hr Storage Hybrid Open Loop ^{*^}	44%
Hydro NPS [^]	94%
DR	95%
Nuclear	96%
Coal	86%
Gas Combined Cycle ^{**}	87%
Gas Combined Cycle Dual Fuel ^{**}	88%
Gas Combustion Turbine ^{**}	74%
Gas Combustion Turbine Dual Fuel ^{**}	90%
Diesel Utility	91%
Steam	78%

** For the two hybrid classes, solar nameplate is assumed to be 100% of the hybrid's MFO and the ICAP of the 4-hr storage component is assumed to be 25% of the hybrid's MFO*

[^] The values for these classes are only illustrative as the units in these classes receive unit-specific accredited UCAP values

*** Preliminary values provided for non-dual fuel and dual fuel Gas Combined Cycle and Gas Combustion Turbine classes may change based on the dual fuel attestations provided by generation owners.*

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Question No. 7

Responding Witness: Stuart A. Wilson

- Q7. Please identify the resource used to develop the assumptions for “other technologies.”
- A7. See the response to PSC 1-3 (a).

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Question No. 8

Responding Witness: Stuart A. Wilson

- Q8. Please provide the workpapers, including Excel workbooks with formulas, supporting all of the tables included in the report ("LGE-KU Qualifying Facilities Rates & Net Metering Service-2 Bill Credit, Generation Planning & Analysis, October 2023").
- A8. See Attachment 5 provided in response to JI 1-3. Most tables are supported with the two Excel files at the filepath: \02_03_04\04_Report.

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Case No. 2023-00404

Question No. 9

Responding Witness: Stuart A. Wilson

- Q9. Refer to “LGE-KU Qualifying Facilities Rates & Net Metering Service-2 Bill Credit, Generation Planning & Analysis, October 2023.” On page 16, the report states: “The Levelized Cost of a CT methodology results in avoided cost rates for solar that are greater than the market price of solar, and these rates do not include revenues for renewable energy certificates that a QF may receive.” Please explain what the Company intends to convey by stating that the levelized cost of a CT avoided capacity cost rates for solar are greater than the market price of solar.
- A9. The Companies intended to convey that using the Levelized Cost of a CT methodology to calculate avoided cost rates for compensating solar QFs results in all-in avoided cost rates (Table 20 on page 16) that are higher than the most competitive solar PPA offers the Companies received in response to their June 2022 request for proposals, particularly when accounting for the value of renewable energy certificates (“RECs”). For example, the Companies received REC revenues in 2023 averaging \$21.15 per MWh for solar RECs sold from their Brown Solar Facility.

In Case Nos. 2020-00349 and 2020-00350, the Companies used two methods to estimate the cost of new solar capacity, the Levelized Cost of a CT method and a method that utilized solar PPA prices to directly calculate annual QF capacity prices. Consistent with least-cost principles, the Companies continue to believe that QF capacity prices should be computed as the minimum capacity price from these two methods.