

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

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| ELECTRONIC JOINT APPLICATION OF |) | |
| KENTUCKY UTILITIES COMPANY AND |) | |
| LOUISVILLE GAS AND ELECTRIC COMPANY |) | |
| FOR CERTIFICATES OF PUBLIC |) | CASE NO. |
| CONVENIENCE AND NECESSITY AND SITE |) | 2022-00402 |
| COMPATIBILITY CERTIFICATES AND |) | |
| APPROVAL OF A DEMAND SIDE MANAGEMENT |) | |
| PLAN AND APPROVAL OF FOSSIL FUEL-FIRED |) | |
| GENERATING UNIT RETIREMENTS |) | |

COMMISSION STAFF'S FIFTH REQUEST FOR INFORMATION
TO LOUISVILLE GAS AND ELECTRIC COMPANY
AND KENTUCKY UTILITIES COMPANY

Louisville Gas and Electric Company and Kentucky Utilities Company (jointly, LG&E/KU), pursuant to 807 KAR 5:001, shall file with the Commission an electronic version of the following information. The information requested is due on July 7, 2023. The Commission directs LG&E/KU to the Commission's July 22, 2021 Order in Case No. 2020-00085¹ regarding filings with the Commission. Electronic documents shall be in portable document format (PDF), shall be searchable, and shall be appropriately bookmarked.

Each response shall include the question to which the response is made and shall include the name of the witness responsible for responding to the questions related to the information provided. Each response shall be answered under oath or, for

¹ Case No. 2020-00085, *Electronic Emergency Docket Related to the Novel Coronavirus COVID-19* (Ky. PSC July 22, 2021), Order (in which the Commission ordered that for case filings made on and after March 16, 2020, filers are NOT required to file the original physical copies of the filings required by 807 KAR 5:001, Section 8).

representatives of a public or private corporation or a partnership or association or a governmental agency, be accompanied by a signed certification of the preparer or the person supervising the preparation of the response on behalf of the entity that the response is true and accurate to the best of that person's knowledge, information, and belief formed after a reasonable inquiry.

LG&E/KU shall make timely amendment to any prior response if LG&E/KU obtain information that indicates the response was incorrect or incomplete when made or, though correct or complete when made, is now incorrect or incomplete in any material respect.

For any request to which LG&E/KU fail or refuse to furnish all or part of the requested information, LG&E/KU shall provide a written explanation of the specific grounds for their failure to completely and precisely respond.

Careful attention shall be given to copied and scanned material to ensure that it is legible. When the requested information has been previously provided in this proceeding in the requested format, reference may be made to the specific location of that information in responding to this request. When applicable, the requested information shall be separately provided for total company operations and jurisdictional operations. When filing a paper containing personal information, LG&E/KU shall, in accordance with 807 KAR 5:001, Section 4(10), encrypt or redact the paper so that personal information cannot be read.

1. Refer to Case 2022-00402, Direct Testimony of Stuart A. Wilson (Wilson Direct Testimony), Exhibit SAW-1, 2022 Resource Assessment, pages 22–23, Section

4.4.1, “Stage One, Step One: Portfolio Development and Screening with PLEXOS,” which describes the initial capacity expansion modeling performed in PLEXOS.²

a. Perform additional PLEXOS modeling runs using identical assumptions to those used in Stage One, Step One as described in the 2022 Resource Assessment, making no modifications, except set the summer and winter capacity value of solar resources to 0 for the base price scenario.

b. For the modeling runs in part a., provide the Selected Portfolio, Incremental Present Value Revenue Requirement (PVRR), Loss of Load Expectation (LOLE), Reserve Margin, Net Summer/Winter Capacity, and Dispatchable Summer/Winter Range.

2. Refer to Case 2022-00402, Wilson Direct Testimony, Exhibit SAW-1, 2022 Resource Assessment, pages 22–23, Section 4.4.1, “Stage One, Step One: Portfolio Development and Screening with PLEXOS,” which describes the initial capacity expansion modeling performed in PLEXOS. Perform additional PLEXOS modeling runs using identical assumptions to those used in Stage One, Step One as described in the 2022 Resource Assessment, with only the below modifications, and provide the Selected Portfolio, Incremental PVRR, LOLE, Reserve Margin, Net Summer/Winter Capacity, and Dispatchable Summer/Winter Range. For model runs that include technologies not previously modeled, such as Carbon Capture and Sequestration (CCS), low-GHG hydrogen co-firing, or coal-to-gas conversion, provide the additional capital, operational, and fuel cost assumptions.

² If LG&E/KU cannot complete the modeling runs by July 7, 2023, LG&E/KU may file a motion requesting an extension and providing the estimated date this response will be filed.

a. Coal resource decisions: For Brown 3, Ghent 2, and Mill Creek 1 and 2, model all the potential compliance routes for the newly proposed Environmental Protection Agency (EPA) carbon regulation rule as options for PLEXOS to select:

(1) Scenario 1: Economic retirement with Selective Catalytic Reduction (SCR)/Overhaul Option

(a) Add SCR to Ghent 2 and Mill Creek 1 and 2 in 2028, or retire by 2028. No additional capital investments, forced retirement by 2032.

(b) Complete overhaul of Brown 3 required for continued operation in 2028, or economic retirement by 2028. No additional capital investments, forced retirement by 2032.

(2) Scenario 2: Advanced Tech for EPA Compliance - NG Co-Firing.

(a) Add SCR to Ghent 2 and Mill Creek 1 and 2 in 2028, begin co-firing 40 percent natural gas on a heat input basis starting 2030, retire by 2040.

(b) Complete overhaul of Brown 3 in 2028, begin co-firing 40 percent natural gas on a heat input basis starting 2030, retire by 2040.

(3) Scenario 3: Advanced Tech for EPA Compliance – CCS.

(a) Add SCR to Ghent 2 and Mill Creek 1 and 2 in 2028, install CCS with 90 percent capture starting in 2030, retire any time after 2040.

(b) Complete overhaul of Brown 3 in 2028, install CCS with 90 percent capture starting in 2030, retire any time after 2040.

(4) Scenario 4 (Optional): Reduced Capacity Factor for EPA Compliance.

(a) Add SCR to Ghent 2 and Mill Creek 1 and 2 in 2028, begin operating at 20 percent maximum capacity factor in 2030, retire by 2035.

(b) Complete overhaul of Brown 3 in 2028, begin operating at 20 percent maximum capacity factor in 2030, retire by 2035.

(5) Scenario 5: Non-Ozone Season Operations.

(a) Repeat most economic option from Scenarios 2–4, but with non-ozone season operation instead of the SCR for Ghent 2 and Mill Creek 1 and 2.

(b) Continue with Complete overhaul of Brown 3 in 2028 or economic retirement and most economic EPA compliance option.

b. New thermal resource options: For each of the above scenarios, include all of the following candidate resource options in place of the standard, non-compliant Natural Gas Combined Cycle (NGCC) and Simple Cycle Combustion Turbine (SCCT) resources from the original modeled scenarios.

(1) For the proposed NGCC units, model the potential compliance routes for the newly proposed EPA carbon regulation rule as options for PLEXOS to select:

(a) Resource 1: Build NGCC with addition of CCS with 90 percent capture by 2035.

(b) Resource 2: Build NGCC, begin co-firing 30 percent low-GHG H2 by volume by 2032, co-firing 96 percent low-GHG H2 by volume by 2038.

(c) Resource 3: Build NGCC as proposed but operate with maximum capacity factor below 50 percent, begin co-firing 30 percent low-GHG H2 by volume by 2032.

(d) Resource 4: Build NGCC as proposed but operate with maximum capacity factor below 20 percent.

(e) Resource 5: Build NGCC as proposed but with a retirement date in 2032.

(2) For all the SCCT units resource options, operate with maximum capacity factor below 20 percent.

c. Existing thermal resources: Include with all above scenarios. Give the model the option to keep Haefling and Paddy's Run units online.

3. Refer to LG&E/KU's response to Staff's Second Request for Information (Staff's Second Request), Item 81, in which LG&E/KU produced the results of a modeling run in which a 20-year life was used for both NGCC and SCCT units.

a. Confirm that the optimal portfolio included the continued operation of Ghent Unit 2, but in non-ozon season months only (October through April) with a resulting capacity factor between 35 percent and 47 percent. If this cannot be confirmed, explain each reason why it cannot be confirmed.

b. Re-run this scenario using the preferred compliance method from Item 3.a. above and provide the results.

4. Refer to LG&E/KU's response to Staff's First Request for Information (Staff's First Request), Item 47(a), Exhibit SAW-1, Appendix D, pages D-22 through D-24.

a. Explain whether the results of the economic minimum reserve margin analysis (17 percent summer and 24 percent winter) correspond to a LOLE of 3.87 days in 10 years.

b. Using the resources LG&E/KU used to calculate the economic reserve margin, explain what the minimum reserve margin and resource portfolio would correspond to a LOLE 1 day in 10 years.

c. Explain why a LOLE of 1 day in 10 years is not appropriate for determining the minimum reserve margin target.

5. Refer to LG&E/KU's Response to Staff's First Request, Item 47(a), Exhibit SAW-1, pages 34–35, in which the assessment of the cost effectiveness of adding the two utility owned solar facilities appears to be predicated on the possibility of the Rhudes Creek and Ragland PPAs not being built.

a. Confirm that the analysis implicitly assumes that the 640 MW from the four solar PPAs identified in Stage Two are not being built.

b. Explain what risks and issues could prevent Rhudes Creek, Ragland, and the four solar PPAs from being built that will not prevent the Owned Solar projects from being completed.

6. Refer to the Application in Case No. 2023-00122,³ Direct Testimony of Stuart A. Wilson (Case No. 2023-00122 Wilson Direct Testimony), Exhibit SB4-1, page 7. Also refer to the LG&E/KU's Response to Staff's First Request, Item 47(a), Section 4.1.5, page 21. According to the LG&E/KU's definition of dispatchable generation resources in Exhibit SB4-1, the solar power purchase agreements (PPAs) are not dispatchable, but the two proposed company owned solar facilities are considered dispatchable.

³ Case No. 2023-00122, *Electronic Joint Application of Kentucky Utilities Company and Louisville Gas and Electric Company for Approval of Fossil Fuel-Fired Generating Unit Retirements* (filed May 10, 2023), Application.

a. Explain why the energy received from the Ohio Valley Electric Corporation (OVEC) is considered dispatchable. Include in the response whether LG&E/KU have ever not dispatched all of the OVEC energy when it was available.

b. Explain the differences between the energy received from OVEC and the energy received from the solar PPAs. Include in the response how the energy received from OVEC is treated differently from that of the solar PPAs toward satisfying hourly demand.

7. Refer to the Case No. 2023-00122 Wilson Direct Testimony, Exhibit SB4-1, page 7 and page 8, Table 2.

a. During periods when the sun is shining and LG&E/KU's proposed owned solar facilities are producing energy, explain when the companies would not fully dispatch all of the energy produced.

b. During periods when the sun is shining and LG&E/KU's proposed owned solar facilities and the proposed solar PPAs are producing energy, explain whether LG&E/KU would not fully dispatch the energy from the owned solar facilities.

c. During periods when the sun is shining and LG&E/KU's proposed owned solar facilities and the solar PPAs are producing energy, explain whether the PLEXOS, PROSYM, and SERVIM models treated these two resources differently, and if so, explain how.

8. Refer to the Case No. 2023-00122 Wilson Direct Testimony, Exhibit SB4-1, page 14, Table 5, which provides a 2028 Reliability Analysis for incremental resource additions to the current portfolio. Refer also to LG&E/KU's response to Staff's Second Request, Item 50, providing the LOLE for certain portfolio options.

a. Provide the LOLE for the Final portfolio for which approval was initially sought in Case No. 2022-00402 with both the owned solar and the solar PPAs removed.

b. Using all of the same assumptions used to calculate the loss of load exceptions in Table 5, provide the LOLH and EUE values for all portfolios listed in Table 5.

c. Using all of the same assumptions used to calculate the loss of load exceptions in response to Staff's Second Request, Item 50, provide the LOLH and EUE values for all portfolios listed in Staff's Second Request, Item 50.

9. Refer to the Case No. 2023-00122 Wilson Direct Testimony, Exhibit SB4-1, page 20, Table 8.

a. Provide an update to the table that recalculates portfolio 6 except that it uses the Solar PPAs instead of the Owned Solar and that recalculates portfolio 8 except that it uses the Owned Solar instead of Solar PPAs.

b. Based on the results in part a., comparing the cumulative results of updated Portfolio 6 with the updated Portfolio 8, explain which portfolio has the lowest overall present value revenue requirement (PVRR). If one portfolio has a lower PVRR early and then is higher later over the forecast period, explain why and include the cross over year PVRR.

10. Refer to "Louisville Gas and Electric and Kentucky Utilities Generator Interconnection Request Queue Updated as of June 8, 2023."⁴

⁴ LG&E/KU, *Louisville Gas and Electric and Kentucky Utilities Generator Interconnection Request Queue* (updated June 8, 2023) available at: https://www.oasis.oati.com/woa/docs/LGEE/LGEEdocs/LGE_and_KU_GI_Queue_Posting_June_08,_2023_3.pdf (last accessed on June 23, 2023).

- a. Explain generally what information is included in this document.
- b. Provide a copy of the interconnection queue with the updates as of June 8, 2023.
- c. Identify the LG&E/KU affiliate that made the interconnection requests identified by queue numbers LGE-GIS-2022-003 and LGE-GIS-2022-004.
- d. Confirm that the interconnection requests identified by queue numbers LGE-GIS-2022-003 and LGE-GIS-2022-004 pertain to the NGCC units for which LG&E/KU are requesting CPCNs in this matter.
- e. Explain how the LG&E/KU affiliate or division that made the interconnection requests identified by queue numbers LGE-GIS-2022-003 and LGE-GIS-2022-004 was able to do so on June 21, 2022, a day before LG&E/KU sent its 2022 request for proposal for new generation (2022 RFP).
- f. Provide any correspondence prior to June 22, 2022 between the LG&E/KU division responsible for sending out the 2022 RFP and the LG&E/KU affiliate or division that made the interconnection requests identified by queue numbers LGE-GIS-2022-003 and LGE-GIS-2022-004 regarding the 2022 RFP or the need for generation discussed in the RFP.
- g. Describe any communications not provided above prior to June 22, 2022 between the LG&E/KU division responsible for sending out the 2022 RFP and the LG&E/KU affiliate or division that made the interconnection requests identified by queue numbers LGE-GIS-2022-003 and LGE-GIS-2022-004 regarding the 2022 RFP or the need for generation discussed in the RFP.

h. Explain why the Generator Interconnection Request Queue Updated as of June 8, 2023 shows that LGE-GIS-2022-004 has been withdrawn by the customer “after scoping meeting,” including what happened at the scoping meeting that prompted the withdraw and explain whether LG&E/KU still plans to move forward with that NGCC unit.

11. Provide any written analysis or report, excluding any integrated resource plan and testimony in prior Commission cases, prepared by or on LG&E/KU’s behalf discussing the cost or feasibility of CCS for any fossil fuel units or hydrogen co-firing of natural gas units.

12. State whether it would be possible to use natural gas co-firing for Brown 3, Ghent 2, Mill Creek 1, or Mill Creek 2. If it would not be possible, explain why it would not be possible for each unit. If it would be possible, explain what work would be necessary to allow for natural gas co-firing for each unit, provide an estimate or an estimated range of the cost of such work, and explain how the estimate was determined and identify uncertainties with respect to the estimate.



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