

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

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)	

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

Kentucky Utilities Company (KU) and Louisville Gas and Electric Company (LG&E) (collectively, LG&E/KU), pursuant to 807 KAR 5:001E, is to file with the Commission an electronic version of the following information. The information requested is due on March 10, 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 when made or, though correct when made, is now incorrect 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 its 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 5:001E, Section 4(10), encrypt or redact the paper so that personal information cannot be read.

1. Refer to the Joint Application.
 - a. Identify LG&E/KU's current generating units with dual fuel capabilities, and describe the dual fuel capabilities of each unit.

b. Identify LG&E/KU's current generating units with black start capabilities, and describe the black start capabilities.

c. Explain whether dual fuel capabilities were considered for the proposed natural gas combined cycle (NGCC) units.

2. Refer to Joint Application, page 15, paragraph 19, in which stated that "As it began to appear that the Companies could have a capacity need beginning in 2028, the Companies accelerated their DSM-EE Program Plan development."

a. State whether LG&E/KU plans to conduct another Cadmus Group (Cadmus) study of cost-efficiency for proposed demand-side management (DSM) programs for the purpose of potentially amending those programs in seven years or earlier.

b. State any factors that changed between the filing of LG&E/KU's 2021 Integrated Resource Plan (IRP) in Case No. 2021-00393 and the filing of the Joint Application in this case that contributed to the proposed adoption of DSM programs excluded from the IRP.

c. State whether LG&E/KU could have previously implemented the proposed DSM programs in a cost-effective manner and why it did not.

3. Refer to the Joint Application, pages 15–16. LG&E/KU stated that in the 2024-2030 DSM-EE Program Plan, there were 39 potential programs that were considered, but that a "scoring rubric" narrowed it to 14 programs.

a. Identify and describe all 39 potential programs that were considered for the 2024-2030 DSM-EE Program Plan.

b. Explain whether LG&E/KU have considered the possibilities of implementing any of the 25 potential or proposed programs not selected for the 2024-2030 Program Plan as pilot programs.

4. Refer to the Direct Testimony of Lonnie E. Bellar (Bellar Direct Testimony), page 10, lines 20–21, and page 11, lines 1–7. Since the NGCC units are replacing base load coal units, presumably they will run at a high load factor. With the variability of solar generation output, explain why the simple cycle combustion turbines (SCCT) would not be the units that ramp up and down following the solar output variability.

5. Refer to Bellar Direct Testimony, page 11, lines 19–23.

a. Provide an update on the development of hydrogen as a viable NGCC fuel.

b. Explain how LG&E/KU would get sufficient supplies of hydrogen to its NGCC units.

c. Explain whether LG&E/KU's current SCCT fleet can utilize hydrogen and whether next generation SCCTs will be equipped to burn hydrogen.

6. Refer to the Direct Testimony of Robert Conroy (Conroy Direct Testimony), page 2, line 19, discussing “[h]ow do the Companies plan to finance the NGCCs, solar facilities, and battery facilities they are proposing.”

a. Explain whether LG&E/KU have considered the Energy Infrastructure Reinvestment (EIR) Program for financing these facilities or potential alternatives. If not, explain why it was not considered.

b. Confirm that the EIR Program was created by the Inflation Reduction Act (IRA) and provides up to \$250 billion in loan guarantees to “enable operating energy

infrastructure to avoid, reduce, utilize or sequester air pollutants or anthropogenic emissions of GHG.”

7. Refer to the Conroy Direct Testimony, page 7, lines 19–21.

a. Explain why LG&E/KU feel it is appropriate to use the 50-basis point addition from their most recent rate on equity (ROE) in this case.

b. Describe how LG&E/KU has encouraged DSM incentives from this 50-basis point addition from Case No. 2017-00441.²

c. Explain why an ROE witness was not provided for the DSM portion of this case.

8. Refer to the Direct Testimony of Phillip Imber (Imber Direct Testimony), page 4, lines 6–8. Identify LG&E/KU’s coal-fired generating units that are equipped with Selective Catalytic Reduction equipment.

9. Refer to the Imber Direct Testimony, page 4, lines 14–18. Provide the annual projected emissions and projected allocations for each unit planned to be retired, for 2023 through 2030, assuming continued operation of the units.

10. Refer to the Imber Direct Testimony, page 4, lines 20–23. Provide a copy of LG&E/KU’s comments and the status of LG&E/KU’s request to the EPA to revise the Good Neighbor Plan.

11. Refer to the Imber Direct Testimony, page 5, lines 11–12. Provide any updates to the Good Neighbor Plan.

² Case No. 2017-00441, *Electronic Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for Review, Modification, and Continuation of Certain Existing Demand-Side Management and Energy Efficiency Programs* (Ky. PSC Oct. 5, 2018).

12. Refer to the Imber Direct Testimony, page 8. Provide the specific assumptions in the Resource Assessment for greenhouse gas emissions standards for existing generating units stated to align with the repealed Affordable Clean Energy Rule.

13. Refer to the Imber Direct Testimony, page 9, lines 11–24.

a. Explain whether LG&E/KU's assertion that its reportable emissions of carbon dioxide equivalent of greenhouse gases are less than 25,000 metric tons per year includes the three coal units with the addition of SCRs.

b. Explain how the pricing of methane emissions is related to the pricing of carbon dioxide emissions for modeling purposes.

14. Refer to the Imber Direct Testimony, page 9, lines 22–24. Provide LG&E/KU's reportable emissions of carbon dioxide equivalent to greenhouse gases.

15. Refer to the Imber Direct Testimony, page 10, line 23 through page 11, line 2. Provide the current status of LG&E/KU's Title V air construction permit.

16. Refer to the Direct Testimony of John Bevington (Bevington Direct Testimony), page 2, lines 17–19.

a. Provide the avoided capacity and energy values used to determine the cost-effectiveness of the DSM programs.

b. Explain in detail the methodology for calculating the avoided capacity and energy values.

17. Refer to the Bevington Direct Testimony, page 8.

a. Provide a complete list of the 39 possible programs considered and the scores each received under LG&E/KU's scoring rubric. Provide the detailed scoring results from each of LG&E/KU's evaluators and from each of Cadmus' evaluators.

b. Provide the results of the preliminary cost-benefit analysis conducted on the pool of 14 programs mentioned on lines 18–20. Provide any supporting workpapers used to conduct this cost-benefit analysis.

c. Explain which programs were combined for the second round of analysis, and why they were combined.

d. Explain why the initial screening of the 39 programs was performed to eliminate some of the 39 programs rather than conducting a cost-benefit analysis on all these programs.

18. Refer to the Bevington Direct Testimony, page 8–10, regarding 39 possible DSM programs evaluated.

a. Identify which of these programs were rejected during the “rubric process.”

b. Provide the six program evaluator scores and total score for all 39 DSM programs evaluated.

c. Explain whether LG&E/KU and Cadmus considered any other factors to include in the rubric. If so, identify and explain those factors.

19. Refer to the Bevington Direct Testimony, page. 14, lines 17–20. LG&E/KU stated that after thoroughly evaluating the Pay-As-You-Save (PAYS) program, LG&E/KU determined that it would not generate cost-effective savings.

a. Explain whether LG&E/KU considered weighting cost-effectiveness more than customer savings in this specific scenario of considering the PAYS program.

b. Explain in further detail how the IRA creates the possible influx of financing options for LG&E/KU’s customers.

20. Provide a cost-benefit analysis for the following eliminated programs:
 - a. Midstream HVAC Rebates;
 - b. Downstream Rebates;
 - c. Home Energy Reports;
 - d. Small Business Energy Reports;
 - e. New Home Construction Rebates;
 - f. LED Streetlight Retrofits; and
 - g. Strategic Energy Management.

21. Refer to the Bevington Direct Testimony, Exhibit JB-1, Appendix B. Explain why costs under the Total Resource Cost (TRC) test were lower than the Program Administrator Cost (PAC) test in some cases (e.g., Connected Solutions, Peak Time Rebates, Demand Response).

22. Refer to the Bevington Direct Testimony, page 11.
 - a. Explain why TRC test was used rather than the PAC test, or some other test.
 - b. Explain whether the TRC test includes factors that do not affect rates or service.

23. Refer to the Bevington Direct Testimony, page 13, which discusses the role of rooftop solar in the DSM-EE portfolio. Clarify whether LG&E/KU considered incremental incentives for battery storage paired with net metering installations.

24. Refer to the Bevington Direct Testimony, page 14, which states, “[T]he newly enacted Inflation Reduction Act creates the possible influx of financing options for customers.”

a. Explain whether LG&E/KU included these new IRA-related financing options, including various rebates and tax credits, in the development of its DSM-EE portfolio.

b. If not, explain how LG&E/KU intend to leverage these programs.

c. Quantify the effects these financing options will have on either the DSM-EE portfolio or the underlying load forecast.

25. Refer to the Direct Testimony of David S. Sinclair (Sinclair Direct Testimony), page 4, line 16, and page 9, lines 17–23.

a. The two NGCC units have a combined capacity of 1,242 MW, and the three coal units proposed to retire have a combined capacity of 1,194 MW. Explain why LG&E/KU needs any of the proposed solar facilities and PPAs.

b. Explain and demonstrate how investing in the 125 MW lithium-ion battery is more cost-effective than acquiring an appropriately sized SCCT or utilizing its current SCCT fleet.

c. If not explained above, explain how the 125 MW lithium-ion battery will be utilized operationally, including charging and discharging.

26. Refer to the Sinclair Direct Testimony, page 10, lines 1–6; page 23, lines 13–24; page 24, lines 1–14; and Exhibit DSS-1. Explain why LG&E/KU chose to enter into the proposed PPAs instead of owning all the solar facilities.

27. Refer to the Sinclair Direct Testimony, page 10, lines 9–19.

a. Provide a copy of each solar PPA contract and explain the terms and prices under which LG&E/KU will take energy from each of the providers.

b. If not explained above, explain whether the interconnection upgrade costs will be the merchant solar companies' responsibility and provide the estimated costs.

c. Explain the estimated timeline in which each of the solar merchant companies (BrightNight LLC, ibV Energy Partners, and Clearway Energy) will file applications for construction certificates with the Kentucky State Board on Electric Generation and Transmission Siting (Siting Board).

d. Explain whether any of LG&E/KU's industrial customers have expressed an interest in renewable energy such that a portion of the proposed solar energy projects is in response to that interest. If so, provide the detailed information about the customer, average usage, and the extent of the discussions between LG&E/KU and those customers.

e. Refer also to the Direct Testimony of Stuart A. Wilson (Wilson Direct Testimony), Exhibit SAW-1, Appendix B, Subpart 3a, page 5.

(1) LG&E/KU are only proposing to build and own the 120 MW Mercer County facility. The 120 MW Marion County facility will be constructed as a merchant facility until LG&E/KU take possession post construction. Explain how the execution risks faced by the four solar PPA project developers will be different from that faced by the BrightNight LLC.

(2) Accounting for differences in financing, explain why LG&E/KU's self-build plan for the Mercer County solar facility escapes the execution risks faced by the other solar developers.

(3) Further describe the solar PPA execution risk analysis, whether it was more qualitative, based on company experience and personal judgment or whether it was based on quantitative modeling.

28. Refer to the Sinclair Direct Testimony, page 15, table 2. Explain any updated information regarding the status of OVEC and whether any discussions have taken place regarding the facility's retirement. Include in the response whether LG&E/KU have raised the issue at board or committee meetings.

29. Refer to the Sinclair Direct Testimony, page 15, lines 5–12. Explain and demonstrate how LG&E/KU's proposed portfolio optimally blends both dispatchable and non-dispatchable resources to ensure reliability and reasonable cost. Include in the response the difference between the proposed portfolio's reasonable cost and a least cost portfolio.

30. Refer to the Sinclair Direct Testimony, page 26, lines 17–24, and page 27, lines 1–7. LG&E/KU's testimony appears to favor creating new generation assets rather than joining a regional transmission organization (RTO).

a. Explain whether LG&E/KU's other regulated affiliates are members of PJM or any other RTO.

b. Explain whether LG&E/KU's affiliates own and operate utility scale batteries.

c. Explain why it is not possible for LG&E/KU to draw on and learn from the operational experience of its other regulated affiliates.

31. Refer to the Direct Testimony of Tim A. Jones (Jones Direct Testimony), page 8.

a. Identify and explain the provisions in the IRA that significantly accelerate energy efficiency (EE), growth in distributed generation, space heating electrification, and increased electric vehicle (EV) adoption.

b. Refer also to LG&E/KU's current Tariffs. Describe the process a residential customer who purchases an EV would go through to be able to charge the vehicle at the residence and the separate charges that the residential customer would incur to have the EV charger installed and how the customer would be billed.

c. Refer also to LG&E/KU's current Tariffs for Residential Time-of-Day Energy Service.³ In addition to the incentives included in the IRA and LG&E/KU's deployment of AMI meters, explain why the 500-customer limit on customers taking Residential Time-of-Day Energy Service should not be increased or removed.

d. Explain whether LG&E/KU have received indication from the new Blue Oval battery plant of a preference for a proportion of its energy requirements to be satisfied by renewable energy.

32. Refer to the Jones Direct Testimony, page 9, Figure 3. Explain what the solid line in each panel represents.

33. Refer to the Jones Direct Testimony, page 16, lines 12–14 and page 29, lines 1–10.

a. Explain whether LG&E/KU included the resulting bill impacts of the projects proposed in this case when forecasting savings from anticipated residential and

³ LG&E's Electric Tariff, P.S.C. Electric No. 13, Second Revisions of Original Sheet No. 6 (effective Dec. 6, 2021); KU's Tariff, P.S.C. Electric No. 13, Second Revisions of Original Sheet No. 6 (effective Dec. 6, 2021).

commercial adoption of DSM and EE programs. If so, explain specifically how the costs were included in the bills for each customer class.

b. Explain why it is reasonable to assume LG&E/KU ratepayers will experience price increases of 2 percent annually consistent with long-term inflation as opposed to projected price increases resulting from fuel price increase plus rate increases resulting from the LG&E/KU's future actions.

34. Refer to the Jones Direct Testimony, page 16, lines 8–11, which provides “the IRA incentivizes energy efficient or electric end-use appliances (not just heat pumps) by providing qualifying low- and mid-income customers home efficiency and electrification tax incentives and rebates up to a lifetime maximum of \$14,000.”

a. Confirm that this refers to High-Efficiency Electric Home Rebate Act (HEERHA) program rebates for home electrification and weatherization included in the IRA and is described as one of the two impacts that the IRA has that tends to reduce the load forecast.

b. Explain whether LG&E/KU's modeling incorporated other IRA energy efficiency provisions in the load forecast, and if so, how. Specifically, explain whether the Residential Energy Efficiency Tax Credit, which provides up to \$3,200 per year in tax credits for all income classes, was incorporated into modeling.

35. Refer to the Jones Direct Testimony, page 16. Refer also to the Commission Staff's Report in LG&E/KU's 2021 IRP in Case No. 2021-00393 stating that LG&E/KU should “expand its discussion of [distributed energy resources (DERs)] to identify resources other than distributed solar that could potentially be adopted by

customers and explain how and why those resources are expected to affect load, if at all.”⁴

Refer also to the Jones Direct Testimony, page 21, in which Jones explains that in LG&E/KU’s 2022 CPCN Load Forecast, LG&E/KU only analyze distributed solar generation, noting that “if future DER customers choose their DER technology on the basis of economics, they will almost certainly choose solar over wind, hydro, biomass, and battery energy storage.”

a. Indicate whether policy changes, decreasing costs, or changing markets were considered in the economics and uptake of home battery storage.

b. Indicate if aspects other than economics for home battery storage, such as resiliency benefits and the increasing value it may provide, were considered in customer adoption of the technology.

36. Refer to the Jones Direct Testimony, page 17, lines 17–22, and page 18, lines 1–4. Explain in further detail the reasonableness of accelerating the IRA impacts on the Energy Information Administration (EIA) forecast by ten years. Include in the response the characteristics of LG&E/KU’s service territories that would warrant assuming swifter adoption impact results.

37. Refer to the Jones Direct Testimony, page 23, lines 4–15. Assume that LG&E/KU receive approval for the planned fossil and renewable generation additions as proposed.

⁴ Case No. 2021-00393, *Electronic 2021 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company* (Ky. PSC Sept. 16, 2022), Commission Staff’s Report on the 2021 Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company at pg. 67.

a. Explain why it would not be reasonable for LG&E/KU to remove the 1 percent cap on distributed generation eligible for the Net Metering Service 2 (NMS-2) compensation rate.

b. Explain whether the Small Capacity Cogeneration Qualifying Facilities (SQF) tariff rate paid to net metering customers was held at the current tariffed rate or recalculated to reflect the cost of new generation. If held at the current rate, explain why that is a reasonable assumption.

38. Refer to the Jones Direct Testimony, Exhibit TAJ-1, page 15. Explain whether Blue Oval will take part in or has expressed an interest in an interruptible tariff as a part of its service.

39. Refer to the Jones Direct Testimony, Exhibit TAJ-1, page 16. Provide a list of the energy efficiency incentives available to homeowners from the IRA.

40. Refer to the Jones Direct Testimony, Exhibit TAJ-1, page 19.

a. Explain what rate schedule LG&E/KU assumes for the EV load shapes.

b. If known, explain what the load shape would look like and how charging behavior would change if EV owners were on Tariff RTOD-Energy or Tariff RTOD-Demand. Include in the response whether residential customers must take both of these tariffs jointly or individually.

41. Refer to the Wilson Direct Testimony, page 4, lines 4–13, generally discussing the effect and requirements of the Good Neighbor Plan. Refer also to the Imber Direct Testimony, page 5, lines 11–13, discussing when LG&E/KU expect the Good Neighbor Plan to become effective. Because the Good Neighbor Plan has such far

reaching consequences, explain whether LG&E/KU know or believe that lawsuits seeking revisions or to delay implementation have been filed or will be filed.

42. Refer to the Wilson Direct Testimony, page 4, lines 4–13, generally discussing the effect and requirements of the Good Neighbor Plan. If LG&E/KU were to make the investments in selective catalytic reduction (SCR) technology, explain how much longer each of the units could run and whether that would obviate the need for the two proposed NGCC units.

43. Refer to the Wilson Direct Testimony, page 3, lines 3–14. For each proposed unit addition or retirement, provide the installed capacity (ICAP) and unforced capacity (UCAP) ratings for both summer and winter, and explain which capacity value is utilized in the PLEXOS production cost model and how.

44. Refer to the Wilson Direct Testimony, page 4, lines 13–18 and lines 19–23, and Exhibit SAW-1, Appendix B, page 4.

a. Explain each component of the major overhaul of the Brown Unit 3 that LG&E/KU contend is necessary to keep it operating safely beyond 2028.

b. Provide any cost benefit studies, along with a discussion of the assumptions used in the studies, used to justify the retirement of Mill Creek Unit 2, Brown Unit 3 and Ghent Unit 2.

45. Refer to the Wilson Direct Testimony, page 8, lines 4–6. Provide and explain the report and bid evaluation sheets that resulted in the 43 supply-side options and all dispatchable DSM options that were included in the resource analysis.

46. Refer to the Wilson Direct Testimony, page 8, lines 7–12. Explain whether the six fuel price scenarios used in Stage 1 are the same fuel price scenarios used in Stage 2.

47. Refer to the Wilson Direct Testimony, page 10–11.

a. Explain whether LG&E/KU’s project engineering group updated their solar and storage, SCCT, and NGCC proposals to account for the IRA.

b. If yes, explain in detail what changes the updated proposals included.

48. Refer to the Wilson Direct Testimony, page 14–15.

a. Explain whether the coal units are dispatched economically or committed as “must run resources.”

b. Explain whether coal retirement was endogenously selected in the model or whether different retirement dates were investigated through scenario analysis. In any case, identify the earliest and latest retirement dates examined and any other model constraints for the retirements of the units.

c. Provide a copy of any analysis of the book life or operating life of LG&E/KU’s coal units prepared or relied on in the last seven years to establish depreciation rates or make resource decisions, and briefly explain how the conclusions of those analyses changed over time.

d. Provide the “Financial Model built in Excel to calculate and compare 17 PVRR values for various portfolios.”

49. Refer to the Wilson Direct Testimony, page 14–15. Provide a list of all the Stage 1 runs with a brief description.

a. List all annual and cumulative resource limits of the model in each run (that restrict investment in a certain resource type).

b. List all resources that were forced in the model for each run.

50. Refer to the Wilson Direct Testimony, page 16, lines 9–10.

a. Explain when the solar contracts were assumed to begin in the PLEXOS modeling and why this differed from the PROSYM modeling (RFP dates).

b. List all annual and cumulative resource limits of the model in each run (that restrict investment in a certain resource type).

c. List all resources that were forced in the model for each run.

51. Refer to the Wilson Direct Testimony, page 10. Lines 7–12, Exhibit SAW-1, Appendix B, page 9, and Appendix D, Table 1, page 4. The capacity of the two proposed 621 MW NGCC units is greater than the proposed retired capacity of the three coal units 1,194 MW. Explain why the minimum reserve margin targets need to be greater than the capacity of the fully dispatchable resources of 12 percent summer and 21 percent winter.

52. Refer to the Wilson Direct Testimony, Exhibit SAW-1, page 5, stating that “[a]fter screening the RFP responses for economics and practicability, 43 options proceeded to the assessment.”

a. Define “practicability” and explain how it was assessed.

b. Identify the resources that were excluded for practicability reasons.

c. Identify the resources that did not proceed to the assessment based on their economics.

d. For each resource that was considered and then excluded for practicability reasons, provide each basis for excluding each such resource.

e. Produce all workpapers for this screening step.

53. Refer to the Wilson Direct Testimony, Exhibit SAW-1, page 5, subpart 3, and Table 1, page 11.

a. Explain how and whether the analysis of reliability enhancements was more qualitative in nature based on experience and personal knowledge or quantitative based on modeling results.

b. Explain how the cost of the Brown Energy Storage System (Brown BESS) compares to the costs of the 2-hour and 4-hour batteries submitted in response to the RFP.

c. Assuming that the Brown BESS will be utilized in the same manner as the combination solar/battery projects submitted in response to the RFP, explain how the cost of the Brown BESS utilized in conjunction with LG&E/KU's proposed solar projects compares to the combination battery/solar projects submitted in response to the RFP.

d. From a ratepayer's perspective, explain why it is more economical for LG&E/KU to own Brown BESS as opposed to accepting one of the RFP proposals.

e. Step 2 involved stress testing the economically optimal portfolio. Step 3 involved analyzing the addition of additional resources to the economically optimal portfolio. Explain and compare the portfolio cost differences between the economically optimal portfolio (Step 2) and the final portfolio (Step 3).

f. Provide a table showing the annual load forecast components and the annual existing resources, resource additions and retirements, net capacity position and reserve margin over the forecast period for both summer and winter seasons.

54. Refer to the Wilson Direct Testimony, page 13, lines 17–20.

a. Explain how LG&E/KU modeled the uncertainty of solar PPA execution risk.

b. Explain whether any of the merchant solar projects that have already been issued Siting Board construction certificates submitted bids responding to LG&E/KU's Request for Proposal (RFP). If not, explain whether LG&E/KU considered approaching or approached one of these merchant projects as a possible resource.

c. Consider that with supply chain issues and long delays in RTO processing transmission interconnect study requests, several merchant solar projects have been or are expected to be canceled.

(1) Explain whether these specific considerations were discussed or taken into account in the solar project bidder's responses to LG&E/KU's RFP.

(2) Explain whether LG&E/KU have experienced or are aware of any delays in processing merchant renewable project interconnection requests to interconnect with its transmission system with its independent Transmission Organization, and if so, explain the timing and nature of the delays.

55. Refer to the Wilson Direct Testimony, page 15, footnote 16.

a. Explain the meaning of “uncertainties involved in estimates of solar projects' transmission costs.” Include in the response, what specific elements are included in “transmission costs” and whether the solar facilities are assumed to reside in LG&E/KU's service territories.

b. By not including the uncertainties of transmission costs and interconnection delays in the modeling, explain why the model would not tend to over supply the portfolio with solar capacity.

56. Refer to the Wilson Direct Testimony, page 14, lines 25–27.

a. Explain whether LG&E/KU assumed that “complying with the Good Neighbor Plan” means that there would be no appeals or challenges to the proposed rule and that it would go into effect at the earliest possible date, and that date was then hard coded into PLEXOS as a constraint.

b. Explain whether LG&E/KU are aware of any other proposed EPA rule with such far reaching implications for electric generation fleets that went unchallenged.

c. Explain the reasonableness of assuming that the Good Neighbor Plan will not be tied up in the court system for years and, consequently, why LG&E/KU are choosing to retire coal units prematurely.

d. All else being equal, explain how the results of Stage 1 would change if the start date for Good Neighbor Plan compliance were to be delayed due to court challenges up to the Supreme Court level as has happened with previous EPA rules.

57. Refer to the Wilson Direct Testimony, page 14, lines 31–34 and page 15, line 1.

a. Explain how PLEXOS accounts for resource reliability in determining whether to retire a resource or to add a resource.

b. Explain whether and how the Stage 1 results would change, if at all, if all potential resources were evaluated on an Effective Load Carrying Capability (ELCC) basis.

c. Explain whether the reliability measure used in PLEXOS evolves over time as a resource ages or as weather or other generating conditions change.

d. Explain whether and how PLEXOS accounts for transmission capacity and whether there is a difference between import and export capacity depending on LG&E/KU's need. If PLEXOS does not account for this, explain where in the resource modeling process this is accounted for.

e. Explain whether and how PLEXOS accounts for transmission costs. If PLEXOS does not account for this, explain where in the resource modeling process this is accounted for.

58. Refer to the Wilson Direct Testimony, page 15, lines 2–8 Assume that the Commission were to grant LG&E/KU's application as filed and in place.

a. Explain how LG&E/KU's resource portfolio would have performed during winter storm Elliot, including specifically whether rolling blackouts would have been necessary, and if so, whether they would have been better or worse.

b. Explain the reasons why the blackouts in LG&E/KU's balancing area on or about December 23, 2022, during winter storm Elliott were necessary. Include in the response (1) a separate explanation of why power could not be purchased from SEEM, MISO, PJM, or other sources; (2) whether LG&E/KU had sufficient transmission capacity to import sufficient power, and if not, why not; (3) whether any of the transmission interconnects had a Transmission Line Release (TLR) placed on them that would have prevented the import of power, and if so, the effect, if any, of that TLR; and (4) whether power was available that could have prevented the blackouts if LG&E/KU had additional transmission capacity to import from SEEM, MISO, PJM, or other sources.

c. State whether the Tennessee Valley Authority (TVA) was exporting power to other balancing areas during the blackouts in LG&E/KU's balancing area, and if so, why TVA was exporting such power.

59. Refer also to the Wilson Direct Testimony, page 15.

a. Refer to lines 9–11. Explain the meaning of “the desirability of renewables predictability correlates with the level of fossil fuel prices.”

b. Refer to lines 12–14.

(1) Explain the meaning of “dispatchable DSM and batteries are uneconomical for achieving minimum levels of reliability and meeting the significant need for energy created by the retirement of the three coal units.”

(2) If dispatchable DSM is not economical for achieving minimum levels of reliability and energy needs, explain how these programs can be cost-effective for DSM purposes, but not for reliability or energy needs.

(3) If batteries are not economical for achieving minimum levels of reliability and energy needs, explain how LG&E/KU justify the proposed 125 MW/500 MWh battery to be online in 2026.

60. Refer to the Wilson Direct Testimony, page 15, lines 17–21. Explain and show that the results from the Step 1 of Stage 1 are least cost of other alternatives.

61. Refer to the Wilson Direct Testimony, page 16, lines 1–9.

a. Explain how LG&E/KU selected the specific 22 different portfolios and whether these represented the least cost portfolios.

b. Of the portfolios based upon the Mill Creek NGCC and Ghent Unit 2 with selective catalytic reduction (SCR), confirm that Brown Unit 3 was assumed retired.

c. Explain whether the statement means that in Step 1 of Stage 1 that in PLEXOS the solar contracts were not assumed to begin at their RFP specified start date and the model was allowed to phase them in based on cost, uncertainty and other specified factors.

d. Explain the rationale for assuming that the contracts began on the RFP specified start dates. Include in the response whether PROSYM requires specified start dates or is it able to choose start dates based on cost and solar PPA uncertainty and any other specified factors.

62. Refer to the Wilson Direct Testimony, page 17, lines 3–4. Describe the methodology used to calculate the “average optimal amount of solar” for the three fuel price scenarios with a Mid coal-to-gas price ratio.

63. Refer to the Wilson Direct Testimony, page 24, lines 2–3, which states, “Although these portfolios meet minimum reserve margin constraints in total, the differences in their full dispatchable reserve margins indicate that the reliability of these portfolios is very different.”

a. Provide any analysis conducted that supports this statement.

b. Explain whether the model was required to meet a dispatchable reserve margin, the total reserve margin, or some other constraint.

c. Provide any examples in resource planning of other companies or jurisdictions where a dispatchable reserve margin is required.

64. Refer to the Wilson Direct Testimony, pages 28–30. Explain whether LG&E/KU considered any additional approaches for mitigating solar execution risk besides solar asset ownership.

65. Refer to the Wilson Direct Testimony, pages 30–34. Confirm that no battery resources besides Brown BESS were evaluated in SERVIM as part of Stage 3, Step 2.

66. Refer to the Wilson Direct Testimony, page 16, lines 12–18, page 17, lines 1–9 and Exhibit SAW-1, Appendix B, pages 55–59.

a. Confirm that in both the PLEXOS and PROSYM model runs, individual fuel price forecasts were not used and that the coal to gas (CTG) ratio was the variable used.

b. Given Europe’s decreasing dependence on Russian natural gas and an increasing demand for U.S. natural gas exports, explain why natural gas prices will not remain relatively high into the future.

c. Referring to Appendix B, page 59, Table 38.

(1) Explain the basis is for the individual coal price forecasts and how each coal price forecast was selected to pair with the respective natural gas prices.

(2) Explain the basis for selecting a mid-CTG ratio, regardless of natural gas price forecasts, as the expected CTG ratio for use in PLEXOS and PROSYM model runs.

(3) Explain why the Companies believe that the atypical CTG price ratios are atypical and less likely to happen versus the mid-CTG ratios.

67. Refer to the Wilson Direct Testimony, Exhibit SAW-1, Appendix B, page 58, footnote 48. If not already provided, provide the cost benefit study showing the retirement of the Mill Creek Unit 2, Ghent Unit 2 and Brown Unit 3 in 2028 and six years before the end of the book depreciation lives of Mill Creek Unit 2 and Ghent Unit 2 (2034). Include

in the response a description of the steps and assumptions used in each analysis. Also provide the analysis in excel spreadsheet format with all cells visible and unprotected.

68. Refer to the Wilson Direct Testimony. Provide the six optimal portfolios generated in Step 1 of Stage 1 of the resource assessment. For each portfolio, show which resource additions occur each year throughout the modeling period.

69. Refer to the Direct Testimony of Charles Schram (Schram Direct Testimony), page 5, line 19.

a. Describe the magnitude of the price change for the five RFP respondents who modified their proposal as a result of the IRA.

b. Provide both the pre- and post-IRA RFP responses for the five RFP respondents who modified their proposal as a result of the IRA (or identify them in the record if already provided).

c. Explain whether the respondents who modified their proposals gave justification for the change (i.e., identify specific programs within the IRA that would impact their cost).

d. Confirm that the Department of Treasury has issued some initial guidance on certain federal tax credit provisions, with further guidance still pending, since the passage of the IRA. State whether that guidance is likely to affect the cost of facilities proposed in the RFP responses, and if so, explain how. Explain whether LG&E/KU will reissue the RFP or allow respondents to further adjust their bids based on that guidance.

70. Refer to the Direct Testimony of Lana Isaacson (Isaacson Direct Testimony), page 7–8. Explain whether the Residential Online audit program is a substitute for a third-party verification to ensure that the self-installation was completed.

71. Refer to the Isaacson Direct Testimony, pages 8–9. Explain whether the new federal standards for lighting may have negatively impacted the cost-effectiveness for the Business Solutions program, and if so, explain how.

72. Refer to Isaacson Direct Testimony, page 14–15, regarding adoption of DSM programs that are not cost-effective. Explain the process LG&E/KU uses to determine adoption of DSM programs that are not cost-effective.

73. Refer to the Isaacson Direct Testimony, page 15–16.

a. Provide a breakdown of the cumulative energy (MWh) and demand (MW) savings levels for each program in each year from 2024-2030.

b. Clarify whether the MWh savings represented in the Energy Efficiency Portfolio table are first-year savings, or lifetime savings. Provide the first-year or lifetime savings values not included in the table.

c. Explain how the savings represented in these tables are linked to the Cross-Sector DSM Potential Study Projection provided in Exhibit LI-1, and the Demand Response Assessment provided in Exhibit LI-2. Provide any supporting workpapers used to determine the 2024-2030 portfolio savings levels assumed based on these potential studies.

d. Refer to the Isaacson Direct Testimony, Exhibit LI-1, Tables 8-10. Provide all supporting workpapers used to determine the Economic and Achievable potential levels of savings.

74. Refer to 2024-2030 DSM-EE Program Plan, Exhibit JB-1, Table 1-1, pages 14–16. LG&E/KU are providing summaries of proposed modifications to each program.

a. Explain why the Appliance Recycling Program ended in 2018 and explain why it has a proposed startup date in 2026.

b. Explain, if any, how many industrial customers opted out of the Business Solutions (formerly Nonresidential Rebates) due to the incentive cap.

c. Explain the budget impact for the proposed modification of removing the incentive cap for the Business Solutions program.

75. Refer to 2024-2030 DSM-EE Program Plan, Exhibit JB-1, page 19, Table 1-4.

a. While the Commission understands that Low-Income programs historically have not had a TRC score above 1.0, explain whether LG&E/KU's modifications to the Income-Qualified programs would potentially increase the cost-effectiveness over time.

b. It appears that the findings in the DSM-EE Program Plan determined that the Residential online audit program has a tendency not to be cost-effective. State whether LG&E/KU agree with that characterization. If not, please explain. Also, explain whether LG&E/KU have any intention of terminating or modifying this program if it underperforms.

76. Refer to 2024-2030 DSM-EE Program Plan, Exhibit JB-1, page 29, Table 3-3.

a. Explain why LG&E/KU are proposing an annual budget for the incentives at \$0, considering the Income-Qualified Solutions have an incentive structure of \$1,650 in program services per single-family household and \$750 per multifamily unit.

b. Explain why LG&E/KU concluded that a 3.0 percent labor escalation rate is appropriate.

77. Refer to 2024-2030 DSM-EE Program Plan, Exhibit JB-1, page 41. Explain why LG&E/KU did not propose a separate program for Optimized Charging and instead included it with Connected Solutions.

78. Refer to 2024-2030 DSM-EE Program Plan, Exhibit JB-1, page 48. LG&E/KU state that AMI is currently being deployed to all customers. Explain when LG&E/KU anticipate having AMI fully installed throughout their entire service territory.

79. Refer to 2024-2030 DSM-EE Program Plan, Exhibit JB-1, page 49, Table 4-4 and page 50, Table 4-6. Regarding the Peak Time Rebates Program:

a. Explain LG&E/KU's intentions for year 1 of the program.

b. Provide cost justification for the year 1 administration program costs considering the program is not expected to start until 2025.

c. Explain whether LG&E/KU are limiting participation to 92,500 for each LG&E and KU service territory separately or combined.

80. Refer to 2024-2030 DSM-EE Program Plan, Exhibit JB-3, page 2, Table 1. Provide the emails received from Mountain Association (Chris Woolery) with regards to Full Project Costs, Maximum Project EUL, and kWh Savings per project.

81. Refer to 2024-2030 DSM-EE Program Plan, Exhibit JB-3, page 3–5.

a. Explain, if at all, what customer classes the target market for the PAYS program would be.

b. Explain, if possible, what would need to occur for the PAYS program to become cost-effective.

c. Explain how, with a 0 or 3 percent interest rate, the cost-effectiveness of the PAYS program does not change regardless of participation count.

82. Refer to Exhibit LI-1, Demand Response Assessment Exhibit LI-1, page 9, Figure 1.

a. Identify which demand response programs listed in Figure 1 are included in the proposed DSM program categories identified in the Application, page 16.

b. If any of the demand response programs listed in Figure 1 are not included in the proposed DSM programs, explain why not.

83. Refer to Exhibit LI-2, 2023 LG&E and KU Demand Response Assessment, page 1. Explain why LG&E/KU did not select all potential Demand Response programs to be screened.

84. Refer to Exhibit_LI-3_-_KU_DSMRC_Calculations.xlsx, Tab DCCR2, cell J15. Explain how KU derived a 7.4 percent Rate of Return on DSM Rate Base.

85. Refer to Exhibit_LI-4_-_LGE_Electric_DSMRC_Calculations.xlsx, Tab DCCR2, cell J15. Explain how LG&E derived a 7.36 percent Rate of Return on DSM Rate Base.

86. State whether DSM programs were integrated into any modeling performed to determine load forecast or capacity requirements.

87. Refer to the executive summary of Exhibit SAW-1 (Reserve Margin Analysis), which states, "The cost of capacity for this analysis was based on a response to the Companies' June 2022 RFP for simple-cycle combustion turbine ("SCCT") capacity and was 34% lower than the cost of SCCT capacity used in the 2021 IRP Reserve Margin Analysis. Based on the updated load forecast and after factoring in the updated cost of

SCCT capacity, the minimum reserve margin target for the summer did not change from 17%, but the minimum winter reserve margin target decreased from 26% to 24%.”

- a. Identify the specific response to the RFP being referred to.
- b. Explain the drivers behind the cost difference of 34% for the SCCT in the RFP responses versus the 2021 IRP Reserve Margin Analysis.
- c. Explain whether the cost of SCCT capacity used in the 2021 IRP Reserve Margin Analysis is the same as the cost for SCCT resources in LG&E/KU’s IRP modeling.
- d. Provide the SCCT costs in the 2021 IRP analysis, current analysis, 2022 RFP response, 2021 Reserve Margin Analysis, and 2022 RFP Reserve Margin analysis.
- e. Explain how a reduction in capacity cost led to a reduction in the reserve margin target.

88. Refer to the Reserve Margin Analysis, Table 1. Explain whether the values for the dispatchable and nondispatchable margins are inputs or outputs of the model. Specifically, explain whether the model is required to meet certain portion of the PRM with dispatchable resources.

89. Refer to workpaper FirmCapacityWinter, FirmCapacityMonthly, CapRatings, and CapMax within the PLEXOS folder of the SAW Workpapers provided as part of the Joint Application.

- a. Explain what the values in each workpaper represent and whether they were an input to the capacity expansion step of PLEXOS.

b. Confirm that LG&E/KU assumed a 0 percent firm capacity contribution from solar in winter.

c. Provide a single file with the installed, unforced, and firm capacity for each of LG&E/KU's existing and planned (or under consideration) thermal resources.

d. Explain why the energy storage resources under consideration are not included in these files and provide what their values would be in each file.

e. Explain why the NewNGCC and NewSCCT resources are assumed to have firm capacity that exceeds their MaxCap.

90. Refer to the LG&E/KU's 2021 IRP in Case No. 2021-00393.⁵ Also refer to the pending application in this case. Provide a comparison of:

a. The load forecast, prior to the inclusion of EE, and DER. Provide a workpaper including the hourly load forecast of both analyses and explain the main drivers behind any changes (identify the workpaper if a responsive workpaper has already been provided in this matter).

b. The EE forecast. Provide a workpaper including the hourly EE forecast of both analyses and explain the main drivers behind any changes (identify the workpaper if a responsive workpaper has already been provided in this matter).

c. The DER forecast. Provide a workpaper including the hourly EE forecast of both analyses and explain the main drivers behind any changes (identify the workpaper if a responsive workpaper has already been provided in this matter).

⁵ Case No. 2021-00393, *Electronic 2021 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company* (filed Oct 19, 2021), 2021 IRP.

d. Technology costs. Provide a workpaper outlining the fixed and variable O&M, and incremental capital expenditures for all existing resources, and the fixed and variable O&M and capital costs for all resources available for selection by the model (identify the workpaper if a responsive workpaper has already been provided in this matter).

e. Capacity Contribution by resource type for all new resources and by unit for existing and planned resources. Provide a list of the capacity contribution of all existing, planned, and under consideration resources and explain whether those changed between the two analyses. If yes, please explain why and provide any relevant studies (identify the workpaper if a responsive workpaper has already been provided in this matter).

f. Target Reserve Margin. Explain whether the two analyses used the same target reserve margin.

g. Coal retirement options. Explain whether and how the IRP analysis investigated economic retirement of coal units, explain any differences in how coal retirements were handled in this case as compared to the IRP for each coal unit, and explain each basis for the different treatment.

h. Fuel and commodity prices. Provide a workpaper or identify the location of a workpaper in this record, including the gas, coal, and market prices used in each analysis.

91. Refer to LG&E/KU's 2021 IRP in Case No. 2021-00393.⁶ Also refer to the pending application in this case.

a. Confirm that the IRP model did not reflect any IRA provisions, since the IRA was not enacted when the IRP was produced.

b. State whether any anticipated provisions similar to the IRA were reflected in the IRP model, and if so, identify those provisions.

c. Provide a list of all the model inputs that reflect IRA provisions in the pending application.

92. Refer to LG&E/KU's 2021 IRP in Case No. 2021-00393, page 5-39 stating that "the current environment does not support the installation of NGCC without CCS due to its CO2 emissions."⁷

a. Explain whether LG&E/KU considered NGCC units with CCS in their current analysis and reconcile this consideration with the IRP statement.

b. Explain why the analysis conducted by LG&E/KU in the 2021 IRP in Case No. 2021-00393 identified SCCTs as the sole type of new gas generation resource addition, whereas the analysis conducted in this application identified NGCC as the sole type of new gas.

93. Refer to the EPA's draft white paper on greenhouse gas emission reduction technologies, issued on April 21, 2022 and titled *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Combustion Turbine Electric Generating*

⁶ Case No. 2021-00393, *Electronic 2021 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company* (filed Oct 19, 2021), 2021 IRP.

⁷ Case No. 2021-00393, *Electronic 2021 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company* (filed Oct 19, 2021), 2021 IRP at 5-39.

Units, in which the EPA explored carbon capture and storage (CCS) as well as hydrogen blending technologies.⁸

a. Provide a timetable for when LG&E/KU expect a final version of the draft white paper to be issued.

b. State whether LG&E/KU believe the EPA will base any rulemaking on New Source Performance Standards for greenhouse gas emissions at new natural gas plants on the EPA's April 2022 white paper (or the final version of that paper), and explain each basis for LG&E/KU's belief.

c. Explain generally the process by which the EPA reviews New Source Performance Standards, including specifically when periodic reviews are required under the current framework.

d. State whether LG&E/KU believe there is a risk that the EPA's current review of New Source Performance Standards for greenhouse gas emissions at new natural gas plants could result in a CCS-based standard, and explain each basis for LG&E/KU's response.

e. Explain whether LG&E/KU's proposed NGCC units were tested against a range of potential revised greenhouse gas New Source Performance Standards for CO₂.

⁸ EPA, Office of Air Quality Planning and Standards, Sector Policies and Programs Division, *Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Combustion Turbine Electric Generating Units* (issued April 21, 2022) (last accessed Feb. 15, 2023) <https://www.epa.gov/system/files/documents/2022-04/epa_ghg-controls-for-combustion-turbine-egus_draft-april-2022.pdf>.

f. If a CCS-based standard or a standard reducing the existing 1,000 lbs./MWh by 20 to 30 percent were initiated, describe the economic impact on the proposed NGCC plants and explain each basis for LG&E/KU's response.

g. If LG&E/KU do not expect the EPA to adopt New Source Performance Standards that would require, indirectly or otherwise, CCS at new natural gas plants as part of the EPA's current review of New Source Performance Standards, explain each basis for LG&E/KU's expectation and explain whether LG&E/KU expect the EPA to adopt New Source Performance Standards that would require CCS at new natural gas plants (i.e. in 8 years, 16 years, or at some other period), and if so, when.

h. Explain whether LG&E/KU's proposal in this case is based in whole or in part on its desire to begin operating its proposed NGCC units before the EPA adopts New Source Performance Standards that would require CCS on new NGCC units.

94. Explain whether LG&E/KU accounted for the "Energy Community Bonus" of the IRA for the solar and storage resources that would replace the coal units. Specifically, explain:

a. Whether there was any communication with RFP respondents about the applicability of the provision;

b. Whether any RFP response was updated based on the inclusion of this bonus; and

c. Whether LG&E/KU included that bonus in their modeling essentially reducing the cost of solar and storage resources beyond the RFP bids. If yes, explain for which projects the bonus credit was available.

95. Explain whether energy storage was allowed to dispatch economically or followed a fixed dispatch profile in the SERVIM analysis.

96. Provide the book life and operating life used to model the new NGCC resources.

97. Indicate whether IRA tax credits of 30 percent for home battery storage were considered in assumptions around its economics leading to LG&E/KU's decision to model only distributed solar generation.

98. Provide the CO₂ emission rates for the proposed new NGCC units.

99. Provide a detailed description of the performance of LG&E/KU's thermal generation fleet during winter storm Uri and winter storm Elliott, including any unplanned outages at its coal or natural gas plants.

100. Provide the forced outage rates for each thermal generation unit in LG&E/KU's fleet over the last five years.

101. State what LG&E/KU would expect an ELCC value to be for its proposed NGCC units and explain why.

102. State whether there are any naturally occurring, utility scale carbon storage sites in the vicinity of the proposed NGCC units, and provide any written analysis of potential carbon storage sites in LG&E/KU's balancing area.

103. Explain whether there is a risk of an existing source performance standard being implemented that would require, whether directly or indirectly, that CCS be added to LG&E/KU's proposed NGCC units on or before 2050, and if so, explain LG&E/KU's position regarding the likelihood of such a standard being implemented.

104. Identify the interstate natural gas transmission pipeline that serves each of LG&E/KU's existing natural gas units and the interstate transmission pipeline that will serve each of LG&E/KU's proposed NGCC units.

105. Identify each natural gas unit that is currently located in LG&E/KU's balancing area that is operated by an entity other than LG&E/KU that serves load, identify the size of each such unit, identify the operator of each such unit, and identify the interstate transmission pipeline that serves each such unit.

106. In Excel spreadsheet format, with all formulas, columns, and rows unprotected and fully accessible, provide all workpapers not previously provided.

Nancy Vinsel for

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DATED FEB 17 2023

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