COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC 2024 INTEGRATED RESOURCE PLAN OF DUKE ENERGY KENTUCKY, INC.	))	CASE NO. 2024-00197

COMMISSION STAFF'S FIRST REQUEST FOR INFORMATION TO DUKE ENERGY KENTUCKY, INC.

Duke Energy Kentucky, Inc. (Duke Kentucky), pursuant to 807 KAR 5:001, shall file with the Commission an electronic version of the following information. The information requested is due on September 4, 2024. The Commission directs Duke Kentucky to the Commission's July 22, 2021 Order in Case No. 2020-00085[1] 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 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.

[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).

Duke Kentucky shall make timely amendment to any prior response if Duke Kentucky obtains 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 Duke Kentucky fails or refuses to furnish all or part of the requested information, Duke Kentucky 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, Duke Kentucky 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 IRP pages 4-5, Figures 1.2 and 1.3. Provide estimated capital and operations and maintenance (O&M) cost for the portfolios shown in Figures 1.2 and 1.3.

2. Refer to the IRP, pages 9. For the Optimized Portfolios on page 9, explain the exact assumptions being imposed in the "With EPA CAA Section 111 Update" scenario or not imposed in the "Without EPA CAA Section 111 Update" scenario that:

a. Would cause Duke Kentucky to model the East Bend dual fuel option (DFO) conversion by 2030 in both scenarios.

b. Would cause Duke Kentucky to model the East Bend Natural Gas Conversion by 2030 in both scenarios.

c. For both the DFO and Natural Gas Conversion of East Bend in each scenario, once the conversion is complete, explain the modeled retirement date of East Bend.

d. In the "Without EPA CAA Section 111 Update" scenario, explain the rationale for modeling the East Bend DFO conversion and the Natural Gas Conversion.

3. Refer to the IRP, pages 9–10.

a. For the carbon capture and sequestration (CCS) technology, DFO, and full gas conversion modifications of the East Bend generator on page 9 and for each alternate scenario on page 10, provide a discussion of the planning, engineering, and construction timelines including putting Duke Kentucky into reservation queues for suppliers and construction crews, leading up to when each East Bend modification is complete.

b. Assuming that "Without EPA CAA Section 111 Update" scenario ultimately proves to be true, for each potential East Bend generator modification explain how far along in the planning and construction process Duke Kentucky will have gone before it reaches the point of no return and each particular modification (CCS, DFO, and full gas conversion) is carried out.

4. Refer to IRP, pages 11–12, regarding generation technology cost projections and resource options.

a. Provide any Requests for Proposals (RFPs) and responses, if any, submitted or received by Duke Kentucky and used in determining cost projections.

b. If no RFPs were submitted, explain why.

c. Identify which resource option cost projections were based on self-build cost and which were not.

5. Refer to the IRP, page 12.

a. Provide the cost and operational characteristics for each technology resource made available to the EnCompass model in the economic optimization modeling process. Also include with the response as a separate technology/resource option, any potential resource that has been modified to accommodate CCS, DFO, or full gas conversion.

b. For the CCS, DFO, and full gas conversion resource options, provide the source of and a description of how the cost data was obtained.

6. Refer to the IRP, Figures 3.1-3.16, pages 15–25. For each Figure, provide the data in excel spreadsheet form with all cells visible and unprotected.

7. Refer to the IRP, page 16.

a. Explain in detail how the energy prices derived from the generation expansion plans for the entire Eastern Interconnect from Central Canada eastward to the Atlantic Coast, south the Florida and west to the foot of the Rockies is used to simulate PJM energy prices in Duke Energy Ohio Kentucky (DEOK) Zone.

b. Explain how the Base, High, and Low Fuel prices were obtained or derived with and without EPA CAA Section 111 updates across the entire Eastern Interconnect.

8. Refer to the IRP, page 28. Define “energy community.”

9. Refer to IRP at 33, Table 4.1.

a. State whether the Summer Capacity MW values in Table 4.1 were used by the model as maximums or fixed values.

b. Explain how the Summer Capacity MW values in Table 4.1 were determined.

10. Refer to the IRP, Table 4.1 page 33. Small modular nuclear reactors (SMRs) and carbon capture and sequestration (CCS) are not quite market ready yet. Explain whether the EnCompass model was constrained as to when a particular resource could be constructed and added to the generation portfolio. If so, explain which resources and the dates they could be included in the generation portfolio.

11. Refer to the IRP, Table 4.1 page 33 and 35.

a. Explain the basis for the summer capacity ratings for each of the resources, i.e., nameplate, unforced capacity, PJM accreditation, etc. If PJM accreditation is the basis, explain the corresponding PJM Delivery Year.

b. Provide an update to Table 4.1 to include Duke Kentucky's existing resources (listed on page 35) and showing capacity values at summer and winter peak, and at summer and winter peak on an Effective Load Carrying Capability (ELCC) basis.

c. Explain how each of the resources listed in Table 4.1 including Duke Kentucky's existing resources, are represented and evaluated in the EnCompass resource optimization/selection process and in the Portfolio analysis process.

d. For each of the potential resources offered into the EnCompass model including Duke Kentucky's existing resources, provide and explain the useful lives of the resources used in the modeling, regardless of when the resource was included in a portfolio. For example, if the useful life of a resource is 40 years that was added to a

portfolio in year 10 of the IRP study period, confirm that 40 years would be used and not a lesser amount so as to skew the production cost analysis.

12. Refer to the IRP, Table 4.1 page 33 and 37.

a. Explain why a 100 MW nameplate 4-hour Lithium-Ion battery is only credited with 16 MW at summer peak but has a 2025/2026 BRA ELCC Class Rating of 59 percent.

b. Explain whether the 4-hour Lithium-Ion battery was modeled as being able to provide capacity, energy, and ancillary services in order to realize its full potential relative to other potential resources.

13. Refer to the IRP, page 37. Explain the extent to which Duke Kentucky has studied the feasibility of installing CCS at East Bend.

14. Refer to the IRP, page 39. Explain whether has conducted or is aware of wind studies showing that there is sufficient and sustained wind within the Duke Energy Ohio Kentucky (DEOK) PJM Load Zone to justify constructing wind generation.

15. Refer to the IRP, Table 4.1 page 33 and 6.3 page 44.

a. Explain the differences between Solar + Storage: Solar and Solar + Storage: Battery.

b. Provide cost and operational characteristics of these two resource mixes and compare them to all the other potential resources made available to the EnCompass model.

16. Refer to IRP, pages 43-49, Tables 6.1 to 6.17. Provide estimated capital and operations and maintenance (O&M) cost for each of the portfolios displayed in Tables 6.1 through 6.17.

17. Refer to the IRP, Tables 6.1-6.17 pages 43-49. For each of the tables, provide the requirements of the Clean Air Act (CAA) Section 111 which are being applied to the optimization, how each portfolio satisfies specific applicable CAA Section 111 requirements, both with and without respectively, over the portfolio planning horizon.

18. Refer to the IRP, Figures 6.1-6.4, pages 49–51. Provide the data represented by each of the figures (including the data used to calculate the percentages) in excel format with all cells visible and unprotected.

19. Refer to the IRP, Figures 6.5-6.8, pages 51–53. Provide the data supporting each of the figures (including the data used to calculate the percentages) in excel format with all cells visible and unprotected.

20. Refer to the IRP, Figures 6.9-6.12, pages 53–55.

a. Provide the data supporting each of the figures (including the data used to calculate the percentages) in excel format with all cells visible and unprotected.

b. Refer also to the IRP, page 16. Explain whether the PJM prices used to obtain prices within the DEOK PJM Load Zone reflect the assumptions used to run each of the scenarios determining energy market purchases.

c. If the answer to part b. is in the affirmative, explain how Duke Kentucky modeled the various EPA Section 111 compliance strategies in entire Eastern Interconnect to determine energy prices in the DEOK PJM Load Zone in order to ensure the consistent application of modeling assumptions.

21. Refer to IRP, page 57 regarding sensitivity analysis. Explain why decrease to load forecast was not included as a sensitivity.

22. Refer to the IRP, Figure 7.1, page 61.

a. Explain the timeline for East Bend to be converted to DFO.

b. Refer also to Figure 6.10, page 54. Explain whether Duke Kentucky market energy purchases in Figure 6.10 takes into account the DFO conversion of East Bend by December 31, 2029, as shown in Figure 7.1.

23. Refer to the IRP, Figure 7.1, page 61.

a. Confirm that the portfolio represented by Figure 7.1 is the preferred plan.

b. Explain how the cost of this portfolio compares to the portfolios discussed and highlighted in Section 6.

c. Explain how Duke Kentucky chose this portfolio as its preferred portfolio as opposed to the portfolios evaluated in Section 6.

d. Refer also to Appendix H, Table H.3, page 153. Explain whether the table is based upon the portfolio in Figure 7.1 and how the two relate to each other. Include in the response, for Table H.3 break out the generation resources so make the comparison between Figure 7.1 and Table H.3 more apparent.

24. Refer to Duke Kentucky's 2024 Integrated Resource Plan (IRP), page 63, regarding the effects of Kentucky Senate Bills 4 and 349 and page 61, Figure 7.1.

a. State how much lead time Duke Kentucky needs from filing of notice with the Commission under Senate Bill 349 to completion of projects included in the preferred portfolios and provide an estimated timeline.

b. State whether this lead time was factored into the timing of modeling of new generation construction or conversion generation resources.

c. State what PJM interconnection queue lead time was factored into the timing of modeling of new generation construction or conversion generation resources and explain how that lead time was determined.

d. State whether the 50 MW of solar to be added in 2029 is intended to reflect power purchase agreements, purchase of existing or planned facilities, or self-built facilities.

25. Refer to the IRP, page 74.

a. Provide PJM Base Residual Auction (BRA) clearing prices from the 2021/2022 through the 2024/2025 planning years in the DEOK PJM load Zone and in adjacent Load Zones.

b. Explain possible reasons for the differences in capacity prices.

c. Provide monthly average Locational Marginal Prices (LMPs) for the DEOK PJM Load Zone and in adjacent Load Zones and explain the extent to which and why Duke Kentucky might be subject to zonal pricing risk.

d. Explain if high BRA market clearing prices encourage the construction of transmission lines as well as generation resources.

e. Explain whether within a PJM Load Zone, the market clearing energy price is the same throughout the load zone and any differences in LMPs are the result of congestion and line loss.

26. Refer to the IRP, page 73. Duke Kentucky states, “These projects include studies of customer satisfaction, appliance saturation studies, end-use, and competition (to monitor customer switching percentages in order to forecast future utility load); and

related marketing research projects." Describe the nature of the competition Duke Kentucky faces and which customer classes are switching sources of energy.

27. Refer to the IRP, page 74. Provide a copy of Itron, Inc.'s statistically adjusted end-use (SAE) methodology and an explanation of how variables incorporating weather and energy efficiency are derived.

28. Refer to the IRP, page 74.

a. Explain whether the use of the 30-year window versus the use of a 10-year window could cause an understatement of forecast peak demand.

b. Provide a graph illustrating the volatility differences between 10-year and 30-year weather windows.

29. Refer to the IRP, Tables B.10 and B.11, pages 85–86. Confirm that the energy forecasts are presented in megawatt hours (MWh)

30. Refer to the IRP, Tables B.12-B.15, pages 88–90.

a. Explain the significant decrease in load forecast for 2024 (summer and winter) and for 2025 (winter).

b. Refer also to the IRP, Table H.3, page 153. Table H.3 does not match Tables B.12-B.15. Explain the basis for the peak load forecast presented in Table H.3 and explain any differences between Table H.3 and its corresponding table on pages 88–90.

31. Refer to the IRP, Table B.15, page 90 and Table B.17, page 92. Explain the slight differences between the tables.

32. Refer to the IRP, Table B.19.

a. Confirm that the data presented represents Duke Kentucky's summer energy and peak load forecasts.

b. Explain whether the data presented is before or after demand response (DR) and which other table(s) do the data correspond.

33. Refer to the IRP, Appendix C, page 101. Explain whether customers with behind the meter generation are eligible for DSM programs.

34. Refer to the IRP, Appendix C, page 101. Explain the historical and forecast budgets supporting the level of DSM included in the load forecast.

35. Refer to the IRP, Appendix C, page 101.

a. For each of the DSM programs listed, explain whether the specific budget allocated to the program and or the number of participating customers has been reached in in 2023 and year to date 2024.

b. For the purposes of load forecasting, explain whether each program was assumed to be fully subscribed and, if so, provide the maximum level of energy and capacity savings included in the forecasts.

36. Refer to the IRP, Appendix C, pages 106–110. Explain whether Duke Kentucky has examined the differences in potential Low-Income Services program need and participation for the poverty groups that are between 100 percent below the federal poverty level up to the federal poverty level, and the group that falls between 100 percent and 200 percent below the federal poverty level.

37. Refer to the IRP, Appendix C, pages 106-110 and pages 116–117.

a. Explain the extent to which Duke Kentucky works with non-profit groups, such as Habitat for Humanity, or any other housing construction/renovation group to enhance the energy efficiency of the housing and appliances.

b. For the Low-Income Neighborhood Program, in instances where the "at least 50 percent of the households at or below 200 percent of the federal poverty guidelines" threshold is almost (but not quite) met within a given geographic boundary, explain what actions, if any, Duke Kentucky takes to assist households in that area.

c. For the Low-Income Neighborhood Program, explain whether there is a minimum number of household structures necessary to define a neighborhood or if Duke Kentucky will gerrymander street boundaries to create a neighborhood that fits the poverty threshold.

38. Refer to the IRP, Appendix C, page 108. Explain what Tier 2 services are included in the program that are in addition to Tier 1 services.

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DATED AUG 13 2024

cc: Parties of Record

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