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 CONVENIENCE AND NECESSITY AND APPROVAL OF A DEMAND SIDE MANAGEMENT PLAN AND APPROVAL OF FOSSIL FUEL-FIRED GENERATING UNIT RETIREMENTS	**)** **)** **)** **)** **)** **)** **)** **)**	**CASE NO. 2022-00402**

RESPONSE OF
KENTUCKY UTILITIES COMPANY
AND
LOUISVILLE GAS AND ELECTRIC COMPANY
TO
JOINT THIRD DATA REQUESTS OF THE ATTORNEY GENERAL AND KENTUCKY INDUSTRIAL UTILITY CUSTOMERS, INC.
DATED MAY 31, 2023

FILED: JUNE 9, 2023

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Lonnie E. Bellar**, being duly sworn, deposes and says that he is Chief Operating Officer for Louisville Gas and Electric Company and Kentucky Utilities Company and an employee of 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.

Lonnie E. Bellar

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 7th day of June 2023.

Notary Public

Notary Public ID No. KYNP61560

My Commission Expires:

November 9, 2026

TAMMY J. ELZY
COMM EXPIRES 11/09/2026
NOTARY PUBLIC
ID # KYNP61560
STATE AT LARGE, KENTUCKY

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **John Bevington**, being duly sworn, deposes and says that he is Director – Business and Economic Development for LG&E and KU Services Company, 220 West Main Street, Louisville, KY, 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.

John Bevington

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 8th day of June 2023.

TAMMY J. ELZY
COMM EXPIRES 11/09/2026
NOTARY PUBLIC
ID # KYNP61560
STATE AT LARGE, KENTUCKY

Notary Public

Notary Public ID No. KYNP61560

My Commission Expires:

November 9, 2026

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Robert M. Conroy**, being duly sworn, deposes and says that he is Vice President, State Regulation and Rates, for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of 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.

Robert M. Conroy

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 7th day of June 2023.

Notary Public

Notary Public ID No. KYNP61560

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November 9, 2026

TAMMY J. ELZY
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ID # KYNP61560
STATE AT LARGE, KENTUCKY

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Philip A. Imber**, being duly sworn, deposes and says that he is Director – Environmental and Federal Regulatory Compliance 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.

Philip A. Imber

Philip A. Imber

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 7th day of June 2023.

TAMMY J. ELZY
COMM EXPIRES 11/09/2026
NOTARY PUBLIC
ID # KYNP61560
STATE AT LARGE, KENTUCKY

Tammy J. Elzy

Notary Public

Notary Public ID No. KYNP61560

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COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **David S. Sinclair**, being duly sworn, deposes and says that he is Vice President, Energy Supply and Analysis for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of 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.

David S. Sinclair

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 7th day of June 2023.

Notary Public

Notary Public ID No. KYNP61560

My Commission Expires:

November 9, 2026

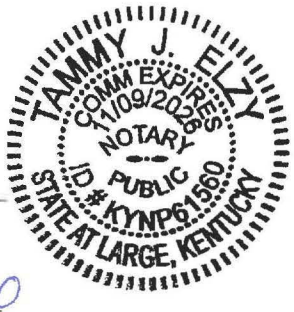
VERIFICATION

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 7th day of June 2023.



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KENTUCKY UTILITIES COMPANY
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Response to Joint Third Data Requests of the Attorney General and Kentucky Industrial Utility Customers, Inc.
Dated May 31, 2023

Case No. 2022-00402

Question No. 1

Responding Witness: Lonnie E. Bellar

Q-1. Refer to the response to AG-DR-1-24 regarding the potential relocation of the Brown 3 SCR to the Mill Creek 2. The response indicates that the Brown 3 SCR is sized for 455 mW, while Mill Creek 2 is a 355 mW unit.

a. Indicate whether the Brown 3 SCR could be reconfigured for Mill Creek 2.

b. If the response to part (a) of this question is "yes," then provide the estimated cost and an estimated schedule that would allow Brown 3 to continue to operate during the "key years of GNP compliance," then retired and the SCR relocated to Mill Creek 2.

A-1. The Companies assume the reference should be to AG-DR-2-24.

a. The Brown 3 SCR could be reconfigured for Mill Creek 2. As indicated in the Companies' response to AG 2-24, at a minimum, the resulting difference in megawatt ratings would require a redesign of the Brown Unit 3 SCR based on a new Computational Fluid Dynamics model utilizing Mill Creek Unit 2 design parameters. In addition to redesigning the SCR itself, new foundations, support steel, and ancillary equipment would be required due to site-specific constraints between the two locations.

b. The Companies have not evaluated this option and are therefore unable to provide the requested cost estimate and schedule. Based on experience, the cost to decommission, transport, store, modify, and then reconstruct is likely to cost more than building a new SCR specifically designed for Mill Creek 2.

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Question No. 2

Responding Witness: Philip A. Imber / Stuart A. Wilson

Q-2. Refer to the response to AG-DR-2-4 at 5 where in the last paragraph of the response, the Companies refer to a "shortage of allowances" that supports the "retirement or idling of non-SCR units."

a. Describe what is meant by the term "idling" of the non-SCR units and in what circumstances, under what conditions, and for what time period, the Companies could "idle" non-SCR units, e.g., idling Mill Creek 2 until Brown 3 is retired, then relocating the Brown 3 SCR to Mill Creek 2.

b. Provide a copy of all "idling" analyses and results the Companies have performed, including all assumptions, data, calculations, and electronic workbooks in live format with all formulas intact. If the Companies have not done any such analyses, then explain why they have not done so.

A-2.

a. Because the Good Neighbor Plan is applicable to ozone season (May through September) NO_x emissions, one option for compliance would be "idling" (i.e., not operating) non-SCR units during the ozone season, but keeping them in service for operation during the non-ozone season only. Regarding the feasibility of actually relocating the Brown 3 SCR to Mill Creek 2, see the response to Question No. 1.

b. The Companies evaluated operating non-SCR units only in the non-ozone season as part of select portfolios in Section 4.5 of the 2022 Resource Assessment in Exhibit SAW-1 and the 2023 Fossil Fuel-Fired Electric Generating Unit Retirement Assessment in Exhibit SB4-1. Supporting documentation for the respective analyses is available in Exhibit SAW-2 and Exhibit SB4-2.

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Question No. 3

Responding Witness: Philip A. Imber / Stuart A. Wilson

Q-3. Refer to the response to AG-DR-2-4 at 3 where the Companies state:

> "Assuming no investment in SCR controls and no implementation of NGCC in 2027 and 2028 as proposed in the CPCN, modeling for the proposed Good Neighbor Plan depicted a reliance on the allocation market as early as 2026. With the same operational assumptions, the final Good Neighbor Plan depicts a reliance on the allocation market as early as 2027. As a result, the final Good Neighbor plan does not change the timeline for the need to transition to lower emitting generating sources and therefore does not change the 2022 Resource Assessment."

a. Explain why the changes in the final GNP compared to the proposed GNP do not result in a delay of one year for the retirements of Brown 3, Mill Creek 2, and Ghent 2 and replacement of the retired capacity with the proposed new NGCC capacity, all else equal.

A-3.

a. The GNP has no effect on the retirement date of Brown 3. See, e.g., Section 1.1 of Exhibit SAW-1 ("*Although unaffected by the Good Neighbor Plan*, the 412 MW Brown Unit 3 … is the Companies' coal unit with the highest operating costs and will require a $26 million overhaul in 2027 to operate safely beyond 2028" (emphasis added).).

Regarding Mill Creek 2 and Ghent 2, see pages 2-5 of the Direct Testimony of Philip A. Imber and Section 4.1.1 of Exhibit SAW-1. Mr. Imber's testimony stated that the proposed Good Neighbor Plan "would effectively require non-SCR-equipped coal units to cease operating, or operate only at very minimal levels, during each year's ozone season beginning in 2026."[1]

[1] Imber at 4 lines 6-8.

Consistent with Mr. Imber's conclusion about the proposed Good Neighbor Plan, Section 4.1.1 of Exhibit SAW-1 states:

> As proposed, the Good Neighbor Plan effectively requires installing SCR to operate Mill Creek 2 and Ghent 2 during the ozone season (May through September) beginning in 2026. But because replacement generation may not be available by 2026, the Companies have asked the EPA to extend the compliance deadline in the event that retiring and replacing a resource is lower cost than physical compliance with SCR. To achieve Good Neighbor Plan compliance, the Companies *assumed* in the Resource Assessment that non-SCR-equipped coal units could not operate during the ozone season beginning in 2026 unless the units were scheduled to be replaced. *Specifically, the Companies assumed they could avoid the cost of installing SCR in 2026 if the non-SCR-equipped unit was replaced by the 2028 ozone season.*[2]

In other words, the Companies' resource modeling of the proposed Good Neighbor Plan *assumed* that the final rule would relax its strictures sufficiently to allow the Companies to rely on the allocation market beginning in 2026 to allow for ozone season operation of non-SCR units in 2026 and 2027, with replacement of those units needed before the 2028 ozone season. Again, what the Companies modeled before the issuance of the final Good Neighbor Plan was a relaxation of the terms of the proposed Good Neighbor Plan, *not the full strictures of the Good Neighbor Plan as proposed*. Therefore, although the final Good Neighbor Plan does include somewhat relaxed compliance requirements relative to the proposed rule, *the Companies' original resource modeling had already assumed much of the eventual relaxation*. That is why the final Good Neighbor Plan does not extend the timeline of the Companies' CPCN requests in this proceeding; rather, the final rule makes it clear that the Companies will have to rely on the allocation market beginning in 2027 absent installing the proposed NGCCs in 2027 and 2028, making it imperative to have replacement generation installed prior to the 2027 and 2028 ozone seasons.

The Companies would also note that the Sixth Circuit's recent administrative stay of the EPA's denial of Kentucky's State Implementation Plan ("SIP") relevant to the GNP and its applicability to Kentucky should have no effect on this proceeding.[3] Litigation over the GNP could easily extend into the latter months of 2024; if challenges to the rule are unsuccessful, there is no reason to expect any extension or relaxation of GNP compliance deadlines,

[2] Exhibit SAW-1 at 18 (emphases added).
[3] *Commonwealth of Kentucky v. EPA*, Case No. 23-3216, Order (6th Cir. May 31, 2023), available at https://www.ag.ky.gov/Press%20Release%20Attachments/DN%2028%20Administrative%20Stay.pdf.

making it too late to achieve compliance if the Companies' requested CPCN gets delayed. Such an assumption is imprudent. The result would be great uncertainty and unacceptable risk regarding the Companies' ability to maintain low-cost, reliable service, particularly during ozone seasons (i.e., summers) beginning in 2027.

Moreover, it is far from certain that success in reversing EPA's denial of the state's SIP or challenging provisions of the GNP itself would result in a substantively different outcome in the magnitude and timing of required NO_x emissions reductions. Under the Clean Air Act, the EPA promulgates the National Ambient Air Quality Standards ("NAAQS"). One of the NAAQS is the 2015 8-Hour Ozone NAAQS, which is 70 parts per billion (ppb). Effective August 3, 2018, certain areas of the country, including parts of Connecticut and Kentucky, were designated moderate non-attainment areas regarding the 2015 8-Hour Ozone NAAQS.[4] For each non-attainment area classified under CAA section 181(a) for the 2015 ozone NAAQS, the attainment date is "as expeditiously as practicable" but no later than the date provided in Table 1 to 40 CFR 51.1303(a).[5] Applying the compliance timelines in the cited table to the 2018 non-attainment determinations under the 2015 8-Hour Ozone NAAQS, the latest permissible attainment dates are 2021 for marginal areas, 2024 for moderate areas, and 2027 for serious areas. EPA determined it is not possible to implement all necessary emissions controls for the moderate area attainment date.[6] Therefore, EPA aligned the GNP provisions with 2026, the last full ozone season that precedes the 2027 serious area attainment date.

In addition to local attainment obligations, the Clean Air Act obligates upwind states (including Kentucky vis-à-vis Connecticut) to reduce emissions so they are not significant contributors to non-attainment in downwind states. Today, modeling indicates that Kentucky's NO_x emissions contribute to ozone non-attainment in Connecticut at a level between 0.7 and 1 ppb. At the time Kentucky promulgated its SIP regarding the 2015 8-Hour Ozone NAAQS, EPA's guidance was that significant contribution required a level above 1 ppb; EPA has since revised its position such that any contribution to non-attainment above 1% of the NAAQS (i.e., greater than 0.7 ppb for the 2015 8-Hour Ozone NAAQS) is a significant contribution that the upwind state must address.

EPA has broad authority to define the level of significant contribution. Thus, even if Kentucky succeeds in reversing EPA's denial of Kentucky's SIP or

[4] 83 Fed. Reg. 25,794 (June 4, 2018), available at https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf.
[5] Available at https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-51/subpart-CC/section-51.1303.
[6] 88 Fed. Reg. 36,654 (June 5, 2023).

otherwise challenging the GNP, it will still likely have to submit a new SIP that includes sufficient NO_x reductions to meet its obligations in accordance with the applicable statutory timeline. Therefore, the outcome of those legal challenges is unlikely to have any effect on the generation decisions at issue in this proceeding.

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Question No. 4

Responding Witness: Stuart A. Wilson

Q-4. Refer to the Companies' Application in the SB 4 Proceeding at paragraph 12. Describe in detail how the Companies' proposed owned solar generation maintains or improves the reliability of the Companies' system compared to the retired electric generating units consistent with the sections of SB 4 cited in this paragraph of the application. Specifically address how the proposed owned solar generation allows the Companies to "safely deliver electric energy in the quantity, with the quality, and at a time that the utility customers demand" on an intermittent basis compared to the retired electric generating units on an around the clock basis regardless of weather and/or sun/daylight conditions.

A-4. See Exhibit SB4-1, Section 3.2.2 and Portfolios 5 and 6 in Table 5 for the reliability impact of adding owned solar generation to the Companies' generation portfolio. Adding owned solar reduces summer and full-year LOLE. Note that the Companies' SERVM modeling accounts for 49 different weather years and accurately models solar facilities' availability. See also Table 7 on page 18 of Exhibit SB4-1, which shows that adding owned solar increases the Companies' summer reserve margin.

The ability to "safely deliver electric energy in the quantity, with quality, and at the time that the utility customers demand" is a function of the portfolio of generation assets and their combined performance capability and not the capability of any one particular generation asset. That is why the Companies' existing generation portfolio has numerous generation technologies and why the Companies are proposing a portfolio that would have a similar range of generation technologies. The Companies are not proposing that future reliability depends on the two owned solar projects in this case that have a combined nameplate capacity of 240 MW however, as demonstrated in Table 5, their addition to the portfolio improves overall system reliability, especially in the summer.

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Question No. 5

Responding Witness: David S. Sinclair

Q-5. Provide a copy of all internal documents, including operating and/or planning procedures, manuals, and guidelines that address the concept that owned solar resources are "dispatchable" resources as opposed to intermittent resources that are dependent on weather and/or sun/daylight conditions.

A-5. No responsive internal documents exist. However, from the transmission perspective, sections 30.5 and 33.2 of the Companies' Open Access Transmission Tariff ("OATT") address how solar generators might be instructed to reduce their output to mitigate constraints or to meet overall generation output needs for the system. See also the response to Question No. 9, which addresses solar resources' dispatchability.

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Question No. 6

Responding Witness: Lonnie E. Bellar

Q-6. Refer to the Companies' Application in the SB 4 Proceeding at paragraph 13 wherein it states:

> "Senate Bill 4 defines resilience as "having the ability to quickly and effectively respond to and recover from events that compromise grid reliability."[16] Each of the Companies' two proposed NGCC units will have startup times, ramp rates, and a dispatchable capacity range better than each of the Affected Units.[17] Brown BESS will also have the ability, when charged, to respond instantaneously to events that might compromise grid reliability, and the Companies-owned solar facilities will also add to system resilience."

a. Confirm that the Companies' proposed owned solar resources will not "have startup times, ramp rates, and a dispatchable capacity range better than each of the Affected Units." If denied, then provide a detailed explanation and all support relied on for your response.

b. Explain in detail how the Companies' proposed owned solar resources "will add to system resilience," specifically, how the resources will improve the "ability to quickly and effectively respond to and recover from events that compromise grid reliability."

A-6.

a. Not confirmed. Because solar generation is inverter based, its startup time and ramp rate is almost instantaneous with changes in solar irradiance, but unlike the solar PPAs, the Companies will have the opportunity to curtail or re-dispatch these assets when they are able to produce energy. Each owned solar facility's dispatchable range is less than that of each retiring coal-fired unit due to the nameplate capacity of each owned solar facility.

b. See the response to Question No. 4. When they are able to produce energy, owned solar facilities will add to system resilience by providing energy even if fossil fuel sources or supplies are compromised. Adding portfolio diversity improves system resilience by reducing reliance on a single fuel source or type.

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Question No. 7

Responding Witness: David S. Sinclair / Stuart A. Wilson

Q-7. Reference the response to PSC-DR-1-25. Confirm that the Companies' proposed solar generation facilities are not intended to represent capacity additions.

A-7. As indicated in the response to PSC 1-25, the Companies' proposed solar resources are intended to help hedge future natural gas price volatility and reduce exposure to possible future CO_2 emissions regulations. Their primary economic value is not their expected contribution to summer peak.

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Question No. 8

Responding Witness: Lonnie E. Bellar / Stuart A. Wilson

Q-8. Refer to Ex. SAW-1 in the CPCN proceeding at 24 and Joint Application in the SB 4 proceeding at 5.

a. Because the Companies will not have dispatch control over the referenced solar PPAs, would those PPAs be barred by SB 4?

b. Are the referenced solar PPAs intended to replace the generating units proposed to be retired in the SB 4 proceeding?

c. If the answer to subpart b., above, is "no," are the referenced solar PPAs intended to be non-replacement (supplemental) resources?

A-8.

a. SB4 does not "bar" entering into solar PPAs. The Companies' SB4 application and supporting testimony and exhibits are clear that solar PPAs are not dispatchable and therefore do not constitute "new electric generating capacity" that meets the requirements of SB4 Section 2(2)(a). The solar PPAs are intended to help hedge future natural gas price volatility and reduce exposure to possible future CO_2 emissions regulations.

b. No.

c. Yes. See the response to part (a).

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Question No. 9

Responding Witness: David S. Sinclair

Q-9. Reference the docket in LG&E-KU's 2021 IRP, Case No. 2021-00393, Vol. 3.

a. Confirm that in § 2.1 ("Dispatchable Resources"), photovoltaic solar is not identified as a dispatchable resource.

b. Conform that in § 2.2 ("Non-Dispatchable Resources"), photovoltaic solar is identified as a non-dispatchable resource.

A-9. There are multiple documents in Volume 3 of the Companies' 2021 IRP filing. The Companies assume this request refers to the 2021 IRP Resource Screening Analysis.

a. & b. Confirmed. Note that the cited document does not define the term "dispatchable." The Companies' categorization in the cited document attempted to reflect the intermittent nature of solar and wind resources, which the Companies do not dispute, but it was imprecise regarding Companies-owned solar resources. A more precise category into which to place Companies-owned solar resources would have been "Dispatchable Intermittent Resources"; a more precise category into which to place solar PPA resources would have been "Non-Dispatchable Intermittent Resources."

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Question No. 10

Responding Witness: Lonnie E. Bellar

Q-10. Reference the response to AG-DR-1-49, in which the Companies discussed, inter alia, that the proposed dispatchable NGCC units will provide load-following capability. Confirm that the Companies' proposed solar facilities (both owned and procured via PPA) will not provide load-following capability.

A-10. The solar PPAs will not provide load-following capabilities, but the Companies will have the opportunity to curtail or re-dispatch the owned solar assets when they are able to produce energy.

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Question No. 11

Responding Witness: David S. Sinclair

Q-11. Explain whether the Companies agree that the dispatch rate for the company-owned solar facilities would be commensurate with established solar irradiance and capacity factors applicable to the Companies' service territories, but could never exceed those capacity factors.

A-11. See the response to PSC 4-9. Capacity factor is a calculated value based on actual energy output over a specified timeframe. Solar capacity factors will vary based on actual irradiance levels and could be higher or lower than forecast.

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Question No. 12

Responding Witness: Lonnie E. Bellar / David S. Sinclair

Q-12. Identify and describe all additional equipment and computer technology together with the costs thereof that will allow the Companies to curtail the generation from the proposed owned solar resources. In addition, indicate whether this additional cost is included in the Companies' economic analyses of these resources.

A-12. Solar inverter technology has been capable of responding to curtailment requests for a number of years, as demonstrated in a California ISO report from 2017.[7] The California ISO noted that "…new solar and wind resources are able, both technologically and contractually, to respond to oversupply conditions by reducing their production output. On March 11, 2017, the ISO observed solar curtailment exceeding 30 percent of the solar production for an hour." While the technology exists to curtail solar output, and the Companies will have real time access to solar resource data, the amount of solar energy entering the Companies' system is expected to remain small enough that curtailing solar output should not be needed at this time.

[7] https://www.caiso.com/documents/curtailmentfastfacts.pdf

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Question No. 13

Responding Witness: David S. Sinclair

Q-13. Identify and describe in detail each and every circumstance when the Companies would intentionally curtail the generation from the proposed owned solar resources.

A-13. At currently proposed levels of solar generation, both owned and PPAs, the Companies do not anticipate having to curtail solar output. Given that the marginal generation cost of owned solar is $0/MWh (marginal cost is negative for the 10-year duration of the IRA's production tax credit), it would likely be the last resource that generation dispatch would curtail under normal operating conditions. However, as demonstrated on a regular basis in the California ISO, solar generation can be and is curtailed. See the response to Question No. 12.

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Question No. 14

Responding Witness: Stuart A. Wilson

Q-14. Confirm that the Companies' proposed BESS is not economic when compared to two portfolios equivalent in all respects, except that in one portfolio the BESS is included and in the other portfolio the BESS is not included. If denied, then provide a copy of all studies and analyses relied on for your response.

A-14. Confirmed. The proposed BESS is not economic as modeled. As stated in 4.6.2 of Exhibit SAW-1, the primary benefit of Brown BESS would be to provide the Companies valuable operational experience with a technology at utility scale that will be vital to integrating large amounts of renewable generation reliably in the future. The Companies also noted that Brown BESS might provide quantifiable benefits that could provide savings that were not included in the Companies' analysis, such as reducing wear and tear on SCCT and NGCC units and allowing the Companies to carry lower amounts of spinning reserves. Also, the Brown BESS will increase the reliability and resilience of the Companies' resource portfolio. See, e.g., Table 5 of Exhibit SB4-1.

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Question No. 15

Responding Witness: Lonnie E. Bellar / Stuart A. Wilson

Q-15. Refer to the Companies' application in the SB 4 Proceeding at paragraph 16 wherein it states: "The Companies' proposal to retire the Affected Units does not result from any financial incentives or benefits offered by any federal agency; rather, it is to ensure safe and reliable service at the lowest reasonable cost in compliance with applicable law and consistent with reserve margin requirements."

a. Confirm that the Companies' economic analyses to retire the Affected Units and replace the Affected Units with the proposed owned solar resources does, in fact, reflect financial incentives in the form of tax benefits offered by the federal government set forth in the Inflation Reduction Act ("IRA") that effectively reduce the cost of such resources.

b. Indicate whether the Companies have performed economic analyses that do not reflect these financial incentives in the form of tax benefits pursuant to the IRA. If so, describe the changes, if any, to the Companies' proposed new resources (selection, size, and timing) and the comparative CPVRR of the proposed portfolio if such financial incentives were not available. If not, then explain why the Companies did not perform such analyses in response to SB 4 requirement addressed in the Companies' application at paragraph 16.

A-15.

a. Not confirmed as stated. It is true that the Companies' total proposed CPCN-DSM resource portfolio includes solar and battery resources for which the IRA provides certain tax benefits. But as shown in Table 8 on page 20 of Exhibit SB4-1, the Companies project significant PVRR savings (ranging from $36 million to $3.6 billion) would result from retiring the Affected Units and adding only the two proposed NGCC units.[8] Therefore, the decision to

[8] $36 million is the sum of incremental PVRR values for Portfolio 5 in the High Gas, Low CTG fuel price scenario; $3.6 billion is the sum of these values in the High Gas, Current CTG fuel price scenario.

retire the Affected Units does not result in any way from any financial incentives or benefits offered by any federal agency; that decision would be the same regardless of financial incentives or benefits, which is the only inquiry relevant to SB4 Section 2(2)(c).

b. See the response to part (a).

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Question No. 16

Responding Witness: Lonnie E. Bellar

Q-16. Refer to the Companies' application in the SB 4 proceeding at paragraph 17. Confirm that "all known direct and indirect costs of retiring the electric generating unit" do not include the remaining undepreciated net book value of each of the Affected Units at the date of retirement because these costs are not incremental and will be recovered from customers either through the Companies' Retired Asset Recovery Riders ("RARR") or base revenues.

A-16. Confirmed. Because the Companies would recover the remaining undepreciated net book value of each of the Affected Units regardless of whether each Affected Unit retires, those amounts are not direct or indirect costs of retiring the Affected Units. That notwithstanding, the Companies' PVRR calculations included the cost of undepreciated capital in all scenarios. The PVRR associated with undepreciated capital is the same in all scenarios and has no effect on the costs of unit retirements.

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Question No. 17

Responding Witness: Lonnie E. Bellar

Q-17. Explain whether the gas-fired units the Companies propose to retire (Haefling Units 1 and 2, and Paddy's Run 12) will have any stranded costs due to undepreciated expense.

a. Confirm that several years ago, the Companies either replaced or upgraded the gas supply line for at least one of the Paddy's Run units. In your response, explain also: (i) whether any other improvements or upgrades were made to these units, and if so, (ii) whether those improvements extended the unit's operable lifespans.

b. Explain the differences between Paddy's Run Unit 12 and Paddy's Run Unit 13.

c. Provide the expected remaining lifespan of Paddy's Run Unit 13.

d. Explain whether the retirement and demolition of Paddy's Run Unit 12 will in any manner affect the remaining lifespan of Paddy's Run Unit 13.

e. Confirm that Units 12 and 13 are the only remaining generating units at Paddy's Run Station.

f. Given that Paddy's Run Unit 11 (retired and mothballed in 2021) had black start functionality, explain whether either or both of Units 12 and 13 have that same functionality.

A-17. The Companies do not expect any material unrecovered costs due to undepreciated expenses of Haefling 1-2 or Paddy's Run 12.

a. Confirmed. In 2016, the Companies constructed a gas supply line connecting the Paddy's Run Station to Texas Gas to support winter operation of Paddy's Run CTs, primarily Paddy's Run 13. No upgrades to Paddy's Run 11, 12, or 13 were made as a part of that project.

b. Paddy's Run 12 is a small-frame combustion turbine commissioned in 1968, with a maximum summer capacity of 23 MW and an average summer heat rate of approximately 17,700 Btu/kWh at maximum load. Paddy's Run 13 is a large-frame combustion turbine commissioned in 2001, with a maximum summer capacity of 147 MW and an average summer heat rate of approximately 10,800 Btu/kWh at maximum load. Paddy's Run 13 is newer, larger, more efficient, more reliable, and able to follow load more effectively than Paddy's Run 12.

c. Based on its 40-year book life as indicated in the most recent depreciation study, Paddy's Run 13 would have an expected lifespan extending to 2041. However, the unit's remaining lifespan may differ from its book life.

d. The retirement and demolition of Paddy's Run 12 has no impact on the remaining lifespan of Paddy's Run 13.

e. Confirmed.

f. Neither Paddy's Run 12 nor Paddy's Run 13 has black start functionality.

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Question No. 18

Responding Witness: Lonnie E. Bellar / Robert M. Conroy

Q-18. Paragraph 5.3 of the Stipulation in Case Nos. 2020-00349 and 2020-00350 addresses the potential retirements of Mill Creek 1 and 2 and Brown 3 and the recovery of the remaining undepreciated net book value through RARRs. It states:

> "The Parties agree that the Utilities remain responsible for retirement decisions regarding electric plant, and in particular regarding electric generating units and stations. Also, the Parties recognize that using depreciation rates as agreed in this Stipulation for Mill Creek Unit 1, Mill Creek Unit 2, and E.W. Brown Unit 3 could result in significant remaining net book value and uncollected decommissioning costs for these generating assets retired after the date of this Stipulation. Therefore, the Utilities shall be authorized to recover the Retirement Costs of such retired assets and other site-related assets that will not continue in use through a Retired Asset Recovery Rider (attached hereto as Stipulation Exhibits 8 (KU) and 9 (LG&E)) until the Retirement Costs are fully recovered. "Retirement Costs" include the net book value, materials and supplies that cannot be used economically at other plants owned by the Utilities, and decommissioning or removal costs and salvage credits, net of related accumulated deferred income tax ("ADIT"). Related ADIT shall include the tax benefits from tax losses. (A) The Retirement Costs exclusive of ADIT are to be recorded as regulatory assets. The Retirement Costs inclusive of ADIT shall be recovered on a levelized basis, including a weighted average cost of capital carrying cost using the most recently approved base rate return on equity. The recovery period for each retired generating unit shall be ten years from the retirement date of the unit. (B) The Retired Asset Recovery Rider will include a credit for the depreciation expense and rate of return component for each retired unit embedded in base rates at that time."

a. Confirm that the Companies agree that the RARR should apply to all retired generating units, including the Affected Units at issue in this proceeding, as well as other units that may be addressed in future SB 4 proceedings.

b. Confirm that the Companies do not oppose a clarification by the Commission in this proceeding to avoid any unintentional ambiguity that the RARR is applicable to all retired generating units and is not limited to Mill Creek 1 and 2 and Brown 3.

c. Referring to the response to AG-DR-2-15 (a), provide all rationale for why the specific rate recovery methodology for Ghent Unit 2's retirement costs could not be determined in the instant case.

A-18.

a. Confirmed, subject to Commission approval, as it relates to all generating units where significant unrecovered costs will exist at retirement. The Stipulation referenced above discussed only Mill Creek 1, Mill Creek 2, and Brown 3 because the depreciation lives of those three units were not revised to reflect the depreciation study results in those proceedings. However, Rider RAR does not specify any particular units and may be used for any generating units where appropriate, subject to a separate filing and approval by the Commission. As discussed in the response to the preceding question, the Companies do not expect any material unrecovered costs with regards to Haefling 1 and 2 and Paddy's Run 12. Thus, the Companies will likely treat the retirement of these units as ordinary retirements whenever they occur.

b. The Companies do not oppose this clarification with regards to generating units where significant unrecovered costs will exist at retirement.

c. The Companies believe the specific rate recovery methodology for Ghent Unit 2 retirement costs could be determined as part of this proceeding subject to the Commission's approval. Separate filings with the Commission are necessary for the inclusion of specific costs associated with each generating unit retirement asset to be recovered through Rider RAR.

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Question No. 19

Responding Witness: Lonnie E. Bellar / Stuart A. Wilson

Q-19. Identify all potential paths forward that could maintain the optionality to continue to operate Ghent 2 other than the construction of a new SCR. Provide a copy of all analyses and studies that evaluate each of these potential paths forward.

A-19. Barring the construction of an SCR, the only viable path forward that could maintain the optionality to continue to effectively operate Ghent 2 would be to operate the unit during non-ozone season only. The Companies evaluated this as part of Portfolios 3, 4, 6, and 7 in section 4.5 of Exhibit SAW-1, and as part of Portfolio 4 in Exhibit SB4-1.

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Question No. 20

Responding Witness: Lonnie E. Bellar

Q-20. Refer to Table 7 shown in the May 10, 2023 Direct Testimony of Lonnie Bellar at 21 in the SB 4 Proceeding.

a. Confirm that Portfolio 5 (retire Mill Creek 1 and 2, Brown 3, Ghent 2, PR 12, and HF 1-2 and add DSM, MC5 and Brown 12) on Table 7 shows CPVRR savings of $588 million on average, that Portfolio 6 (same as Portfolio 5, but add owned solar) shows CPVRR savings of $528 million on average (reduction in savings of $60 million compared to Portfolio 5), and that Portfolio 7 (same as Portfolio 6, but add BESS) shows CPVRR savings of $407 million on average (reduction in savings of $121 million compared to Portfolio 6).

b. Explain why the Commission should approve the addition of owned solar when it will cost customers $60 million more in CPVRR than Portfolio 5.

c. Explain why the Commission should approve the addition of BESS when it will cost customers $121 million more in CPVRR than Portfolio 6.

A-20. The Companies assume the reference should be to Table 8: Cumulative PVRR Changes ($M).

a. Confirmed.

b. All solar (owned or PPA) provides a hedge against fuel price risk. Note that the PVRR effect of adding owned solar is a reduction of $78 million in the high gas, mid-CTG ratio scenario (comparing Portfolio 5 to Portfolio 6). Also, solar provides potential CO_2 compliance cost savings, which this table does not reflect. Finally, note that the full CPCN-DSM portfolio—including owned solar, Brown BESS, and solar PPAs—results in an average CPVRR savings of $745 million, which is $157 million higher than Portfolio 5, which excludes all solar and Brown BESS.

c. See the responses to part (b) and Question No. 14. See also the Direct Testimony of David S. Sinclair at 24-26.

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Question No. 21

Responding Witness: Lonnie E. Bellar

Q-21. Reference the response to AG-DR-2-2. Provide a copy of the Joint Reliability Coordination Agreement once it is finalized. Please consider this an ongoing request.

A-21. See attachment being provided in a separate file.

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Question No. 22

Responding Witness: Lonnie E. Bellar / David S. Sinclair / Stuart A. Wilson

Q-22. Reference the response to AG-DR-2-3.

a. Confirm that the "economic retirement," as referenced in the response to subpart c., of each of Brown Unit 3, Ghent Unit 2, and Mill Creek Unit 2 will nonetheless result in stranded costs due to undepreciated expense.

b. Provide a discussion regarding the extent to which the Companies have investigated the extraction of rare earth minerals and metals from coal combustion residual materials, including coal ash, and/or from coal refuse materials. Explain also whether the Companies are aware of the University of Kentucky's studies in this regard. If the Companies have not conducted any such investigations or studies, explain why not.

A-22.

a. Confirmed.

b. The Companies have not investigated extraction of rare earth minerals and metals from the closed ash ponds. The 2015 CCR Rule and subsequent updates do not contemplate the mining of rare earth minerals and metals. The Companies may need to pursue variances to ongoing and completed closure activities approved by the Commission to contemplate mining activity. Yes, the Companies are aware of, and actively monitoring, coal ash research taking place at the University of Kentucky.

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Question No. 23

Responding Witness: John Bevington / Robert M. Conroy

Q-23. Reference the response to AG-DR-1-19. Given the Commission's exclusion of all expenses related to dues for membership organizations in the Companies' last rate cases, explain whether the Companies will remove these sums from collectible DSM expenses.

A-23. The Companies assume the reference should be to AG-DR-2-19. Additionally, the Commission excluded only EEI dues in the Companies' last rate case, not all expenses related to dues for membership organizations as the question incorrectly states. The premise to the request is not accurate.

As the request relates to the DSM expenses, the Companies are members of Midwest Energy Efficiency Alliance ("MEEA") and subscribe to services provided by E Source Companies LLC ("E Source"). Neither organization participates in lobbying, regulatory advocacy, or public relations activity. The Companies utilize these entities for DSM related collaboration and technical/benchmarking assistance. For example, in the August 24, 2016, DSM Advisory Group Meeting, the Advisory Group discussed rules for Industrial DSM Opt-Out and the Companies invited MEEA to present its review of opt-out rules in other nearby states.[9] E Source provides DSM focused, and independent technical/measure assistance as well as benchmarking expertise. As part of these services, for example, in 2022, E Source performed an independent review of an energy-saving device that the Companies considered as a potential measure for one of the Companies' approved DSM programs.

[9] The meeting minutes are available at: https://lge-ku.com/sites/default/files/media/files/downloads/LGE-KU-EnergyEfficiencyAdvisoryGroupMeetingMinutes-Aug-24-2016.pdf.

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Question No. 24

Responding Witness: Stuart A. Wilson

Q-24. Reference the response to PSC-DR-3-2, and the application generally. Confirm that the savings referenced in subpart a. to PSC-DR-3-2 are not net of the stranded costs that will occur as a result of the retirement of the Affected Units.

A-24. Confirmed.

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Question No. 25

Responding Witness: Philip A. Imber / Stuart A. Wilson

Q-25. Reference the response to PSC-DR-3-10 (b). Explain how the characteristics of Ghent Unit 2 and Mill Creek Unit 2 would or might change in the event SCR is added to each unit.

a. Can the Companies confirm that the addition of SCR to these units would not trigger an EPA New Source Review?

A-25. The Companies assume the reference should be to PSC-DR-2-10. In the event SCR is added to each unit, the auxiliary load would increase by an estimated 4.4 MW for Ghent 2 and by an estimated 1.5 MW for Mill Creek 2, resulting in a reduction of net maximum available generation. Net heat rates would increase by an estimated 0.6% and 1.0% respectively. SCRs require a higher operating temperature, which would be expected to increase Mill Creek 2's minimum net generation level to 150 MW but would not be expected to materially affect Ghent 2's minimum net generation level. Operating costs of both units would increase due to the cost of ammonia to operate the SCRs and additional capital costs of replacement catalysts.

a. Not confirmed. Because a physical change to a unit or a change in the method of the unit's operation that might result in a significant emissions increase and a significant net emissions increase of a regulated NSR pollutant (e.g., sulfuric acid mist, H_2SO_4), the addition of SCR to each unit would need to be evaluated under the New Source Review processes to determine the appropriate permitting requirements.

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Question No. 26

Responding Witness: Lonnie E. Bellar / Robert M. Conroy / Philip A. Imber

Q-26. In the event the Companies extend the lives of Ghent Unit 2 and Mill Creek Unit 2 by adding SCRs to each unit, explain whether:

a. the SCRs could be timely constructed and operational in order to comply with the Good Neighbor Rule and all other applicable environmental regulations and requirements;

b. the units could continue to operate year-round until the effective enforcement date of the EPA's proposed CO2 regulations, which is anticipated as 2035.

c. Keeping the units open until 2035 would trigger any reliability concerns.

d. Keeping the units open until 2035 would add to the Companies' resilience.

e. Keeping the units open until 2035 would leave the Companies with adequate reserve capacity.

f. Keeping the units open until 2035 would not harm ratepayers.

A-26.

a. The approximate timeline to receive regulatory approval, permitting, design, and implementation of an SCR on Ghent Unit 2 and Mill Creek Unit 2 is 40-50 months. Therefore, it may be possible to have SCR in service for the 2027 ozone season. The Good Neighbor Plan bases state budgets and unit allocations on SCR controls in 2026. The Companies would rely on banked allocations or possibly the allocation market to address the emissions from units that exceed the allocations provided under the dynamic budgeting program until the SCRs are operable. Also see the response to PSC 4-1.

b. Addition of SCR to Mill Creek Unit 2 and Ghent Unit 2 addresses the controls necessary to operate the units year-round per the controls and allocation

market constructs of the Good Neighbor Plan. Other proposed rules within the next decade could impact capital and operation & maintenance of these units (see the response to LFUCG/LOU Metro 1-15).

It is unclear why the question specifically references an "effective enforcement date of the EPA's proposed CO_2 regulations, which is anticipated in 2035." The EPA's proposed CO_2 regulations require coal units to be categorized for compliance at some time prior to January 1, 2030. Regardless of the sub-category chosen, the unit remains available under the proposed CO_2 regulations at any time of the year that it is operating in compliance with its permit and the requirements of the chosen sub-category (routine operations and maintenance – 2032 retirement, a 20% capacity factor limit – a 2035 retirement, natural gas co-firing – a 2040 retirement, or carbon capture and storage – no defined retirement).

c. It is unclear from the question what other generating units are built or retired in the Companies' fleet and whether total resources are sufficient to address reliability. However, a portfolio containing Ghent Unit 2 and Mill Creek Unit 2 will have greater reliability than the same portfolio without Ghent Unit 2 and Mill Creek Unit 2.

d. It is unclear from the question what other generating units are built or retired in the Companies' fleet and whether total resources are sufficient to address resilience. However, a portfolio containing Ghent Unit 2 and Mill Creek Unit 2 will have greater resilience than the same portfolio without Ghent Unit 2 and Mill Creek Unit 2.

e. It is unclear from the question what other generating units are built or retired in the Companies' fleet and whether total resources are sufficient to address adequate reserve capacity. However, a portfolio containing Ghent Unit 2 and Mill Creek Unit 2 will have greater reserve capacity than the same portfolio without Ghent Unit 2 and Mill Creek Unit 2.

f. To the extent that adding SCRs to Ghent Unit 2 and Mill Creek Unit 2 to continue to operate them until 2035 is not the least cost option, customers would pay higher rates than they otherwise would have with the least cost option and customers could be exposed to expenses related to additional compliance programs.