

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC JOINT APPLICATION OF KENTUCKY)	
UTILITIES COMPANY AND LOUISVILLE GAS AND)	CASE No.
ELECTRIC COMPANY FOR CERTIFICATES OF)	2022-00402
PUBLIC CONVENIENCE AND NECESSITY AND)	
APPROVAL OF A DEMAND SIDE MANAGEMENT PLAN)	

ATTORNEY GENERAL’S SUPPLEMENTAL DATA REQUESTS

The intervenor, the Attorney General of the Commonwealth of Kentucky, through his Office of Rate Intervention [“OAG”], hereby submits the following Supplemental Data Requests to Kentucky Utilities Co. [“KU”], and Louisville Gas & Electric Co. [“LG&E”][hereinafter jointly referenced as “LG&E-KU” or “the Companies”] to be answered by the date specified in the Commission’s Orders of Procedure, and in accord with the following:

- (1) In each case where a request seeks data provided in response to a staff request, reference to the appropriate request item will be deemed a satisfactory response.
- (2) Identify the witness who will be prepared to answer questions concerning each request.
- (3) Repeat the question to which each response is intended to refer. The OAG can provide counsel for LG&E-KU with an electronic version of these questions in native format, upon request.
- (4) These requests shall be deemed continuing so as to require further and supplemental responses if the Companies receive or generate additional information within the scope of these requests between the time of the response and the time of any hearing conducted hereon.

(5) Each response shall be answered under oath or, for representatives of a public or private corporation or a partnership or association, be accompanied by a signed certification of the preparer or 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.

(6) If you believe any request appears confusing, request clarification directly from Counsel for OAG.

(7) To the extent that the specific document, workpaper or information as requested does not exist, but a similar document, workpaper or information does exist, provide the similar document, workpaper, or information.

(8) To the extent that any request may be answered by way of a computer printout, identify each variable contained in the printout which would not be self-evident to a person not familiar with the printout.

(9) If the Companies have objections to any request on the grounds that the requested information is proprietary in nature, or for any other reason, notify OAG as soon as possible.

(10) As used herein, the words "document" or "documents" are to be construed broadly and shall mean the original of the same (and all non-identical copies or drafts thereof) and if the original is not available, the best copy available. These terms shall include all information recorded in any written, graphic or other tangible form and shall include, without limiting the generality of the foregoing, all reports; memoranda; books or notebooks; written or recorded statements, interviews, affidavits and depositions; all letters or correspondence; telegrams, cables and telex messages; contracts, leases, insurance policies or other agreements; warnings and caution/hazard notices or labels; mechanical and electronic recordings and all

information so stored, or transcripts of such recordings; calendars, appointment books, schedules, agendas and diary entries; notes or memoranda of conversations (telephonic or otherwise), meetings or conferences; legal pleadings and transcripts of legal proceedings; maps, models, charts, diagrams, graphs and other demonstrative materials; financial statements, annual reports, balance sheets and other accounting records; quotations or offers; bulletins, newsletters, pamphlets, brochures and all other similar publications; summaries or compilations of data; deeds, titles, or other instruments of ownership; blueprints and specifications; manuals, guidelines, regulations, procedures, policies and instructional materials of any type; photographs or pictures, film, microfilm and microfiche; videotapes; articles; announcements and notices of any type; surveys, studies, evaluations, tests and all research and development (R&D) materials; newspaper clippings and press releases; time cards, employee schedules or rosters, and other payroll records; cancelled checks, invoices, bills and receipts; and writings of any kind and all other tangible things upon which any handwriting, typing, printing, drawings, representations, graphic matter, magnetic or electrical impulses, or other forms of communication are recorded or produced, including audio and video recordings, computer stored information (whether or not in printout form), computer-readable media or other electronically maintained or transmitted information regardless of the media or format in which they are stored, and all other rough drafts, revised drafts (including all handwritten notes or other marks on the same) and copies of documents as hereinbefore defined by whatever means made.

(11) For any document withheld on the basis of privilege, state the following: date; author; addressee; indicated or blind copies; all persons to whom distributed, shown, or explained; and, the nature and legal basis for the privilege asserted.

(12) In the event any document called for has been destroyed or transferred beyond the control of the Companies, state: the identity of the person by whom it was destroyed or transferred, and the person authorizing the destruction or transfer; the time, place, and method of destruction or transfer; and, the reason(s) for its destruction or transfer. If destroyed or disposed of by operation of a retention policy, state the retention policy.

(13) Provide written responses, together with any and all exhibits pertaining thereto, in one or more bound electronic volumes, separately indexed and tabbed by each response, in compliance with Kentucky Public Service Commission Regulations and Orders.

(14) “And” and “or” should be considered to be both conjunctive and disjunctive, unless specifically stated otherwise.

(15) “Each” and “any” should be considered to be both singular and plural, unless specifically stated otherwise.

Respectfully submitted,

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Certificate of Service

Pursuant to the Commission's Orders in Case No. 2020-00085, and in accord with all other applicable law, Counsel certifies that an electronic copy of the forgoing was served and filed by e-mail to the parties of record.

This 14th day of April, 2023



Assistant Attorney General

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1. Other than the petition that will be filed in docket no. 2023-00122, explain whether the Companies will initiate any additional steps in the instant docket in order to comply with Senate Bill 4 (2023 Regular Session of the Kentucky Legislature).
2. Confirm that the Companies have entered into an agreement with PJM and TVA, termed the "PJM, TVA and LG&E/KU Joint Reliability Coordination Agreement."¹ If so confirmed:
 - a. Provide a copy of this agreement.
 - b. Provide a discussion regarding whether this agreement could improve the Companies' overall reliability, and if so, how.
 - c. If any cost-benefit analyses regarding joining this agreement were performed, provide copies. If such analyses were conducted in Excel, provide them with all cells and rows fully accessible.
 - d. Confirm that MISO will no longer participate in this agreement.
 - e. Explain whether the Companies anticipate any changes to their transmission system as a result of this agreement. Include in your discussion an explanation of whether the agreement could improve energy flows between the TVA, LG&E-KU and PJM transmission systems.
 - f. Explain whether the agreement will have any impact on the Companies' projected future reserve requirements, ability to sell capacity/energy, and/or ability to buy capacity/energy. If so, then describe each such impact.
 - g. Explain whether NERC and/or FERC approval is necessary for this agreement, and if so, provide the status of each such approval.
3. Provide the annual value derived from the beneficial reuse of coal combustion residuals (CCRs).
 - a. Confirm that the full dollar value of the sale of CCRs inures to ratepayers' benefit.

¹ See the PJM slide deck presented to PJM's Interregional Market Operations MC Webinar, on March 20, 2023, accessible at: <https://www.pjm.com/-/media/committees-groups/committees/mc/2023/20230320-webinar/item-02---pjm-tva-lge-ku-joint-reliability-coordination-agreement-update.ashx>

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- b. Confirm that as the number of coal-fired power plants and CCR suppliers across the U.S. continues to decline, the value of CCRs continues to increase.²
 - c. Provide the projected total value derived from the beneficial reuse of CCRs that will cease based on the premature retirement of the Brown Unit 3, Ghent Unit 2, and Mill Creek Unit 2 coal-fired units.
 - d. Explain whether the lost value of the sale of CCRs was included in the Companies' cost-benefit analyses utilized in their proposals to retire these three units.
4. Reference the responses to AG-DR-1 and 2.
 - a. Confirm that the Companies' responses were based on the proposed Good Neighbor Plan ("GNP") rule.
 - b. If so confirmed, explain whether the Companies' responses to these (and any other data requests) remain unchanged based on the EPA's March 15, 2023 publication of the GNP Pre-Publication Final Rule, as announced in the footnote below.³ The link to the actual Final Rule is accessible in the following footnote.⁴
5. Reference the response to AG-DR-1-13 (j).
 - a. Explain whether the Trimble CTs are capable of operating on fuel oil.
 - b. If the response to subpart a., above, is "yes," and given further that: (i) the Texas Gas Transmission is the sole supply of natural gas to the Trimble Station; and (ii) no other gas pipelines are located near Trimble Station,⁵ explain whether the Companies have conducted any studies regarding whether the addition of dual fueling capability at Trimble Station could enhance reliability in a cost-effective manner. If any studies have been conducted, then please provide copies.
 - c. Confirm that Trimble-1 is capable of operating from gas firing. If so, then provide the amount of the derate, if applicable.

² See, e.g., https://www.bizjournals.com/louisville/news/2023/04/01/sustainable-efforts-save-19-million-for-customers.html?ana=e_me_native&j=31044835&senddate=2023-04-03

³ <https://www.epa.gov/newsreleases/epa-announces-final-good-neighbor-plan-cut-harmful-smog-protecting-health-millions>

⁴ https://www.epa.gov/system/files/documents/2023-03/FRL%208670-02-OAR_Good%20Neighbor_Final_20230314_Signature_ADMIN%20%281%29.pdf

⁵ See response to AG-DR-1-13 (f).

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- d. Explain whether Trimble-2 is capable of operating from gas firing. If so, then provide the amount of the derate, if applicable.
6. Reference the response to AG-DR-1-18. The note at the bottom of the table provided therein states, "Hydro and Solar based on nameplate ratings."
 - a. Provide the actual capacity factor for hydro and solar during those periods.
 - b. Given that winter peaks occur in mornings and/or in evenings, confirm that solar generation would be unable to contribute toward meeting the Companies' winter-time peak energy requirements.
 - c. Reference also the 2021-00393 docket,⁶ the Companies' response to AG-DR-1-35, in which the Companies stated in pertinent part: "The increase in summer reserve margin is due to increased adoption of renewables, but not to account for any expected intermittency associated with renewables. The summer reserve margin increases because solar generation provides no contribution to winter reserve margin, and the Companies must add other forms of capacity to meet winter reserve margin requirements." Explain whether: (i) the Companies still agree that solar generation provides no contribution to winter reserve margin, and (ii) whether the Companies' response to AG-DR-1-33 in the instant docket is an affirmation of that statement.
 7. Reference the response to AG-DR-1-22 (c). Explain the difference between hydrogen's energy content on a volume basis and its energy content on a mass basis. Also explain any potential impact that the use of hydrogen could have on the Companies' Fuel Adjustment Clause filings.
 - a. Explain whether a hydrogen-natural gas mixture could ever be used in LG&E's gas LDC business. If so, explain whether any additional costs would be involved. Include in your explanation whether a separate distribution system would have to be constructed for hydrogen.
 - b. Explain whether the Companies agree with the report, accessible at the link in the footnote below, indicating that when burned, hydrogen ". . . contributes to climate change by increasing the amounts of other greenhouse gases such as methane, ozone and water vapor, resulting in indirect warming. . . . And when we look at the relative warming impact from continuous instead of pulse emissions — which are more

⁶ *In Re*: Electronic 2021 Joint Integrated Resource Plan Of Louisville Gas & Electric Co. And Kentucky Utilities Co.

representative of the real world — hydrogen is 100X more potent than CO2 emissions over a 10-year period.”⁷ Include in your explanation whether the Companies believe that the burning of hydrogen will increase costs of their efforts to comply with the GNP, or other environmental rules.

8. Reference the response to AG-DR-1-25. Explain whether the costs of the referenced transmission upgrades have been included within the project cost estimates contained in the Companies' application. Provide a break-out of the projected costs of these upgrades, regardless of whether they have already been included in the total project cost projections portrayed in the application.
 - a. Provide also a discussion of all additional costs that will, or could be incurred for the Mercer County facility, given that it will not be located entirely within KU's service territory. Include in your response whether any such additional costs are included in the total project cost projections for this proposed facility set forth in the application.
9. Reference the response to AG-DR-1-27 (a). In the event the Companies' patent-pending process for recycling decommissioned solar panels becomes cost-effective, explain whether any potential proceeds earned from such recycling would inure to ratepayers' benefit.
 - a. Provide a discussion regarding whether the Companies intend to move forward with this technology, and if so: (i) whether they would license it to third parties; and (ii) whether any portion of licensing fees earned would inure to ratepayers' benefit.
 - b. To the extent any information regarding the recycling process is publicly available, provide background information regarding how this process works and the types of materials and substances it can extract and recycle.
10. Reference the response to AG-DR-1-28 (b). The question asked, *inter alia*, to “[e]xplain whether any off-system sales (“OSS”) from the BESS would inure to the benefit of LG&E customers, KU customers, or both.” The only response was to refer to the response to subpart (b), which did not answer the question posed in subpart (c). Provide an appropriate response.
 - a. If the Companies intend to allocate any of these proceeds to KU ratepayers, provide a complete, and comprehensive, justification.

⁷ <https://www.edf.org/blog/2022/03/07/hydrogen-climate-solution-leaks-must-be-tackled>

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11. Reference the original response to AG-DR-1-28 (e), and the supplemental response thereto filed on March 27, 2023, both of which referred to, *inter alia*, Exhibit SAW-1 § 6.2.3.
 - a. Exhibit SAW-1 § 6.2.3 states, in pertinent part: “Therefore, the Brown BESS’s ownership was assigned using a method similar to the method used for the jointly-owned CTs⁸ by better balancing 2028 summer reserve margins based on dispatchable and battery capacity, after assigning the NGCC⁹ units’ ownership allocation.” [Emphasis added]. Explain precisely how the method utilized to determine the ownership of the Brown BESS differed from the method utilized determined ownership of the jointly-owned CTs.
 - b. Assuming the two NGCC plants are approved, explain whether any potential summer reserve margin shortfall in the LG&E system could be addressed through allocation of power from the three NGCC plants as opposed to: (i) the proposed battery; or (ii) a new CT.
 - c. Provide all workpapers associated with the methodology to determine ownership of the proposed BESS in Excel format, with all formulae fully accessible and intact.
 - d. Explain how the Companies believe that they have satisfied their burden of proof regarding ownership of the proposed BESS.
12. Explain whether the Companies prepared any cost-benefit analyses regarding the proposed BESS. If so, provide copies.
 - a. Explain whether any such cost-benefit analyses include O&M costs over the projected 15-year lifespan. If not, explain why not.
 - b. Given that the Companies’ projected lifespan of the BESS is only 15 years, explain whether benefits ever could exceed costs.
 - c. If costs exceed benefits, confirm that the BESS would not be a least-cost resource.
13. Reference the response to AG-DR-1-30. Explain why the BESS’s projected operating costs for the December-March period are generally significantly lower than the April-November period in the referenced fuel price scenarios.

⁸ Combustion turbines.

⁹ Natural Gas Combined Cycle.

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14. Explain whether the Companies agree that in a hypothetical situation, a utility seeking to move to 100% renewable generation resources should, as a matter of prudent cost estimation, also include the cost of replacement power needed to maintain system reliability.
 - a. Regarding the Companies' proposed solar resources in the instant docket, discuss to what extent the Companies' modelling analyzed and assessed the additional costs that would be incurred in procuring replacement power needed to maintain a reliable system due to the intermittent nature of solar generation.
 - b. Discuss whether the Companies' modeling identified not just the cost of adding more renewables to its system, but also the value of those resources. Include in your discussion how the Companies chose to define value.
 - c. Explain whether the Companies agree that in comparing the relative costs of dispatchable resources and renewables, utilizing a measure of the levelized avoided cost of electricity can provide a meaningful value.¹⁰

15. Reference the response to AG-DR-1-38. Confirm that the net book value as of the most recent projected retirement dates for the four units discussed therein totals \$694.3 million.
 - a. Confirm that these sums will be recovered via the Companies' Retired Asset Recovery Rider (RARR), together with weighted average costs of capital (WACC).
 - b. Provide the amortization period that will be applied to the recovery of these funds through the RARR.
 - c. Confirm that costs of decommissioning, and demolition of the four plants will also be recovered through the RARR.
 - d. Confirm that the costs of the four plants recovered in base revenues will be credited to any recoveries through the RARR until base rates are reset in a future base rate case proceeding. If this is not the case, then explain how the Companies will ensure that: i) customers will not pay twice for the return of and on the rate base investment in the four plants, and ii) customers will

¹⁰ See, e.g., P. Bonifas and T. Considine, "The Limits to Green Energy," Cato Regulation Institute, Winter 2022-2023, accessible at: <https://www.cato.org/regulation/winter-2022-2023/limits-green-energy> (last accessed March 20, 2023).

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timely receive the benefit of the reduction in non-fuel and non-depreciation operating expenses after the plants are retired.

- e. Based on the WACC charges that will be applied over the amortization period, provide the total known costs that will be passed through to ratepayers as of the final year for the amortization period. Provide the support for your response in Excel live format with all formulas intact.
16. Reference the response to AG-DR-1-62. Provide the Total Resource Cost (TRC) test score for rooftop solar as a DSM program.
 - a. Confirm that the attachment provided in response to this question entitled, "2021 Rooftop Solar Potential Study Report" at p. 42 indicates that residential rooftop solar has a TRC of 0.88.
 - b. Explain the difference(s) between the Modified TRC test, and the traditional TRC test.
 17. Reference the response to PSC-DR-1-23. Given that residential rooftop solar requires significant up-front capital, explain whether the Companies' proposed increase in their Market Research budget to research possible solar DSM offerings will include community solar, and any potential programs targeted specifically to Income Qualified customers.
 18. Reference the response to AG-DR-1-66. With regard to both: (i) the existing Residential and Small Nonresidential Demand Conservation subcomponent; and (ii) the new Smart Thermostats, Room Air Conditioners, Water Heaters measure, explain how the Companies:
 - a. communicate to customers that their thermostat will be controlled; and
 - b. obtain affirmative authority from the customers to do so.
 19. Reference the response to AG-DR-1-69. Provide the most recent actual amounts of the dues for both organizations identified in the response.
 20. Reference the response to PSC-DR-1-20. Confirm that when the Companies perform cost-benefit analyses of prospective DSM programs, the costs thereof are passed on to ratepayers, either through the DSM surcharge, or in base rates.
 - a. Provide an estimate of the costs of completing the requested cost-benefit analyses.

- b. Explain whether the referenced cost-benefit analyses will include costs for preparing the cost-benefit analyses.
 - c. Provide an itemization of all costs considered in the referenced cost-benefit analyses.
21. Reference the response to PSC-DR-1-27. Assuming the solar merchant facilities are in fact completed and become commercially operable, confirm the following:
- a. Retail ratepayers will be responsible for the \$9.8 million in transmission interconnection costs for the Song Sparrow (Clearway Energy) facility. If the amount is not correct, please provide: (i) the amount of the transmission interconnection cost for which retail ratepayers will be responsible; and (ii) the overall total system upgrade costs required to accommodate the output from this facility.
 - b. Retail ratepayers previously paid a certain amount of costs for the Gage (BrightNight LLC) facility. Please provide: (i) the amount of those costs; and (ii) the overall total system upgrade costs required to accommodate the output from this facility.
 - c. Neither the Grays Branch (ibV Energy Partners) nor the Nacke Pike (ibV Energy Partners) have submitted generator interconnection requests to the Companies' Independent Transmission Organization. Explain whether any of the other components of the overall total system upgrade costs required to accommodate the output from these facilities have been identified, and if so, provide them and explain the proportion for which retail ratepayers will be responsible.
22. Reference the following: (i) the application generally; (ii) the Companies' most recent assessment of the cost-effectiveness of joining an RTO; and (iii) the PJM report, "Energy Transition in PJM: Resource Retirements, Replacements and Risks" ("PJM Report") accessible at the link in the footnote below.¹¹
- a. Confirm that according to the PJM Report at page 1: (i) The growth rate of electricity demand is likely to continue to increase from electrification; (ii) thermal generators are retiring at a rapid pace and those retirements are at risk of outpacing the construction of new resources; and (iii) PJM's interconnection queue is composed primarily of intermittent and limited-duration resources.

¹¹ <https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx>

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- b. Confirm that according to the PJM Report at p. 2, 21% of PJM's installed capacity is at risk of retiring by 2030.
 - c. Confirm that the PJM Report at p. 3 states: "The composition and performance characteristics of the resource mix will ultimately determine PJM's ability to maintain reliability. It is critical that all PJM markets effectively correct imbalances brought on by retirements or load growth by incentivizing investment in new or expanded resources."
 - d. Given the PJM Report's findings and conclusions, explain whether the cost-benefit analyses within the Companies' most recent RTO membership analysis evaluated any potential benefits of securing reliability must-run status for Ghent Unit 2, and/or Mill Creek Unit 2. If so, explain how the value of that status was calculated.
 - e. Confirm that if the Companies were to both join an RTO and secure reliability must-run status for Ghent Unit 2 and/or Mill Creek Unit 2, that status would not toll or delay the need for complying with some or all aspects of the GNP while the must-run status is in effect.
23. Explain whether the SCR for Brown Unit 3 could, after the unit is decommissioned, be removed and utilized on Ghent Unit 2. If so, provide: (i) a cost estimate, including how the potential moving of the SCR would affect the Companies' other relevant cost-benefit analyses; and (ii) a projection of possible months of operation for Ghent Unit 2 that would comply with the GNP.
- a. If the Brown Unit 3 SCR cannot be utilized on Ghent Unit 2, then explain why not; explain also whether it would or could be cost effective to modify the SCR from Brown Unit 3 and utilize it on Ghent Unit 2 or explain why it would not be possible or cost effective; provide all studies performed to evaluate this option, including all analyses in Excel live format with all formulas intact.
 - b. To the extent that the Brown Unit 3 SCR can be utilized on Ghent Unit 2, provide the results of a portfolio that reflects the continued operation of Ghent Unit 2, including, but not limited to, the net present value savings or costs compared to the Companies' base reference portfolio in the same format as Tables 9 and 13 in Exhibit SAW-1.
24. Explain whether the SCR for Brown Unit 3 could, after the unit is decommissioned, be utilized on Mill Creek Unit 2. If so, provide: (i) a cost estimate, including how the potential moving of the SCR would affect the

Companies' other relevant cost-benefit analyses; and (ii) a projection of possible months of operation for Mill Creek Unit 2 that would comply with the GNP.

- a. If the Brown Unit 3 SCR cannot be utilized on Mill Creek Unit 2, then explain why not; explain also whether it would or could be cost effective to modify the SCR from Brown Unit 3 and utilize it on Mill Creek Unit 2 or explain why it would not be possible or cost effective; provide all studies performed to evaluate this option.
 - b. To the extent that the Brown Unit 3 SCR can be utilized on Mill Creek Unit 2, provide the results of a portfolio that reflects the continued operation of Mill Creek Unit 2, including, but not limited to, the net present value savings or cost compared to the Companies' base reference portfolio in the same format as Tables 9 and 13 in Exhibit SAW-1.
25. Reference the response to PSC-DR-1-54 regarding how the Companies modeled the uncertainty of solar PPA execution risk.
- a. Confirm the following statement from Ex. SAW-1, § 4.6.1. p. 34 of 104: "Project execution is a particularly acute risk in the current solar market, as the Companies have experienced with the two solar PPAs they executed in 2019 and 2021 (Rhudes Creek and Ragland, respectively); neither project has received all necessary approvals, neither is on schedule or has begun construction, and neither is likely to proceed any time soon because it will be difficult or impossible to finance the projects at the contracted price in today's solar market and interest rate environment."
 - b. Confirm that in the event the following proposed solar facilities (with which the Companies seek to enter into PPAs) for whatever reason(s) are not constructed: (i) all four of the proposed non-owned facilities identified in the application for the instant case; and (ii) both the proposed Rhudes Creek and Ragland facilities, that adding the proposed Mercer County and Marion County solar facilities is favorable in the majority of cases evaluated.
26. Reference the response to AG-DR-1-57, and the article accessible in the footnote below.¹² Explain whether the Companies agree with the report cited in the article that reuse of retired coal plants could cut the costs of small modular nuclear reactors by 35%.

¹² https://www.utilitydive.com/news/coal-plants-retire-advanced-nuclear-reactors-smr/645974/?utm_source=Sailthru&utm_medium=email&utm_campaign=Newsletter%20Weekly%20Roundup:%20Utility%20Dive:%20Daily%20Dive%2004-01-2023&utm_term=Utility%20Dive%20Weekender

27. Reference the response to PSC-DR-1-79.
- a. Identify the information technology (IT) the Companies intend to implement in 2024.
 - b. Explain whether this IT would be part of the communications back haul system for the AMI system.
 - c. Explain whether the costs for this IT equipment would be recovered through base rates, or through the DSM surcharge.
 - d. Provide the projected Peak Time Rebate program participation rate in year two of its existence, in terms of percentage of total customers of both companies, separately and combined.
 - e. Explain whether the Companies believe that by year 5, a participation rate stretch goal of 20% is reasonable.
28. Reference the response to Kentucky Coal Association DR-1-5, Attachment 2, "Using Solar and Storage to Meet 100% of the Electricity Requirements of a Distribution Circuit: A Case Study for LG&E Highland 1103 Circuit," December, 2018, p. 2. This study was prepared in response to the City of Louisville's 100 Percent Clean Energy Resolution, and was presented by Mr. David Sinclair to the Louisville Metro Council. According to this document:
- "This study evaluates the solar generation and energy storage requirements and associated economics of serving the electricity requirements of the LG&E Highland 1103 distribution circuit with local resources on a standalone basis, without connection to the power grid. . . . This study is an attempt to quantify, at a high-level, some of the technological and economic challenges associated with serving a typical distribution circuit with 100% locally generated renewable energy."
- a. Explain whether the Companies still confirm the following:
 - (i) "While the technical challenges of using just local solar generation and energy storage to reliably serve the real-time electricity needs of customers on this circuit can likely be met, doing so would require a large geographic space (almost as large as the circuit footprint);"

- (ii) “Despite assuming customers would continue to use natural gas for space and water heating, the quantity of solar generation capacity required to be built would need to be about eight times greater than the summer hourly peak to generate enough energy to charge the batteries to reliably serve nighttime load and address extended periods of dense clouds and short days that are common during winters in Louisville.”
 - (iii) “The cost of electricity would likely be two to five times higher over the 30-year study period as compared to continuing to take electricity from the LG&E system.”
 - b. Discuss and explain whether the results would be similar for other circuits in both the LG&E and KU systems which have populations and loads similar to the Highland 1103 circuit.
 - c. Referring to the quote in subpart (iii) immediately above, explain whether the cost of electricity would escalate by a similar amount if: (i) the Companies owned the renewable generation; and (ii) if the Companies entered into purchase power agreements with owners / developers of independent solar projects.
- 29. Reference the response to Kentucky Coal Association DR-1-5, Attachment 1, p. 18. Confirm the statement, “For the LG&E/KU system to be 100% renewable annually would require ~14,500 MW of solar generation requiring over 110 square miles of solar panels.”
 - a. Provide an estimate of how much energy storage would be required if the combined LG&E-KU systems were to convert to 100% renewable energy.