COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC 2021 JOINT INTEGRATED	)
RESOURCE PLAN OF LOUISVILLE GAS AND	)
ELECTRIC COMPANY AND KENTUCKY	) CASE NO. 2021-00393
UTILITIES COMPANY	)

SUPPLEMENTAL DATA REQUESTS OF JOINT INTERVENORS METROPOLITAN HOUSING COALITION, KENTUCKIANS FOR THE COMMONWEALTH, KENTUCKY SOLAR ENERGY SOCIETY AND MOUNTAIN ASSOCIATION

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DEFINITIONS

1. "Document" means the original and all copies (regardless of origin and whether or not including additional writing thereon or attached thereto) of any memoranda, reports, books, manuals, instructions, directives, records, forms, notes, letters, or notices, in whatever form, stored or contained in or on whatever medium, including digital media.

2. "Study" means any written, recorded, transcribed, taped, filmed, or graphic matter, however produced or reproduced, either formally or informally, a particular issue or situation, in whatever detail, whether or not the consideration of the issue or situation is in a preliminary stage, and whether or not the consideration was discontinued prior to completion.

3. "Person" means any natural person, corporation, professional corporation, partnership, association, joint venture, proprietorship, firm, or the other business enterprise or legal entity.

4. A request to identify a natural person means to state his or her full name and business address, and last known position and business affiliation at the time in question.

5. A request to identify a document means to state the date or dates, author or originator, subject matter, all addressees and recipients, type of document (e.g., letter, memorandum, telegram, chart, etc.), identifying number, and its present location and custodian. If any such document was but is no longer in the Company's possession or subject to its control, state what disposition was made of it and why it was so disposed.

6. A request to identify a person other than a natural person means to state its full name, the address of its principal office, and the type of entity.

7. "And" and "or" should be considered to be both conjunctive and disjunctive, unless specifically stated otherwise.

8. "Each" and "any" should be considered to be both singular and plural, unless specifically stated otherwise.

9. Words in the past tense should be considered to include the present, and words in the present tense include the past, unless specifically stated otherwise.

10. Unless otherwise specified in each individual interrogatory or request, the terms "you," "your," "LG&E," "KU," "LG&E/KU," or "Companies" refer collectively to Louisville Gas & Electric Company and Kentucky Utilities Company, including any affiliated companies, predecessors-in-interest, employees, authorized agents, outside consultants or contractors, or other representatives.

11. "LG&E" means Louisville Gas & Electric Company and/or any of their officers, directors, employees or agents who may have knowledge of the particular matter addressed, and affiliated companies.

12. "KU" means Kentucky Utilities Company and/or any of their officers, directors, employees or agents who may have knowledge of the particular matter addressed, and affiliated companies including Pennsylvania Power and Light.

13. "The Companies" means LG&E and KU.

14. "Joint Intervenors" means the Mountain Association, Kentuckians For The Commonwealth, and Kentucky Solar Energy Society, who were granted the status of full joint intervention in this matter.

15. "Commission" or "PSC" means the Kentucky Public Service Commission, including its Commissioners, personnel, and offices.

16. "DSM-EE" means Demand Side Management-Energy Efficiency.

17. "RFP" means Request for Proposals.

18. "RTO" means Regional Transmission Organization.

INSTRUCTIONS

1. If any matter is evidenced by, referenced to, reflected by, represented by, or recorded in any document, please identify and produce for discovery and inspection each such document.

2. These requests for information are continuing in nature, and information which the responding party later becomes aware of, or has access to, and which is responsive to any request is to be made available to Joint Intervenors. Any studies, documents, or other subject matter not yet completed that will be relied upon during the course of this case should be so identified and provided as soon as they are completed. The Respondent is obliged to change, supplement and correct all answers to

interrogatories to conform to available information, including such information as it first becomes available to the Respondent after the answers hereto are served.

3. Unless otherwise expressly provided, each data request should be construed independently and not with reference to any other interrogatory herein for purpose of limitation.

4. Whenever the documents responsive to a discovery request consist of modeling files (including inputs or output) and/or workpapers, the files and workpapers should be provided in machine-readable electronic format (e.g., Microsoft Excel), with all formulas and cell references intact.

5. The answers provided should first restate the question asked and also identify the person(s) supplying the information.

6. Please answer each designated part of each information request separately. If you do not have complete information with respect to any interrogatory, so state and give as much information as you do have with respect to the matter inquired about, and identify each person whom you believe may have additional information with respect thereto.

7. Wherever the response to a request consists of a statement that the requested information is already available to Joint Intervenors, please provide a detailed citation to the document that contains the information. This citation shall include the title of the document, relevant page number(s), and, to the extent possible, paragraph number(s) and/or chart/table/figure number(s).

8. If you claim a privilege including, but not limited to, the attorney-client privilege or the work product doctrine, as grounds for not fully and completely responding to any discovery request, please describe the basis for your claim of privilege in sufficient detail so as to permit Joint Intervenors or the Commission to evaluate the validity of the claim. With respect to documents for which a privilege is claimed, please produce a "privilege log" that identifies the author, recipient, date, and subject matter of the documents or interrogatory answers for which you are asserting a claim of privilege and any other information pertinent to the claim that would enable Joint Intervenors or the Commission to evaluate the validity of such claims.

9. In the case of multiple witnesses, each interrogatory should be considered to apply to each witness who will testify to the information requested. Where copies of testimony, transcripts or depositions are

requested, each witness should respond individually to the information request.

10.The interrogatories are to be answered under oath by the witness(es) responsible for the answer.

SUPPLEMENTAL DATA REQUESTS PROPOUNDED TO LOUISVILLE GAS AND ELECTRIC COMPANY AND KENTUCKY UTILITIES COMPANY BY JOINT INTERVENORS

2.1. Please refer to the Companies' response to Joint Intervenors' Question 1.4(b). [The Companies have been using PROSYM for production cost modeling for decades and many tools supporting PROSYM have been developed to support its efficient use. Even though Plexos is capable of production cost modeling, it will take time to build the same level of analytical robustness and efficiency as PROSYM.]

a. Please identify and fully explain the function of each "tool supporting PROSYM."
b. Please clarify what is meant by the statement that it will "take time to build the same level of analytical robustness and efficiency as PROSYM"?
c. Are the Companies developing the resources or tools necessary to use Plexos for production cost modeling?
    i. If so, please state approximately when that effort started (e.g., month and year), the approximate time expected to project completion, and an estimate of the work hours involved.
    ii. If not, please explain why not.
d. Does any other group within the Companies currently use PLEXOS, e.g., for generation scheduling or market price forecasting?
e. How do the Companies intend to use PLEXOS in (i) future IRP filings and (ii) future certificate of need filings (e.g., which years would be modeled, what modules of PLEXOS would be used, etc.)?

2.2. Refer to the Companies' response to Joint Intervenors Request 1.19(c), including the attached document, titled "Analysis of Generating Unit Retirement Years" (October 2020).

a. The attached document states on page 10: "Because MC2 can be retired without replacement as shown in Table 3, there are no incremental costs for new capacity to replace MC2. The

total net PVRR ("NPVRR") impact of retiring MC2 in 2028 is a savings of $131.2 million." Did the Companies calculate the NPVRR impact of retiring MC2 in any year(s) earlier than 2028?

i. If so, please provide each NPVRR impact calculation for retirement years earlier than 2028, including workpapers in native format with formulas intact.
ii. If not, please explain in full why the Companies did not calculate the NPVRR impact of retiring MC2 in any years earlier than 2028.

b. Refer to Table 8 in the attached document, providing "Stay-Open Costs" for Mill Creek 2 and Brown 3 for the years 2026 through 2034. Please provide the Stay-Open Costs for each unit in the years 2022–2025 (with O&M and annual costs provided separately, as in Table 8).
c. For each of the last five years, please provide the following information for each of Mill Creek, Ghent, and Tremble County:
i. The total amount of fly ash created (tons per year);
ii. The total amount of gypsum created (tons per year);
iii. The total number of tons of fly ash sold from each plant; and
iv. The total number of tons of gypsum sold from each plant.

2.3. Refer to the Companies' response to Joint Intervenors' Request 1.22(a), which states in part, "These costs reflect the stay-open capital used in the 2021 IRP. The costs do not include all capital items in the Companies' current Business Plan."

a. Please provide the Companies' current Business Plan.
b. Please identify each capital item included in the current Business Plan but not used in the 2021 IRP.
c. Please provide a workbook with each capital item identified in response to subpart b, including a description for each.
d. For each of the Companies' thermal resources, please explain how the forecasted capital expenditures for thermal resources in the Companies' current Business Plan differ from those used in the IRP modeling for each of the Companies' thermal resources.

2.4. Refer to the Companies' response to Joint Intervenors request 1.24, including the May 2018 "Generation Services Engineering 2018 Steam Only Depreciation Study Evaluation" (referred to below as the "2018 Study")

a. The 2018 Study was reviewed February 2022. Please explain in full what that review consisted of, including identification of the person(s) responsible for the review.
b. Please provide inspection reports for the Mill Creek, Ghent,

Brown, and Trimble thermal units since May 2018.

2.5. Refer to the Companies' Response to Metro Request 1-8. Please produce the referenced "LG&E and KU Energy LLC Capital and Investment Review Policy" and the "Capital Evaluation Model."

2.6. Refer to the Companies' response to Commission Staff's Question 26(b)(3), which states *inter alia*: "The Companies would consider NGCC without CCS a plausible technology option under certain circumstances." Please fully explain the circumstances under which the Companies would consider NGCC without CCS including, but not limited the following: expectations related to carbon regulation; expected useful life of the resource; capital costs; variable and fixed operating and maintenance costs; technology advancements; and any other factors the Companies consider relevant.

2.7. Please refer to the Companies' response to Commission Staff's Q4, pg 14 PDF of 02-PSC_DR1_LGE_KU_Responses_2021-00393.pdf.

a. The companies quote from Case No. 2018-00348, Order Appx. (Ky. PSC July 20, 2020) the statement that the "Companies should continue the stakeholder process through the DSM Advisory Group and strive to include recommendations and inputs from the stakeholders." Please describe the work of this DSM advisory group since the last IRP, and what recommendations and inputs from stakeholders have been included in this IRP or what recommendations and inputs the companies are currently following or planning to follow in the next 15 years.
b. The companies quote from the same order: "Staff encourages LG&E/KU to continue exploring cost- effective DSM-EE as a method to avoid costly capital investments should energy margins diminish over time." The companies mention in LGE_KU_2021_IRP_Volume_III.pdf, pg 76 pdf that: "Successful deployment of DSM programs could reduce or defer the need for peaking resources, particularly for battery storage where their modular nature allows for more custom project sizes." Aside from the modular nature of battery storage, what other factors would be weighed in deciding whether to eliminate battery storage vs eliminate SCCT development?

2.8. Refer to the Companies' Response to Joint Intervenors' request 1.2. Please provide a detailed explanation as to the claims that the IRP reflects the Companies' objective "to provide all customers, irrespective of income or other demographic criteria, with safe and reliable service at the lowest reasonable cost," when the Companies have not considered or performed any analysis on the impacts of the proposed Integrated Resource Plan (IRP) on residential customers with low- and fixed-incomes.

2.9. The Companies state in A-1.2 (a) of Response to Joint Intervenors' Initial Request for Information (Case No. 2021-00393) that "the Companies do not have access to customer-specific income data." While the Companies claim is that they do not have access to this customer-specific data, that does not mean the Companies cannot layer income data from other sources (e.g. U.S. Census American Community Survey data, MHC's State of Metropolitan Housing Reports, Louisville Metro Center for Health Equity's Health Equity Report, 2020 Analysis of Impediments to Fair Housing Choice in Louisville Metro, Ky, etc.) to gain a better understanding of the Companies customer residential service location data when layered with other publicly available data on geographic income and poverty distribution by census tract to better understand the impact of the proposed IRP on low- and fixed-income residential customers. Please provide a detailed explanation as to the reasoning the Companies did not access and layer additional publicly available data on top of their customer-specific location data to analyze the IRP's impact on fixed- and low-income residential customers.

2.10. Please provide a detailed explanation as to the reasoning for the Companies not analyze historical data on low-income households in the preparation of the proposed IRP.

2.11. Please provide a detailed explanation as to why no analysis was performed on the impact of "expected increases in the cost of generation" on low-income households.

2.12. Please provide a detailed explanation as to why no analysis was considered during the development of the proposed IRP pertaining to the planning and development of new DSM programs targeted at low-income households.

2.13. Please provide a detailed explanation as to why studies related to environmental and health impacts on low-income communities and communities of color were not considered as a part of the process in developing the proposed IRP.

2.14. Please provide a detailed explanation as to why no studies related to the impact of economic disparities on low-income communities and communities of color were considered as a part of the process to develop the proposed IRP.

2.15. 14.2 percent of Louisville/Jefferson County residents live below the federal poverty line, higher than the U.S. rate of 13.4 percent. Low- and fixed-income residential customers make up a significant percentage of your customer base and any analysis and/or studies conducted during the IRP development process must include targeted analysis of low- and fixed-income residents. Why have low- and fixed-income residential customers been ignored during the analysis process in developing the proposed IRP by the Companies?

2.16. Refer to the Companies' response to Commission Staff's Request 58, in which the Companies stated: "The reporter's question was about the forecast of CO2 emissions that was provided in response to data request MA-KFTC-MHC-3 Question No. 6(4) in Case Nos. 2020-00349 and 00350. As shown in response to Question No. 6(1) of that same data request, all retiring coal units from 2028 on were assumed to be replaced with a 1x1 NGCC. Thus, the assumptions associated with that particular forecast did not even consider future renewable resources or any other technologies. The 2021 IRP considered a broad range of technologies and demonstrates that renewable technologies are likely to be an important resource in the coming 15 years covered by the IRP."

Please clarify this response.

a. Are the Companies stating that the forecast presented in response to questions 6(1) and 6(4) in Case Nos. 2020-00349 and 00350 was inaccurate and inconsistent with the IRP forecast?
b. Please explain why, in their response to questions 6(1) and 6(4) in Case Nos 2020-00349 and 00350, the Companies assumed all retiring coal units would be replaced with 1x1 NGCC.
c. Please provide a side-by-side comparison of the Companies' forecast CO2 emissions from Case Nos. 2020-00349 and 350 and

the 2021 IRP, including projected energy generation and the assumed generation portfolio mix for each year in each forecast, and the percentage contribution of each generator to energy production and CO2 emissions. Please confirm if the Companies consider the forecast from the 2021 IRP to be the more realistic scenario and if not, why not.

2.17. Refer to the figures in Table 12 of the Analysis of Generating Unit Retirement Years produced in the Companies' response to JI Q1-19(c). Please provide all supporting analyses, workpapers, and documentation (in machine-readable format with formulas intact) for these figures.

2.18. Refer to page 1 of the attachment to Companies' response to JI Q1-24, stating that the depreciation review process consisted of "evaluating key parameters . . . with equipment condition . . . to provide a risk-based assessment regarding the likelihood of equipment failure as compared to industry norms." Please provide the described evaluation and analysis, as well as all supporting workpapers and documentation.

2.19. Please confirm that 2035 was the only year modeled in PLEXOS. If not, which years were modeled?

2.20. Please refer to the PLEXOS input files named "EFORMW_2021BP" and "EFORProb_2018BP".
   a. Please explain how PLEXOS interprets the values reported in both workbooks.
   b. Please explain if forced outages were modeled in PLEXOS for any units other than the coal units.

2.21. Please refer to the PLEXOS input file named "FirmCapacityWinter". It does not appear that the firm capacity for the 4 and 8 hour battery storage resources are contained within this file. Please explain where the "FirmCapacityWinter" is captured in the inputs for the battery storage resources.

2.22. Please refer to the PLEXOS input file named "LzldStayOpenCosts."
   a. Please provide the supporting workbook, with all formulas and links intact, used to develop the costs that are contained within this workbook.
   b. Please provide the units for the values within this workbook.

c. Please confirm that the costs for existing units represent ongoing fixed O&M and capital maintenance and the costs for new units represent initial capital expenditures and ongoing fixed O&M. If anything but confirmed, please explain in full.
d. Please provide the basis for the assumed capital cost of new units.

2.23. Please refer to the PLEXOS input file named "2021BP_VOM". Please explain why there is no variable O&M modeled for the resources named "New SCCT" and "New SCCT 2028".

2.24. Please refer to the PLEXOS input file named "RunningCostOpCharge".
a. Please provide the units for the values reported in this workbook.
b. Please describe what the costs in this workbook represent in PLEXOS.

2.25. Please refer to the PLEXOS input file named "2021BP_PJMPrice". Please explain if a PJM market interaction was modeled in PLEXOS.

2.26. Please refer to the PLEXOS output file named "CONFIDENTIAL_659", worksheet named "Fuel". Please explain why the "New SCCT" and "New SCCT 2028" do not have fuel reported in this worksheet.

2.27. Please refer to the PLEXOS output file named "CONFIDENTIAL_659", worksheet "Gen". Please explain why the "New SCCT" has a value reported for the "FO&M" field, but the "New SCCT 2028" does not.

2.28. Please refer to the PLEXOS output files. Please explain what the folders named "669" and "673" represent.

2.29. Please explain what the PLEXOS file "mttr_2021BP.csv" is intended to represent?

2.30. Please explain why the Companies did not model significantly differing winter versus summer capacities for most existing thermal units but did so for new thermal resources?

2.31. Please refer to the file "LzldStayOpenCosts".

a. Were the new resources contained in the referenced file the only ones that passed through the resource screening analysis? Please explain.

b. What was the rationale for screening out the other resources?
c. If other resources not included in "LzldStayOpenCosts" passed the screening please explain how they were evaluated in PLEXOS.

2.32. In response to JI Q1-4(c), the Companies' stated, "The capacity expansion plans were optimized to meet minimum reserve margin requirements for both summer and winter. Specifically, Plexos was used to identify the least-cost generation portfolio that meets minimum reserve margin constraints (i.e., 17 percent in the summer and 26 percent in the winter) at the end of the IRP planning period. Then, an annual resource plan was developed to meet minimum reserve margin constraints throughout the planning period."
a. How were these constraints represented, e.g., as constraints applying to all "summer" months and all "winter" months, as constraints in the peak summer and peak winter months?
b. Was PLEXOS able to simultaneously solve for a summer and winter reserve margin constraint? Please explain in full.

2.33. Please refer to the PROSYM input and output files in the folder named "ReferenceCase".
a. Please confirm that PROSYM was used to perform production cost modeling for each of the nine expansion plans developed from the PLEXOS modeling. If anything but confirmed, please explain your response in full.
b. If additional production cost runs were performed in PROSYM, please provide the modeling input and output files for those runs.
c. If only "ReferenceCase" run was used to derived the production cost results included in the revenue requirements for each portfolio please explain how that was done and indicate which cell references, tabs, etc. were used.

2.34. Please confirm if the production cost runs performed within PROSYM were dispatched to load or to price.

2.35. Please refer to workbook named "CONFIDENTIAL_20210923_2021IRPResPlanModel_0283D04", worksheet named "NREL" and the Companies response to Joint Intervenors' requests 1.54 subpart d and 1.55 subpart a, where it stated that the Company modeled solar and battery storage resources with the Investment Tax Credit "ITC".

a. Please provide a cell reference that shows how ITC is applied to the cost of new solar and battery storage resources in this workbook.

2.36. Please refer to the workbook named "CONFIDENTIAL_20210923_2021IRPResPlanModel_0283D04", worksheet named "PROSYM".
   a. Please explain what the column named "Iter" represents.
   b. Please confirm what PROSYM production cost runs were included in the column named "SysCost".
   c. Please explain why the costs modeled in the column named "SysCost" do not seem to match the costs reported in the PROSYM output file named "out_stationyr".

2.37. Please refer to the workbook named "CONFIDENTIAL_20210923_2021IRPResPlanModel_0283D04", worksheet named "Detail".
   a. Please explain what the difference is between the stay-open capital and O&M reported in rows 3073 to 3140 and the stay-open capital and O&M reported in rows 1505 to 1572.
   b. Please explain what the 1 and 2 mean in the column named "Case".

2.38. Please refer to the workbook named "CONFIDENTIAL_20210923_2021IRPResPlanModel_0283D04", worksheet named "Profiles". Please provide the supporting workbook, with all formulas and links intact, used to develop the profiles reported in rows 3 to 25.

2.39. Please refer to the spreadsheet entitled "20210924_ScarcityPricingFigure_0283" provided in response to Joint Intervenors' First Set of Discovery. With respect to this spreadsheet please answer the following questions:
   a. Please confirm that only tabs "Scarcity Data" and "Chart1" were used for this IRP. If that is not the case, what were the other tabs used for?
   b. What is the source of data in the tab "Scarcity Data"?
   c. What do the data in each of the columns in the tab "Scarcity Data" represent?
   d. What are the units for each of the columns in the tab "Scarcity Data"?
   e. Why were these data used to develop scarcity prices?

f. Please provide the workbook(s) used to support and/or develop the data in the tab "Scarcity Data".
g. Please provide any data in the Companies' possession that characterizes both the number of hours in the 2025 SERVM simulation in which scarcity pricing would apply and which scarcity price applied.

2.40. With respect to the PROSYM files used to perform the RTO analysis contained in Volume III of the IRP please answer the following questions:
a. How do the case names: 0_2022BP, 1_CTRule, 2_SpinRes, 3_RTOExp, 4_TransExp, 5A_PurAdder, 5B_OSSAdder, 6_SpliGenLoad, 7_Losses, 8_NoCT, and 9PJMB relate to the RTO analysis conducted?
b. For each case name identified in response to subpart a above, please explain (i) what each case name means and (ii) what each case was used for?
c. Please explain how the data in the folder with the file path 2021RTOAnalysis/PROSYM relate to the calculation of benefits and costs contained in RTOCostAnalysis_2021. Be specific including giving specific filepath and cell references for the data that are utilized in the RTOCostAnalysis_2021 spreadsheet.

2.41. Please refer to the spreadsheet entitled "20211002_Tablesfor ReliabilityAnalysisD06" provided in response to Joint Intervenors' First Set of Discovery.
a. Provide the workbook(s) with all formulas and links intact used to develop the Stay-Open and Overhaul costs in the tab "Stay-Open Cost".

2.42. Please refer to the spreadsheet entitled "MHC_Joint DR1 Attach to Q80(a)" provided in response to Joint Intervenors' First Set of Discovery.
a. Please explain how these data were used to develop the available transmission capacity ("ATC") assumptions in the SERVM modeling.
b. Provide, with all formulas and links intact, any workbook(s) used to translate these data into ATC assumptions in the SERVM modeling.
c. Please explain why these particular time periods were chosen to develop the ATC assumptions.
d. Please explain what the data in columns D – G and and I – K represent? E.g. are these physical import and export limits, historical emergency energy transactions, historical flows between regions (for any reason), etc.?

e. Please provide the hourly ATC assumptions used in this modeling.

2.43. Please refer to the spreadsheet entitled "Monthly Results" provided in response to Joint Intervenors' First Set of Discovery (filepath JI-1 Confidential/WorkpapersCONFIDENTIAL/0283_2021IRP/ReserveMargin/SERVM/SERVM_Run/20211004). With respect to this spreadsheet please answer the following:

a. Please define each of the following terms: EUE_Capacity, EUE_Intrahour, EUE_Multihour, LOLE_Capacity, LOLE_Intrahour, LOLE_Multihour, LOLH_Capacity, LOLH_Intrahour, and LOLH_Multihour.
b. What is the "Probability" in Column G of tab "SMMA_2021IRP_RetM2(Combined)" measuring? Please explain in full.
c. Cells B21:K23 of tab "Sheet1" correspond with the reported LOLE values in Table 15 of the Reserve Margin Analysis. These cells are derived from the pivot table in columns A – L which show the sum of "ProbWeightedLOLE*10". Is the multiplication by 10 intended to represent 10 years? If not, what does it represent?
d. Are the LOLE values reported on tab "Sheet1" in units of events or hours? If events, what does it mean to have a partial event (value < 1)?
e. If the answer to subpart c is "yes", are the reported LOLE results on tab "Sheet1" intended to represent LOLE over a 10-year period? Please explain in full.

2.44. Please refer to Tables 14 and 15 of the Reserve Margin Analysis. With respect to this spreadsheet please answer the following:

a. How is LOLE being measured? In events or hours?
b. If LOLE is being measured in hours how is 1 in 10 standard being applied to these results? As no more than 2.4 hours in 2025 or in some other way? Please explain in full.
c. If LOLE is being measured in events, how is the 1 in 10 standard being applied to these results? Please explain in full.

2.45. The Reserve Margin Analysis at page 24 states, "Total costs are estimated based on average ("Avg") reliability and generation production costs as well as the 85th and 90th percentiles (%-ile) of the reliability and generation production cost distribution."

a. Please identify which files provided in response to Joint Intervenors' initial discovery requests show how these calculations were made?

b. If all the files necessary to reproduce these calculations were not provided in response to Joint Intervenors' initial discovery requests, please provide them with all formulas and links intact.

2.46. Please provide the forced outage rate assumptions and the ancillary service requirements enforced in the SERVM modeling.

2.47. The Company's response to JI Q-1.11 says in part, "See Table 20 on page 22 of the '2021 IRP Long-Term Resource Planning Analysis' in the IRP Volume III. The CO2 emissions reduction forecasted for the base IRP scenario reflects a PPL-wide reduction of 68% by 2035." The referenced table shows reductions of 22 – 47% by 2035. Please explain how the Company determined a 68% reduction by 2035 would be achieved. Provide any workbooks supporting your response in electronic format with all formulas and links intact.

Table 20: Forecasted CO_2 Emissions vs. 2010 Actuals

Scenario	Year	CO_2 Emissions (short tons)	% Change from 2010
2010 Actual	2010	35,843	--
Base Load, Base Fuel Prices	2035	21,505	-40%
Base Load, High Fuel Prices	2035	19,692	-45%
Base Load, Low Fuel Prices	2035	25,100	-30%
High Load, Base Fuel Prices	2035	22,831	-36%
High Load, High Fuel Prices	2035	20,636	-42%
High Load, Low Fuel Prices	2035	28,079	-22%
Low Load, Base Fuel Prices	2035	20,619	-42%
Low Load, High Fuel Prices	2035	19,155	-47%
Low Load, Low Fuel Prices	2035	22,992	-36%

2.48. Please refer to the spreadsheet entitled "20211002_Tablesfor ReliabilityAnalysisD06" provided in response to Joint Intervenors' First Set of Discovery.

a. Please explain why there is a difference between frequency (every few years) of the overhaul costs given in tab "Stay-Open Cost" and the annual, historical capital costs by units given in response to JI 1-17(d).
b. Will the overhaul costs given in tab "Stay-Open Cost" be capitalized when they are recovered from ratepayers? Please explain in full.
c. If the overhaul costs in the tab "Stay-Open Cost" are a different category of costs from the capital costs given in response to JI 1-17(d) please explain why annual capitalized maintenance was not accounted for as part of the Companies' stay-open costs.

2.49. Please refer to the Companies' response to JI Q-1.41, which says in part, "[T]he Large Nonresidential Demand Conservation Program is open to industrial customers who have not opted out of DSM." Which respect to this statement please answer the following:

a. Please give a copy of the communication(s) typically sent to eligible opt-out customers describing the opt-out/in options.
b. Describe the process that a customer would take to opt back in to DSM programs.
c. Please explain why DR programs are subject to opt-out provisions, what rules, Commission orders, etc. apply?
d. Please explain how DSM cost-allocation works for customers who opt-in to DSM programs even though they are eligible to opt-out.

2.50. Refer to the Companies' response to PSC Q-1.13 which says in part, "The load forecast implicitly assumes these efficiency improvements will continue throughout the IRP analysis period."

a. Please explain why the Company believes the load forecast accounts for efficiency improvements throughout the IRP analysis period.
b. Please provide any workbook(s) in electronic format with all formulas and links intact that support your answer.
c. What were the Companies' annual incremental peak and MWh savings from DSM during historical period used to develop the load forecast model?

2.51. According to Table 8-17, Volume I, p.105 pdf, the Companies' generation resource mix would continue to rely heavily on coal and natural gas through 2036. The generation mix supplied from coal and natural gas is proposed to decline from 96.6% in 2021 to 91.1% in 2030 and 79.0% in 2036.

a. Explain how the Companies reconcile this plan with Louisville Metro's 100% Renewable Energy Commitment.
b. Explain how the Companies reconcile this plan with their parent company PPL's commitment to reduce emission 70% by 2035 (relative to 2010 emissions), 80% by 2040, and 100% by 2050.

2.52. Considering the Biden Administration and the nation's focus on rapidly reducing greenhouse gas emissions in response the climate crisis, which the Company has acknowledged in the IRP (p. 13, Vol. III); and Louisville Metro Government's commitment to reaching 100% clean energy for Metro operations by 2030 and the entire community by 2035; and PPL's climate commitments, have the Companies evaluated a range of scenarios based on achieving aggressive

emission reduction goals? For example, achieving a 50% reduction in CO2 emissions by 2030 and 100% reduction by 2036?

If yes, please provide all data, analysis, and workpapers associated with these scenarios.

2.53. The Biden Administration just placed the "social cost of carbon" (SCC) for a ton of CO2 emitted in 2020 at $51. Meanwhile, economists Nicholas Stern and Joseph Stiglitz suggested a value around $100 per ton by 2030; Carleton and a colleague set it at about $125 per ton of carbon in a paper published in January; and Frances Moore, an environmental economist at the University of California at Davis, put it at $220 per ton in the estimate she and a colleague produced in 2015. What value do the companies place or reference for the SCC?

2.54. Please provide all data for the projected annual carbon dioxide and methane emissions that would be produced by the Companies under the plan proposed in the IRP. Include the percent change this represents relative to the Companies' emissions in 2021 and 2010.

2.55. With regard to methane (also referred to as natural gas):
   a. Please describe all measures the Companies take to monitor, control, prevent, and repair methane leaks in all of its infrastructure, including pipelines, meters, storage facilities, and generation plants.
   b. Please provide any and all data and reports produced by the Companies regarding methane leakage from 2016 to 2021.
   c. What plans and goals do the companies have to reduce methane emissions during the planning period?
   d. How were methane emissions factored into the Companies' IRP planning process, risk assessments, and cost-benefit analyses?
   e. Please provide the following data for the past five years:
      i. Natural gas wholesale purchases (volumetric) for re-sale to customers and for power generation
      ii. Natural gas production from wells owned by the Companies
      iii. Natural gas volumes sold to customers
      iv. Natural gas volumes burned for electricity generation
      v. Amount of natural gas lost between the source (where the Companies acquire the gas) and the end-use (when it passes through the customer's meter or when burned in a generator)

2.56. In this time of climate crisis, felt by our entire community and country, why do the Companies express little sense of urgency, or

commitment to community responsibility, participation, and collaboration? Why do they seem to minimize the public interest?

2.57. In comparing and evaluating possible resource additions and retirements (including distributed generation) do the companies include the costs of pollutants and environmental damage, negative health impacts, and the potential avoided costs of these (such as those costs quantified in: https://www.epa.gov/statelocalenergy/public-health-benefits-kwh-energy-efficiency-and-renewable-energy-united-states; and https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf)?

2.58. Please provide details of all participation by the Companies in Merchant Solar developments not described in the IRP, and how such developments are connected to the Companies' operations described in the IRP.

2.59. Regarding the research conducted at the EW Brown Station solar and battery storage facility, please provide each of the research reports and presentations referenced on p.108 of Volume I.

a. Provide all reports and data available concerning vegetation management and grazing at the EW Brown solar field.

2.60. In reference to "Data Analytics" (p.109, Vol. I), please provide all data, analysis and reports resulting from modeling of "the minute-to-minute impacts of intermittent renewable generation on the Companies' transmission and generation systems." Please identify all software used for this modeling.

2.61. What is the status of the Companies' carbon capture research and the status of carbon capture technologies? What is the Companies' assessment of the state of carbon capture and sequestration technologies, and how these technologies will evolve over the next 15 years? What are the Companies projections for how the cost of carbon capture and sequestration will change over the next 15 years. Please provide all data, reports and analysis to support the Companies' response.

2.62. Regarding the impact of Electric Vehicle charging on peak loads, what measures are the Companies considering to incentivize customers to shift EV charging into lower load hours of the night?

2.63. Since the companies are already experiencing customers switching from gas appliances to electric, please provide more details of your expectations in that regard, and the implications for increasing both regular demand and peak demand for electricity?

2.64. Can the companies model how expanded distributed generation (for example that might occur with the elimination of the 1% cap on net metered solar), and expanded utility scale solar combined with battery storage, could be used to moderate the effects of expanded EV adoption on load profiles.

2.65. With respect to the potential buildout of crypto-currency mining in Kentucky:
   a. Explain whether or how the companies have incorporated crypto currency mining operations into their load forecasts.
   b. Do the companies expect the development of crypto currency mining to impact the planned retirement of their coal-based power plants?

2.66. Provide the location for each solar EV charging station and non-solar EV charging station currently operated by the Companies.
   a. Describe any efforts the Companies have made to explore cooperation with any Cities or schools on the electrification of bus fleets.
   b. Has the Company evaluated incentives for electrification of bus fleets or other fleets for the benefits they would provide to the companies and customers?

2.67. How did the Companies' include consideration of weather extremes into the IRP planning process? Do the Companies' forecasts and planning take account of the risk of more extreme weather in the future, as is expected due to climate change, and as we have already been experiencing in recent years?

2.68. The number of tornadoes doubled in the period 2000-2020 compared to 1980-2000. Clearly extreme weather and climate patterns are changing. Note that all the peak load events were in the last eleven years. But on page 21 pdf, Vol 1, the companies state that for the Reserve Margin Analysis, they based their forecasts on weather going back 48 years. How do the Companies justify giving the same weight to weather data from 1973-1988 as to what occurred in 2005-2020?

2.69. How will the Advanced Metering Initiative help with Demand Side Management? Please give details. For example:

a. What data and DSM pilot programs (mentioned on page 17 volume 1) will be associated with the implementation of the AMI?
b. Detail possible ways implementation of AMI will lead to energy reductions and to demand impacts and give details of the estimated size of impacts.

2.70. On page 94, the companies state that their DSM programs have been a "tremendous success", and on page 102 state: "...the Companies project that the portfolio of programs will reduce demand by 179 MW through 2025 as well as achieve energy savings of approximately 215 GWh."
a. Can the companies indicate what metric should be used to evaluate the success of the DSM programs and size of these savings? For example a 215 GWh savings represents less than 1% of current or projected energy requirements (Table 8-17, pg 105 pdf). Is there an alternative metric that should be used to evaluate the programs? For example, how do the companies' savings compare to DSM programs in other states? (Note that the ACEEE 2020 State Energy Efficiency Scorecard (https://www.aceee.org/state-policy/scorecard) ranks Kentucky 33 out of 50 states, and Kentucky scores poorly in their category Utility and Public Benefits Programs and Policies).
b. Can the companies indicate their energy saving goals for the entirety of the planning period (i.e. beyond 2025)?
c. How does the cost of existing or planned demand side resources compare to the cost of supply side resources in meeting customer demand?

2.71. Please explain the companies' cost benefits analyses of DSM programs (including energy efficiency programs):
a. Please provide all data and analysis performed regarding all DSM programs considered for implementation during the planning period. Please include all Benefit-Cost analyses and all cost tests utilized for each program and identify each program that was evaluated.
b. Did cost benefit analyses include potential avoided transmission or distribution investments? If not, why not?
c. Did cost benefit analyses include avoided pollutants and environmental damage, avoided negative health impacts, and the avoided costs of these (such as those costs quantified in: https://www.epa.gov/statelocalenergy/public-health-benefits-kwh-energy-efficiency-and-renewable-energy-united-states; and https://www.whitehouse.gov/wp-

content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf)?

d. If the companies have not used the Societal Cost Benefit Test in considering DSM offerings, please explain why not.

2.72. On p.13 of Vol. III, the Companies state, "the Companies did not directly evaluate new demand-side management ("DSM") programs in this IRP. Instead, the IRP identifies potential opportunities for new DSM programs that will be evaluated with data and pilot programs associated with the implementation of AMI." Please explain why DSM programs, which the Companies describe as being "a tremendous success", were not thoroughly evaluated for their potential to meet the Companies' resource requirements and provide direct benefits to their customers.

2.73. On p.94 (Volume I of IRP), the Companies state that their DSM programs have been a "tremendous success."

a. Why then does the IRP indicate all DSM programs ending after 2025 and providing no further incremental energy savings?

b. Why have the Companies not evaluated the use of demand side management, energy efficiency, and distributed energy resources as system resources on par with traditional supply resources?

2.74. Have the Companies evaluated how to provide the greatest benefits to their customers through the strategic utilization of Distributed Energy Resources in all its forms (DERs, including but not limited to DSM, energy efficiency, distributed generation, battery storage, demand response)? Have the Companies evaluated how the benefits of DERs can be shared most broadly among their customers, especially low-income, and historically underserved and marginalized communities?

2.75. Refer to Vol. I, Table 8-12 "KU and LG&E Demand Side Management Energy and Demand Impacts (Incremental)", particularly the second page, showing "DSM Summer Peak Demand Reduction (MW)."

a. Please clarify if the negative values for "Residential and Small Nonresidential Demand Conservation" are intended to reflect an increase in demand. If so, please explain in full how this demand conservation program increases the summer peak demand.

b. Please clarify whether the negative values for "Total Annual Demand Reduction" are intended to reflect a net increase in demand. If so, please explain in full how the cumulative effect

of the Companies DSM programs results in a net increase in the summer peak demand.

2.76. In Table 8.1, Vol. I, p.76 of pdf, please explain what "CSR" and "DCP" refer to.

2.77. On p.84 of Vol. I, it states: "VVO will also support implementation of conservation voltage reduction (CVR), the intentional lowering of distribution system voltages on targeted system components to reduce overall system demand and produce direct energy savings for customers." Please provide further explanation of CVR, how it operates, its costs and benefits, and what the Company sees as the long-term potential for this strategy.

2.78. Regarding Nonresidential Rebates Programs, on p.95 of Vol. I, it states: "This program is offered to all nonresidential class customers. The objective is to identify energy efficiency opportunities for customers and assist them in the implementation of these identified energy efficiency opportunities via incentives. The incentives are available for both prescriptive and custom measures, as well as LEED certifications and new construction that exceeds the current building code."

a. List all measures implemented from 2018 - 2021 with the following information:
    i. Measure / action implemented
    ii. Cost of measure to customer
    iii. Amount of incentive provided by the Company
    iv. Annual energy and demand savings of measure
    v. Process used to determine Measure and Incentive amount
b. Please explain the process used to determine what measure will be incentivized for a customer. What Measurement & Verification processes are used to confirm that Measures are installed correctly and perform as expected? Are installations third-party verified?
c. What is the annual budget for the Nonresidential Rebate Program and the average expenditure per participant? How many customers received incentives each year from 2018 - 2021?

2.79. Why does the Company propose to continue offering energy efficiency rebate programs for non-residential customers but does not propose extending these rebates to residential customers?

2.80. On p.9 of Vol. I, the Companies note that they experience peak demand in summer and winter, and that the increasing use of electric

heating increases the frequency of winter peaks. There is also a societal shift towards the electrification of heating systems, as another strategy for decarbonizing the energy system. With this in mind, please provide all studies and analysis performed by the Companies concerning incentivizing the use of high-efficiency heat pumps, including units known as "mini-split heat pumps," for both residential and nonresidential customers.

2.81. In August of 2020, KU made a presentation to Mountain Association regarding a potential on-bill tariff, including a slide referencing their "On-Bill Tariff Analysis – 'Measure View" that included some of their assumptions and the results of their preliminary "cost/benefit tests for normal weather." Please provide the full set of assumptions that the companies used for these analyses, as well as the full analyses and results of all of the cost/benefit tests for which scores were presented. (Utility test: 3.57, TRC test: 0.26, RIM test: 0.16, RIM net fuel test: 0.16, Societal Test: 0.26, and Participant test: 2.09.)

2.82. Ouachita Electric in Arkansas credited robust investments in PAYS (Pay as you Save programs) and DER's when they delivered a 4.5% rate decrease to their owner-members in 2020. How would a robust PAYS-based inclusive utility investment program impact the companies' cost of service? How would a robust plan to incent DER's impact the companies' cost of service?

2.83. In reference to the "2021 RTO Membership Analysis" (Vol. III, pp.84-140), on p.103 it states, "The High Case uses assumptions most supportive of RTO membership, such as lower administration costs, higher energy and capacity prices, and lower transmission expansion costs."

a. Are we correct that higher energy and capacity prices are deemed favorable if the Companies are selling energy and capacity into the RTO?
b. In cases where RTO energy and capacity prices are very low, would that provide an opportunity to provide lower cost power to customers?
c. Did the Companies evaluate RTO membership through the lens of meeting aggressive carbon emission reduction goals? Was enabling greater and more rapid reductions in carbon emissions included as a benefit among the measures used to evaluate RTO membership? Please discuss how RTO membership could enable the Companies to meet such goals.
d. How would the RTO analysis be changed if achieving more aggressive carbon emission reduction goals were included as a

benefit among the other metrics used to evaluate RTO membership?

e. How did the Companies include Louisville Metro's 100% Renewable Energy Commitment into their RTO Membership Analysis? Please provide all data and workpapers associated with this analysis.

2.84. In PSC ORDER 20210514 in case number 2020-00174 (Kentucky Power), the commission identified several principles that should be followed in evaluating distributed generation. These include: Evaluating eligible generating facilities as a utility system or supply side resource; Treating benefits and costs symmetrically; Conducting forward-looking longer term and incremental analyses; Avoiding double counting; and Ensuring transparency. Please indicate:

a. How the companies have followed these principles when planning for the role of distributed generation in the planning period.
b. What avoided costs have been incorporated into the analyses of distributed generation? For example, have any of the following been included: avoided energy cost, ancillary services cost, generation capacity cost, transmission capacity cost, distribution capacity cost, carbon cost, environmental compliance cost.
c. How have the companies applied any of these same principles and avoided costs to evaluation of any of its DSM (including energy efficiency) programs?
d. Have the companies considered jobs benefits of distributed generation or energy efficiency programs?

2.85. Page 36 In figures 5-14 to 5-15 the companies illustrate how distributed generation will only impact energy requirements in the "high scenario when a new federal law is assumed to eliminate the 1% cap on total installed net metering capacity'. Without this cap elimination DG will not grow sufficiently to reduce companies' energy requirements.

a. Is it not in the public interest to reduce the energy requirements the company needs to meet? So would it not be in the public interest for the company to push for expanded DG?
b. Can the companies analyze the cost savings to the companies in this high solar vs. base solar scenario (e.g. using the principles and avoided cost categories set forth in The NSPM-DER and in PSC order in Kentucky Power Company Case No. 2020-00174)?

2.86. In section 8.3, the companies discuss a variety of efforts they will be making to integrate renewables, but they propose a small percentage of renewables in their 15-year plan, and a small amount

of battery storage that might address the frequently mentioned concern related to lack of dispatchability of renewables. On pages 14 and 15 of pdf of Volume III, the companies show that the capital cost of 4 hour battery storage and SCCT's will be roughly equal by 2030 (similarly, as shown on page 18 of pdf, Volume III, by 2031 the LCOE of batteries is slightly below that of SCCTs):

a. Expand on why the companies are waiting until 2035 to add new battery storage while adding new SCCT in 2028.
b. Expand on why such a small amount of battery storage (200 MW) is being added at all, especially in comparison to the 1320-1488 MW of SCCT.
c. Do the companies incorporate environmental compliance costs, carbon costs, or carbon or methane emissions data in comparing the cost benefits of batteries and SCCT?
d. Explain how the companies consider battery storage and solar jointly in their planning. Explain the specific relationship between solar planning and battery planning. How are the cost benefits calculated of solar and battery storage considered in combination?

2.87. Have the companies done or planned research into long duration storage such as pumped hydro storage? Please give details.

2.88. We would like to see a detailed analysis of the costs of dealing with regulations:

a. What are the companies' costs of trying to head regulations off (analysis, lobbying, legal actions).
b. What are the companies' costs of responding to regulators (penalties, ameliorative actions).
c. How are these costs reflected in customer bills and in reduced shareholder dividends?

2.89. Please supply more details on required new investments in the grid:

a. to provide enhanced security against cyber-attacks,
b. to accommodate rooftop solar, solar arrays and other distributed sources,
c. to maintain reliability in extreme weather.

2.90. Will the companies offer strategies to enhance the benefits of grid edge resources, that may also reduce capital cost by customers to invest in those, such as interconnected renewables, timed vehicle charging and storage? ConnectDER (https://connectder.com), manufactures a collar designed to fit between the revenue meter and the meter base for a convenient interconnection location for grid edge resources. This could empower both companies and

customers with enhancing the value of grid edge resources and reducing the customer's cost to install grid edge resources by conveniently interconnecting at the meter base instead of facing complexities and added costs that may arise from connections at the customer's load distribution panel. Will companies partner with ConnectDER and provide the collar to customers wishing to interconnect resources to companies or allow ConnectDER collar products to be installed by their customers between the meter base socket and the meter? If not, please explain the rationale fully.

2.91. Please provide any and all energy burden analysis considered as a part of the Integrated Resource Plan (IRP) process. Please provide any and all internal analysis and discussion materials from the Companies of these studies.

2.92. Please provide any and all strategy screens the Companies applied during the development of the proposed Integrated Resource Plan (IRP) process to advance equity and the outcomes from applying these strategy screens. Please provide any and all internal analysis and discussion materials from the Companies of these studies.

2.93. Please provide data on the impact of electrifying large sectors of the U.S. economy over the period of the proposed Integrated Resource Plan (IRP) and the implications for low-income customer affordability and access. What steps are the Companies taking to ensure equitable distribution of benefits and costs on low-income customers? Please provide any and all analysis. Please provide data by census tract and zip code.

2.94. Please provide the following data, and any and all internal analysis and discussion materials, on how this influenced the preparation of the proposed Integrated Resource Plan (IRP) and how COVID-19 pandemic data impacted the analysis in anticipating future pandemic instability:

a. Please provide data for the number of people who are eligible for gas disconnection by census tract. Please provide data for the number of people who are eligible for electric disconnection by census tract
b. Please provide data on the number of people who are behind on their gas payments by census tracts. Please provide data on the number of people who are behind on their electric payments by census tract.
c. Please provide data on the average amount owed on past due bills by census tract.

d. Please provide data on the number of people who have a signed repayment plan by census tract.
e. Please provide data on the number of people who are behind on their payments, but do not have a signed payment plan in place by census tract.
f. Please provide data on the number of people who have a signed payment plan who are current on that payment plan by census tract.
g. Please provide data on the number of people who have a signed payment plan who have missed one or more payments by census tract.
h. Are the people who have missed one or more payments on their payment plan included in the overall number of people who are eligible for disconnection?
i. Please provide data on the number of people who have received support from pandemic utility assistance programs by census tract.
j. Please provide data on the amount of money received by the Companies from pandemic utility assistance programs.
k. How many households have the companies disconnected from electrical service since February 2020? Including multiple disconnections to households, how many total disconnections have been carried out?
l. What was the average length of these disconnections?
m. Which zip codes (or census tracts in Louisville/Lexington) had the highest disconnection rates?
n. How much would it have cost to forgive those arrearages instead of making those disconnections?

2.95. In their 2017 report "Lights Out in the Cold: Reforming Utility Shut-Off Policies as If Human Rights Matter," the NAACP "calls for concrete action toward establishing policies that protect the well-being of all utility customers and the eventual elimination of utility disconnections." They also provide "a collection of true stories about real people whose lives were cut short, or nearly cut short, by utility companies who were willing to pull the plug to protect profits," and go on to state that "the establishment of a universal right to uninterrupted energy service would ensure that provisions are in place to prevent utility disconnection due to non-payment and arrearages."

But according to the Legal Aid Network of Kentucky, for ratepayers that are facing disconnection, "a 30-Day Extension of Service Must Be Granted if:

- Member of Household is Ill: The customer brings in, before the shut-off

date, a "Certificate of Need" statement signed by a doctor, nurse, or public health official, saying that cutting off service would harm a member of the household who is ill. Follow-up requests for extensions must include not only the doctor's statement but also an agreed partial payment plan.

· Notice Goes To Low-Income Household between November 1 & March 31: Customer brings in, before the shut-off date, a statement from their local office of Community Based Services that they qualify for the heating assistance program or their income is at or below 130% of poverty. If the customer can work out a payment plan which will catch up their bill by no later than October 15, they can't be disconnected."

What concrete actions are the companies taking to ensure and increase universal access to electricity, especially to underserved communities such as low-income households and communities of color? What policies do you have in place that go above and beyond the legal rights noted by the Legal Aid Network?

2.96. What was the amount collected in late fees for each of the calendar years 2018 – 2021? How much do you expect to collect in 2022? How much (as a percentage of revenue) do late fees contribute to the companies' budgets? How do these numbers compare nationally?

2.97. In the IRP filings, the companies state: "In 2021, EPA began emphasizing the use of their environmental justice screening tool ("EJ Screen") when community or project stakeholders have concerns about impacts on a community regarding issues related to environmental justice. However, as of the date of this IRP, there is no prescribed guidance on data interpretation nor any defined actions that should be taken based on the data provided by use of EJ Screen. Therefore, the Companies will continue to utilize existing siting processes until change is prompted by local, state, or federal drivers. Although not actively utilizing the EPA's EJ Screen, the Companies consider environmental and economic factors in assessing and planning development activity."

a. Please elaborate in detail how you consider environmental and economic factors in planning and development. Specifically, how do you identify and consider impacts on low-income households and communities of color?
b. Would it be beneficial to begin working with the screening tool to identify inequities in advance of directives on how to address them? Will you continue to ignore these inequities unless forced to address them by a regulatory entity?
c. We know that low-income and communities of color are disproportionately impacted by energy production and energy

burden. How do you consider these impacts in your planning and development processes? How do you prioritize DSM and DER's that lower energy bills in environmental justice communities?

2.98. How are the companies helping low-income households and communities of color access DER's to lower their energy bills? Are the companies encouraging more accessible and equitable solar policy like the monetization of tax incentives, virtual net metering, third-party ownership, etc? If not, why?

2.99. Please provide data on programmatic DSM charges and disbursements (incentives, rebates, and weatherization assistance) for low-income and communities of color, either by census tract or zip code.

2.100. How have the companies engaged stakeholders, including residential customers, in the development of this IRP?

Respectfully submitted,

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CERTIFICATE OF SERVICE

In accordance with the Commission's July 22, 2021 Order in Case No. 2020-00085, *Electronic Emergency Docket Related to the Novel Coronavirus COVID*-19, this is to certify that the electronic filing was submitted to the Commission on March 4, 2022; that the documents in this electronic filing are a true representations of the materials prepared for the filing; and that the Commission has not excused any party from electronic filing procedures for this case at this time.

Tom FitzGerald