COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC 2022 INTEGRATED	**)**	
RESOURCE PLAN OF EAST KENTUCKY	**)**	**CASE NO.**
POWER COOPERATIVE, INC.	**)**	**2022-00098**

RESPONSES TO JOINT INTERVENOR'S SUPPLEMENTAL INFORMATION

REQUEST TO EAST KENTUCKY POWER COOPERATIVE, INC.

DATED AUGUST 30, 2022

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

2022 INTEGRATED RESOURCE PLAN OF EAST KENTUCKY POWER COOPERATIVE, INC.	))	**CASE NO. 2022-00098**

CERTIFICATE

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Darrin Adams, being duly sworn, states that she he supervised the preparation of the responses of East Kentucky Power Cooperative, Inc. to the Joint Intervenors Supplemental Set of Data Requests in the above-referenced case dated August 30, 2022, and that the matters and things set forth therein are true and accurate to the best of his knowledge, information and belief, formed after reasonable inquiry.

Darrin W. Adams

Subscribed and sworn before me on this 20th day of September 2022.

Gwyn M. Willoughby
Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

2022 INTEGRATED RESOURCE PLAN OF EAST KENTUCKY POWER COOPERATIVE, INC.	))	**CASE NO. 2022-00098**

CERTIFICATE

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Scott Drake, being duly sworn, states that she he supervised the preparation of the responses of East Kentucky Power Cooperative, Inc. to the Joint Intervenors Supplemental Set of Data Requests in the above-referenced case dated August 30, 2022, and that the matters and things set forth therein are true and accurate to the best of his knowledge, information and belief, formed after reasonable inquiry.

Scott Drake

Subscribed and sworn before me on this 20th day of September 2022.

Gwyn M. Willoughby
Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

2022 INTEGRATED RESOURCE PLAN OF EAST KENTUCKY POWER COOPERATIVE, INC.	**)** **)**	**CASE NO. 2022-00098**

CERTIFICATE

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Craig Johnson, being duly sworn, states that she he supervised the preparation of the responses of East Kentucky Power Cooperative, Inc. to the Joint Intervenors Supplemental Set of Data Requests in the above-referenced case dated August 30, 2022, and that the matters and things set forth therein are true and accurate to the best of his knowledge, information and belief, formed after reasonable inquiry.

Craig Johnson

Subscribed and sworn before me on this 20th day of September 2022.

Gwyn M. Willoughby
Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

2022 INTEGRATED RESOURCE PLAN OF EAST KENTUCKY POWER COOPERATIVE, INC.	))	**CASE NO. 2022-00098**

CERTIFICATE

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Julia Tucker, being duly sworn, states that she has supervised the preparation of the responses of East Kentucky Power Cooperative, Inc. to the Joint Intervenors Supplemental Set of Data Requests in the above-referenced case dated August 30, 2022, and that the matters and things set forth therein are true and accurate to the best of her knowledge, information and belief, formed after reasonable inquiry.

Julia J. Tucker

Subscribed and sworn before me on this 26th day of September 2022.

Gwyn M. Willoughby
Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

2022 INTEGRATED RESOURCE PLAN OF EAST KENTUCKY POWER COOPERATIVE, INC.	**)** **)**	**CASE NO. 2022-00098**

CERTIFICATE

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Fernie Williams, being duly sworn, states that she he supervised the preparation of the responses of East Kentucky Power Cooperative, Inc. to the Joint Intervenors Supplemental Set of Data Requests in the above-referenced case dated August 30, 2022, and that the matters and things set forth therein are true and accurate to the best of his knowledge, information and belief, formed after reasonable inquiry.

Fernie D. Williams

Subscribed and sworn before me on this 19th day of September 2022.

Gwyn M. Willoughby
Notary Public

GWYN M. WILLOUGHBY
Notary Public
Commonwealth of Kentucky
Commission Number KYNP38003
My Commission Expires Nov 30, 2025

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 1

RESPONSIBLE PARTY: Julia J. Tucker

Request 1. Refer to Joint Intervenor Response 4b, please provide the most recent IHS updated outlook, released in July 2022.

Response 1. See attached Confidential Report named "*Response 1 Joint Intervenors Attachment – State Analysis Summer_CONFIDENTIAL.*"

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 2

RESPONSIBLE PARTY: Fernie Williams

Request 2. Refer to Joint Intervenor Response 7(a-c) and answer the following requests.

Request 2a. Has EKPC determined a margin of error for their load forecast methodology, given that the load forecast methodology has remained unchanged since at least the 2010 Load Forecast?

i. If so, please provide the results and conclusions reached, along with supporting analyses, work papers, and documentation.

ii. If not, please explain why not.

Response 2a. A margin of error for long term load forecasts is not available.

i. N/A

ii. There is no margin of error available because these are long-term forecasts that do not include many data points 15 years from the forecast vintage. Any analysis is based on near term accuracy rather than long term. East Kentucky Power Cooperative recognizes that the IRP is based on a point in time and updates its forecast every two years to ensure long term projections are based on recent assumptions and history.

Request 2b. Has EKPC determined the accuracy of their past load forecast projections compared to actual load data now available to ensure accuracy in their load forecast methodology?

(b) i. If so, please provide associated work papers in native format with formulae intact and explain the conclusions drawn from that analysis.

(c) ii. If not, please explain why not.

Response 2b.

i. The tables below report accuracy of long-term forecasts in the near term. The actual data is weather normalized. It is important to emphasize the uncertainty with assumptions other than weather, in particular economic development and macroeconomic assumptions. For example, the economic assumptions for 2018 could not have predicted the downturn experienced in 2020 and 2021 due largely to a global pandemic. DSM and demand response assumptions have been revised over time as well. This uncertainty along with general model attributes contribute to the overall deviations in the tables below. Forecasts are based upon the best information available at the time. Underlying assumptions are constantly changing. EKPC prepares various scenarios to understand what levels of lower or higher growth may occur.

ii. N/A

Year	Winter Peak	2015 IRP Forecast	2015 IRP Forecast % Difference	2019 IRP Forecast	2019 IRP Forecast % Difference
2016	3,002	3,239	8%		
2017	3,135	3,259	4%		
2018	3,349	3,282	-2%		
2019	3,380	3,302	-2%	3,258	-4%
2020	3,144	3,338	6%	3,281	4%

Year	Summer Peak	2015 IRP Forecast	2015 IRP Forecast % Difference	2019 IRP Forecast	2019 IRP Forecast % Difference
2016	2,384	2,363	-1%		
2017	2,421	2,396	-1%		
2018	2,363	2,428	3%		
2019	2,440	2,456	1%	2,341	-4%
2020	2,459	2,502	2%	2,377	-3%

Year	Total Requirements	2015 IRP Forecast	2015 IRP Forecast % Difference	2019 IRP Forecast	2019 IRP Forecast % Difference
2016	12,895,262	13,563,866	5%		
2017	12,838,462	13,781,894	7%		
2018	13,267,758	13,974,738	5%		
2019	13,134,522	14,147,514	8%	14,354,291	9%
2020	13,064,550	14,436,649	11%	15,109,727	16%

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 3

RESPONSIBLE PARTY: Fernie Williams

Request 3. Refer to Joint Intervenor Response 10, please explain how Seasonal Residential growth rates were reclassified, and how their reclassification affected the growth rate of any other Customer class.

Response 3. Seasonal Customers are classified by owner-member cooperatives. Growth rates were not reclassified. Rather, the seasonal Customers were reclassified to an RUS class other than seasonal. This represents less than 0.1% of RUS class energy sales at the EKPC level and the effects to other classes are marginal. Total energy is not affected by reclassifications.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 4

RESPONSIBLE PARTY: **Fernie Williams**

Request 4. Refer to Joint Intervenor Response 13b, please provide the 2022 Long Range Load Forecast. If not yet complete, please provide the anticipated date of completion.

Response 4. The 2022 Load Forecast will be completed in December 2022 and subsequently reviewed and approved by RUS.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 5
RESPONSIBLE PARTY: Fernie Williams

Request 5. Refer to Joint Intervenor Response 14, 15, and 16a, and answer the following requests.

Request 5a. What assumptions for cryptocurrency operations are made in the 2020 load forecast, given the increasing load attributable to cryptocurrency operations?

Response 5a. There are no assumptions for cryptocurrency operations in the 2020 load forecast.

Request 5b. Is the load attributable to cryptocurrency expected to increase? Please explain.

Response 5b. Individual cryptocurrency loads are not forecasted by EKPC. Cryptocurrency operators often contact owner-member cooperatives regarding new loads. Some of these cryptocurrency operators move forward as end-use retail members while others do not. In the near term, cryptocurrency is expected to increase, however, cryptocurrency operations tend to be correlated to the price of cryptocurrency and energy prices. There is no additional information for cryptocurrency loads in the long term.

Request 5c. If no assumptions are made for cryptocurrency operations in the 2020 load forecast, please explain why in light of the increase of load from 6.5MWs in 2021 to 27.5MWs in 2022.

Response 5c. Cryptocurrency loads can be installed quickly. At the time the 2020 load forecast was prepared, the cryptocurrency loads in 2021 and 2022 were not known.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 6

RESPONSIBLE PARTY: **Scott Drake**

Request 6. Refer to Joint Intervenor Response 16e, which provides the per kilowatt rate for EKPC's interruptible incentive. Please provide "the dollar value of incentives or rebates paid to participating cryptocurrency operations (in the aggregate and on average)." If the requested information is not available, please explain why not.

Response 6. Total cryptocurrency load fluctuates slightly each month resulting in slightly different total cryptocurrency load. The current average monthly interruptible credit for cryptocurrency loads in aggregate is approximately $150,000.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 7

RESPONSIBLE PARTY: Fernie Williams

Request 7. Refer to Joint Intervenor Response 26a, does the EKPC load research program monitor Customers who own electric vehicles? If not, in what way does EKPC monitor changes to end consumer adoption of electric vehicles?

Response 7. The load research program does not have details regarding participants with electric vehicles. EKPC monitors changes to end-use retail member adoption by surveying consumers.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 8
RESPONSIBLE PARTY: Scott Drake

Request 8. Refer to Joint Intervenor Response 28, has EKPC considered incentive programs to increase the adoption of electric vehicles? Has EKPC taken steps to facilitate the adoption of electric vehicles within the EKPC service area, such as through the creation of a public charging network? If not, please explain why.

Response 8. EKPC and its owner-members are evaluating a residential EV home charge pilot program that will provide a per kWh incentive to charge the EVs during off-peak hours while at home. Although the pilot program design is to shift or move charging times of the EVs from on-peak hours to off-peak hours, the incentive could increase adoption. EKPC has not taken steps specifically to increase adoption of EVs.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 9
RESPONSIBLE PARTY: Scott Drake

Request 9. Refer to Joint Intervenor Response 61 and answer the following requests.

Request 9a. Please explain what measures in long standing energy efficiency programs (i.e., button up weatherization) were eliminated due to cost effectiveness?

Response 9a. In the 2019 tariff revisions, the following measures were eliminated due to cost-effectiveness:

Program	**Measures**
Button-Up Weatherization	High efficiency windows and doors
Residential Direct Load Control	Water heaters (no new installations)
Touchstone Energy Home	15% more energy efficient option

Request 9b. Please explain why the ENERGY STAR Appliances program was determined to no longer be cost effective despite high participation and energy savings at an all-time high.

<u>Response 9b</u>. The ENERGY STAR® Appliances program was no longer cost-effective in 2019. The main reason for this was the decline in energy and capacity prices. As a result, refrigerators, freezers, clothes dryers, dishwashers, air conditioners, heat pumps, and heat pump water heaters were no longer cost-effective.

<u>Request 9c</u>. Please explain how EKPC determined the "high rate of free riders" and why that determination resulted in the discontinuance of the Commercial and Industrial Lighting program.

<u>Response 9c</u>. EKPC and the owner-member cooperatives observed that more companies chose to move to the most efficient LED lights as the price of those lamps declined regardless of any incentive offered by EKPC. Once the majority of members choose LED regardless of rebates, LEDs become the new baseline technology for lighting. Thus, continuing to provide incentives results in a significant number of free riders. Programs with high rates of free riders incur unnecessary utility expense. High levels of free ridership also result in an inefficient allocation of resources.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 10

RESPONSIBLE PARTY: **Scott Drake**

Request 10. In reference to Residential Efficient Lighting Program, please detail how the Company plans to incorporate the new federal lighting standards that will take effect in 2023.

Response 10. EKPC, in partnership with its owner-member cooperatives, provides an LED bulb to end-use members attending their electric cooperative's annual meeting, as well as providing an LED bulb incentive to end-use members completing the online virtual energy assessment for their home. The LED bulbs provided are promotional in nature. However, EKPC claims energy savings from the bulbs. The new standard that will take effect in 2023 will lower the kWh savings per bulb claimed by EKPC when compared to 2022.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 11

RESPONSIBLE PARTY: Scott Drake

Request 11. In reference to the CARES Low-Income Weatherization Program, please provide the following information:

Request 11a. The average savings per household completed in 2019, 2020, and 2021.

Response 11a. The average savings over the requested three years is 4,731kWhs.

Request 11b. The average number of measures installed per home.

Response 11b. Almost all of EKPC's CARES rebates are directed toward and support the installation of a heat pump. Thus, one measure is installed per home by the CARES program.

Request 11c. Explain how the $2,000 incentive cap was established and detail whether the cap includes the cost of labor.

<u>Response 11c.</u> During the initial design phase of the CARES program, EKPC worked with training staff at Kentucky Housing Corporation ("KHC") to identify the most impactful needs for Community Action Agencies ("CAA"). Working with KHC staff, it became evident that justifying the cost of a new heat pump was the biggest challenge for CAA's, yet the largest potential energy savings measure. Two thousand dollars ($2,000) was identified as the amount needed to push the average Savings to Investment Ratio ("SIR") above 1.0 in the CAA's evaluation program. For an agency to justify a measure, the SIR must be greater than 1. The incentive cap does contribute matching funds to the installation cost of the heat pump, which includes the cost of labor.

<u>Request 11d.</u> Is the $2,000 cap sufficient to upgrade to an air source heat pump? Please explain.

<u>Response 11d.</u> Yes, in most situations, $2,000 has helped CAAs across the state achieve an SIR greater than 1.0, which is a requirement in their evaluation process to be able to install an air source heat pump.

<u>Request 11e.</u> Can participants pay a co-pay to increase the number of measures received? Please explain.

<u>Response 11e.</u> A co-pay payment provision would be within the CAA program guidelines. The CAAs are best positioned to provide their program guidelines. CARES provides up to $2,000 in matching funds to CAA for qualified homes.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 12
RESPONSIBLE PARTY: Scott Drake

Request 12. In reference to the Heat Pump Retrofit Program, please provide the following information.

Request 11a. Did EKPC run its cost-effectiveness tests based on the federal standards that will take effect in 2023, which requires 15 SEER in the southern part of the United States? If not, why not?

Request 11b. Has EKPC considered offering tiered incentives to encourage Customers to weatherize their homes prior to the installation of a new heat pump? Please explain.

Response 12a. EKPC conducted cost-effectiveness tests on 15 SEER and 14 SEER heat pumps. The new federal standards will require 15 SEER for split systems and 14 SEER for packaged units.

Response 12b. EKPC offers weatherization services in its Button-Up program. In 2019, the Button-Up program tariff was changed to eliminate multiple levels of incentives because only two measures remained cost-effective.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 13

RESPONSIBLE PARTY: Scott Drake

Request 13. Please explain why did EKPC not include direct load control thermostat program for small business Customers?

Response 13. Many of the owner-member cooperatives' commercial accounts include both small and larger commercial members. The thermostat control technology EKPC uses to control thermostats operates only residential grade after-market thermostats. While some small commercial members utilize residential grade thermostats, larger commercial members utilize thermostats EKPC can't manage. EKPC feels this could be confusing and potentially frustrating to many commercial members. Additionally, the focus of the program is the residential membership. Therefore, EKPC limited participation to residential members.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 14
RESPONSIBLE PARTY: Scott Drake

Request 14. In reference to the Residential Energy Audit Program, please provide the following information.

Request 14a. Will EKPC be sending an LED bulb to members that complete the online Billing Insights analysis after the new federal lighting standards take effect in 2023? Please explain.

Response 14a. Yes. The LED bulb is an incentive for completing the virtual energy assessment. The incentive is not tied to federal standards.

Request 14b. What is the cost to mail the bulb and what evaluation has been completed to ensure that the bulb is installed? Please explain.

Response 14b. The total costs for the bulb, packaging and mailing is $7.86. EKPC has not determined the number of bulbs installed.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 15
RESPONSIBLE PARTY: Scott Drake

Request 15. Given the DSM cost-effectiveness tests conducted, please detail which programs and/or measures that could have cost-effectively been included in the DSM portfolio if a 10% non-energy benefits adder had been assumed.

Response 15. If a 10% non-energy benefits adder were included in the measure cost-effectiveness, the following measures could be added to the DSM portfolio:

- ENERGY STAR® compliant top-mount refrigerator; and
- Smart thermostat for electric furnace with central air-conditioning.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 16

RESPONSIBLE PARTY: Scott Drake

Request 16. In regard to the two EE programs modeled under the DMS portfolio for middle and high carbon cases, please detail how the Appliance Rebate Program and Small Business Lighting Programs would differ from past program offerings by EKPC, such as the ENERGY STAR Appliances and C&I Lighting Programs.

Response 16. The ENERGY STAR® Appliance Rebate Program and Small Business Lighting Program for the middle and high carbon cases have not been redesigned. The ENERGY STAR® Appliance Rebate Program would include cost-effective appliance measures such as refrigerators and clothes washers. The Small Business Lighting Program will be limited to C&I members whose consumption is below a certain threshold. Certain lighting measures are more applicable to small business facilities than to larger business facilities. This program would also likely target efficiency measures with low free ridership, such as fixtures and controls.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 17

RESPONSIBLE PARTY: Scott Drake

Request 17. Has EKPC considered funding a third-party aggregator to for demand response savings from C&I Customers? Please explain why or why not.

Response 17. EKPC is not considering a third-party aggregator for C&I demand response. The only demand response programs offered by EKPC and the owner-members are the interruptible program and direct load control program for commercial members. Due to the complex nature of the interruptible program along with the required three-party agreement and Commission approval for each participant, EKPC will continue to administer the interruptible program utilizing EKPC staff. The direct load control program for commercial members has no participants.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 18
RESPONSIBLE PARTY: Scott Drake

Request 18. Refer to Joint Intervenor Response 62, please explain what changes in programs offered resulted from consultation with the owner-member energy advisor staff.

Response 18. The owner-member energy advisor staff indicated that the cost-effective programs currently offered are appropriate for their membership. They agreed to the changes to the CARES program recommended by EKPC and to the Button-up program recommended by the Collaborative. Both programs were modified and subsequently approved by the Commission effective May 22, 2022.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 19

RESPONSIBLE PARTY: Fernie Williams

Request 19. Refer to section 3.7.1 Load Research on page 94-5, reporting that the load research program consists of 407 meters total, with 35 residential meters, 16 small commercial and industrial meters, 21 medium commercial and industrial meters, and 335 large power meters installed and collecting data, and answer the following questions.

Request 19a. Please explain the decrease in load forecast meters as compared to EKPC 2019 IRP section 3.7.1 Load Research on page 64 where EKPC reported 558 load profile meters total.

Request 19b. Please explain the changes in load forecast meters as compared to EKPC 2019 IRP, section 3.7.1 Load Research at page 65 where EKPC reported 135 residential meters, 41 small commercial and industrial meters, 57 medium commercial and industrial meters, and 325 large power meters.

Response 19a-b. Load research meters may be removed at the request of the consumer or the owner-member. They are also removed when accounts are closed. Participation in the load research program is declining due to a variety of reasons; however, replacement with owner-member cooperatives' AMI systems is trending up. As EKPC evaluates its load research program, it will consider owner-member cooperative AMI data as an option.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 20
RESPONSIBLE PARTY: Fernie Williams

Request 20. Refer to section 3.7 Load Research on page 94-95, is EKPC conducting any other load research and development? What has been the result of past load research projects and proposed projects?

Response 20. EKPC is evaluating its load research program. There are no other load research projects.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 21
RESPONSIBLE PARTY: Darrin W. Adams

Request 21. Refer to EKPC's Response to the Attorney General's Initial Information Request No. 1c, including the statements that "Cooper station provides key voltage support in the transmission area throughout Southern Kentucky. The current transmission system is not configured to support the peak load periods in that region without the generation injections at Cooper Station."

Request 21a. Approximately when did EKPC first become aware of that "the current transmission system is not configured to support the peak load periods in that region without the generation injections at Cooper Station"? Please provide the approximate month and year.

Response 21a. The criticality of the voltage support provided by the Cooper units was recognized in early 2007 when EKPC was notified by the U.S. Army Corps of Engineers that the water levels in Lake Cumberland could be reduced below the intake levels for necessary cooling water for the units.

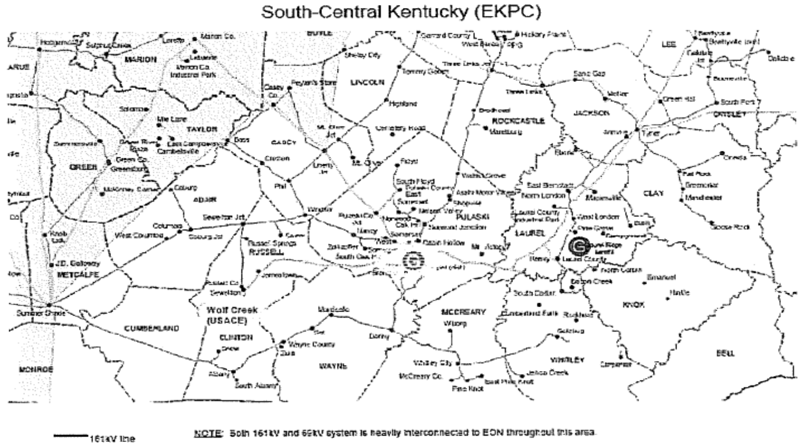
<u>Request 21b.</u> Please identify the particular study or analysis that first led EKPC to conclude that "the current transmission system is not configured to support the peak load periods in that region without the generation injections at Cooper Station" If the particular study or analysis first alerting EKPC to this issue is in EKPC's possession, please produce it.

<u>Response 21b.</u> See Exhibit 1 to testimony submitted by James C. Lamb, Jr. in EKPC's Application for a CPCN for construction of modifications to the water intake system at Cooper Power Station (Case No. 2007-00168) provided below.

<u>Lamb Testimony Exhibit 1</u>
Summary of Power Flow Analysis for Simultaneous Outages of Cooper Units 1 and 2

Power flow analyses of EKPC's 2007 Summer and 2007/08 Winter peak system models were performed to ascertain the ramifications of potential outages of the Cooper Station generating units. The south-central Kentucky area demand is met by four primary sources – the Cooper Station generating units, the Wolf Creek Dam generating units, the E.ON U.S. 345/161 kV transformer at Alcalde, and the Wolf Creek TVA-Russell County-Cooper 161 kV line. Additional support is provided to the area by the following EHV elements – the E.ON U.S. Pineville 345/161 kV transformer, the E.ON U.S. Pocket 500/161 kV transformer, and the Pocket (E.ON U.S.)-Phipps Bend (TVA) 500 kV line. As part of its normal planning process, EKPC evaluates an outage of any one of these sources to determine if transmission system reinforcements are required. EKPC also designs its system for an outage of any single generating unit in conjunction with an outage of a transmission line and transformer. Therefore, in this area EKPC evaluates an outage of Cooper Unit #2 plus an outage of any single line or transformer. However, due to the possibility of decreased water levels for Lake Cumberland that could eliminate the needed water source for the Cooper generating units, the possibility exists that both units could be off simultaneously during the summer. The transmission system must be designed to withstand an additional contingency for this scenario. Furthermore, the U.S. Army Corps of Engineers has informed EKPC that the hydroelectric generating units at the Wolf Creek Dam would be unavailable if the Lake Cumberland water level is lowered below 673 feet. This would eliminate an additional generation source for the area.

South-Central Kentucky (EKPC)



In addition to the potential generating unit outages that could occur due to the Lake Cumberland water level, other typical system issues could exacerbate the problems in the area. In particular, the Kentucky transmission system is often subjected to large levels of parallel flows due to transactions that usually involve energy sales from areas north of Kentucky to areas south of Kentucky. These north-south transfers increase loadings on the Kentucky 161 kV, 138 kV, and 69 kV transmission facilities. The increased flows through the system result in decreased system voltages. Due to the high frequency of these transfers – which are usually in the range of 1000 to 8000 MW – it is prudent to consider the potential impacts of these transfers in the south-central Kentucky area if the generation at Cooper and Wolf Creek is unavailable. Therefore, EKPC has performed power flow analyses for base transfer conditions (0 MW north-south transfer) and for a reasonably expected level of north-south transfer (4000 MW).

The results of these analyses are summarized in the Tables below.

Table 1
2007 Summer

System Overloads Identified
Cooper #1 & #2 off, all Wolf Creek Dam units off

North-South Transfer Level	**Limiting Facility**	**Contingency**	**MVA Flow**	**MVA Rating**	**Possible Load Shed Required**
0 MW	Alcalde-Elihu 161 kV Line (E.ON U.S.)	None	210	205	0 MW
0 MW	Alcalde-Elihu 161 kV Line (E.ON U.S.)	Wolf Creek-Russell County Jct. 161 kV Line (TVA-EKPC)	261	254	15 MW
0 MW	Marion County-Casey County 161 kV Line (EKPC)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	86	78	15 MW
4000 MW	Alcalde-Elihu 161 kV Line (E.ON U.S.)	None	257	205	5 MW
4000 MW	Alcalde-Elihu 161 kV Line (E.ON U.S.)	Delvinta-Green Hall Jct. 161 kV Line (E.ON U.S.-EKPC)	293	254	175 MW
4000 MW	Marion County-Casey County 161 kV Line (EKPC)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	102	78	110 MW
4000 MW	Casey County-Liberty Junction 161 kV Line (EKPC)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	82	78	5 MW
4000 MW	Danville North Tap-Lebanon 138 kV Line	Brown-Alcalde-Pineville 345 kV	192	176	70 MW

	(E.ON U.S.)	Line (E.ON U.S.)			

Table 2
2007 Summer

System Undervoltages Identified
Cooper #1 & #2 off, all Wolf Creek Dam units off

No system undervoltages were identified in 2007 Summer for any north-south transfer level up to 4000 MW

Table 3
2007-08 Winter

System Overloads Identified
Cooper #1 & #2 off, all Wolf Creek Dam units off

North-South Transfer Level	**Limiting Facility**	**Contingency**	**MVA Flow**	**MVA Rating**	**Possible Load Shed Required**
4000 MW	Alcalde-Elihu 161 kV Line (E.ON U.S.)	Wolf Creek-Russell County Jct. 161 kV Line (TVA-EKPC)	331	330	0 MW
4000 MW	Alcalde-Elihu 161 kV Line (E.ON U.S.)	Delvinta-Green Hall Jct. 161 kV Line (E.ON U.S.-EKPC)	336	330	30 MW
4000 MW	Delvinta-Green Hall Jct. 161 kV Line (E.ON U.S.-EKPC)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	249	223	95 MW
4000 MW	Marion County 161/138 kV Transformer (EKPC)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	211	186	155 MW
4000 MW	Lake Reba Tap-West Irvine Tap 161 kV Line (E.ON U.S.)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	240	237	15 MW

Table 4
2007-08 Winter

System Undervoltages Identified
Cooper #1 & #2 off, all Wolf Creek Dam units off

North-South Transfer Level	**Critical Bus**	**Contingency**	**Percent Voltage**	**Minimum Required Voltage**	**Possible Load Shed Required**
0 MW	South Oak Hill 12 kV (EKPC)	Wolf Creek-Russell County Jct. 161 kV Line (TVA-EKPC)	92.3%	92.5%	0 MW
0 MW	Waynesburg 69 kV (E.ON U.S.)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	83.6%	90%	45 MW
0 MW	Norwood 12 kV (EKPC)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	86.3%	92.5%	45 MW
0 MW	Manchester South 69 kV (E.ON U.S.)	Delvinta-Green Hall Jct. 161 kV Line (E.ON U.S.-EKPC)	87.4%	90%	10 MW
0 MW	Maplesville 12 kV (EKPC)	Delvinta-Green Hall Jct. 161 kV Line (E.ON U.S.-EKPC)	89.2%	92.5%	10 MW
4000 MW	Waynesburg 69 kV (E.ON U.S.)	None	91.76%	94%	0 MW
4000 MW	Waynesburg 69 kV (E.ON U.S.)	Wolf Creek-Russell County Jct. 161 kV Line (TVA-EKPC)	89.5%	90%	0 MW
4000 MW	Norwood 12 kV (EKPC)	Wolf Creek-Russell County Jct. 161 kV Line (TVA-EKPC)	91.5%	92.5%	0 MW
4000 MW	Norwood 12 kV (EKPC)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	82.2%	92.5%	65 MW
4000 MW	Waynesburg 69 kV (E.ON U.S.)	Brown-Alcalde-Pineville 345 kV Line (E.ON U.S.)	80.8%	90%	65 MW
4000 MW	Manchester South 69 kV (E.ON U.S.)	Delvinta-Green Hall Jct. 161 kV Line (E.ON U.S.-EKPC)	86.2%	90%	10 MW
4000	Maplesville 12	Delvinta-Green	87.8%	92.5%	10 MW

MW	kV (EKPC)	Hall Jct. 161 kV Line (E.ON U.S.-EKPC)			

The following are the conclusions from the results contained in these Tables:

- System problems may occur with or without a contingency and with or without north-south transfers
- Load shedding up to a level of approximately 175 MW may be required for the most critical single-contingency/transfer combination
- Some of the system problems can possibly be mitigated through upgrades of the facilities in a relatively short timeframe (such as the Marion County-Casey County-Liberty Junction 161 kV line sections)
- Insufficient time exists to address several of the system problems – the Alcalde-Elihu 161 kV line, the Marion County 161/138 kV transformer, the widespread system undervoltages – prior to 2007 Summer and/or 2007/08 Winter

It should also be noted that subsequent to EKPC's initial analysis, E.ON U.S. evaluated its Alcalde-Elihu 161 kV line and provided increased ratings for this facility. The Tables above reflect these revised ratings.

Analysis of potential voltage collapse issues in the area for double contingencies with the Cooper and Wolf Creek generating units off has also been performed. The major finding from this study is that simultaneous outages of the Brown-Alcalde-Pineville 345 kV line (E.ON U.S.) and the Phipps Bend-Pocket 500 kV line (TVA-E.ON U.S.) is likely to result in voltage collapse, regardless of transfer patterns. For this scenario, problems could exist even at load levels that are only 85% of the peak load forecast with no transfers. Furthermore, at load levels that are approximately 90% of peak load values, voltage collapse could occur for north-south transfer levels of approximately 3500 MW for these double contingency conditions.

Based upon the findings summarized above, EKPC concludes that a substantial risk of transmission system problems in the south-central Kentucky area exists if the Cooper and Wolf Creek generating units are unavailable during high load periods. Depending on system loads and transfer patterns, the problems could be severe enough to cause facilities to trip. This could cause cascading outages in the area, resulting in localized blackouts. A nine-county area stretching from Adair County to Clay County could be impacted by these outages. In order to avoid loss of most or all customers in this area, some controlled load shedding may be necessary to minimize the number of customers out of service and to maintain the integrity of the local transmission grid.

Request 21c. Has EKPC analyzed what changes to the current transmission system would be necessary to support the peak load periods in that region without the Cooper Station units?

i. If so, please produce each such analysis, including supporting workpapers with formulae intact.

ii. ii. If not, please explain why not.

Response 21c. An analysis of potential transmission-system modifications to address low-voltage and thermal-loading issues due to the unavailability of the generating units at Cooper Station is currently in progress. Power-flow analysis results are still in the process of being reviewed by EKPC staff.

Request 21d. Please quantify the frequency and duration of the peak load periods during which generation injections at Cooper Station are necessary.

Response 21d. Since May 2021, PJM has required the Cooper generating units to run for the specified number of hours month-by-month shown below for transmission reliability reasons:

Month	Cooper Unit #1 Hours Dispatched for Transmission Reliability	Cooper Unit #2 Hours Dispatched for Transmission Reliability
May 2021	3	2
June 2021	0	0
July 2021	48	83
August 2021	18	2

September 2021	20	186
October 2021	0	72
November 2021	0	0
December 2021	31	0
January 2022	106	90
February 2022	96	96
March 2022	0	0
April 2022	0	0
May 2022	0	24
June 2022	0	1
July 2022	84	158
August 2022	0	0
TOTAL HOURS	**406**	**714**

The longest continuous duration of a unit being dispatched for transmission reliability issues during this period was 137 hours and the shortest duration was 1 hour.

The information provided in the table above does not include an additional 1,056 hours for Cooper Unit #1 and 641 hours for Cooper Unit #2 over the same period during which the units were dispatched due to PJM Hot or Cold Weather Alerts. It is likely that the Cooper units were needed to address local transmission reliability reasons during these weather conditions due to the higher load levels experienced.

Request 21e. Please describe the extent of load shedding requirements that EKPC expects would result without generation injections at Cooper Station, including but not limited to the approximate MW effected, impacted counties, outage duration, and frequency of occurrence (i.e., once annual at summer peak; once over three summer months).

<u>Response 21e.</u> The level of load shedding that could be required if Cooper Station generation is not available at higher load levels is dependent on numerous factors, including transmission outages occurring in the area, status of other generation in the region, and level of regional power transfers occurring. The exhibit to James C. Lamb's testimony referenced in the response to part (b) of this data request indicates that a nine-county area stretching from Adair County to Clay County could be impacted by cascading transmission outages and localized blackouts, and the estimated load shedding that could be required was as high as 175 MW.

A load shedding event occurred in the area near Cooper Station in February 2021, resulting in 10 to 20 MW of load shed by LG&E/KU after both Cooper Units tripped offline. Several transmission line outages were occurring in the area at this time due to a major ice storm moving through the state, and the unexpected loss of more than 300 MW of generation at Cooper Station resulted in excessive thermal loading on an LG&E/KU transmission line. EKPC was preparing to begin shedding load in addition to the load shed by LG&E/KU to maintain operation of the transmission-system within its limits, but a Cooper unit was returned to service prior to EKPC shedding load.

<u>Request 21f.</u> In light of the potential for unplanned outages, please explain in full what steps EKPC has taken or plans to take to ensure that the transmission area throughout Southern Kentucky has adequate voltage support if and when Cooper Station experiences an unplanned outage.

<u>Response 21f.</u> EKPC's transmission-planning process analyzes the system based on single-contingency (N-1) planning. This means that each single transmission element is removed from service in the available power-flow models and the system is assessed for adequacy of steady-state voltages, power flows, and voltage and generator stability. EKPC's transmission-planning criteria also includes outages of a single generation unit in conjunction with each of these transmission element outages. Beginning in 2015, a simultaneous outage of Cooper Units 1 and 2 was considered to be a single generating unit scenario in EKPC's transmission planning process due to the connection of the Cooper Unit 1 emissions system to the scrubber system that had been installed on Cooper Unit 2 in 2012. EKPC believed this to be a prudent decision given the potential for either a planned or unplanned outage of the scrubber to result in both Cooper units not being operational. Therefore, EKPC has taken steps to design the system to withstand a single transmission element outage in the area along with both Cooper Units offline, based on assumed system conditions in available power-flow models. In real-time operations, actual system conditions often differ from those that are assumed in EKPC's and PJM's power-flow models. For instance, there may be simultaneous transmission outages that are occurring in a particular area of the system for either planned or unplanned reasons, and transmission operators must operate the system to remain within all limits for the worst transmission contingency that could impact any facility. Therefore, transmission operators are often operating for an N-2, N-3, etc. state rather than N-1. Another example of the mismatch that occurs between planning-study assumptions and real-time operations is the load level experienced by the system.

Transmission-planning studies are based on a 50/50 load probability, meaning there is a 50% chance of the load being higher than that assumed in the studies. EKPC has seen higher load than modeled on some occasions in the past few years.

From an operational standpoint, if transmission reliability issues arise due to Cooper generation unavailability, EKPC would ensure that all transmission capacitor banks in the area are energized to provide reactive power support to the area. EKPC would also enlist the assistance of neighboring utilities (LG&E/KU and TVA) to energize capacitor banks installed on their systems in the area. Other than this, load shedding is the only mitigation measure available to maintain the system within applicable limits. EKPC would re-configure the system as appropriate based on system conditions to attempt to minimize the amount of load shed and thereby avoid uncontrolled, widespread outages.

EAST KENTUCKY POWER COOPERATIVE, INC.

CASE NO. 2022-00098

SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 22

RESPONSIBLE PARTY: Darrin W. Adams

Request 22. Refer to EKPC's Response to the Attorney General's Initial Information Request No. 1c, including the statements that "Cooper station provides key voltage support in the transmission area throughout Southern Kentucky. The current transmission system is not configured to support the peak load periods in that region without the generation injections at Cooper Station."

Request 22a. Has EKPC studied the potential for upgrades to an existing transmission line to provide adequate voltage support if Cooper Station retires?

i. If so, please produce that analysis, including supporting workpapers with formulae intact and identification of any specific project(s) (including cost estimate(s), if available) that could contribute to voltage support if Cooper Station retires.

ii. If not, please explain why not.

Response 22a. EKPC has not studied the potential to upgrade an existing transmission line to provide adequate voltage support if Cooper Station generating units are retired. Due to the widespread nature of the voltage support required, EKPC is not aware of any single transmission line (or even a set of a few transmission lines) that could be upgraded to provide adequate voltage support

Request 22b. Has EKPC studied the potential for upgrades to existing transformers to provide adequate voltage support when Cooper Station retires?

i. If so, please produce that analysis, including supporting workpapers with formulae intact and identification of any specific project(s) (including cost estimate(s)), if available) that could contribute to voltage support if Cooper Station retires.

ii. If not, please explain why not.

Response 22b. EKPC has not studied the potential to upgrade existing transformers to provide adequate voltage support if Cooper Station generating units are retired. Due to the widespread nature of the voltage support required, EKPC is not aware of any existing transformers that could be upgraded to provide adequate voltage support.

Request 22c. Has EKPC studied the potential for installation of a new transmission line to provide adequate voltage support when Cooper Station retires?

i. If so, please produce that analysis, including supporting work papers with formulae intact and identification of any specific project(s) (including cost estimate(s), if available) that could contribute to voltage support if Cooper Station retires.

ii. If not, please explain why not.

Response 22c. EKPC is currently performing a study to assess the benefits of constructing a new transmission line in the region around Cooper to provide voltage support if Cooper generation is unavailable. This study is still in progress, so results of the power-flow analysis are not yet available. The specific transmission lines that are being considered to provide voltage support along with planning-level cost estimates (+100/-50% accuracy) are:

- Construct a new 345 kV transmission line (5 miles) between LG&E/KU's Alcalde substation and EKPC's Cooper substation and construct a new Cooper 345/161 kV substation expansion ($28MM).
- Construct a new 345 kV transmission line (50 miles) between EKPC's West Garrard and Cooper substations and construct a new Cooper 345/161 kV substation expansion ($110MM).
- Construct a new 161 kV transmission line (30 miles) between EKPC's West Garrard and Liberty Junction substations and construct a new 345/161 kV substation expansion at the Liberty Junction substation ($72MM).
- Construct a new 161 kV transmission line (24 miles) between EKPC's McCreary County and Cooper substations ($40MM).
- Construct a new 161 kV transmission line (20 miles) between EKPC's Denny and Wayne County substations ($55MM).
- Construct a new 161 kV transmission line (8 miles) between TVA's McCreary County-Wolf Creek 161 kV line to EKPC's Monticello substation and construct a new Monticello 161/69 kV substation expansion ($36MM).

- Construct a new 161 kV transmission line (12 miles) between EKPC's Denny and Monticello substations and construct a new Monticello 161/69 kV substation expansion ($27MM).

<u>Request 22d.</u> Has EKPC studied the potential for installation of a new substation to provide adequate voltage support if Cooper Station retires?

i. If so, please produce that analysis, including supporting workpapers with formulae intact and identification of any specific project(s) (including cost estimate(s), if available) that could contribute to voltage support if Cooper Station retires.

ii. If not, please explain why not.

<u>Response 22d.</u> EKPC is currently performing a study to assess the benefits of constructing a new transmission line in the region around Cooper to provide voltage support if Cooper generation is unavailable, as described in the response to subpart d. above. These transmission lines involve either expansion of an existing substation or addition of a new substation for connection of the potential transmission line. This study is still in progress, so results of the power-flow analysis are not yet available.

<u>Request 22e.</u> Has EKPC studied the potential for static volt-ampere reactive compensators, known as SVCs, to provide adequate voltage support if Cooper Station retires?

i. If so, please produce that analysis, including supporting workpapers with formulae intact and identification of any specific project(s) (including cost estimate(s), if available) that could contribute to voltage support if Cooper Station retires.

ii. If not, please explain why not.

Response 22e. EKPC is considering the potential for installation of a fast-switched capacitor bank or SVC as part of the study that is currently in progress.

Request 22f. Has EKPC studied the potential for synchronous condensers to provide adequate voltage support when Cooper Station retires?

i. If so, please produce that analysis, including supporting workpapers with formulae intact and identification of any specific project(s) (including cost estimate(s), if available) that could contribute to voltage support if Cooper Station retires.

ii. If not, please explain why not.

Response 22f. EKPC has not studied the potential for synchronous condensers to provide adequate voltage support if Cooper Station generating units are retired. EKPC's focus to this point has been primarily on transmission infrastructure additions that could bolster support in the area.

Request 22g. Has EKPC studied the potential to deploy a utility-scale battery behind Cooper Stations' point of interconnection in order to provide adequate voltage support when Cooper Station retires?

i. If so, please produce that analysis, including supporting workpapers with formulae intact and identification of any specific project(s) (including cost estimate(s), if available) that could contribute to voltage support if Cooper Station retires.

ii. If not, please explain why not.

Response 22g. EKPC has not studied the potential to deploy a utility-scale battery storage system in the area to provide adequate voltage support if Cooper Station generating units are retired. EKPC's focus to this point has been primarily on transmission infrastructure additions that could bolster support in the area.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 23
RESPONSIBLE PARTY: Darrin W. Adams

Request 23. Please identify any transmission grid upgrades or changes that would be needed to permit the retirement of Cooper Station, and produce supporting analyses (including workpapers in native format), if any.

Response 23. EKPC is currently performing a study to assess the benefits of constructing a new transmission line in the region around Cooper Station to provide voltage support for the area if Cooper generation is unavailable. These study results – once available -- may be able to provide some insight into EKPC transmission-planning criteria that may be violated without the Cooper units online in the models. At this time, EKPC has identified potential transmission projects to possibly mitigate the transmission-system low-voltage and thermal-loading issues that could be seen without generation online at Cooper, but has not identified specifically what would be required to meet EKPC and/or PJM transmission-planning criteria. PJM will need to perform its own analysis of the reliability violations that would be created by the deactivation of the Cooper units in order to determine the necessary transmission-system projects to meet PJM transmission-planning criteria, but EKPC is not aware of any such analysis being performed by PJM.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 24
RESPONSIBLE PARTY: Darrin W. Adams

Request 24. In response to Sierra Club's Initial Request No. 6h (asking EKPC to "Produce all analyses or assessments of the impact that retirement of each unit would have on capacity adequacy, transmission grid stability, transmission grid support, voltage support, or transmission system reliability"), EKPC responded: "There have been no studies for unit retirements of the EKPC fleet." EKPC's Response to the Attorney General's Initial Information Request No. 1c included the following statements: "Cooper station provides key voltage support in the transmission area throughout Southern Kentucky. The current transmission system is not configured to support the peak load periods in that region without the generation injections at Cooper Station."

Request 24a. If there have been no analyses or assessments of the impact that retirement of each unit would have on capacity adequacy, transmission grid stability, transmission grid support, voltage support, or transmission system reliability, please explain in full how EKPC determined that the current transmission system is not configured to support the peak load periods in that region without the generation injections at Cooper Station.

<u>Response 24a.</u> The referenced statements provided in the EKPC Response to the Attorney General's Initial Information Request No. 1c are based in part on studies that were conducted in 2007 in response to the potential for reduced water level of Lake Cumberland that potentially impacted the ability of the Cooper units to be dispatched when needed, as discussed in the above response to Request No. 21, subparts a and b. Furthermore, real-time operational experience, as discussed in the above response to Request No. 21, subparts d and e indicates the importance of the Cooper generating units in providing support to the transmission system in the area.

<u>Request 24b.</u> Please produce all analyses or assessments of the impact that retirement of the Cooper Station units would have on capacity adequacy, transmission grid stability, transmission grid support, voltage support, or transmission system reliability. i. For each analysis or assessment produced in response to subpart c, please also identify the estimated cost and timeline to remediate any identified impacts. ii. If no such analyses or assessments exist, please explain why not and identify and describe the analysis or analyses that EKPC believes would be needed to identify such impacts.

<u>Response 24b.</u> Other than the information provided in the above response to Request No. 21 subpart b, no analyses or assessments of the impact that retirement of the Cooper Station units would have on the transmission grid in the area have been completed. A study of potential transmission-system modifications to address low-voltage and thermal-loading issues due to the unavailability of the generating units at Cooper Station is currently in progress.

Power-flow analysis results are still in the process of being reviewed by EKPC staff. In addition to EKPC's own transmission-planning studies, PJM will need to perform its own deactivation study to ensure that all PJM transmission-planning criteria violations are identified and addressed.

EAST KENTUCKY POWER COOPERATIVE, INC.
CASE NO. 2022-00098
SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 25
RESPONSIBLE PARTY: Darrin W. Adams

Request 25. In PSC Case No. 2007-00168, EKPC Witness Lamb provided a "Summary of Power Flow Analysis for Simultaneous Outages of Cooper Units 1 and 2."1 Please refer to the following statements on page 1 of that Summary: "As part of its normal planning process, EKPC evaluates an outage of any one of these sources to determine if transmission system reinforcements are required. EKPC also designs its system for an outage of any single generating unit in conjunction with an outage of a transmission line and transformer. Therefore, in this area EKPC evaluates an outage of Cooper Unit #2 plus an outage of any single line or transformer. However, due to the possibility of decreased water levels for Lake Cumberland that could eliminate the needed water source for the Cooper generating units, the possibility exists that both units could be off simultaneously during the summer. The transmission system must be designed to withstand an additional contingency for this scenario." (Emphasis added).

Request 25a. Please provide EKPC's most recent power flow analysis for simultaneous outages of Cooper Units 1 and 2.

Response 25. a. The table below provides the identified violations of EKPC transmission-planning criteria (all low voltage violations) for the simultaneous outage of Cooper Units 1 and 2 that were identified in EKPC's 2022 annual power-flow analysis studies.

Location of Violation	Transmission Contingency	Generation Unit Outage	Year/Season of Violation
Speedwell Road 69 kV Substation Bus Voltage	KU Fawkes-Duncannon Lane Tap 69 kV Line Section	Cooper Units 1 & 2	2022/23 Winter
Alcan, PPG, West Berea, and Speedwell Road 69 kV Substation Bus Voltages	EKPC Fawkes-West Berea 138 kV Line	Cooper Units 1 & 2	2022/23 Winter
Big Hill 69 kV Substation Bus Voltages	Three Links Junction-Conway Tap 69 kV Line Section	Cooper Units 1 & 2	2025/26 Winter
Cabin Hollow 69 kV Substation Bus Voltage	Somerset-Cabin Hollow 69 kV Line Section	Cooper Units 1 & 2	2027/28 Winter

Bromley EKPC 69 kV Substation Bus Voltage	Owen County Junction #1-Bromley EKPC 69 kV Line Section	Cooper Units 1 & 2	2033/34 Winter

Request 25b. Please list the transmission projects EKPC has pursued since the above-referenced power flow analysis.

Response 25b. The transmission projects that EKPC has placed in service in the Southern Kentucky area (considered to be the following counties: Adair, Casey, Clay, Clinton, Cumberland, Jackson, Knox, Laurel, Lincoln, McCreary, Pulaski, Rockcastle, Russell, Wayne, and Whitley) since this power-flow analysis was completed in early 2007 are listed below, including the month/year each project was placed in service.

- Laurel County-Keavy/Pine Grove New 69 kV Transmission Line (March 2007)
- Tyner 69 kV, 16.33 MVAR Capacitor Bank Addition (July 2007)
- Thomas Gooch 69 kV, 12.25 MVAR Capacitor Bank Addition (January 2008)
- Denny 69 kV, 33.17 MVAR Capacitor Bank Addition (August 2008)
- Tyner-Fall Rock 69 kV Line Conversion to 161 kV & Installation of a 161/69 kV Transformer at Fall Rock (October 2008)
- Wayne County-Wayne County Junction New Transmission Line (February 2009)
- Eberle-Maplesville 69 kV Transmission Line Rebuild (April 2009)
- McCreary County 161/69 kV Transformer Upgrade (June 2009)
- Annville-Eberle 69 kV Transmission Line Rebuild (August 2009)
- Peytons Store 69 kV, Capacitor Bank Upgrade to 14.29 MVAR (August 2009)

- Tyner-Annville 69 kV Transmission Line Rebuild (September 2009)
- Tyner-Fall Rock New 69 kV Transmission Line (September 2009)
- Maplesville-North London 69 kV Transmission Line Rebuild (December 2009)
- Tyner-McKee 69 kV Transmission Line Rebuild (May 2010)
- Girdler 69 kV, 12.25 MVAR Capacitor Bank Addition (July 2010)
- Bass-Creston 69 kV Transmission Line Conductor Operating Temperature Increase (August 2010)
- East Somerset-Norwood Junction 69 kV Transmission Line Conductor Operating Temperature Increase (November 2010)
- Liberty Church 69 kV, 18.37 MVAR Capacitor Bank Addition (December 2010)
- Big Creek-Goose Rock 69 kV New Transmission Line (March 2011)
- Cooper 161 kV Bus Tie Breaker Addition (June 2011)
- Knob Lick-McKinney's Corner 69 kV Transmission Line Conductor Operating Temperature Increase (July 2011)
- Pine Knot-Whitley City 69 kV Transmission Line Conductor Upgrade (December 2017)
- KU Farley-Liberty Church 69 kV Transmission Line Conductor Operating Temperature Increase (March 2018)
- Russell County-KU Russell Springs 69 kV Transmission Line Switch Upgrade (March 2020)

<u>Request 25c.</u> To EKPC's knowledge, has the design of the transmission system changed since 2007 to ensure it could withstand outages at both Cooper generating units?

i. If so, please explain the timing and substance of those changes.

ii. If not, please explain why, in EKPC's view, the need to design the transmission system so that it can withstand receiving no power injections from Cooper Station has not been addressed over the past fifteen years.

<u>Response 25c.</u> Beginning in 2015, a simultaneous outage of Cooper Units 1 and 2 was considered to be a single generating unit scenario in EKPC's transmission planning process due to the connection of the Cooper Unit 1 emissions system to the scrubber system that had been installed on Cooper Unit 2 in 2012. EKPC believed this to be a prudent decision given the potential for either a planned or unplanned outage of the scrubber to result in both Cooper units not being operational. Therefore, EKPC has taken steps to design the system to withstand a single transmission element outage in the area along with both Cooper Units offline, based on assumed system conditions in available power-flow models.

<u>Request 25d.</u> Since 2007, has EKPC made any changes to its "normal planning process" to account for the possibility of both Cooper generating units being simultaneously offline.

i. If so, please describe each such change in full, including the period of time in which it was applied.

ii. If not, please explain why not.

<u>Response 25d.</u> See response to subpart c. of this request. No other changes have been made to EKPC's normal planning process with respect to both Cooper generating units potentially being offline simultaneously.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 26
RESPONSIBLE PARTY: Julia J. Tucker

Request 26. Do the Cooper Station generating units provide reactive supply and voltage control service under Schedule 2 of PJM's Tariff? Please explain.

Response 26. Yes, Cooper units offer both reactive supply and voltage control. The reactive supply is provided by the generators' ability to supply and/or absorb MVARs on the system. The voltage control service is provided by the generators Automatic Voltage Control (AVC) device coupled with its ability to produce and absorb MVARs.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 27
RESPONSIBLE PARTY: Julia J. Tucker

Request 27. Refer to PJM's Open Access Transmission Tariff, Section V, which governs deactivation of generating units in the PJM Region, and answer the following requests:

Request 27a. Has EKPC previously submitted a written deactivation notice, pursuant to section 113.1, for either or both Cooper Station coal units? If so, please produce each such notice and any subsequent notice of reliability impact, pursuant to Section 113.2, provided to EKPC in response.

Response 27a. No notice has been submitted.

Request 27b. Please confirm that, within 30 days of receiving a written deactivation notice, the Office of Interconnection must provide notice of its determination as to whether deactivating the generating unit(s) would adversely affect the reliability of the transmission system. If anything but confirmed, please explain in full.

Response 27b. Objection. PJM's Open Access Tariff speaks for itself. However, not waiving said objection, EKPC confirms this statement.

Request 27c. Please confirm that a notice of reliability impact under section 113.2 would "(1) identify the specific reliability impact resulting from the proposed Deactivation of the generating unit; and (2) provide an initial estimate of the period of time it will take to complete the Transmission System reliability upgrades necessary to alleviate the reliability impact." If anything but confirmed, please explain in full.

Response 27c. Objection. PJM's Open Access Tariff speaks for itself. However, not waiving said objection, EKPC confirms this statement.

Request 27d. Please confirm that, if a Generation Owner seeking to deactivate a generating unit receives notice under section 113.2 of a resulting reliability concern, "the Generation Owner shall immediately be entitled to file with the Commission a cost of service rate to recover the entire cost of operating the generating unit until such time as the generating unit is deactivated pursuant to this Part V ("Cost of Service Recovery Rate"). In the alternative, the Generation Owner may elect to receive the Deactivation Avoidable Cost Credit provided under this Part V." If anything but confirmed, please explain in full.

Response 27d. Objection. PJM's Open Access Tariff speaks for itself. However, not waiving said objection, EKPC confirms this statement.

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REQUEST 28

RESPONSIBLE PARTY: Darrin W. Adams

Request 28. Refer to EKPC's Response to Joint Intervenors' Request No. 70c., describing EKPC's process for determining need, costs, and benefits of transmission expansion projects.

Request 28a. At any time over the past ten years, have EKPC personnel submitted any problem statements related to the inability of the transmission system to support peak load period in southeast Kentucky without generation injections at Cooper Station (as claimed in EKPC's Response to the Attorney General's Initial Information Request No. 1c)?

i. If so, please produce each such problem statement, and explain what process flowed for each such submission.

ii. If not, please explain why not.

Response 28a. No, EKPC personnel have not submitted a problem statement related to the inability of the transmission system to support peak-load periods in southern Kentucky without generation injections at Cooper Station. However, EKPC transmission-planning staff have undertaken a study to assess potential transmission projects that may provide benefits to the area without Cooper generation online in order to provide EKPC leadership with information regarding potential costs to address operational limitations and reliability risks when Cooper generation is offline.

<u>Request 28b.</u> At any time over the past ten years, has EKPC management considered, approved, or denied a recommended solution to address the inability of the current transmission system to support peak load period in southeast Kentucky without generation injections at Cooper Station (as claimed in EKPC's Response to the Attorney General's Initial Information Request No. 1c)? If so, please describe each such instance in full, including the potential solution(s) under consideration, associated cost estimates and expected benefits, the recommended solution, and the decision made by EKPC management.

<u>Response 28b.</u> No, EKPC management have not considered, approved, or denied any such recommended solution. A recommended solution specifically related to the inability of the transmission system in the area to support peak-load periods without generation injections at Cooper Station has not been presented to EKPC management. EKPC transmission-planning staff have recommended certain transmission projects to EKPC management to address planning-criteria violations that are negatively influenced by the simultaneous outage of both Cooper units, but in most cases those violations were only marginally affected by the outages of the Cooper units, and would still be needed at some point in the fifteen-year planning horizon with the Cooper units online. None of these violations are considered to be significantly impacted by the lack of generation injections at Cooper Station.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 29

RESPONSIBLE PARTY: Julia J. Tucker

Request 29. The Inflation Reduction Act includes provisions allocating $9.7 billion for the United States Department of Agriculture to provide grants and loans to rural electric cooperatives for clean energy and energy efficiency projects. The law enables electric cooperatives to receive an award for up to 25% of project cost, with a cap of $970 million per entity. In light of this development, please answer the following requests.

Request 29a. Please explain whether and to what extent EKPC expects the above-described grant and loan program to impact EKPC's future resource decisions.

Response 29a. EKPC is studying the new Inflation Reduction Act and the impacts it could have on EKPC plans. Nothing has been determined at this time.

Request 29b. Please explain in full EKPC's process for assessing impacts from the above-described grant and loan program. c. In EKPC's estimation, how does the above-described grant and loan program differ from the cost assumptions used in its 2022 IRP? Please explain in full.

Response 29b. EKPC will fully study the Inflation Reduction Act and determine how it can potentially utilize the provisions provided.

Request 29c. In EKPC's estimation, how does the above-described grant and loan program differ from the cost assumptions used in its 2022 IRP? Please explain in full.

Response 29c. There is not enough detailed information available yet to compare the new program to the assumptions used in the IRP.

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REQUEST 30
RESPONSIBLE PARTY: Julia J. Tucker

Request 30. The Inflation Reduction Act includes provisions providing electric cooperatives with direct access to federal energy innovation tax credits, including tax credits for energy storage and traditional renewables. In light of this development, please answer the following requests.

Request 30a. In EKPC's estimation, how does the availability of direct pay tax incentives differ from the cost assumptions modeled in its 2022 IRP? Please explain in full.

Response 30a. There is not enough detailed information available yet to compare the new program to the assumptions used in the IRP.

Request 30b. In light of the availability of direct pay tax incentives, does EKPC expect to re-run any of the modeling in its 2022 IRP? If so, please explain EKPC's anticipated process and timeline.

Response 30b. No, EKPC utilized the data known at the time for this filing. New data will be reflected in future filings.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 31
RESPONSIBLE PARTY: Julia J. Tucker

Request 31. The Inflation Reduction Act allocates nearly $9 billion for Department of Energy home energy retrofits and weatherization. In EKPC's estimation, how will this increased federal funding for weatherization impact EKPC's load forecast over the planning period. Please explain.

Response 31. There is not enough detailed information available yet to compare the new program to the assumptions used in the load forecast.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 32

RESPONSIBLE PARTY: Scott Drake

Request 32. Refer to EKPC's response to Joint Intervenors' Initial Request No. 90d and answer the following requests.

Request 32a. Please explain why, in EKPC's view, carbon dioxide emission reduction targets are appropriate, but not reductions for other greenhouse gases, like methane, for example.

Response 32a. Carbon dioxide accounts for the greatest volume of greenhouse gasses emitted by EKPC resources. By reducing carbon dioxide emissions EKPC can most effectively reduce its total greenhouse gas emissions.

Request 32b. Has EKPC considered adopting an emissions reduction target based on carbon dioxide equivalent (calculated using Equation A-1 in 40 CFR Part 98 to determine the global warming potential of greenhouse gases other than carbon dioxide). If so, please explain the factors EKPC weighed in considering such an emissions target and EKPC's conclusion(s).

Response 32b. No.

Request 32c. Has EKPC estimated the methane emissions from its existing generation portfolio? If so, please provide that estimate, disaggregated to the unit-level, if possible. If not, please explain why not.

Response 32c. EKPC reports methane emissions (in CO2e) to the EPA annually under 40 CFR Part 98. The attached spreadsheet, "Response 32 – GHG CH4 Emissions.xlsx" contains the methane emissions data reported for years 2019 through 2021.

Request 32d. Has EKPC estimated the upstream methane emissions resulting from the drilling, processing, flaring, and transportation of natural gas to its gas-fired generation resources? If so, please provide that estimate.

Response 32d. No.

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REQUEST 33

RESPONSIBLE PARTY: **Scott Drake**

Request 33. Has EKPC studied or caused to be studied the rate impact and Customer benefits of its Kentucky Energy Retrofit program or other on bill financing or Pay-As-You-Save program? If so, please provide each such study. If not, please explain why not.

Response 33. EKPC does not have an Energy Retrofit or a Pay-As-You-Save Program. Only a few of the owner-members offer that financing program.

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REQUEST 34

RESPONSIBLE PARTY: Scott Drake

Request 34. Has EKPC studied or caused to be studied the cost-effectiveness of its Kentucky Energy Retrofit program or other on-bill financing or Pay-As-You-Save program? If so, please provide each such study. If not, please explain why not.

Response 34. EKPC does not have an Energy Retrofit or a Pay-As-You-Save Program. Only a few of the owner-members offer that financing program.

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REQUEST 35
RESPONSIBLE PARTY: Scott Drake

Request 35. Refer to EKPC's response to Joint Intervenors' Request No. 92b, where EKPC states that no forecast of participation or savings rates over the IRP planning period have been performed for the Kentucky Energy Retrofit Rider.

Request 35a. Please state whether EKPC expects to continue the Kentucky Energy Retrofit Rider during the IRP Planning Period. If EKPC does not expect to continue the program, please explain the reasons why in full.

Response 35a. EKPC doesn't have a Kentucky Energy Retrofit Rider. Only a few of the owner-members offer that financing program. Kentucky Energy Retrofit Rider program participants tend to utilize rebates from EKPC's and the owner-members' energy efficiency program (ie. – Heat Pump Retrofit and Button-up). Participation in the energy-efficiency rebate programs, including participants in the Kentucky Energy Retrofit Rider, are included in the IRP forecast.

Request 35b. Do EKPC or its owner-members have targeted participation levels for the Kentucky Energy Retrofit Rider in 2022 or any year thereafter? If so, please provide those targeted participation levels.

Response 35b. EKPC doesn't develop a target for the program. The program utilizes EKPC's Button-up and Heat Pump Retrofit energy efficiency programs. EKPC projects participation in those programs based on participation levels of the previous years.

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REQUEST 36
RESPONSIBLE PARTY: Scott Drake

Request 36. Refer to EKPC's response to Joint Intervenors' Request No. 92, identifying six owner-members offering the Kentucky Energy Retrofit Rider, and answer the following requests.

Request 36a. Please describe the administrative support that EKPC provides to owner-members to support successful implementation of the Kentucky Energy Retrofit Rider.

Response 36a. EKPC staff has working knowledge of the software system(s) utilized to track participation. Staff's expertise is provided to the owner-members and to the Mountain Association when requested.

Request 36b. Please describe the outreach support that EKPC provides to owner-members to support successful implementation of the Kentucky Energy Retrofit Rider.

Response 36b. EKPC is not providing outreach support specifically for this program that is not tariffed by EKPC. EKPC provides outreach support for its tariffed energy efficiency programs utilized by the owner-members whose members can participate in the Kentucky Energy Retrofit Program.

Request 36c. In EKPC's understanding, why have there been no Kentucky Energy Retrofit program participants from (i) Farmers RECC, (ii) Grayson RECC, and (iii) Jackson Energy Cooperative.

Response 36c. EKPC has no knowledge as to the reason(s) those owner-members had no program participants in 2021.

Request 36d. In EKPC's estimation, what support would its owner-members each need to successfully increase participation in the Kentucky Energy Retrofit Rider. Please explain in full.

Response 36d. EKPC is unaware of support needed by the owner-members from EKPC to successfully increase participation in the program.

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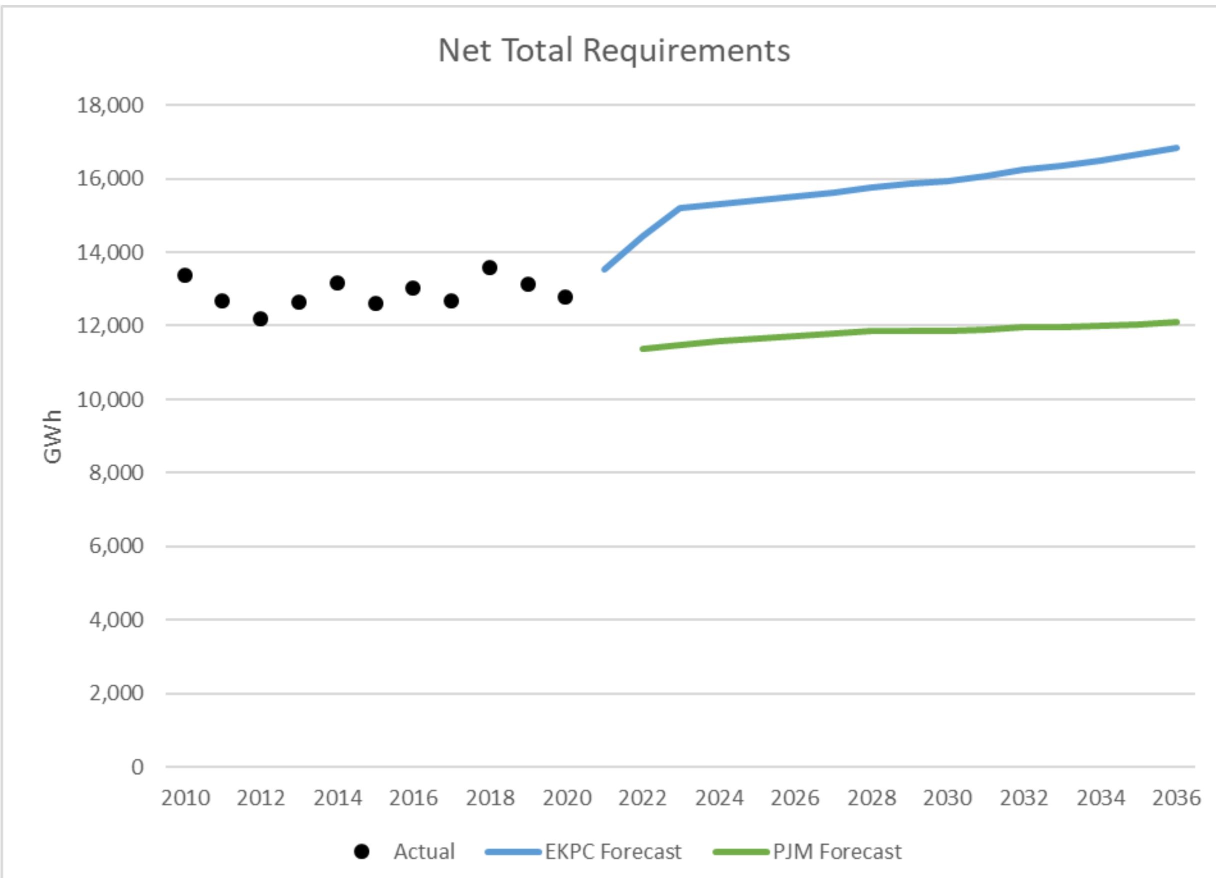
JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 37
RESPONSIBLE PARTY: Fernie Williams

Request 37. Please refer to EKPC response to Joint Intervenor Request No 1 – Figure 1-1,_Figure1-2,_Figure_1-3, Columns E and S of the tab "Data for Graphs". The 2022 PJM Load Forecast Report projects 0.4% growth in total annual energy requirements between 2022 and 2036, and 0.4% growth in the winter peak load demand for the same period. EKPC projects growth rates of 1.1% for total annual energy requirement, and 0.6% for its winter peak demand. Can EKPC explain the difference between its forecasts of winter peak load and total energy requirements and PJM's?

Response 37. The PJM and EKPC forecasts are not the same series. EKPC's forecast is developed according to its work plan and the requirements of RUS. Economic assumptions are based on owner-member share of county-level projections. Appliance saturations are based on an end-use survey as required by RUS. The EKPC forecast also incorporates known changes to industrial Customers. These assumptions may not be the same as the PJM load forecast. Additionally, the resulting forecasts are different. A graph of historical net total energy requirements along with the EKPC and PJM load forecast are included below. The PJM forecast is below historical actual indicating that it is not comparable to the EKPC total energy requirement forecast. The PJM forecast is for the load tied directly to the EKPC transmission system. It includes some load for LG&E/KU which is served from the EKPC system and it does not include the EKPC load that is served from the LG&E/KU transmission system. The two forecasts are not directly comparable without significant modifications to the PJM forecast.



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REQUEST 38

RESPONSIBLE PARTY: **Julia J. Tucker**

Request 38. Please provide EKPC's PJM Load Obligation in Unforced Capacity (UCAP) for Delivery Year 20/21 through Delivery Year 24/25.

Response 38a. Please provide the committed UCAP for each of EKPC's units offered and cleared in the PJM capacity market for the aforementioned delivery years.

Response 38.

Delivery Year	Load Obligation (MW)	UCAP (MW)
2020/2021	2604.6	2809.6
2021/2022	2704.5	2845.8
2022/2023	2791.2	2852.8
2023/2024	Not yet published	2897.5

Delivery year 2024/2025 will not clear until December 22, 2022.

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REQUEST 39
RESPONSIBLE PARTY: Fernie Williams

Request 39. Please refer to EKPC Response to Joint Intervenor Request 27 and the 2022 PJM Load Forecast Report, Table E-4.

Request 39a. Please clarify the source for the electric vehicle plug-in adjustment for the EKPC zone.

Response 39a. PJM describes how plugin electric vehicles are incorporated in section VII of the 2022 Load Forecast Supplement (https://www.pjm.com/-/media/planning/res-adeq/load-forecast/load-forecast-supplement.ashx). Additional details can be requested from PJM.

Request 3b. Please describe to what extent, if any, EKPC incorporated this data into its own load forecast.

Response 39b. The data from the 2022 PJM Load Forecast Report was not incorporated in EKPC's Load Forecast prepared in 2020. EKPC estimates less than 1% of households in its owner-member territories own or lease an electric vehicle.

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REQUEST 40

RESPONSIBLE PARTY: Fernie Williams

Request 40. Please describe why EKPC does not use the PJM load forecast to project its load requirements.

Response 40. EKPC is an RUS borrower and prepares a load forecast based on the requirements of the Code of Federal Regulations, Title 7 Agriculture, Subtitle B Chapter XVII Part 1710 Subpart E. The PJM load forecast does not meet the requirements of the CFR.

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REQUEST 41
RESPONSIBLE PARTY: Fernie Williams

Request 41. Please refer to EKPC Response to Joint Intervenor Request 83. Could EKPC incorporate the distributed solar, battery, etc. data in the PJM Load Forecast Report into its internally produced forecast? Please explain.

Response 41. It is unknown if the PJM Load Forecast data for distributed solar, battery, etc. could be incorporated into the total EKPC load forecast. It would need to be analyzed to ensure the effects are incorporated appropriately. EKPC's seasonal peak forecast may not be coincident with the PJM forecast for the EKPC zone. Lastly, the PJM Load Forecast Report does not include the effects of distributed solar and battery storage for winter.

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REQUEST 42

RESPONSIBLE PARTY: Fernie Williams

Request 42. Please refer to EKPC Response to Joint Intervenor Request 17, subpart (m). Describe in detail the Statistical Load Methodology (SLM), in particular how the SLM differs from "a method using a forecast that does not vary in the same manner as a stochastic method."

Response 42. The RTSim model provides stochastic and deterministic methodologies. Stochastic varies the load, while deterministic does not.

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REQUEST 43

RESPONSIBLE PARTY: Fernie Williams

Request 43. Referring to EKPC Response to Joint Intervenor Request 18, subpart (a). Please describe the statistical weather periods used to create simulations of high and low periods from the expected:

a. Please describe any time periods from which the statistical weather periods are defined.

b. Does EKPC use historic weather normals to forecast expected weather?

c. If the answer to subpart (b) is yes, please define the time period over which EKPC averages weather to produce normal weather.

d. If the answer to subpart (b) is yes, please identify the source of weather normals used by EKPC.

Response 43 a-d. The statistical weather periods are time periods based on historical frequency of periods of days in which weather patterns have occurred in our region. The frequency and duration of weather patterns is the driver for this process, not historical weather normals. For example, a high temperature period may occur for 1 day, 3 days, 5 days, etc. The probability of each of these types of periods is the driver for this methodology.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 44
RESPONSIBLE PARTY: Fernie Williams

Request 44. Please refer to the response to Joint Intervenor Request 40 - Inputs.

Request 44a. Please explain each step that an external reviewer, without access to RTSim, would take in order to review the provided inputs. If such review would also require interpreting code such as ASCII, please explain what information would be necessary to do so.

Response 44a. Each input area is identified by type: Fuel, Load, Value (Market). These are text files readable by any text editor. The Fuel type is the daily price by year for each of the fuels used by the generation fleet. The Load is the 8760/8784 hourly load forecast by year. The Value, the market price, is the hourly price for energy at the EKPC generation and load points.

Request 44b. If it is has not already been provided, please provide all documents and files, in electronic format, necessary to take the steps given in response to subpart a.

Response 44b. Any text editor can be used to view these files.

Request 44c. How would an external reviewer be able to, if at all, review the model constraints that were used, e.g., the reserve margin requirement(s), the new build constraints, etc.?

Response 44c. These inputs are not direct drivers for the constraints referenced.

Request 44d. If it is has not already been provided, please provide all documents and files, in electronic format, necessary to take the steps given in response to subpart c.

Response 44d. These aspects are not part of the data files provided as previously requested.

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REQUEST 45
RESPONSIBLE PARTY: Fernie Williams

Request 45. The response to PSC 27a states "The RTSim Resource Optimizer utilizes an expected load requirement range over the study period. This guides in the creation of the unique resource additions to meet the requirement in each of the runs. The system creates a selection of resources and performs several iterations of the RTSim production cost model to arrive at the least cost configurations."

Please explain in full how production cost runs, which only dispatch generators, but do not optimize their selection, can be used to develop different "selection[s] of resources".

Response 45. RTSim is capable of dispatching generators in a market setting, such as PJM, which uses price as a driver for the next increment of energy. PJM uses LMP (locational marginal price) as a driver to meet the load within its footprint. Similarly, RTSim dispatches the generation fleet using price as a method to simulate the market within the production cost model.

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REQUEST 46

RESPONSIBLE PARTY: **Fernie Williams**

Request 46. Please refer to the responses to Joint Intervenor Requests 17, 19, and 41 and to page 29 of the Commission's September 24, 2021, order in Case Nos. 2020-00349 and 2020-00350.

Request 46a. In EKPC's opinion, does RTSim avoid the problem of "The full range of… assumptions, inputs, and outputs being inaccessible to other parties and to the Commission without several rounds of discovery"? If so, please describe in full how RTSim avoids this issue.

Response 46a. As stated in Response 44a, the inputs have been provided in a format that can be read by any text editor.

Request 46b. In EKPC's opinion, are parties able to re-run RTSim runs? If so, please describe in full how this would be possible.

Response 4b. Parties can re-run RTSim cases, if they have licensed the software.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 47
RESPONSIBLE PARTY: Julia J. Tucker

Request 47. Please refer to EKPC Response to Joint Intervenor Request 31. Please provide the detailed narrative describing why thermal units are modeled on an ICAP basis rather than a UCAP basis.

Response 47. Thermal units are modeled in RTSim with their installed capacity and the expected forced outage rate. The model makes many iterations to develop a robust expectation of production costs. Each iteration takes a draw for forced outages to reach the expected percentage value for the year. In one draw, an outage might occur during winter peak conditions, in another iteration, an outage might occur in the summer, and so forth. By placing the forced outage rate and installed capacity in the model a more accurate view of potential production cost scenarios are developed. If the unforced capacity value (UCAP) is used then all hours of the year have reduced capacity available. That is not reflective of how the system is actually operated.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 48
RESPONSIBLE PARTY: Julia J. Tucker

Request 48. Referring to the Excel spreadsheet attached to EKPC Response to Joint Intervenor Request 35.

Request 48a. Please provide a narrative for the capacity factor assumptions regarding the planned SCGT, which range from 30% to 47%.

Response 48a. The capacity factor is not an assumption. The capacity factor is a result of the modeling. The availability, heat rate, fuel cost, and variable operations and maintenance costs drive the variable production cost shown in the spreadsheet. The variable production cost is then modeled compared to the market prices, and when the unit is economic and available, it will be dispatched into the market. This dispatch drives the capacity factor.

Request 48b. Please provide any operational data or other analyses supporting this capacity factor assumption.

Response 48b. All data has been provided in the referenced spreadsheet.

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REQUEST 49

RESPONSIBLE PARTY: Julia J. Tucker

Request 49. Please refer to EKPC Response to Joint Intervenor Request 43. Has EKPC evaluated any market purchases in its capacity expansion modeling across the IRP planning period? Please explain.

Response 49. Table 8-2 on page 163 of the IRP shows two Power Purchase options that were included in the capacity expansion modeling across the IRP planning period.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 50
RESPONSIBLE PARTY: Julia J. Tucker

Request 50. Please refer to the response to the spreadsheet Joint Intervenor "Request 40 – output".

Request 50a. Please confirm that the provided spreadsheet contains information applicable only to the "Base Case" as noted in cell A4. If your response is anything other than an unqualified affirmative, please explain in full.

Response 50a. Yes.

Request 50b. To which case in Table 8-4 does this output correspond? Please explain in full.

Response 50b. The spreadsheet matches the plan / case in Table 8-7. The recommended plan is a combination of the best cases shown in Table 8-4, which also meets EKPC's defined need for resources based on load and sustainability goals.

Request 50c. This spreadsheet contains system cost data for 500 iterations, how do those iterations relate to the deterministic/single iteration data provided elsewhere in the spreadsheet, e.g., the thermal generation? Please explain in full.

Response 50c. There is no deterministic / single iteration data in the spreadsheet. The results in the spreadsheet are based on the expected output based on 500 iterations.

Request 50d. Please explain why the solar generation data contained in this spreadsheet (line 30) do not match solar generation data in corrected Table 8-10 of the IRP?

Response 50d. The solar generation in corrected Table 8-10 is a combination of line 30 and lines 772 through 782.

Request 50e. What is the source of the corrected Table 8-10 generation data?

Response 50e. The referenced spreadsheet is the source of data for the corrected Table 8-10.

Request 50f. Please explain why only variable thermal generation costs were included in the modeling, i.e., Thermal Total Cost (line 42) is equal to Thermal Variable Cost (line 41).

Response 50f. The dispatch of units is driven by only variable costs. Fixed costs are incurred regardless of amount of run time. The fixed costs are considered when looking at new resources but not existing resources.

Request 50g. Please explain how the data in rows (28) Thermal Generation, (29) Hydro/Battery Discharge, (30) Wind/Solar Generation, (32) Energy Purchased, and (36) Energy Sold sum to the data contained in row (34) System Native Energy.

Response 50g. Generation does not add to System Native Energy. Generation is driven by economics, not load. EKPC's generation units are dispatched based on the economics of the PJM market. Forward purchases are made based on the market price expectations, these purchases are not the real time purchases made for load.

Request 50h. Please provide a detailed narrative explaining why the "(16) Thermal Unit Fixed O&M Costs ($)" is populated with the presented values. i. Please provide a detailed narrative explaining why the "(17) Thermal Unit % Profitability" is populated with the presented values.

Response 50h. Lines 408 through 429 do not show any fixed O&M. Lines 683 through 704 show the net positive margin of the unit's dispatch revenue from the market as compared to its variable cost to operate. That represents the value of each unit to the owner-member as compared to being served solely from the market.

Request 50i. Please provide a detailed narrative explaining why the "(17) Thermal Unit % Profitability" is populated with the presented values.

Response 50i. Lines 708 through 728 is not a metric that EKPC utilizes and so the model has not been populated with data to supply that information.

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SUPPLEMENTAL REQUEST FOR INFORMATION RESPONSE

JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 51
RESPONSIBLE PARTY: Julia J. Tucker

Request 51. The response to Staff's Request 27b states, "The top plan as determined by the Resource Optimizer was the foundation for the creation of the optimal plan. Review of the top plans, and the inclusion of the EKPC Sustainability goals, was performed to provide the final plan."

a. Please provide documentation of this review, if any.

b. Provide the data that were reviewed.

c. Please explain in full how EKPC's Sustainability goals were included after the fact of developing the plans and provide documentation showing how they were included, if any.

d. Please explain what process, if any, EKPC used to calculate the costs of different portfolios (or cases)? Provide all applicable spreadsheet(s) in electronic format with all formulas and links intact.

Response 51 a-d. All five top cases show a need for a Seasonal Purchase, see Table 8-4 on page 167 of the IRP. All five cases show a need for a Peaking Resource in the 2032 to 2034 time frame. Four of the five cases show one or more intermittent resources as being economic.

EKPC took those results and compared the needs for the system based on seasonal peaks and existing resources, as shown on Table 8-6 on page 170 of the IRP. When the economic resources were supplied to meet peak load and sustainability requirements, the resultant plan is shown on Table 8-7 on page 171 of the IRP. There are no spreadsheets associated with the process as it is housed within RTSim and related simple ".txt" input and output files.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 52

RESPONSIBLE PARTY: Fernie Williams

Request 52. Please provide the energy market price forecast (either hourly or sub hourly) that was used in the RTSim modeling.

Response 52. EKPC provided the requested information in its Response to Joint Intervenor's First Information Request 40 – Inputs.

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JOINT INTERVENOR’S REQUEST DATED AUGUST 30, 2022
REQUEST 53
RESPONSIBLE PARTY: Julia J. Tucker

Request 53. Please provide the most recent PJM capacity price forecast in EKCP's possession.

Response 53. See attached Excel spreadsheet, *“Response 53 Joint Intervenors Attachment Capacity-CONFIDENTIAL”,* subject to motion for confidential treatment.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 54

RESPONSIBLE PARTY: Julia J. Tucker

Request 54. Please refer to EKPC Response to PSC Response 27c.

Request 54a. Please provide a detailed narrative explaining how the results listed "Best 1: System Profit to Best 10: System Profit" relate to the five plans and final plan in Table 8-5 of the 2022 IRP.

Response 54a. The values listed for the best ten plans show the net benefit of the plan compared to the expected market prices. When the value is positive, it means that the set of resources provided have costs lower than the expected market prices and that they have a net benefit as compared to the PJM market. When the value is negative, it means that it would be more cost effective to purchase from the market than to have the set of resources defined by that case. Case 1 through 5 of those listed are the cases defined in Table 8-4 on page 167 of the IRP.

Request 54b. Are the values contained in PSC Response 27c the net present value to the system or some other measure? Please provide the generic formula showing which costs and revenues are included in the calculation.

<u>Response 54b.</u> These are the present value of annual values. The values are the difference between market prices paid for generation compared to the variable cost to produce the energy.

<u>Request 54c.</u> Provide the spreadsheet(s) with all formulas and links intact showing how the values in PSC Response 27c were calculated.

<u>Response 54c.</u> The values are developed within RTSim, not within a spreadsheet.

<u>Request 54d.</u> The Response to PSC Request 49 states, "EKPC hedges its exposure to high market prices by ensuring it has adequate resources to cover its load. When the market prices are lower than EKPC's resources, then EKPC purchases from the market and its resources are not dispatched. When the PJM market price is higher than the EKPC resources, then the EKPC generating resources are dispatched into the market. This allows the EKPC owner-members to be hedged against the high market prices." Please explain how EKPC reconciles this strategy against the results in Table 8-10 which show that by 2030 owned generation and firm purchases will equal about 73% of energy requirements falling to 66% of energy requirements by 2036.

<u>Response 54d.</u> Table 8-10 does not show the amount of energy that is capable of being produced, it shows the energy that is economic as compared to the expected market prices. It directly reflects the strategy discussed in the referenced response.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 55

RESPONSIBLE PARTY: Julia J. Tucker

Request 55. Please refer to EKPC Response to Joint Intervenor Request 38. Has EKPC evaluated the costs of retiring any of its thermal units against the cost of replacement capacity either in PJM or through owned or contracted generation? If so, please provide that analysis, including workpapers in native format with formulas intact.

Response 55. No, EKPC has not evaluated the retirement costs of any of its thermal units. Given that none of its thermal units have been fully depreciated, any retirement in the short-term would result in ratepayers being forced to incur stranded investment costs in addition to the costs of investments of new generation.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 56

RESPONSIBLE PARTY: Julia J. Tucker

Request 56. Please provide that status of the Request for Proposals ("RFP") referenced in EKPC Response to Joint Intervenor Request 45, and provide the following information: a. the anticipated schedule for development of the RFP, b. any stakeholder processes that will be involved in the development of the RFP, and c. the anticipated date of the solicitations.

Response 56. EKPC has already issued an RFP for solar energy. Recent changes in laws and regulations have significantly impacted the potential projects and bidders. EKPC will revisit the responses once the bidders have had a chance to review and incorporate the new information.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 57
RESPONSIBLE PARTY: Julia J. Tucker

Request 57. Referring to EKPC Response to Joint Intervenor Request 45b, is it EKPC's position that future Solar Power Purchase Agreements (PPA) will not provide incremental capacity to EKPC? Please explain.

Response 57. Capacity and energy are two separate products sold by solar projects. EKPC may or may not purchase the capacity product as part of a solar power purchase agreement ("PPA") as the value of the associated capacity will depend on price, need and availability. EKPC's expansion plan shown on Table 8-7 of the IRP assumes that EKPC receives a 60% capacity credit for solar PPAs.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 58
RESPONSIBLE PARTY: Julia J. Tucker

Request 58. Please refer to EKPC Response to Joint Intervenor Request 72.

Request 58a. Are seasonal energy-only solar PPAs available to EKPC? Please explain in full.

Response 58a. All solar PPAs that have been solicited and considered by EKPC have been for annual products. EKPC is not aware of seasonal energy-only solar PPAs.

Request 58b. Has EKPC received pricing information in the form of direct bids or indicative pricing?

Response 58b. EKPC has received direct bids for annual solar PPAs for a minimum of ten to fifteen years.

Request 58c. Is it EKPC's intention to pursue energy-only solar PPAs for the winter period? Please explain in full.

Response 58c. EKPC intends to solicit solar PPAs for full annual periods for a minimum of ten to fifteen years.

Request 58d. Will the "annual PPAs" be limited to solar resources only? Please explain in full.

Response 58d. At this time, the contemplated annual PPAs are for solar resources only so EKPC's sustainability goals can be attained as well as providing a price hedge on energy. EKPC may be open to considering other types of renewable generation in the future.

Request 58e. Will the capacity of the annual PPA be monetized in PJM? If so, please explain in full. If not, please explain why not.

Response 58e. Developers can offer both energy and capacity in the solar PPA offerings. EKPC will determine on an individual basis if it is prudent to enter into the capacity offer. If EKPC does purchase capacity from a solar project, it would expect to monetize that capacity in PJM.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 59

RESPONSIBLE PARTY: Julia J. Tucker

Request 59. Please refer to EKPC Response to Joint Intervenor Request 77.

Request 59a. Is it EKPC's understanding that the capacity value of merchant solar facilities connected to its transmission system cannot count towards meeting the EKPC zonal load obligation?

Response 59a. The capacity value of merchant solar facilities connected to EKPC's transmission system can only count towards meeting the EKPC zonal load obligation if EKPC purchases the capacity rights from that facility.

Request 59b. Has EKPC considered contracting to off take the generation and capacity of any of the merchant solar facilities connected or planned to be connected to its transmission system? Please explain.

Response 59b. Yes, see Response 56.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 60
RESPONSIBLE PARTY: Julia J. Tucker

Request 60. In EKPC Response to Joint Intervenor Request 73 it is stated that, "no capacity value was assigned to the solar PPAs for being able to meet winter peak loads." It is also stated that, "EKPC's winter peak typically occurs at 07:00 and 18:00, morning and evening peaks." Typically, the peak times are when the energy price is at its highest.

a. Has EKPC performed any analysis of the value of energy-only seasonal solar PPAs for the off-peak hours during winter period?

b. If so, please provide this analysis indicating the exposure (in MWh and dollars) that energy-only solar PPAs can provide.

Response 60 a-b. The solar PPAs that are shown to be included in the EKPC plan are for annual energy, so the energy only solar value is included in this IRP analysis.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 61
RESPONSIBLE PARTY: Julia J. Tucker

Request 61. Refer to page 58 of the IRP where it is stated: "Solar PPAs were based on expected costs from a recent RFP for solar energy. The PPAs were allowed to annually enter into the model throughout the study period of the capacity expansion study. This allowed solar energy to be compared with market purchases and natural gas resources." Please provide the "expected costs" from the recent RFP for solar energy.

Response 61. The costs used, which were based on expected costs, are shown in Table 8-2 on page 163 of the IRP.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022

REQUEST 62

RESPONSIBLE PARTY: Julia J. Tucker

Request 62. Refer to EKPC Response to Joint Intervenor Request 76.

a. Please provide a detailed narrative of how EKPC intends to evaluate future solar PPAs on a "case by case basis for PJM market participation."

b. In the narrative requested above, please describe any metric(s) EKPC will use to distinguish full requirements solar PPAs from energy-only solar PPAs.

Response 62 a-b. Capacity and energy are two separate products in PJM. The value of the energy from the solar project will be compared to the market price of energy to determine the energy value. The capacity price for the solar project will be compared to the market capacity cost to determine the capacity value.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 63
RESPONSIBLE PARTY: Julia J. Tucker

Request 63. Please refer to EKPC Response to Joint Intervenor Request 79, and provide the following information:

Request 63a. Please indicate which units are providing excess incremental capacity to the PJM RPM above EKPC's PJM Load Obligation, and

Response 63a. EKPC does not segregate its units by those that are providing excess incremental capacity. EKPC aggregates all of its capacity and nets it against the Load Obligation for a net position.

Request 63b. Please provide the revenue EKPC receives for excess cleared capacity in the PJM RPM.

Response 63b. Please see AG Response 15b.

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JOINT INTERVENOR'S REQUEST DATED AUGUST 30, 2022
REQUEST 64
RESPONSIBLE PARTY: Craig A. Johnson

Request 64. Please refer to EKPC Response to Joint Intervenor Request 32 and AG Request 31. Are the Cooper station punch list items identified in the Babcock & Wilcox reports included in the cost estimates contained in the response to AG Request 31? If not, please explain why not and provide the anticipated costs for those items.

Response 64. All the punch list items were completed by internal East Kentucky labor, so there were no external costs. Further all punch list items were completed during the 2021 Fall Outages. No punch list items remain.