

IN THE MATTER OF:
ELECTRONIC 2023 INTEGRATED RESOURCE PLAN OF
BIG RIVERS ELECTRIC CORPORATION
CASE NO. 2023-00310

BIG RIVERS ELECTRIC CORPORATION'S RESPONSES TO THE
OFFICE OF THE ATTORNEY GENERAL'S FIRST REQUEST FOR INFORMATION

REQUEST NO. 1-1: *Provide a copy of any communications to Clearspring Energy Advisors, LLC and 1898 & Co. regarding objectives, directives, positions, and/or decisions regarding the development of the IRP, including assumptions not identified in the IRP, resource alternatives, modeling alternatives, identification and selection of the reference and alternative cases communicated in writing to the Company. Such communications, include, but are not limited to, emails, presentations, notes made by Clearspring Energy Advisors, LLC and 1898 & Co. and/or Company personnel, and other documents.*

RESPONSE: Big Rivers objects to the extent that this request seeks information protected by the attorney-client and attorney work product privileges. Big Rivers further objects to this request as overly broad, unduly burdensome, and not reasonably tailored to lead to relevant or admissible evidence. Subject to and without waiving the foregoing, please see the attached responsive communications.

Witness: Nathaniel A. Berry

For the Objection(s): Counsel



201 Third Street
P.O. Box 24
Henderson, KY 42419-0024
270-827-2561
www.bigrivers.com

REQUEST FOR PROPOSAL

2023 Load Forecast

DSMS/EE Potential Study and

Integrated Resource Plan

RFP # HND-22-035

PROPOSAL DUE DATE: SEPTEMBER 2, 2022, 2:00 PM CST

Invitation to Propose Analyses

Management of Big Rivers Electric Corporation ("Big Rivers") requests that your firm submit a proposal(s) for preparation of one, two, or all of the following:

- Load Forecasts,
- Demand-Side Management Potential Study, and
- Integrated Resource Plan.

General Background Information

Big Rivers is a member-owned, not-for-profit, generation and transmission cooperative (G&T) headquartered in Henderson, Kentucky. Big Rivers provides wholesale electric power and services to three distribution cooperative members across twenty-two counties in western Kentucky.

Big Rivers owns and operates 936 megawatts ("MW") of generating capacity in four stations: Robert A. Reid (65 MW), Robert D. Green (454 MW), and D.B. Wilson (417 MW). Additionally, Big Rivers owns, operates, and maintains a 1,305-mile transmission system and provides for transmission of power to its members as well as third-party entities. Additionally, Big Rivers has 178 MW contracted hydropower capacity from the Southeastern Power Administration ("SEPA") and contracts for 260 MW solar power consisting of 160 MW¹ from a facility located on the Henderson/Webster County line and 100 MW² from Community Energy at sites located in Meade County (40 MW) and McCracken County (60 MW).

¹ See Case No. 2020-00242, Electronic Application of Unbridled Solar, LLC for a Certificate of Construction for an Approximately 160 Megawatt Merchant Electric Solar Generating Facility and Nonregulated Electric Transmission Line in Henderson and Webster Counties, Kentucky (filed Dec. 8, 2020).

² *In the Matter of: Electronic Application of Big Rivers Electric Corporation for Approval of Solar Power Contracts*, P.S.C. Case No. 2020-00183

1.0 Scope of Work

1.1 Load Forecasts

Big Rivers requires a total of four load forecasts be prepared. Load Forecasts for each of its three Member Cooperatives to whom Big Rivers supplies power, which will each serve as the basis for Big Rivers' Load Forecast.

The three Member Cooperatives are:

- Kenergy Corp., <https://www.kenergycorp.com/>
- Jackson Purchase Energy Cooperative, <https://www.jpenergy.com/>
- Meade County Rural Electric Cooperative Corporation, <https://www.mcrecc.com/>

The Load Forecast shall be performed in accordance with relevant sections of the Code of Federal Regulations ("CFR"), specifically 7 CFR § 1710 Subpart E, Load Forecast³. A Load Forecast Work Plan, as required by 7 CFR § 1710, is only needed for Big Rivers. In addition, the Kentucky Public Service Commission ("KPSC") Staff's Report recommendations, on the 2020 Integrated Resource Plan ("IRP") of Big Rivers, Case No. 2020-00299, filed September 21, 2020, related to the Load Forecast shall also be addressed. The KPSC staff report is available at the following link:

https://psc.ky.gov/pscscf/2020%20Cases/2020-00299//20211122_PSC_ORDER01.pdf

A copy of Big Rivers' 2020 Load Forecast contained in Appendix A of the 2020 IRP is located at <https://psc.ky.gov/Case/ViewCaseFilings/2020-00299>

The Load Forecast shall include information, i.e., analysis, description of methodology and tables showing Big Rivers' peak forecast coincident with the MISO peak. This is

³ <https://www.ecfr.gov/current/title-7/subtitle-B/chapter-XVII/part-1710/subpart-E?toc=1>

needed to satisfy the new MISO Module E, Resource Adequacy requirements that are changing from annual to quarterly requirements⁴.

Supporting spreadsheets, models, etc., shall also be provided so that Big Rivers' personnel can make updates to the Load Forecast to reflect either the addition of, removal of, or changes in direct-serve customer load or rural load, and changes in system loss rate.

Additionally, each of Big Rivers' Member Cooperatives will require an update of their respective Load Forecasts in the first half of 2023 for budgeting purposes. The Load Forecast will be a fundamental input to Big Rivers' 2023 IRP.

1.2 Demand-Side Management Potential Study

The Demand-Side Management ("DSM") Potential Study will be a fundamental input to Big Rivers' 2023

IRP and will also provide input to the Load Forecast. The KPSC has directed Big Rivers to consider DSM and Energy Efficiency ("EE") programs when, among other things, developing its Integrated Resource Plans. Big Rivers' current portfolio of a single DSM/EE program is outlined in Case No. 2019-00193. Complete information can be found at the following link: <https://psc.ky.gov/Case/ViewCaseFilings/2019-00193>

DSM/EE programs, other than the current Big Rivers' portfolio, shall be considered in the DSM Study.

Examples of previous DSM Potential Studies are available as part of previous IRP submissions. Big Rivers expects an analysis of a wide range of energy efficiency measures as well as all other demand-side control options. Historically, Big Rivers has used Cost-Effectiveness tests outlined in the DOE document: Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and

⁴ MISO Module E available <https://www.misoenergy.org/legal/tariff/>

Emerging Issues for Policy-Makers⁵. Analysis calculations should be provided with the analysis and available for regulators.

Additionally, analysis of a consolidated \$1 MM program spend based on all measures exceeding cost effectiveness and recommendations for energy efficiency and load control.

All tests defined in the document will be available for all evaluated individual measures and program potential for measures that pass the cost effective Total Resource Cost Test (TRC). A final version of the DSM Potential study will be submitted with the IRP as Appendix B and a summary chapter within the IRP itself. The DSM Potential study should be completed by May 31, 2023.

1.3 Integrated Resource Plan

Big Rivers' 2023 IRP shall, at a minimum, meet the requirements of Kentucky Administrative Regulations ("KAR"), including 807 KAR 5:058, available at the following link: <https://apps.legislature.ky.gov/law/kar/titles/807/005/058/>

Furthermore, additional requirements of the IRP are set forth in the Staff Report included as an Appendix to the Commission's Order, dated November 22, 2021, in Case No. 2020-00299 available at the following link:

https://psc.ky.gov/pscscf/2020%20Cases/2020-00299//20211122_PSC_ORDER01.pdf

Big Rivers' 2020 IRP may also be found at <https://psc.ky.gov/Case/ViewCaseFilings/2020-00299>

1.4 MISO and other Considerations

Preparation of Big Rivers' 2023 IRP shall also incorporate new MISO Module E, Resource Adequacy requirements that are changing from annual to seasonal requirements. Big

⁵https://19january2017snapshot.epa.gov/sites/production/files/2015-08/documents/understanding_cost-effectiveness_of_energy_efficiency_programs_best_practices_technical_methods_and_emerging_issues_for_policy-makers.pdf

Rivers will supply coal, natural gas, fuel oil, power, and emission allowance forward price curves, and Big Rivers' unit specific data.

2.0 Contents of Proposal

As part of the preparation of your proposal, please provide as much detail as is reasonable and appropriate in the areas listed below. Also, please provide any other information that would assist us in our consideration of your firm including, but not limited to, the following:

- A brief description of the organization of your firm, giving particular emphasis to that portion of the firm that would serve Big Rivers;
- Experience and qualifications of the personnel conducting this study, emphasizing experience with generation and transmission cooperatives and depreciation studies;
- A representative listing of references in the areas of generation and transmission of electric utilities;
- A thorough description of the work plan and methodology to be used in the study;
- A timeline to meet Big Rivers' targeted completion dates including specific milestones leading up to that date;
 - Load Forecast Due Date 4/30/2023
 - DSM Potential Study Due Date 5/31/2023
 - IRP Due Date 8/30/2023
- Any potential conflicts of interest;
- The cost to prepare the Load Forecasts, Demand-Side Management Study and Integrated Resource Plan. Big Rivers prefers bids for preparation of each item individually and as a complete package;
- Availability to respond to KPSC or Rural Utilities Service written information requests and to provide expert testimony in meetings or formal hearings and an associated fee schedule including a detailed breakdown of personnel, rates, support services, and expenses.

2.1 Evaluation Process and Timing of Work

No public opening of proposals will be held by Big Rivers. Big Rivers reserves the right to accept or reject any or all proposals, to waive any formality, technicality, requirement, or irregularity in the proposals received, and to request further information about any proposal. A committee of Big Rivers' management will review and evaluate all accepted proposals based on the criteria outlined in the Scope of Work and Contents of Proposal sections of this RFP and any other relevant terms of the proposals received. A presentation to management and the Board of Directors may be required, and Big Rivers reserves the right to negotiate with bidders prior to any final evaluation of proposals. Big Rivers expects to select a proposal for the study on or before September 16, 2022. Bidders submitting proposals do so without recourse against Big Rivers for the rejection of any proposal or Big Rivers failure to enter an agreement for study for any reason. Bidders shall be solely responsible for their own costs of submitting a proposal and any participation in the evaluation process.

Any questions should be provided in writing to Marlene Parsley at marlene.parsley@bigrivers.com.

Please submit your proposal by U.S. Mail or e-mail on or before 2:00 PM (CST) September 2, 2022. Bids received after this date will be returned unopened. It is expected the project will begin no later than November 30, 2022 and all work completed no later than August 31, 2023.

Big Rivers Electric Corporation

ATTN: Marlene Parsley/Nancy Owen
PO Box 24
201 Third Street
Henderson, KY 42420
Marlene.parsley@bigrivers.com
Nancy.owen@bigrivers.com



BID CLARIFICATIONS AND/OR EXCEPTIONS

Bidder offers the following clarifications and/or exceptions taken to any requirement or provision of this Request For Quotation and any proposed modifications or replacement language for each clarification or exception (If none, so state).

Bidder understands that unless itemized above, no other clarifications or exceptions to this Request for Quotation are taken by the Bidder.

Bidder

Signature of Executing Party

Date

Big Rivers Electric Corporation
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The question was asked:

Question: Which specific product do you want to submit a proposal?

Answer: We are seeking a proposal or proposals for any or all of the 3 products.

ACKNOWLEDGEMENT

The undersigned acknowledges receipt of this Addendum and the Bid submitted is in accordance with information, instructions, and stipulations set forth herein.

Bidder: _____

By: _____

Date: _____

Big Rivers Electric Corporation
2023 Load Forecast
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The below questions were asked and answered.

1. Should the price quote and scope of work for the load forecast include following the new MISO Module E methodology for forecasting MISO seasonal peaks as a deliverable in the April 2023 load forecast deadline in the RFP?
 - a. YES

2. Should any direct MISO Module E work for the subsequent submission in Fall 2023 be included in the scope for the load forecasting proposal?
 - a. NO that will be a separate request

3. Does the scope of work for the load forecast include providing three separate Member reports?
 - a. YES

4. Does the scope of work for the load forecast include a full tracking analysis of prior forecasts as put forth in the Staff recommendations?
 - a. YES

5. The Staff recommendations discusses providing weather norms and results for 15 year, 20 year, and 30 year weather periods. Should these different weather norms be included in the scope for the load forecast project?
 - a. YES

6. In the 2020 study, custom weather percentile ranges (80%, 90%, 93.3%) were provided for the individual forecasts to select Members. Should this be included in the scope of work?
 - a. YES

7. DSM Timeline: with the DSM study due one month after the load forecast is due, does that mean that the DSM potential does not need to be part of the load forecast explicitly (they are effectively segregated until being incorporated into the IRP)?

Yes- the DSM impact will be a post-analysis adjustment

8. The RFP references \$1 million program scenario but not a \$2 million scenario as in past efforts. We want to verify that ONLY the \$1 million scenario is required.
 - a. YES

ACKNOWLEDGEMENT

The undersigned acknowledges receipt of this Addendum and the Bid submitted is in accordance with information, instructions, and stipulations set forth herein.

Bidder: _____

By: _____

Date: _____

Big Rivers Electric Corporation
2023 Load Forecast
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Section 2.1 Evaluation Process and Timing of Work

The bid due date has been extended to September 9, 2022.

The deadline for selecting the bid award has also been extended. Big Rivers expects to select a proposal for the study on or before September 23, 2022.

ACKNOWLEDGEMENT

The undersigned acknowledges receipt of this Addendum and the Bid submitted is in accordance with information, instructions, and stipulations set forth herein.

Bidder: _____

By: _____

Date: _____

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ELECTRONIC 2023 INTEGRATED RESOURCE PLAN OF
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REQUEST NO. 1-2: *Refer to Section 3.5, State Regulatory Events, 2023 Integrated Resource Plan, page 45. Confirm that utility owned solar and purchase power agreements (“PPA”) solar resources have different cost and revenue requirement profiles, e.g., owned solar typically has declining cost curve and similar revenue requirement profiles, while PPA solar typically has variations of levelized or escalating levelized cost curve and similar revenue requirement profiles.*

- a. Confirm that all cost and supply projections and assumptions reflect this difference.*
- b. Provide a copy of all the materials, studies, and/or other resources used in modeling the projections and assumptions from the PPA.*

RESPONSE:

a. The 160 MW Unbridled Solar Project was modeled in the IRP as a fixed price PPA on a \$/MWh basis.

b. Please see the following link for access to Big Rivers' Application filed in Case No. 2022-00296 seeking Commission approval of the Amendment to the Unbridled PPA, which includes PPA pricing and total annual energy output.

https://psc.ky.gov/pscecf/2022-00296/sentia.santana%40bigrivers.com/09222022055341/BR_Application_and_Exhibits_for_PA_Amd_%28PBL%29_Redacted.pdf

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Witness: John Christensen (1898 & Co.)

IN THE MATTER OF:
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REQUEST NO. 1-3: *Refer to Section 2.2.5, Solar Resources, 2023 Integrated Resource Plan, page 23, 106. Big Rivers has “contracted to purchase all of the capacity, energy, ancillary services and environmental attributes of a 160 MW solar facility, Unbridled Solar, LLC.” Big Rivers states that this PPA is modeled to be operational in June of 2024, however, footnote 73 states that “in-service... solar has been delayed to 2025 at the time of this IRP filing.”*

- a. Explain, in detail, how this delay impacts each aspect of Big Rivers IRP, including but not limited to, specifically identifying by section and page each assumption, projection, and analysis in the IRP that will be impacted by the delay.*
- b. Explain, in detail, why Big Rivers was incorrect in its assumption that Unbridled Solar, LLC would be operational in June of 2024.*
- c. Explain whether the completion of the facility is delayed until 2025. If so, explain when the commercial operations date or “in-service” capability will begin, and at what date Unbridled Solar, LLC’s power will be added to Big River’s base portfolio. Please provide all documentation to support your assessment.*
- d. Confirm that the Unbridled Solar, LLC is at this time still being constructed with the capacity of producing 160 MW. Please support your answer with documentation.*
- e. If you are unable to affirmatively answer subsection (d) of this Request, please confirm that Big Rivers has no indication that Unbridled Solar, LLC will not be able to provide 160 MW once the facility is complete.*

RESPONSE:

- a. The one-year delay of the in-service date for the Unbridled Solar facility will have virtually zero impact on the IRP, as all the consequential actions will happen later in the decade.

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Big Rivers may have to purchase some energy and capacity to backfill shortfalls in the coming planning year, but that action would not have impacted the selections and financial deltas between the studied portfolios.

b. The Unbridled Solar project entered the MISO Interconnection Queue in the Definitive Planning Phase 2020-2020 Cycle, which has experienced numerous delays. This cycle currently has a target for Phase 2 completion on 1/23/2024, which, if achieved, would result in final completion of the Interconnection Agreement in approximately six months. See <https://cdn.misoenergy.org/Definitive%20Planning%20Phase%20Schedule629192.pdf>.

c. The expected Commercial Operation Date of the Unbridled Solar project is currently February 2025, at which point it would become part of Big Rivers' portfolio. Please see the attached CONFIDENTIAL email between Saxon McKinven and Terry Wright regarding the expected completion date of this project.

d. Yes, Unbridled Solar has started construction with an expected capacity of 160 MWs. Please see the press release from National Grid on this project: <https://nationalgridrenewables.com/press-release/national-grid-renewables-breaks-ground-on-largest-solar-project-in-kentucky/>

e. Not applicable.

Witnesses: John Christensen (1898 & Co.) (for subpart a)

Terry Wright, Jr. (for subparts b-e)

From: Saxon McKinven <[REDACTED]>
Sent: Thursday, November 16, 2023 10:01 AM
To: Wright, Terry; Pogue, Russ
Cc: Drew D. Terwilliger; Doug Wester
Subject: [BULK] RE: [External] RE: Unbridled Solar Update

Terry – we sent this to Ron in Aug, I was under the assumption it was socialized within BREC. We are planning to update this and add other milestones completed or to be completed in the future.

See below for an update on the Unbridled major milestone schedule as requested. Note, this schedule is intended to be an update, and thus is subject to change. NG Renewables reserves the right to adjust the schedule as the projects continues through to completion.

Please let me know if you have any questions before your meeting.

Milestone	Status / Expected Date
PPA Board Approval	Complete
Sponsor Commitment	Complete
Module Supply Agreement	Complete
Inverter Supply Agreement	Complete
MPT Supply Agreement	Complete
EPC Agreements	Aug-2023
Start of Construction / Mobilization	Sep-2023
Provisional GIA	Aug-2023
Final MISO Study Results	Est. Q1 2024
MISO GIA Execution	Est. Q2 2024
Facility Mechanical Completion	Q4 2024
Facility Substantial Completion	Q1 2025
Commercial Operation Date	[REDACTED]



952.988.9000

Saxon McKinven
 Director of Origination



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REQUEST NO. 1-4: *Indicate whether the Company has identified potential on-shore wind resource sites in Kentucky. If so, please include any studies or materials relied on in analyzing the same.*

RESPONSE:

Please see the response to Commission Staff's Request No. 1-29. Big Rivers has not identified sites in Kentucky for a wind facility at this time, but it has expressed a commitment to continue to monitor as wind technology evolves.

Witness: John Christensen (1898 & Co.)

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REQUEST NO. 1-5: *Indicate whether the Company has identified potential on-shore wind resource sites in states other than Kentucky. If so, please include any studies or materials relied on analyzing the same.*

- a. If so: (i) explain whether any studies have been conducted regarding additional transmission costs that would be incurred in the event Big Rivers should enter into a PPA with the owner of the wind project; and (ii) provide copies of all such studies.*
- b. Reference IRP Section 7.4.2. Confirm the following statement at p. 156: "Big Rivers considers wind not economically feasible, as there were no wind resources proposed in our recent all source RFP, and the intermittent operation of wind remote to Big Rivers' load brings the risk of congestion costs which are hard to quantify and/or hedge."*

RESPONSE: Big Rivers has not identified potential on-shore wind resource sites in states other than Kentucky.

- a. Not applicable.
- b. Big Rivers confirms that wind is not economically feasible due to intermittent operation in Big Rivers' service territory and the risk of congestion cost outside of MISO zone 6.

Witness: Nathaniel A. Berry

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REQUEST NO. 1-6: *Indicate whether Big Rivers has considered adding a new coal-fired unit to the Company's generating fleet.*

- a. If not, explain why the Company has not analyzed this as a needed asset to meet its obligations of reliability.*
- b. If so, explain why the Company chose not to pursue this option, and provide the documents utilized in making this assessment.*
- c. For the existing Wilson coal-fired unit, have you considered locking in a long-term coal supply contract given the current cost is particularly low.*

RESPONSE: Big Rivers has considered adding a new coal-fired unit to the Company's generating fleet.

- a. Not applicable.
- b. Big Rivers chose not to pursue this option due to anticipated construction costs compared to a Natural Gas Combine Cycle (NGCC) plant and the environmental challenges of attempting to build a new coal-fired unit. Big Rivers is not aware of any responsive documents.
- c. Yes. Big Rivers plans to request proposals of long-term contracts in the first quarter of 2024.

Witness: Nathaniel A. Berry

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REQUEST NO. 1-7: *Describe specifically the evaluation and decision process, including the decision criteria, and the modeling processes utilized to determine the size and timing of the wind resources reflected in the Company's IRP and each alternative portfolio studied in preparation of the same. In your response, address, among all other issues relevant to the evaluation and decision process, how the base rate and other rate impacts were specifically considered as a decision criterion.*

RESPONSE:

Please see the response to Commission Staff's Request No. 1-52. The EnCompass model developed for this IRP was utilized to evaluate if the energy and capacity from generic wind resources located in the region would benefit Big Rivers' Member-Owners. Table 7.2.3(a) on Page 141 of the IRP outlines in which sensitivities the model selected wind resources. Since the expansion planning model selected wind in a few sensitivities, but not under Base Conditions, the generic wind was included in the alternative portfolios only. Those portfolios were ultimately uneconomic compared to the Base Case Portfolio.

Witness: John Christensen (1898 & Co.)

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REQUEST NO. 1-8: *Given the inclusion of, and reliance on, renewable generation in the IRP, explain to what extent the Company considered the need for synchronous assets and/or gridforming technologies to maintain system voltage and frequency support, and the costs thereof.*

RESPONSE: Big Rivers remains vigilant with respect to grid performance and reliability, and is cognizant of the growth in renewable generation and the risks associated with such growth. Therefore, Big Rivers' 2023 IRP recognizes the value in retaining our most efficient baseload resource, Wilson Station, and identifying resources that will complement intermittent renewable resources, thereby avoiding an excess of grid-following, inverter-based resources.

Witness: Nathaniel A. Berry

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REQUEST NO. 1-9: *In Case No. 2022-00402, LG&E/KU refer to the “execution” risk related to solar resources, meaning that there is a risk of failure to acquire planned resources due to the potential unavailability of components when needed and/or at the prices assumed. Indicate whether the Company agrees that it faces execution risk associated with its proposed solar resources and that there is a probability of failure, potentially a high probability of failure. Explain your response and provide all evidence relied on to inform and/or otherwise relied on for your response.*

RESPONSE: Big Rivers agrees that there is an “execution” risk related to solar resources. To minimize this and other risks, Big Rivers embraces a balanced generating portfolio that does not lean too heavily on any one resource type. Big Rivers has already faced the cancellation of two solar contracts (Meade and McCracken) due to supply limitations, and it has had to renegotiate¹ a third solar PPA (Unbridled Solar PPA) to avoid it being cancelled as well. While we do believe that there is risk related to solar construction and PPAs, we believe that this risk is transient in nature and will eventually resolve itself as supply chains improve and production facilities are built in the United States.²

¹ https://psc.ky.gov/pscecf/2022-00296/senthia.santana%40bigrivers.com/09222022055341/BR_Application_and_Exhibits_for_PPA_Amd_%28PBL%29_Redacted.pdf

² <https://www.reuters.com/business/energy/largest-ever-us-solar-factory-shows-rapid-pivot-american-made-2023-05-11/>

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REQUEST NO. 1-10: *Refer to Section 7.2.1, Assumptions: Inputs and Constraints, 2023 Integrated Resource Plan, pages 135 & 135. Please provide a copy of the charts that are fully visible.*

RESPONSE: Pages 135 and 136 of the 2023 IRP, reformatted to where the charts are fully visible, were filed in this matter on October 3, 2023. Attached to this response is a duplicate copy.

Witness: Nathaniel A. Berry

Table 7.2.1(a)
Alternative Resource Capacity Constraints

Annual Maximum Project Capacity for EnCompass Model											
Year	4-Hour Storage	Wind	Solar PV	Recip 4x5MW	Combustion Turbine	Aeroderivative	Big Rivers CC	Big Rivers DSM	PACE 4-Hour Storage	PACE Solar	
2024								1			
2025											
2026											
2027			200								
2028		200	200						50	100	
2029	300	200	200	630	711	630	635				
2030	300	200	200	630	711	630	635				
2031	300	200	200	630	711	630	635				
2032	300	200	200	630	711	630	635				
2033	300	200	200	630	711	630	635				
2034	300	200	200	630	711	630	635				
2035	300	200	200	630	711	630	635				
2036	300	200	200	630	711	630	635				
2037	300	200	200	630	711	630	635				
2038	300	200	200	630	711	630	635				
2039	300	200	200	630	711	630	635				
2040	300	200	200	630	711	630	635				
2041	300	200	200	630	711	630	635				
2042	300	200	200	630	711	630	635				
2043	300	200	200	630	711	630	635				
2044	300			630	711	630	635				
2045	300			630	711	630	635				
2046	300			630	711	630	635				
2047	300			630	711	630	635				
2048	300			630	711	630	635				
2049	300			630	711	630	635				
2050	300			630	711	630	635				

Table 7.2.1(b)

Cumulative Alternative Resource Capacity Constraints

Cumulative Maximum Project Capacity for EnCompass Model										
Year	4-Hour Storage	Wind	Solar PV	Recip 4x5MW	Combustion Turbine	Aeroderivative	Big Rivers CC	Big Rivers DSM	PACE 4-Hour Storage	PACE Solar
2024								1		
2025										
2026										
2027			200							
2028		200	400						50	100
2029	300	400	600	630	711	630	635			
2030	600	600	800	630	711	630	635			
2031	600	800	1000	630	711	630	635			
2032	600	1000	1200	630	711	630	635			
2033	600	1200	1400	630	711	630	635			
2034	600	1400	1600	630	711	630	635			
2035	600	1600	1800	630	711	630	635			
2036	600	1800	2000	630	711	630	635			
2037	600	2000	2200	630	711	630	635			
2038	600	2200	2400	630	711	630	635			
2039	600	2400	2600	630	711	630	635			
2040	600	2600	2800	630	711	630	635			
2041	600	2800	3000	630	711	630	635			
2042	600	3000	3200	630	711	630	635			
2043	600	3200	3400	630	711	630	635			
2044	600			630	711	630	635			
2045	600			630	711	630	635			
2046	600			630	711	630	635			
2047	600			630	711	630	635			
2048	600			630	711	630	635			
2049	600			630	711	630	635			
2050	600			630	711	630	635			

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REQUEST NO. 1-11: *Refer to Section 7.2.4, Assumptions: Resource Options, 2023 Integrated Resource Plan, page 120. Regarding the proposed 50 MW, 4-hour lithium-ion battery, explain whether a physical location for this potential resource has been identified. If it would not be located within Big River's service territory, explain whether any new transmission facilities or upgrades would be required. If so, explain whether cost estimates for all such transmission projects were factored into the analysis, and identify where they can be found.*

- a. Confirm that use of batteries results in a 15% energy loss. If so confirmed, confirm that if plans for a battery are approved, the Company's customers would be paying the costs of this 15% energy loss, and getting nothing in return.*
- b. Provide the Company's most recent transmission line loss figures.*

RESPONSE: Big Rivers has proposed a hybrid 100 MW solar/50 MW battery project for McCracken County as part of its Letter of Interest in the PACE program. Big Rivers has not identified any more specific siting location for the project.

a. Li-Ion storage assets experience a "round-trip" energy loss during the charging and discharging cycle, as well as parasitic losses while sitting idle. This total loss can be in the 10-15% range depending on many factors. It is important to note that all energy conversions (including burning coal or natural gas to create electricity) result in "losses," but that, in each case, customers do get energy, capacity, and ancillary services in return for the conversion of energy.

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In the case of the storage assets, the electrical losses are a cost of operation. However, customers can still benefit from energy arbitrage, accredited capacity, and ancillary services.

b. The 12 month average line loss calculation as provided in Case No. 2023-00013 follows:

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**12 Month Average Line Loss Calculation
November 2020 - October 2022**

Line No.	(a)	(b)	(c)	(d)
	12 Months Ended	12 Month Total kWh Sources	12 Month Total kWh Line Losses	12 Month Line Losses as a Percent of Total Sources
				(c) / (b)
2	Dec-20	5,011,366,684	106,854,764	2.13%
3	Jan-21	5,067,785,684	104,889,182	2.07%
4	Feb-21	5,214,864,468	111,452,279	2.14%
5	Mar-21	5,304,486,004	116,516,446	2.20%
6	Apr-21	5,619,247,306	124,171,869	2.21%
7	May-21	5,925,480,894	132,034,439	2.23%
8	Jun-21	6,060,312,860	136,913,710	2.26%
9	Jul-21	6,133,981,672	142,491,219	2.32%
10	Aug-21	6,223,940,693	142,295,684	2.29%
11	Sep-21	6,406,541,423	141,585,432	2.21%
12	Oct-21	6,521,169,033	139,282,460	2.14%
13	Nov-21	6,722,163,591	141,106,849	2.10%
14	Dec-21	6,735,125,951	144,728,965	2.15%
15	Jan-22	6,861,283,386	155,586,443	2.27%
16	Feb-22	6,774,794,849	161,864,705	2.39%
17	Mar-22	6,912,576,153	166,900,474	2.41%
18	Apr-22	6,732,513,638	172,041,324	2.56%
19	May-22	6,552,078,944	172,214,557	2.63%
20	Jun-22	6,449,122,198	174,525,864	2.71%
21	Jul-22	6,335,374,933	174,381,682	2.75%
22	Aug-22	6,207,733,470	173,990,628	2.80%
23	Sep-22	6,058,365,332	176,741,432	2.92%
24	Oct-22	5,861,847,712	176,534,843	3.01%

Witnesses: John Christensen (1898 & Co.) (for subpart a)

Christopher S. Bradley (for subpart b)

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REQUEST NO. 1-12: *Refer to Section 3.10, A Focus on Reliability, 2023 Integrated Resource Plan, page 61. Big Rivers is a member of the Midcontinent Independent System Operator (“MISO”) and cites in its IRP a January 2023 MISO report which states, “that as the transition to different generation resources continues, society must decide how to balance reliability, sustainability, and affordability.” In Section 1.0, Executive Summary, 2023 Integrated Resource Plan, page 8, Big Rivers “highlights a path” to “sustainability, reliability, cost-effective generation.”*

- a. Explain if Big Rivers agrees with any positions MISO has taken on “how to balance reliability, sustainability, and affordability.”*
- b. Does Big Rivers prioritize, or rank-order, the objectives of reliability, sustainability, and affordability?*
- c. If so, explain how the Company prioritizes these objectives.*

RESPONSE:

a. MISO has published and regularly updates its “Reliability Imperative” report,¹ which provides visibility into how MISO manages its primary responsibility of reliability with the sustainability and affordability aims of its members. MISO acknowledges its primary “lens” is reliability, though it has a shared responsibility with its utility members and stakeholders to address

¹ See <https://cdn.misoenergy.org/MISO%20Response%20to%20the%20Reliability%20Imperative504018.pdf>.

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all three topics. Big Rivers generally agrees with the work MISO has included in its Reliability Imperative.

b. No, Big Rivers does not rank-order the objectives of reliability, sustainability, and affordability. As described in responses to data requests and comments related to Big Rivers' 2020 IRP in Case No. 2020-00299, Big Rivers strives to strike the appropriate balance for our Member-Owners to provide safe, reliable power at the lowest reasonable cost, taking into account the risk of intermittent resources, regulatory risk of relying too heavily on coal-fired generation, and other factors.²

c. Big Rivers' priority is to safely deliver competitive and reliable wholesale power as desired by its Member-Owners.

Witness: Nathaniel A. Berry

² See *In the Matter of: Electronic 2020 Integrated Resource Plan of Big Rivers Electric Corporation*, Case No. 2020-00299, Big Rivers Electric Corporation's Response to the Staff's Report and Post-Hearing Comments (Feb. 11, 2022).

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REQUEST NO. 1-13: *Refer, generally, to the 2023 Integrated Resource Plan.*

Relating to MISO, Big Rivers cites changes to the MISO tariff, which impacts capacity requirements, as an uncertainty it must continually evaluate. Further, Big Rivers states it experiences losses in the MISO power market during off-peak hours, has had two PPAs terminated due to MISO interconnection issues, and cites rapid fleet changes in the MISO region that give rise to urgent and complex reliability challenges. Big Rivers, however, states that through its participation in MISO, it has capitalized on selling its non-native load.

- a. Explain if, and how, membership in MISO has a net-positive financial impact on Big Rivers members.*
- b. If applicable, provide the net savings that Big Rivers realized from its MISO membership from the date of its last IRP, and explain how the net savings was calculated.*
- c. Explain in detail what significant beneficial operational changes have occurred due to the Company's membership in MISO.*
- d. Explain all costs associated with the Company's membership in MISO.*
- e. Explain if Big Rivers has considered terminating its membership in MISO, and if so, what was the reasoning for the decision to stay.*

RESPONSE:

- a. Big Rivers relied on an analysis performed by Charles River & Associates (CRA) in 2010 when it determined joining MISO was the least-cost option for managing its contingency

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reserve requirements. At the time, joining MISO was estimated to be at least \$32 million less costly to Big Rivers than stand-alone self-supply of contingency reserves. Since that time, Big Rivers has not identified any other less-cost option for it to acquire reserves to meet its NERC obligations.

b. Big Rivers has not conducted a cost-savings study since the last IRP.

c. Please see Big Rivers' annual reports submitted to the Public Service Commission, pursuant to the Commission's November 1, 2010, Order in Case No. 2010-00043, *In the Matter of: Big Rivers Electric Corporation to Transfer Functional Control of Its Transmission System to Midwest Independent Transmission System Operator, Inc.*¹

d. Big Rivers has budgeted \$2.6M for MISO Administrative Fees (MISO Schedule 10) for 2024.

e. Big Rivers regularly evaluates its MISO membership and currently believes its options for meeting its Contingency Reserve requirements largely remain the same as they did when Big Rivers first joined MISO in 2010. Accordingly, Big Rivers remains a Transmission Owning member of MISO.

Witness: Erin M. Murphy

¹ The annual reports can be found on the Commission's website through the following link: <https://psc.ky.gov/Case/ViewCaseFilings/2010-00043/Post>

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REQUEST NO. 1-14: *Refer to Section 3.8, Regulatory Climate, 2023 Integrated Resource Plan, page 57. Big Rivers states that on September 15, 2023 it submitted a Letter of Intent "to fund a project that will significantly reduce carbon emissions in our service area."*

- a. *Explain the project in detail.*
- b. *Explain in detail whether this project is to be funded entirely by The Empowering Rural America Program ("NewERA").*
- c. *If the project is not funded in its entirety by NewERA, explain what expenses and/or liability Big Rivers will incur if the project is approved.*
- d. *Explain whether ratepayers would be responsible for paying any portion of this anticipated expense.*

RESPONSE:

a. On September 15, 2023, Big Rivers submitted a Letter of Interest (LOI) for funding via the Empowering Rural America (New ERA) program to support installation of a carbon capture and sequestration project at its D.B. Wilson Generating Station. The US Department of Agriculture's Achievable Reductions Tool (ART) estimates that installation of carbon capture technology on this generating resource would reduce greenhouse gas emissions by 47.9% annually and decrease carbon intensity by 52.6% annually.

b. Big Rivers has requested the maximum available funding from the New ERA program: 25% grant and a 0% loan for the balance.

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c. Big Rivers anticipates using the 45Q tax credits to offset costs of the project. Under Big Rivers' present analysis, even in the most conservative case, the loan amount for the project would be offset by the 45Q tax credits over the life of the project.

d. Big Rivers' analysis does not model any expenses for this project being borne by its Member-Owners.

Witness: Erin M. Murphy

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REQUEST NO. 1-15: *Refer to Section 3.5, State Regulatory Events, 2023 Integrated Resource Plan, page 44. Big Rivers states it has several “regulatory assets on its books arising out of its successful efforts to mitigate the loss of two large aluminum smelters, and each year utilizes its regulatory liability account to further reduce the regulatory assets.” Please list each regulatory asset, and describe how each regulatory asset was acquired.*

RESPONSE: In 2013 and 2014, Big Rivers lost 850 MW of load from two aluminum smelters, which represented more than one-half of its total native load. Preparing for the potential closure of one or both of the smelters and mitigating the load loss after the smelters' eventual departures resulted in a multitude of regulatory proceedings, as well as a focused managed audit (the “Focused Audit”) ordered by the Commission.¹ In Case No. 2012-00535,² Big Rivers requested Commission approval to increase its wholesale electric service rates to its three member-owner distribution cooperatives. There were numerous arguments presented in the case by Big Rivers and the intervenors related to the handling of depreciation. In its October 29, 2013, Order, the Commission found it reasonable to require the depreciation of Big Rivers' Kenneth C. Coleman

¹ See *In the Matter of: Electronic Application of Big Rivers Electric Corporation for Approval to Modify Its MRSM Tariff, Cease Deferring Depreciation Expenses, Establish Regulatory Assets, Amortize Regulatory Assets, and Other Appropriate Relief*, Case No. 2020-00064, Application (Feb. 28, 2020).

² *In the Matter of: Application of Big Rivers Electric Corporation for an Adjustment of Rates*, Case No. 2012-00535.

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Generating Station ("Coleman Station"), which at the time was temporarily idled, to be recorded in a regulatory asset account and excluded from rate recovery at that time. In Case No. 2013-00199,³ the Commission found that Big Rivers should continue to defer the depreciation on the Coleman Station in the regulatory asset account rather than record that depreciation as an expense and found that effective February 1, 2014, Big Rivers would defer the depreciation on its D.B. Wilson Generating Station in a regulatory asset.⁴ The Commission's April 25, 2014, Order also initiated the focused audit of Big Rivers' efforts to mitigate the impact of the loss of the smelters loads. KRS 278.255(3) states:

Audits provided under this section may, at the discretion of the commission, be performed by the commission staff or by a competent, qualified and independent firm. When the commission orders an audit to be performed by an independent firm, the commission shall select the audit firm, which shall work for and under the direction of the commission, with the cost to be borne by the utility. The commission shall include the cost of conducting any audits required in this section in the cost of service of the utility for ratemaking purposes.

The Focused Management Audit Expenses regulatory asset was established pursuant KRS 278.255(3).

³ *In the Matter of: Application of Big Rivers Electric Corporation for a General Adjustment in Rates Supported by Fully Forecasted Test Period*, Case No. 2013-00199.

⁴ See *Id.*, Order (Apr. 25, 2014).

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In Case No. 2018-00146,⁵ among other relief, Big Rivers requested Commission authorization to establish, for accounting purposes, a regulatory asset to defer the expenses related to the termination of the Station Two Contracts between Big Rivers and the City of Henderson, Kentucky and the Henderson Utility Commission related to the Station Two Generation Station. In its October 23, 2018, Order, the Commission authorized Big Rivers to establish a regulatory asset for the value of the Station Two Contracts that Big Rivers would have otherwise had to retire and write off as a result of the termination of the Station Two Contracts (“Station Two Retirement Costs”). Station Two, owned by Henderson Municipal Power and Light and operated by Big Rivers, was retired in 2019.

In Case No. 2020-000064,⁶ among other relief, Big Rivers requested authorization to establish regulatory assets for the costs related to the retirement of the Coleman Station and Robert A. Reid Station Unit 1 (“Reid Unit 1”). Coleman Station and Reid Station Unit 1 were idled in 2014 and 2016, respectively. In its June 25, 2020, Order, the Commission found that the case was “the culmination of BREC’s efforts to mitigate the loss of 850 MW of load from two aluminum smelters” and approved the establishment of the Coleman Station Retirement Costs and the Reid

⁵ *In the Matter of: Application of Big Rivers Electric Corporation for Termination of Contracts and Declaratory Order and For Authority to Establish a Regulatory Asset*, Case No. 2018-00146.

⁶ *In the Matter of: Electronic Application of Big Rivers Electric Corporation for Approval to Modify Its MRSM Tariff, Cease Deferring Depreciation Expenses, Establish Regulatory Assets, Amortize Regulatory Assets, and Other Appropriate Relief*, Case No. 2020-00064.

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Station Unit 1 Retirement Costs regulatory assets, to include the remaining net book value and decommissioning cost for the stations.

The table below summarizes the authorization of the Smelter Loss Mitigation Regulatory Assets.

Smelter Loss Mitigation Regulatory Asset:	Established Pursuant to:	KPSC Order Date:
Coleman Station Depreciation Deferral	Case No. 2012-00535	10/29/2013
Wilson Station Depreciation Deferral	Case No. 2013-00199	4/25/2014
Focused Management Audit Expenses	KRS 278.255(3)	
Station Two Retirement Costs	Case No. 2018-00146	10/23/2018
Coleman Station Retirement Costs	Case No. 2020-00064	6/25/2020
Reid Station Unit 1 Retirement Costs	Case No. 2020-00064	6/25/2020

Witness: Talina R. Mathews

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REQUEST NO. 1-16: *Refer to Section 2.2.3, Capacity Resources, 2023*

Integrated Resource Plan, page 18. Big Rivers states that it purchases 178 MW hydropower from the federal Southeastern Power Administration ("SEPA").

- a. Explain whether Big Rivers has analyzed if and how any drought conditions would affect its purchase of hydropower in the future.*
- b. Explain whether the hydropower provides reliable and continuous electricity to its customers.*
- c. For the hydropower produced provide the cost per MW.*
- d. Explain how Big Rivers would meet the anticipated increase in demand if a drought occurred before the Unbridled Solar, LLC facility is completed.*
 - i. And if purchasing power from MISO is the answer, please rectify its above-cited concerns with MISO and why Big Rivers feels this strategy is the most reliable and sustainable.*

RESPONSE:

- a. Big Rivers has not analyzed if or how any drought conditions would affect its purchase of hydropower in the future.
- b. Big Rivers' hydropower contract with SEPA provides 1500 kW energy for each kW of contract demand, thus the hydropower supply as contracted is reliable but not continuous.
- c. Current capacity rate is \$3.793/kW or \$3,793/MW.

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- d. It is unclear what increase in demand the Attorney General is referring to. Regardless, according to MISO Tariff provisions, all of Big Rivers' load obligations are met through purchases from MISO.
- i. The question refers to Big Rivers' "above-cited concerns with MISO" but there are no such above-cited concerns. Regardless, MISO's Tariff requires MISO to plan and operate the transmission system reliably. Therefore, if any resource is not available, MISO dispatches other resources to meet system requirements.

Witness: Terry Wright, Jr.

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REQUEST NO. 1-17: *Refer to Section 3.8, Regulatory Climate, 2023 Integrated Resource Plan, page 56. Explain whether Big Rivers has received any monies associated with the Inflation Reduction Act (“IRA”) and/or Infrastructure Investment and Jobs Act (“IIJA”), and if so, identify the amount of money received and what Big Rivers intends to do with the funds.*

RESPONSE: While Big Rivers has submitted Letters of Interest (LOI) for each the PACE and New ERA programs, Big Rivers has not, at this time, received any monies associated with the Inflation Reduction Act or the Infrastructure Investment and Jobs Act.

Witness: Erin M. Murphy

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REQUEST NO. 1-18: *Refer to Section 5.1, Demand Side Management ("DSM"),
page 75. Provide a general description of how costs savings will be shared between Big Rivers,
a wholesale power provider, and its Member-Owners who implement the programming.*

- a. List and explain all DSM programs Big Rivers and Member-Owners have
negotiated and implemented or plan to implement.*

RESPONSE: The distribution of costs and benefits specific to the administration of any
DSM program proposed by Big Rivers would be defined in proposed tariffs submitted to the KPSC
for approval.

- a. Big Rivers offers a Low-Income Weatherization Support Program ("LIWSP") on a
pilot basis to provide financial support to Community Action Agencies allowing
previously deferred homes of retail residential members to be weatherized. In this
pilot, all costs are paid by Big Rivers.

Witness: Russell L. Pogue

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REQUEST NO. 1-19: *Given the rising reliability issues facing the Commonwealth of Kentucky, has Big Rivers considered if the benefits of a direct interconnection with East Kentucky Power Cooperative, Inc. ("EKPC") would not outweigh the costs? Upon belief, the two transmission systems come within a few miles of each other, and EKPC and LGE-KU have over 70 interconnections. Given EKPC interconnects with PJM, and its massive transmission system, this would seemingly interconnect the state's regulated electric generating utilities, and would enhance state-wide reliability and perhaps offer new opportunities in the form of a much more robust physical hedge against reliability risks of all types. Further, it might enable Big Rivers at some point in the future to join PJM, and provide more interconnections between TVA and PJM. Please explain if Big Rivers has considered this, and if so, explain why the Company decided not to interconnect with EKPC.*

- a. *Given the above, explain whether MISO is developing plans for more interconnections between the MISO and PJM footprints, such as it had planned a few years ago with the Duff-Coleman project. Include in your response a discussion of whether the Company believes MISO might find value in interconnecting the Company's and EKPC's transmission systems. If so, explain whether the Company believes such an interconnection should be studied.*

RESPONSE: Big Rivers has evaluated possible EKPC interconnections in the past and continues to believe that such interconnections have the potential to benefit both Big Rivers and EKPC and should continue to be considered and evaluated in the future.

- a. Big Rivers is not aware of any planned MISO to PJM interconnections at this time.

However, such interconnections are routinely considered. The following was

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presented at the October 27, 2023 MISO/PJM Interregional Planning Stakeholder
Advisory Committee (IPSAC):

- *After discussions with stakeholders at the February 17, 2023 Interregional Planning Stakeholder Advisory Committee (IPSAC), the MISO-PJM Joint RTO Planning Committee decided not to initiate a Coordinated System Plan (CSP) study in 2023*
- *The CSP determination was based on the following rationale:*
 - *Interregional Market Efficiency Project (IMEP):*
 - *No interregional constraints were identified in the respective regional processes*
 - *Targeted Market Efficiency Project (TMEP):*
 - *RTOs believed it prudent to assess the impact of planned upgrades and congestion persistence with an additional year of market data*
 - *Interregional Reliability Projects; Interregional Public Policy Projects; Ad-Hoc studies:*
 - *No drivers were identified to warrant a study.¹*

¹ See the October 27, 2023, PJM_MISO IPSAC presentation at Slide No. 5. The presentation is available at <https://cdn.misoenergy.org/20231027%20MISO-PJM%20IPSAC%20Presentation630649.pdf>.

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REQUEST NO. 1-20: *Provide the projected non-native sales forecast for the
three-year IRP period.*

RESPONSE: Big Rivers objects to this request as vague, as it seeks “the projected non-native sales forecast for the three-year IRP period,” without any further explanation. Subject to the foregoing, Big Rivers states that the information ostensibly sought is provided in the 2023 IRP. Non-Member Sales Peak data in kW is included on Table 4.3(a), and Non-Member Energy Requirements in MWh is included on Table 4.4(a).

Witness: Terry Wright, Jr.

For the Objections(s): Counsel

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REQUEST NO. 1-21: *Confirm that all generation resources at Sebree station are gas-fired.*

- a. If so confirmed, identify the gas pipeline providing supply to Sebree station.*
- b. Explain whether Big Rivers has ever considered dual-fuel capability at Sebree station. If so, provide copies of all relevant studies and analyses that may have been conducted in this regard.*
- c. For the existing gas-fired unit, have you considered negotiating any termed supply contracts, or guaranteed delivery contracts, with the pipeline owner that might provide a beneficial hedge against potential increased fuel costs or lack of pipeline capacity?*

RESPONSE: Confirmed.

- a. The gas pipeline providing supply to Sebree station is owned by Texas Gas Transmission, LLC.
- b. Big Rivers continually monitors and analyzes the efficiency and reliability of its generating fleet, including potential options for dual-fuel capability at Sebree station for reliability in extreme weather events. Big Rivers' analysis in this regard is preliminary, and no formal studies have been conducted at this time.

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c. Yes, Big Rivers has explored purchasing firm capacity from Texas Gas Transmission, LLC, which would require several major system upgrades at substantial cost.

Witness: Nathaniel A. Berry

OAG 1-22

There was not a Request for Information for OAG 1-22.

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REQUEST NO. 1-23: *Refer to Section 2.2.7 and Table 2.2.7 (a). Of the entities submitting RFIs, explain how many are data centers or crypto-mining entities that would carry a high fixed load for purposes of running computers, servers and other data processing equipment.*

- a. *Explain what policies Big Rivers has in place to ensure that an inordinate percentage of the Company's capacity will not be devoted toward meeting the needs of a few high-load large industrial customers, such as was the situation prior to 2014 when the smelter load left the Big Rivers system.*
- b. *Are the Company's assumptions concerning economic development in its service area in line with the State's economic development plan, or alternatively, are the Company's assumptions and project economic development growth at a level even with, or greater than, the State's economic development plan?*

RESPONSE: Of the entities submitting RFIs during the 2023 calendar year, two were for data centers or crypto-mining entities that would carry a high fixed load as a result of running significant amounts of computers, servers and other data processing equipment. For more information related to the RFIs from data centers or crypto-mining entities, please see Big Rivers' response to Kentuckians for the Commonwealth and Kentucky Resource Counsel's Request No. 1-63.

a. New high-load industrial customers that would require additional generation would be required to assist in funding the infrastructure upgrades. Big Rivers and its Member-Owners will continue to negotiate contracts with high-load large industrial customers which balance the

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need for incentives to attract these economic development opportunities to Kentucky with adequate protections for other retail customers, such as was done with respect to the Agreement for Electric Service between Big Rivers' Member, Jackson Purchase Energy Corporation and Block Mining, Inc. (formerly Blockware Mining LLC).¹

b. Yes, Big Rivers' assumptions with respect to economic development in its service area are in line with the State's economic development plan.

Witness: Nathaniel A. Berry

¹ See *In the Matter of: Electronic Tariff Filing of Big Rivers Electric Corporation and Jackson Purchase Energy Purchase Corporation for Approval and Confidential Treatment of A Special Contract and Cost Analysis Information and a Request for Deviation from the Commission's September 24, 1990 Order in Administrative Case No. 327, Case No. 2021-00282, Direct Testimony of Mark J. Eacret pp 9-10, (June 21, 2021).*

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REQUEST NO. 1-24: *Refer to Fig. 2.3 (a) and Table 2.3 (a). Provide the reason(s) for the increased heat rate between 2021-2022. Provide also the heat rate for CY 2023 year-to-date.*

RESPONSE: The main driver of the increase in heat rate between 2021 and 2022 was lower average dispatch levels from MISO. The performance curve of the generating units is such that they are more efficient as output increases. Please see the attachment to Big Rivers' response to Request No. 11(e) of Kentuckians for the Commonwealth and Kentucky Resource Counsel's First Request for projected annual data by unit, including 2023 heat rate.

Witness: Nathaniel A. Berry

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REQUEST NO. 1-25: *With regard to all anticipated renewable energy projects, provide the proposed accounting treatment for all renewable energy credits (RECs).*

RESPONSE: As an RUS borrower, Big Rivers will follow guidance provided by the RUS to account for RECs. Attached to this response is a copy of RUS's guidance to RUS electric borrowers on "Recommended Accounting for Renewable Energy Credits (RECs)."

Witness: Talina R. Mathews

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REQUEST NO. 1-26: *Provide a narrative explanation regarding what efforts the Company has taken and will take to attempt to obtain government grants, loans and incentives such as those provided in the Inflation Reduction Act, for renewable energy projects.*

RESPONSE: The Company has submitted a Letter of Interest (LOI) for the Affordable Clean Energy (PACE) and Empowering Rural America (New ERA) programs established by the Inflation Reduction Act. Big Rivers will continue to seek and evaluate opportunities for government funding in connection with its generation portfolio.

Witness: Erin M. Murphy

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REQUEST NO. 1-27: *Refer to Section 7.2.3, Expansion Planning Results, 2023
Integrated Resource Plan, page 140. Regarding the proposed combined cycle plant, explain
whether the Company is continuing its efforts to find potential partners / co-owners.*

RESPONSE: Big Rivers is continuing its efforts to identify potential partners/co-
owners.

Witness: Nathaniel A. Berry

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REQUEST NO. 1-28: *Do you agree that load and generation should more
aligned?*

- a. Does membership in MISO, with its large renewables portfolio, cause uncertainty
and a decoupling of GDP and demand, and is the rate-payer ultimately liable for
this cost?*

RESPONSE: Big Rivers shares the Commission's belief that maintaining resource adequacy and limiting market risks are important objectives in today's environment. The growing renewables portfolio in MISO does bring some uncertainty, but it is not limited to the MISO footprint. Across the United States, as well as in Kentucky, utilities that are members of RTOs and ISOs (as well as those not in organized markets, such as the Tennessee Valley Authority and Louisville Gas and Electric/Kentucky Utilities) are facing uncertainties when it comes to resource adequacy and reliability. The Public Service Commission has the responsibility to ensure that utilities under their jurisdiction have resources that are sufficient to meet the needs of their customers and that they do so efficiently. Only those costs approved by the PSC are collected from the rate-payer by Big Rivers through rates and riders such as the fuel adjustment clause.

Witness: Nathaniel A. Berry

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REQUEST NO. 1-29: *Explain if Big Rivers has analyzed investing in storage to maximize existing asset generation?*

- a. If so, detail which storage assets have been analyzed, and describe Big Rivers position on whether the cost of investing in storage and maximizing existing generation capacity would outweigh the cost of building new generation?*
- b. Explain whether Big Rivers believes adding storage assets would help stabilize capacity during peak use?*

RESPONSE:

a. Big Rivers operates within the MISO market construct where energy and ancillary services are co-optimized among all the resources capable of providing the market's needs in each moment of time. The Company is aware of some instances around the world where storage assets have been used to provide ancillary services to allow traditional generation to produce incrementally higher levels of energy. Big Rivers has not studied this scenario because it does not believe sufficient financial opportunity exists to justify the effort to develop such plans.

b. Big Rivers does not understand what is meant by "stabilize capacity during peak use." Storage assets are allowed to be used to meet utilities' resource adequacy requirements under the MISO RA construct. The MISO RA construct is designed to ensure the MISO footprint has sufficient generation and storage resources available to meet its coincident peak.

Witness: John Christensen (1898 & Co.)

Case No. 2023-00310
Response to OAG 1-29
Witness: John Christensen
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REQUEST NO. 1-30: *Would you agree that DSM programs are intended to optimize generation?*

- a. *If so, would you agree that investing in capital resources for storage, as contemplated in Question 29, would more efficiently serve the same purpose as DSM programs, albeit with less impact on the ratepayer?*

RESPONSE: DSM programs/resources can be used to optimize generation, and storage can be used as a demand response resource as part of a DSM portfolio to optimize generation. Please see the response to the Attorney General's Request No. 1-29.

a. Big Rivers objects to this request as vague, as it is not clear what is intended by the phrases "more efficiently" and "less impact," or to which "ratepayer" the request refers (e.g., DSM program participant(s), all ratepayers, etc.). Subject to the foregoing, Big Rivers states that storage can be used as a demand response resource as part of a DSM portfolio. Please see the response to the Attorney General's Request No. 1-29.

Witness: Nathaniel A. Berry

For the Objection(s): Counsel

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REQUEST NO. 1-31: *Indicate whether Big Rivers has analyzed adding a nuclear power plant to the Company's generating fleet.*

- a. If not, explain why the Company has not analyzed this as a needed asset to meet its obligations of reliability.*
- b. If so, explain if the Company plans to pursue this option, and if the Company has considered any joint ownership/partnership agreements to finance the construction of the resource. Please provide the documents and materials utilized in making this analysis.*

RESPONSE: Big Rivers has conducted some preliminary evaluation of nuclear small modular reactors, but the technology is still in the development phase with significant and uncertain costs. Big Rivers will continue to evaluate the technology in order to make decisions which promote reliability and bring economic value to our Member-Owners. As addressed in Section 7.1.4 on page 125 of the IRP, nuclear was not included as a potential generation resource due to high cost and technology maturity risk during the planning period.

- a. Not applicable.
- b. Please see above. No particular joint ownership/partnership agreements have been considered at this time.

Witness: Nathaniel A. Berry

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REQUEST NO. 1-32: *Big Rivers has successfully generated non-native load sales to the benefit of its Member-Owners. Has Big Rivers analyzed whether adding additional generating resources to its fleet, agnostic of fuel/power source, would be the most effective and forward-thinking resource plan to ensure Big Rivers is able to supply reliable, sustainable, and affordable power?*

RESPONSE: Yes. As part of the IRP, Big Rivers analyzed the addition of generating resources with a variety of fuel sources.

Witness: Nathaniel A. Berry

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I, Christopher Bradley, verify, state, and affirm that the information request responses filed with this verification for which I am listed as a witness are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.



Name Christopher Bradley
Title Vice President System Operations
Company Big Rivers Electric Corporation

STATE OF Kentucky)
) ss:
COUNTY OF Daviess)

SUBSCRIBED AND SWORN TO before me by Christopher Bradley on this the 3
day of JANUARY, 2024.

My commission expires: 1-14-2026


Notary Public

Notary ID: KYNP43026

IN THE MATTER OF
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I, Talina R. Mathews, verify, state, and affirm that the information request responses filed with this verification for which I am listed as a witness are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.



Talina R. Mathews
Chief Financial Officer
Big Rivers Electric Corporation

STATE OF KENTUCKY)
) ss:
COUNTY OF DAVIESS)

2nd SUBSCRIBED AND SWORN TO before me by Talina R. Mathews on this the
2nd day of January, 2024.

My commission expires: October 31, 2024




Notary Public

Notary ID: KYNP16841

IN THE MATTER OF
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I, Nathaniel A. Berry, verify, state, and affirm that the information request responses filed with this verification for which I am listed as a witness are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.


Name Nathaniel A. Berry
Title Chief Operating Officer
Company Big Rivers Electric

STATE OF KENTUCKY)
) ss:
COUNTY OF DAVIESS)

SUBSCRIBED AND SWORN TO before me by Nathaniel A. Berry on this the 3 day of JANUARY, 2024.

My commission expires: 1-14-2026

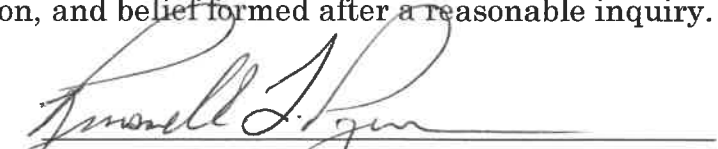

Notary Public

Notary ID: KYNP43026

IN THE MATTER OF
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I, Russell L. Pogue, verify, state, and affirm that the information request responses filed with this verification for which I am listed as a witness are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.



Russell L. Pogue
Manager Power Marketing
and Member Relations
Big Rivers Electric Corporation

STATE OF KENTUCKY)
) ss:
COUNTY OF DAVIESS)

SUBSCRIBED AND SWORN TO before me by Russell L. Pogue on this the
3 day of JANUARY, 2024.

My commission expires: 1-14-2026



Notary Public

Notary ID: XVNP 43026

