

BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF MISSOURI

In the Matter of a Determination of Special )  
Contemporary Resource Planning Issues to be ) Case No. EO-2024-0045  
Addressed by The Empire District Electric )  
Company d/b/a Liberty in its next Triennial )  
Compliance Filing or next Annual Update Report )

**PUBLIC COUNSEL’S SUGGESTED SPECIAL CONTEMPORARY ISSUES**

COMES NOW the Office of the Public Counsel and, in response to the August 25, 2023, order in the above-captioned case opening it and ordering, “Any party wishing to suggest a special contemporary issue that Liberty should consider in its next annual update report shall file its written suggestion no later than September 15, 2023,” suggests in the attached verified memorandum certain special contemporary issues that Liberty should consider in its next annual (2024) update report.

Respectfully,

/s/ Nathan Williams

Nathan Williams  
Chief Deputy Public Counsel  
Missouri Bar No. 35512

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**CERTIFICATE OF SERVICE**

I hereby certify that copies of the foregoing have been mailed, hand-delivered, transmitted by facsimile or electronically mailed to all counsel of record this 15<sup>th</sup> day of September 2023.

/s/ Nathan Williams

## MEMORANDUM

To: Missouri Public Service Commission Official Case File,  
Case No. EO-2024-0045 Liberty (Empire)

From: Geoff Marke, Chief Economist  
Lena Mantle, Senior Analyst  
Missouri Office of the Public Counsel

Re: Special Contemporary Issues for UTILITY NAME in its Next Triennial Compliance Filing  
or Next Annual Update Report

Date: 9/15/2023

### Issue 1: Rate Design: Pricing as a Resource Candidate

#### Special Contemporary Topic Request Background:

Based on MISO and SPP generation interconnection queue requests it appears as though the proliferation of clean energy policy is having a material impact on changing grid planning and operations. The two dominant grid planning challenges and cost drivers are now resource adequacy, to provide reliability during net peak load hours, and time shifting of renewable electricity from periods of excess generation to periods when it can be more beneficially consumed. Rate designs established under the old paradigm are no longer aligned with marginal grid costs and are an impediment to realizing various policy goals and affordability.

Fortunately, each of our Missouri IOU's have fully deployed (or soon to be fully deployed) advanced metering infrastructure ("AMI") in place and operational. Whether or not benefits are realized from these investments is largely a function of the rate design and subsequent price signals to consumers.

Presently, rate design is contemplated in two sections of the Commissions IRP rules. They are as follows:

- 20 CSR 4240-22.030 Load Analysis and Load Forecasting (5) (C):
  - Policy analysis—to assess the impact of legal mandates, economic policies, and **rate designs** on future energy and demand requirements. The utility may use any load forecasting method or methods that it demonstrates can adequately analyze the impacts of legal mandates, economic policies, and **rate designs**; and

- CSR 4240-22.050 Demand-Side Resource Analysis (4) (B):
  - Identify **demand-side rates** applicable to the major classes and decision-makers identified in subsection (1)(A). When appropriate, consider multiple demand-side rate designs for the same major classes;

In practice, demand-side rates (when modeled at all) have historically been embedded largely in the demand-side management analysis, and presented in conjunction with MEEIA/energy efficiency assumptions typically articulated across a spectrum of “achievable potentials” scenarios (e.g., realistic achievable potential (“RAP”) and maximum achievable potential (“MAP”). As such, it is difficult to reasonably understand what, if any, impact rate design will have on future resource planning assumptions.

Request for Modeling:

Given the large sunk investment cost of AMI technology, RTO resource reliability concerns, and the Commission’s expressed interest in rate design, there should be a greater emphasis on modeling and having an explicit, transparent section devoted to rate design/pricing as a demand-side resource. For example, if a utility was modeling whether or not a natural gas peaker plant was a necessary investment, it should also be modeling whether or not different pricing structures could accomplish the same match of energy creation to load utilizing the existing assets for which customers have already paid.

- OPC recommends that the Commission order Liberty (Empire) to do the following:
  - Model and explicitly present future resource adequacy scenarios based on the following assumptions:
    - With demand-side rates and traditional demand-side management investments (e.g., MEEIA);
    - Only demand-side rates without MEEIA investment;
    - Neither demand-side rates nor MEEIA (but maintain naturally occurring energy efficiency adoption); and
    - Indicate whether or not naturally occurring savings and/or federally-sponsored DSM savings are included in the modeling. If yes, these savings should be identified and separated as well.
  - Include an explicit section within the demand-side management volume and the executive summary where low, medium and high TOU differentials are modeled and presented with expected demand savings articulated separate and aside from other demand side management practices.<sup>1</sup>

The Commission as well as encouraging the Company to solicit recommendations from interested stakeholders.

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<sup>1</sup> The results of which should be highlighted in any executive summary and not buried in a Company work paper.

## Issue 2: Solar Adoption as a result of IRA subsidies

On June 28, 2023 the Biden administration announced \$7 billion in solar grants to fund residential solar programs for the expressed intent of lowering energy costs for families. Funding for this endeavor will be channeled through the U.S. Environmental Protection Agency’s (“EPA”) Greenhouse Gas Reduction Fund.<sup>2</sup>

The Missouri Environmental Improvement and Energy Resources Authority (“EIERA”) has filed a notice of intent to compete for this funding. Guidance around the eligibility and other funding parameters is still pending. That being said, it would not be unreasonable to assume that there could very well be a large capital infusion of residential rooftop solar subsidies (\$100m+) in Missouri in the near future. This potential scenario could have an impact on many facets of utility operations, including resource planning.

### Request for Modeling:

The potential infusion of capital for customer-owned solar investments targeted at low- and moderate-income customers could have a material impact on IRP modeling assumptions moving forward.

- OPC recommends that the Commission order Liberty (Empire) to begin developing modeling scenarios assuming residential solar adoption levels that considers both naturally occurring (e.g., utility as a passive observer—homeowner-owned rooftop solar) and utility-sponsored (e.g., utility as an active participant—ratepayer-subscribed community solar or virtual solar options) solar additions as a result of federal subsidies.

## Issue 3: Battery Storage Operation and Lifecycle Assumptions

### Special Contemporary Topic Request Background:

Battery storage technology has been introduced into various IRP modeling scenarios for several years now, but to date it has largely not been a serious near-term candidate resource due to cost and performance considerations. This will likely change moving forward as more intermittent generation comes online and federal subsidies get passed down to utilities and consumers. The potential integration of large amounts of battery storage (at both the customer and utility level) pose both new challenges and opportunities, as battery technology is fundamentally different from that of more traditional power generators like gas and coal resources. Batteries do not generate energy, but rather store energy and move it from one time of day to another. Batteries can profit with this strategy—called arbitrage—so long as the price difference between charging and discharging is large enough to make up for efficiency losses in storage and variable operation costs.

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<sup>2</sup> United States Environmental Protection Agency (2023) Biden-Harris Administration Launches \$7 Billion Solar for All Grant Competition to Fund Residential Solar Programs that Lower Energy Costs for Families and Advance Environmental Justice Through Investing in America Agenda <https://www.epa.gov/newsreleases/biden-harris-administration-launches-7-billion-solar-all-grant-competition-fund>

### Request for Modeling:

A batteries cycle life is the amount of time or cycles a battery storage system can provide regular charging and discharging before failures or significant degradation can occur. Stated differently, the frequency, duration and operating conditions matter even before size and location (e.g., transmission, distribution, behind the meter) are considered. As such, absent input into how battery storage investment are intended to be used the IRP analysis will provide an incomplete picture in expected net present value revenue requirement (“NPVRR”) and resource adequacy.

- OPC recommends that Commission order, Liberty (Empire) to provide detailed assumptions surrounding battery cycle life on any planned future investment in storage. This should include, at a minimum, expected frequency and duration of operational usage of the battery resource. In short, the analysis should be able to reasonably demonstrate that the utility-scale storage investment will be operational for X period based on articulated assumed usage patterns.

### Issue 4: Estimated Generation Interconnection Costs

#### Special Contemporary Topic Request Background:

Active interconnection requests in RTO’s have surged in the past year, increasing to approximately six times the capacity requested in 2014.<sup>3</sup> This has also led to increased wait times and as well as lower overall completion rates. Proposed energy storage, renewable and (to a lesser extent) conventional dispatchable generation currently face lengthy delays and high costs to interconnect new generation to the transmission grid.

Moreover, interconnection costs seem to vary considerable across generation type. In the Southwest Power Pool (“SPP”) “potential interconnection Costs of all solar (\$157/kW) and wind (\$154/kW) requests have been greater than those of storage (\$109/kW) and natural gas (\$97/kW) projects since 2010.<sup>4</sup> Interconnection costs between generation types have been even more pronounced in the Midcontinent Independent System Operator (“MISO”) where historically the per kW cost of completed wind project interconnections have been more than three times that of completed natural gas project interconnections. Table 1 provides an illustrative breakdown of Lawrence Berkeley National Lab’s analysis of MISO’s total interconnection costs by fuel type over time.<sup>5,6</sup>

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<sup>3</sup> MISO alone has 49 GW of approved interconnection agreements (mostly solar) but face nearly two-years in delays before they could reach commercial operation. This comes in the midst of 2.1 GW of capacity shortfall starting in the 2025/2026 planning year according to the July 2023 Organization of MISO State/MISO survey results.

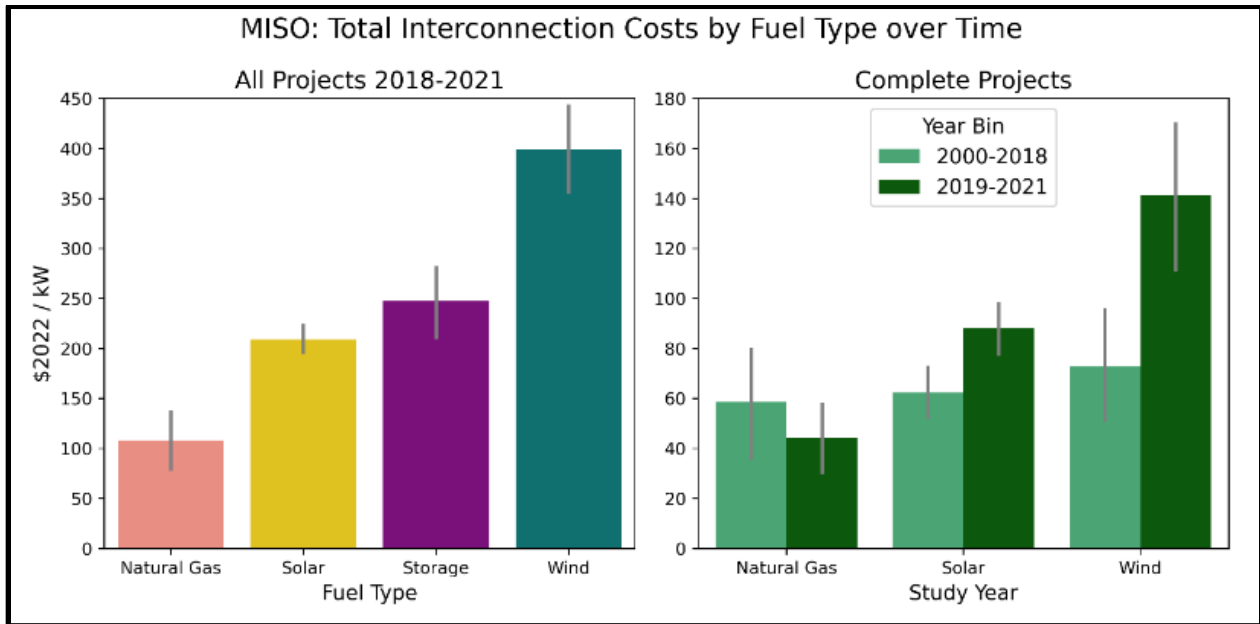
<https://cdn.misoenergy.org/20230714%20OMS%20MISO%20Survey%20Results%20Presentation629607.pdf>

<sup>4</sup> Lawrence Berkeley National Lab (2023) Generator Interconnection Cost Analysis in the Southwest Power Pool (SPP) Territory [https://eta-publications.lbl.gov/sites/default/files/berkeley\\_lab\\_2023.04.20-spp\\_interconnection\\_costs.pdf](https://eta-publications.lbl.gov/sites/default/files/berkeley_lab_2023.04.20-spp_interconnection_costs.pdf)

<sup>5</sup> Lawrence Berkeley National Lab (2023) Generator Interconnection Costs to the Transmission System [https://emp.lbl.gov/interconnection\\_costs](https://emp.lbl.gov/interconnection_costs)

<sup>6</sup> See GM-1a for a copy of the LBNL technical briefs that provide historical cost estimates for MISO and GM-1b for SPP.

Table 1: MISO: Total Interconnection Costs by Fuel Type over Time



Request for Modeling:

Based on the total interconnection costs by fuel type across both MISO and SPP it is evident that costs vary considerably across resource type. This is not factored into the modeling cost assumptions necessary for evaluating new supply side resource candidates. As a result, omission of this information will necessarily overstate/understate the costs of various resource types when contemplating the net present value of revenue requirement (“NPVRR”) across different resource types. Future modeling should account for this variable moving forward.

- OPC recommends that the Commission order Liberty (Empire) to include a model of low, medium, and high interconnection cost estimates that are supported by historic total interconnection costs by fuel type for MISO in its resource adequacy planning scenarios.

Issue 5: Power Purchase Agreements as Resource Candidates

Special Contemporary Topic Request Background:

The record levels of generation interconnection requests within both the MISO and SPP queues are not limited to investor-owned utilities. In fact, much of the planned generation projects up for consideration are driven by private investors who are looking for customers (including utilities) to enter into power purchase agreements (“PPA’s) with. There may or may not be opportunities and terms that are more favorable and least-cost for ratepayers than traditional utility-ownership. However, neither the Commission nor stakeholders would ever know unless a utility issued a competitive request-for-proposal and compared those cost assumptions against traditional utility ownership models.

### Request for Modeling:

The OPC recommends that the Commission should order Liberty (Empire) to issue a competitive request for proposal for PPA generation options that match their traditional planned investment over the next ten years.

- Liberty (Empire) should provide a breakdown of the cost results, size, location and type of resources that were bid into the RFP.
- Said results should be considered against traditionally owned utility investments.

### Issue 6: Mothball Energy Generation

#### Special Contemporary Topic Request Background:

The practice of closing facilities over a long time or storing equipment and tools that are still in working order is called mothballing. In 2015 Germany began mothballing oil and coal plants, and creating a capacity reserve system in which mothballed resources were only dispatched under emergency scenarios surrounding energy shortfalls.<sup>7</sup> In July of 2022, German Chancellor Olaf Scholz's government announced the temporary reactivation of 27 mothballed oil and coal-fired power plants (4.3 GW of coal plants) to help fill the energy shortfall until March 2024 as a result of the war in the Ukraine.<sup>8</sup>

#### Request for Modeling:

The Commission should order Liberty (Empire) to analyze and produce estimated costs for mothballing any dispatchable generation resource that is subject to a planned retirement in the 20 year planning period. Estimates should include all costs including the minimum continued O&M of the mothballed units.<sup>9</sup>

### Issue 7: Resource Adequacy

#### Special Contemporary Topic Request Background:

The North America Energy Reliability Corporation ("NERC") has identified five significant evolving risk profiles facing electric utilities. The number one risk is the impact on reliability and resilience of the implementation of energy policies. In its report,<sup>10</sup> NERC states:

Decarbonization, decentralization, and electrification have been active policy areas. Implementation of policies in these areas is accelerating, and, with changes in the resource

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<sup>7</sup>*The Guardian* (2015) Germany to mothball largest coal power plants to meet climate targets  
<https://www.theguardian.com/environment/2015/jul/02/germany-to-mothball-largest-coal-power-plants-to-meet-climate-targets>

<sup>8</sup> Connolly, K. (2022) Germany to reactive coal power plants as Russia curbs gas flow. *The Guardian*.  
<https://www.theguardian.com/world/2022/jul/08/germany-reactivate-coal-power-plants-russia-curbs-gas-flow>

<sup>9</sup> The General Assembly recognized this scenario as well recently by passing RSMo.§393.1715.6

<sup>10</sup> North American Electric Corporation (2023) 2023 ERO Reliability Risk Priorities Report  
[https://www.nerc.com/comm/RISC/Related%20Files%20DL/RISC\\_ERO\\_Priorities\\_Report\\_2023\\_Board\\_Approved\\_Aug\\_17\\_2023.pdf](https://www.nerc.com/comm/RISC/Related%20Files%20DL/RISC_ERO_Priorities_Report_2023_Board_Approved_Aug_17_2023.pdf) page 20. See also GM-2.

mix, extreme weather events, and physical and cyber security challenges, reliability implications are emerging. Demonstrated risks, such as energy sufficiency as well as natural gas and electric interdependence, are becoming increasingly critical. Emerging potential risks, such as aggregate DERs, are increasingly concerning. Due to the interdependency of critical infrastructures (i.e., electricity, natural gas, water, transportation, and communications), potential reliability risks are magnified when cross industry segments and agencies act independently to create or implement policy.

In its *2022 Long-Term Reliability Assessment*<sup>11</sup> report NERC provides the following conclusions and recommendations.

The energy and capacity risks identified in this assessment underscore the need for reliability to be a top priority for the resource and system planning community of stakeholders. Planning and operating the grid must increasingly account for different characteristics and performance in electricity resources as the energy transition continues. General actions for industry and policymakers to address the reliability risks described in this 2022 [Long-Term Reliability Assessment] include the following:

- Manage the pace of generator retirements until solutions are in place that can continue to meet energy needs and provide essential reliability services
- Include extreme weather scenarios in resource and system planning
- Address [inverter-based resources] performance and grid integration issues
- Expand resource adequacy evaluations beyond reserve margins at peak times to include energy risks for all hours and seasons
- Increase focus on [distributed energy resources] as they are deployed at increasingly impactful levels
- Mitigate the risks that arise from growing reliance on just-in-time fuel for electric generation and the interdependent natural gas and electric infrastructure
- Consider the impact that the electrification of transportation, space heating, and other sectors may have on future electricity demand and infrastructure

#### Request for Modeling:

While detailed consideration of each of these actions should be considered in the comprehensive triennial resource planning, OPC recommends the Commission order the following analysis in the next annual resource plan update. OPC is not asking that Liberty (Empire) change its preferred plan in the annual filing but instead report on the ability of its current resource plan to meet forecasted load and use this information in determining its preferred resource plan in its next triennial filing.

1. Analyze and report on the ability of the planned resource additions in Liberty's (Empire) current preferred plan to continue to meet energy needs in all hours of each year. OPC is

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<sup>11</sup> North American Electric Reliability Corporation (2022) 2022 Long-Term Reliability Assessment. [https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC\\_LTRA\\_2022.pdf](https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2022.pdf) page 7. See also GM-3.



not asking that Liberty (Empire) change its plan in the annual filing, but instead report on the ability of its current resource plan to meet forecasted load and consider this information in determining its preferred resource plan in its next annual update filing.

2. Analyze and report on the ability of the planned resource additions in Liberty's (Empire) current preferred plan to provide essential reliability services including the capability of the planned resource to support voltage, frequency, and dispatchability.
3. Analyze the risk to Liberty's (Empire) customers of Liberty (Empire) relying on just-in-time fuel for electric generation and the interdependent natural gas and electric infrastructure. Liberty's (Empire) future IRP filings should include the results of the analysis and the measures the utility is taking to mitigate this risk.

### Issue 8: Modeling for Low, Medium, High Participation of Aggregator of Retail Customer ("ARCs")

#### Special Contemporary Topic Request Background:

Although the MO PSC currently has a temporary prohibition on ARC participation in Missouri such a prohibition is not guaranteed. The increased volatility surrounding market prices, concerns over reliability and the introduction of FERC Order 2222 create a scenario where RTO rules and assumptions are in-flux and likely to include an increased emphasis on demand response actions whether from incumbent utilities, third-party aggregators, or both.

#### Request for Modeling:

Recognizing that the Commission ordered this topic last year, OPC is renewing this request in light of the uncertainty surrounding the status of the continued ARC prohibition. As such, OPC recommends that the Commission order Liberty (Empire) to model for a low, medium, and high participation scenario of commercial and industrial customers electing to participate in demand response activities based on the introduction of a third-party(s) ARC within its footprint and provide an analysis on what the impact said ARC would have on Liberty's (Empire) IRP.


**BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF MISSOURI**

**AFFIDAVIT OF LENA M. MANTLE**

STATE OF MISSOURI    )  
                                  )    SS.  
COUNTY OF COLE    )

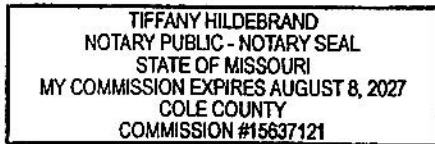
**COMES NOW LENA M. MANTLE** and on her oath declares that she is of sound mind and lawful age; that she contributed to the foregoing *Memorandum* and that the same is true and correct according to her best knowledge and belief.

Further the Affiant sayeth not.

  
Lena M. Mantle  
Senior Analyst

**JURAT**

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 14<sup>th</sup> day of September, 2023.



  
Tiffany Hildebrand  
Notary Public

My Commission expires August 8, 2027.


**BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF MISSOURI**

**AFFIDAVIT OF GEOFF MARKE**

STATE OF MISSOURI    )  
                                  )  
COUNTY OF COLE     )     SS.

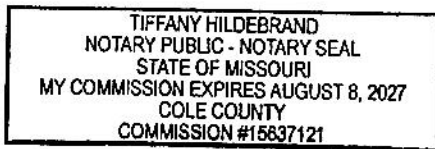
**COMES NOW GEOFF MARKE** and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Memorandum* and that the same is true and correct according to his best knowledge and belief.

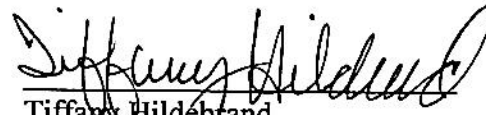
Further the Affiant sayeth not.

  
\_\_\_\_\_  
Geoff Marke  
Chief Economist

**JURAT**

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 14<sup>th</sup> day of September, 2023.



  
\_\_\_\_\_  
Tiffany Hildebrand  
Notary Public

My Commission expires August 8, 2027.