Pursuant to Rule 211 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (“FERC” or “Commission”), 18 C.F.R. § 385.211, Clean Grid Alliance, Sierra Club, Natural Resources Defense Council, Sustainable FERC Project, Fresh Energy, GridLab, American Clean Power Association, 1 and Solar Energy Industries Association (jointly, the “Clean Energy Coalition”) submit these Comments to the proposed tariff changes made by the Midcontinent Independent System Operator, Inc. (“MISO”) on November 30, 2021, to include seasonal and accreditation requirements to MISO’s resource adequacy construct (“Seasonal RA Proposal” or “Proposal”) 2 under Section 205 of the Federal Power Act, 16 U.S.C. § 824d.

The Clean Energy Coalition includes members of MISO’s Environmental Sector stakeholder group 3 and aligned industry groups that all have an interest in ensuring that the outcome of this proceeding promotes the adoption of a clean electricity grid in a reliable and

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1 American Clean Power is a national trade association representing a broad range of entities with a common interest in encouraging the expansion and facilitation of wind, solar, energy storage, and electric transmission in the United States. The views and opinions expressed in this filing do not necessarily reflect the official position of each individual member of American Clean Power.

2 MISO’s Filing to Include Seasonal and Accreditation Requirements for the MISO Resource Adequacy Construct, (Nov. 30, 2021), Accession No. 20211130-5166 (“Proposal”).

3 The MISO Environmental Sector is a group of environmentally-focused entities recognized by MISO, based on the definitions, rights, and processes outlined in Article Two, Section VI, paragraph A of the MISO Transmission Owners Agreement and Section 6.1 of the MISO Bylaws, https://cdn.misoenergy.org/MISO%20TOA%20(for%20posting)47071.pdf; and the MISO Stakeholder Governance Guide (Stakeholder Sectors and Voting Rights), https://cdn.misoenergy.org/Stakeholder%20Governance%20Guide105455.pdf. Not every member organization of the MISO Environmental Sector is a signatory to these Comments, and these Comments should not be taken to represent the MISO Environmental Sector as a whole or any Environmental Sector member organizations not included here.
cost-effective manner. Many member parties of the Clean Energy Coalition consistently participated in MISO’s Resource Adequacy Subcommittee (“RASC”) stakeholder process over the last twelve months leading up to MISO’s initiation of this proceeding.

The Clean Energy Coalition agrees that MISO has identified an important issue: Risk patterns for managing supply and demand on the grid are changing with the expansion of renewable resources, and the withdrawal of thermal resources. MISO’s stated objective of the Proposal is to identify the changing patterns of risk, such as loss of load probability, and to develop a mechanism to reward resources that mitigate that risk. In addition, MISO proposes to address its growing concern that scheduled maintenance may unintentionally exacerbate this risk.

While we support addressing the loss of load risk patterns and scheduled maintenance issues that MISO has identified, MISO fails to demonstrate that its proposed reforms will resolve these near- and long-term reliability needs. Indeed, the proposed changes could reduce the reliability of the system, while increasing costs to customers.

Broadly, we have four major concerns with MISO’s filing:

1. MISO’s concern that uncoordinated scheduled maintenance undermines resource adequacy is well-founded and deserves careful policy responses. However, MISO’s proposal does not sufficiently address the impacts of maintenance outages on resource adequacy. The fundamental near-term problem MISO is trying to address is operational in nature, but MISO has proposed a planning approach, which puts the overall efficacy of the Proposal in question.

2. MISO’s identification of periods of risk and subsequent compensation to resources for reducing risk is not methodologically sound. For example, MISO’s approach for determining risk periods will not identify all high-risk hours, and MISO’s proposed construct is rigid and does not allow for a changing risk pattern that will continue into the future as the resource mix continues to evolve. Similarly, MISO’s accreditation methodology, including proposed exemptions, does not result in an accurate evaluation of the amount of capacity that can be expected to serve load.

4 Each signatory organization to these Comments has previously individually submitted a Notice of Intervention pursuant to Rule 214 of the Commission’s Rules of Practice and Procedure.

5 Planning typically focuses on the investment time frame, and the acquisition of resources (via contracting, ownership, etc.) to meet future demand. In the operational time frame, system and market operators are tasked with making the best use of the resources already in the ground; operators do not have the ability to obtain additional resources beyond what is built. Scheduling maintenance of resources in such a way that the system is not put at risk is fundamentally an operational problem.

6 As proposed, MISO’s construct does not clearly identify times of risk, and rewards different types of resources in different ways. Two different types of resources that perform identically could receive different accreditations. Additionally, the proposed construct distorts risk calculations by artificially equalizing each season’s risk, regardless of the actual risk calculations. The result is that resources could receive accreditation for performance during times of no risk, or conversely, would not receive accreditation for performance during times of significant risk.

7 MISO assumes that there are 65 hours of risk in each season, which can further distort the actual risk profile and accreditation. As the renewable mix changes in the future, it is important that MISO’s approach can capture risk patterns as they change, and this proposal does not accomplish that.
3. Many provisions in the Proposal loosen the overall function of performance-based accreditation and strict capacity commitment and, thus, will likely erode any reliability benefits the proposal as a whole could bring.

4. Several components of the Proposal have unknown effects, such as the implications of using flawed data sets in the foundational analytics, and the implications on utility Integrated Resource Planning (“IRP”). These represent an unacceptably high risk of unintended consequences in the form of reduced reliability, and/or an increase in cost to customers.

Taken together, these deficiencies pose a significant risk that implementing the Proposal could lead to electric rates, terms, and conditions for MISO customers that are unjust and unreasonable. For these reasons, and given the legal restriction on modifying the proposal, the Clean Energy Coalition requests that FERC reject it so that the deficiencies in the proposal can be addressed in a future filing by MISO. A just and reasonable resource adequacy construct, given the challenges faced in the MISO region, would include:

- Separating planning time frames from operational periods;
- Recognizing fuel supply risk;
- Developing a more robust and consistent assessment of periods of system risk;
- Ensuring resource accreditation is consistent across different resource types;
- Incorporating the principles and recommendations from the Energy Systems Integration Group (“ESIG”) Redefining Resource Adequacy initiative, which represents an industry-wide thought leadership and consensus effort; and
- Working with member utilities to ensure any changes to the resource adequacy construct are practically implementable in state and utility planning processes, such as IRP processes.

I. BACKGROUND: Reliability Needs are Evolving and Need Urgent Attention.

Power systems across North America are transitioning away from coal dependence. This transition is creating new challenges for balancing authorities tasked with maintaining reliability, given the variable nature of renewable resources. For this reason, the Clean Energy Coalition greatly appreciates MISO’s intention behind its proposed shift to a seasonal Resource Adequacy framework and availability-based accreditation methodology. The Clean Energy Coalition is supportive of a seasonal construct for the Planning Resource Auction (“PRA”) in principle, and similarly, supportive of rewarding flexible dispatchable generation for availability during high-risk hours.

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MISO’s overarching concern and rationale for the proposed changes to its Tariff is that periods of risk (of loss of load) are shifting in both time and magnitude. MISO’s intention is to find times of system risk, and reward resources that reduce that risk.\textsuperscript{11} MISO’s challenges are rooted in operational issues stemming from the unavailability of generation resources that are on planned or unplanned outages. The capacity from unavailable resources is already accounted for in the PRA, but they are not available in the operational timeframe when the capacity is needed. Scheduling maintenance of resources during a time when the system is not at risk is fundamentally an operational problem. While planning solutions can help incentivize the construction and contracting of resources to support reliability, without performance based or ex-post conditions tied to grid conditions, planning solutions cannot address the underlying problem that MISO has identified with scheduled maintenance events. Instead, MISO should propose an operational solution to manage scheduling of outages and may include some modification to MISO’s outage protocols and maintenance margin, such as an auction for maintenance schedule slots or use of an availability reserve demand curve in the energy market.

MISO has not conducted sufficient analysis to understand the implications of scheduled resource maintenance on grid reliability. This is a problem given that MISO’s key concern is to ensure that scheduled resource maintenance does not compromise reliability. MISO does not use Loss of Load Expectation (“LOLE”) modeling in a straightforward manner to assess the maximum level of capacity that can be out of service without affecting reliability. Instead, it resorts to inappropriate modeling that develops seasonal planning reserve margins based on inconsistent resource metrics and flawed inputs to the modeling. With changing risk profiles throughout the year, it will be increasingly difficult for MISO to ensure LOLE targets are met when scheduled resource maintenance may result in insufficient availability of generation capacity during periods that historically had little if any risk. Unfortunately, as discussed below, the Proposal contains too many loopholes that allow outage risks to remain.

The Clean Energy Coalition appreciates the work that MISO has done to date to address these critical reliability concerns and the opportunity to continue working with MISO staff to identify and implement effective resolutions, as discussed below. Although the Clean Energy Coalition believes that the Proposal is unjust, unreasonable, and unduly discriminatory, and an ineffective solution to the issues posed by the changing energy resource mix and usage patterns, the Clean Energy Coalition is confident that these difficult problems will require solutions in the near term before significant changes materialize.

\textsuperscript{11} See, e.g., Proposal at 5.
II. The Proposal’s Accreditation Methods Would Result In Undue Discrimination Between Thermal and Renewable Generators.

A. MISO does not apply consistent risk metrics across different types of resources to effectively evaluate any given resource’s contribution to risk mitigation.

As part of the Proposal, MISO uses thermal resource availability, measured in average megawatts (“MW”), during historic times of system risk. Availability is based upon capacity that each resource bids into the MISO market. This metric is an ex post approach and based upon actual historical performance. MISO uses its assessment of tight margin hours as the risk period for thermal resources, which is one way to measure Loss of Load Probability (“LOLP”) or LOLE risk. Yet, the Proposal also provides that MISO will continue to use Expected Load Carrying Capability (“ELCC”) (used in the status quo for annual accreditation of wind resources) for calculating the seasonal accreditation of wind resources, and it has stated its intention to consider using ELCC for solar in the near future. ELCC is a probabilistic metric that is based on a statistical “expected value” and represents an ex ante, or forecast capacity. The Proposal is also deficient in that it did not address a seasonal accreditation methodology for energy storage resources.
The difference between the ELCC accreditation approach and the new approach that MISO proposes to use for thermal resources is substantial.\textsuperscript{20,21} For example, an ELCC calculation for thermal resources would be approximately 80–95 percent of rated capacity, depending on the resource. If a thermal resource with a 90 percent ELCC happened to have 100 percent availability during risk periods, then that resource’s \textit{ex post} accreditation would be 100 percent, whereas its \textit{ex ante} accreditation would be 90 percent.

This valuation discrepancy persists even if the performance of a wind resource and thermal resource were identical. For example, consider a 100 MW nameplate capacity wind plant with ELCC of 20 percent and a 100 MW nameplate capacity thermal plant with ELCC of 90 percent. If both resources offer 50 MW during MISO’s times of risk, the thermal plant would be credited 50 MW and the wind plant would be credited 20 MW. Alternatively, if both resources offered their full capacity during MISO’s times of risk, the thermal plant would be credited 100 MW and the wind plant would be credited 20 MW.

The difference in compensation is material as wind, and eventually solar, resources would receive a fraction of the compensation paid to the thermal generator for providing the same amount of capacity.\textsuperscript{22} Thus, MISO’s Proposal to use alternative accreditation approaches for different resource types is not consistent with good market design, does not provide consistent signals so that resources can potentially respond to periods of reliability risk, and thus may not provide the level of reliability that MISO seeks. Moreover, its Proposal will compensate thermal generators more than others for providing the same amount of capacity, rendering it unjust, unreasonable, and unduly discriminatory.

\textbf{B. MISO does not use the same input data to assess periods of risk to calculate thermal and wind resource accreditation.}

The use of the ELCC metric for wind means that the risk periods that wind can potentially mitigate are hours when there is a loss of load probability, measured \textit{ex ante}. Tight margin hours (measured \textit{ex post}), used for thermal accreditation, are not necessarily the same time periods. Again, the Proposal is not comparing a resource’s available capacity on the same basis.

Thermal resources are credited based upon their performance during tight margin hours. These may correspond somewhat with LOLP hours. However, according to MISO’s own

\textsuperscript{20} The first calculations of LOLP and ELCC date back to the 1950s, and can be found in papers by Calabrese, Garver, and others. These emerging methods were applied primarily to thermal resources. ELCC is not “just for renewables” but is part of a probabilistic framework to assess system risk, and can be calculated for any resource type.

\textsuperscript{21} For thermal resources, a multi-year forced outage rate is used in LOLE modeling, meaning the ELCC percentage for a given resource is based on several prior years’ performance data. Therefore, in any given planning year, a resource may actually perform better or worse than its ELCC rate in terms of availability.

\textsuperscript{22} Additionally, for storage resources, MISO has given no indication of what the eventual seasonal capacity accreditation methodology will be.
analysis, 23 tight margin hours do not always occur during LOLP hours. MISO has not examined whether it would be better to (a) pool the tight margin and LOLE hours and use those periods to assess all resources, or (b) adopt either the LOLP approach or the tight margin approach, but not both, and apply to all resources. Under MISO’s Proposal, thermal resources would get credit based upon actual offers during tight margin hours, while wind resources would get credit based upon an expected value of generation during different hours.

To the extent that these resources can modify their behavior to maximize revenues, thermal units would have no incentive, under the Proposal, to help with LOLP hours, and wind resources would have no incentive to help during tight margin hours.24

C. MISO’s Proposal does not consider fuel supply risk for thermal generators, which is discriminatory and results in an ineffective accreditation methodology.

While MISO’s Proposal does consider whether a coal or gas resource is available during high-risk periods (notwithstanding the problems already identified with the method for evaluating high risk periods and exemptions from the availability-based accreditation), it appears not to consider whether these resources have fuel supply risks, such as non-firm gas delivery or freezing coal piles, during periods when they are accredited as capacity resources. Thus, similar to the February 2021 extreme freeze event, during which coal and natural gas resources were unavailable because of fuel supply issues, 25 accredited capacity resources may be unavailable due to fuel supply issues which are separate from forced outage issues. Fuel supply risk must be considered in planning for resource adequacy and must be an aspect of the resource adequacy construct, especially a seasonal construct given that these risks can be seasonal in nature. MISO does not explain in its filing whether, or to what extent, its availability-based method for determining thermal resource capacity accreditation captures past limitations on fuel availability, or whether historic fuel availability is representative of future periods given changes in the resource mix, extreme weather patterns, and other factors. In contrast, the ELCC methodology for accrediting wind resources and the availability-based accreditation for solar does take into account fuel supply risks for these resources given that the assessment of their ability to deliver power to the grid is directly tied to whether they have the fuel (i.e., wind or sun) to generate power. Thus, without more information, the fact that MISO’s Proposal does not expressly consider fuel supply risk for coal and gas but does consider it for wind and solar results in an approach to capacity accreditation that is unjust, unreasonable, and unduly discriminatory.


24 For example, a wind plant could add battery storage, and based upon timing of wind generation and risk, could potentially alter its delivery pattern to MISO. How this is done would potentially change how the resource contributes to its capacity accreditation. Such a wind plant would be motivated to be available during LOLP hours, but not during tight margin hours.

D. The adjustment by the ratio of Unforced Capacity to Intermediate Seasonal Accredited Capacity for all Schedule 53 resources under the proposal will result in a number of resources accredited at levels that exceed their nameplate rating.

The seasonal accreditation methodology that MISO is proposing for Schedule 53 resources (i.e., thermal resources) may unduly discriminate against non-thermal resources. Under MISO’s Proposal, a new Schedule 53 of the tariff (“Seasonal Accredited Capacity Calculation”) will memorialize the accreditation methodology for Generation Resources (thermal resources, largely) and Demand Response Resources, but not, generally, for renewable or storage resources. An Intermediate Seasonal Accredited Capacity (“ISAC”) is first calculated for every resource, using the Tier 1 / Tier 2 methodologies discussed below. Subsequently, as recommended by MISO’s Independent Market Monitor (“IMM”), a single system-wide conversion ratio of Unforced Capacity (“UCAP”) (summed for all Schedule 53 resources) to ISAC (again summed for all Schedule 53 resources) is calculated; and then for each Schedule 53 resource, the final Seasonal Accredited Capacity (“SAC”) is calculated by multiplying its ISAC by the system-wide ratio. The ratio, which will change from year to year, is expected to be greater than 1.

Because MISO included this ratio adjustment very late in the stakeholder process, without the benefit of any independent analysis, the impact of the outcome on overall system reliability is unclear. Essentially, MISO is proposing to shift the supply curve associated with the entire Schedule 53 fleet to the right, after the unit-specific ISAC values have been calculated. All Schedule 53 (thermal) resources will benefit from this adjustment, relative to renewable resources. Additionally, Schedule 53 units that have better historical availability than their peers will be rewarded, whereas Schedule 53 units that have worse historical availability than their peers will be penalized. The average Schedule 53 resource will receive a capacity credit equal to its UCAP value, which takes into account forced outages only. This stands in contrast to wind resources, whose ELCC-driven capacities take into account probabilistically expected generation across all hours of the year.

Specifically, MISO has not clarified whether widening the accreditation gap between the best performing and worst performing Schedule 53 resources will require the best performing resources to contribute to reliability at levels that exceed their nameplate, and whether the contribution would help or hurt reliability. The answer is not clear because, while the total MWs of Schedule 53 resources accredited under this proposal would be unchanged, it is counterintuitive that high performing resources could be accredited at a level that exceeds their physical ability to perform in an effort to “make up” for the poorer performing units.

26 Proposal at 15; McFarlane Testimony at 15; Redline Tariff at 273–274 (Section 69A.4.1), 310–320 (Schedule 53).
27 Proposal at 17–18; McFarlane Testimony at 28–29; Redline Tariff at 318–320 (Schedule 53).
29 The UCAP/ISAC ratio adjustment was adopted and presented by MISO at the November 3, 2021 meeting of the MISO Resource Adequacy Subcommittee, less than 30 days before MISO filed this Proposal at FERC. Proposal at 17–18; MISO, MISO Resource Adequacy Reforms at 6 (Nov. 3, 2021), https://cdn.misoenergy.org/20211103%20RASC%20Item%2004a%20Resource%20Adequacy%20Reforms%20Presentation%20(RASC010,%20011,%20012)_600791.pdf.
Accordingly, for the foregoing reasons, MISO’s Proposal—to use two different accreditation techniques—is unjust, unreasonable, and unduly discriminatory. In addition to requiring that wholesale utility rates and charges are just and reasonable, Federal Power Act (“FPA”) section 205 provides:

No public utility shall, with respect to any transmission or sale subject to the jurisdiction of the Commission, (1) make or grant any undue preference or advantage to any person or subject any person to any undue prejudice or disadvantage, or (2) maintain any unreasonable difference in rates, charges, service, facilities, or in any other respect, either as between localities or as between classes of service.30

To make a finding of undue preference or discrimination, the Commission must first find that the affected entities are similarly situated.31 The Commission has a long-standing policy that intermittent resources, such as wind and solar generators, are not similarly situated to thermal generators.32 However, providing revenue credits to resources for offering an amount of capacity that exceeds its accreditation value should be available to all market participants, rather than only thermal generators. Similarly, using different inputs to identify the same fundamental market parameters, such as high-risk hours, which determine compensation for the participating generation resources, can lead to discriminatory outcomes. MISO has not demonstrated that this disparate treatment is justified. Moreover, with each passing year, market design improvements have streamlined the participation of intermittent resources, which arguably offer more flexible generation services than thermal units. In addition, long-duration battery storage is available on a commercial scale. Thus, we ask in these Comments that the Commission reconsider this policy and find that thermal and intermittent resources are indeed similarly situated for the purpose of providing resource adequacy.

Alternatively, if the Commission declines to make that finding, we ask that the Commission still reject MISO’s proposal as unjust and unreasonable. In the Integration of Variable Energy Resources (“VERs”) proceeding, which sought to “remove barriers to the integration of variable energy resources,” the Commission amended the pro forma Open Access Transmission Tariff (“OATT”) to allow more frequent transmission scheduling intervals.33 This change allowed intermittent resources to mitigate charges for imbalance charges. Opponents to the OATT revisions argued that a technology-neutral practice such as imbalance service should not be unjust and unreasonable if applied equally to all participants. The Commission disagreed and held that “[s]imply because VERs are not similarly situated in all respects to conventional, dispatchable generators, it does not follow . . . that existing pro forma OATT provisions that place a disproportionate burden on VERs are just and reasonable.”34 MISO’s proposal places a

31 Transmission Agency of N. Cal. v. FERC, 628 F.3d 538, 549 (D.C. Cir. 2010) (rejecting claim of undue discrimination where parties were not similarly situated); Sacramento Mun. Util. Dist. v. FERC, 474 F.3d 797, 802 (D.C. Cir. 2007) (same); Ohio Power Co. v. FERC, 744 F.2d 162, 165 n.3 (D.C. Cir. 1984) (same).
33 Order No. 764, 139 FERC ¶ 61,246 at 1-2.
34 Id. at P 47.
disproportionate burden on renewable resources. When renewable resources provide the same service as thermal resources, renewable resources receive just a portion of the compensation that thermal generators receive, without a valid justification. While renewable resources are not similarly situated in all respects to thermal generation, they are becoming increasingly similar in characteristics when comparing the ability to perform in extreme weather events.\textsuperscript{35} Such disparate accreditation calculation is no longer warranted and should not be accepted by the Commission here.

III. MISO’s Approach To Risk Hour Identification And Subsequent Compensation Of Resources For Reducing Loss Of Load Risk Is Methodologically Flawed And Does Not Correspond To Actual Times Of Risk.

A. The Proposal is rigid and does not allow for changing risk patterns.

For thermal generating resources, MISO uses a prescribed algorithm to identify a set of high-risk hours (system-wide, without reference to any individual resource) in each season for a given planning year, and then evaluates each resource’s historical performance (going back three years) during the identified high-risk hours. Based on the resource’s average performance across those high-risk hours, the resource will receive an accreditation, in megawatts, for the seasonal PRA.\textsuperscript{36}

MISO’s attempt to separate high-risk hours is flawed because it arbitrarily uses a fixed 65 hours per season. This is not consistent with MISO’s assertion that risk periods are changing with the adoption of more renewables (a point with which we agree), and it may artificially create perceived times of risk even when there is no risk. This also may result in risk periods that are overlooked if there are more than 65 actual hours of high risk within a season.

For thermal resources, MISO’s approach to historic availability-based accreditation includes selecting some number of “Tier 2” hours (that is, historically risky hours in a season) and some number of “Tier 1” hours (all other hours in the season). MISO’s approach to selecting historic hours for Tier 2 is to first determine whether there are 65 hours of high risk in the season, including “MaxGen” hours and any other hours with a margin below 25 percent.\textsuperscript{37} If there are fewer than 65 hours of high risk, MISO “borrows” resource performance data from high risk periods in other seasons, and uses these borrowed values to ensure that there are 65 historically risky hours used in the accreditation for all seasons.\textsuperscript{38} This approach creates an artificial profile for these resources and assumes risk in a season during hours when there are none. The Tier 2 component of a resource’s evaluation for SAC accreditation purposes could be based entirely on actual historic performance in other seasons.


\textsuperscript{36} McFarlane Testimony at 19–21; Redline Tariff at 310–320 (Schedule 53).

\textsuperscript{37} Redline Tariff at 315 (Schedule 53).

\textsuperscript{38} Id. at 317–318 (Schedule 53).
In addition, using a fixed amount of Tier 2 hours could cause MISO to overlook other periods within the season that have significant risk. For example, if one season were to have 100 hours of significant LOLP risk, MISO would ignore 35 of those hours. MISO and its stakeholders generally agree that risk patterns are changing; therefore, it seems prudent to utilize methods that can adapt to this changing risk without using artificial limitations, such as the 65-hour limit per season, that distort the risk calculations. If a particular season (say, summer, i.e. June through August) has more than 65 hours of high risk, or is riskier than other seasons, then for that season, under MISO’s Proposal, thermal resources will not be evaluated under the full range of relevant times. This approach is completely contrary to the intent of a seasonal resource adequacy construct and, thus, at best reduces the efficacy of the proposal, and at worst may result in reduced system reliability because the accreditation of capacity resources is flawed. Accordingly, MISO fails to demonstrate how its process for determining high-risk hours is just and reasonable, as it does not account for instances where more than 65 risky hours are forecasted to occur in a given season, among other issues.

Another important issue with the Proposal is that the times of tight reserve margins may or may not be the same as those with high LOLP risk. For example, MISO’s approach of allowing resources with a 12-hour lead time to count as available for purposes of determining the system’s margin in a given historic hour fails to consider how unexpectedly tight hours typically arise in the range of 2 to 8 hours because reality diverges from forecasts. MISO has not demonstrated that this is not an issue and has not provided the requested data to stakeholders to perform an independent evaluation.

B. MISO used an inaccurate and inappropriate modeling foundation that informs everything from the planning reserve margins to the capacity compensation structures, resulting in the proposal failing to reflect the reality of weather, energy use, and generation.

The goal of a resource adequacy market construct is to minimize system risk to an acceptable level at an appropriate cost to consumers. The appropriate steps for achieving such a goal include (1) setting reliability targets using metrics that accurately reflect risk (including the frequency, size, duration and timing of potential load loss); (2) developing accreditation methodologies that accurately reflect the ability and availability of each resource to serve load (i.e., contribute to reliability) under a range of system conditions including complex load-weather-generation interactions; and (3) adequately compensating resources for their contribution to reducing system risk.

However, MISO’s definition of risky hours in its proposed new accreditation methodologies does not have a theoretically consistent basis, and uses alternative risk periods for

39 Id. at 317.
different resources. Despite multiple requests from several of the Clean Energy Coalition, MISO has not provided any data to demonstrate that its metrics used to identify risk hours (Max Gen Hours and Tight Margin Hours, where the latter is defined as the tightest-margin hours in a season, up to a cap on number of such hours, or up to 25 percent margin, whichever comes first)\textsuperscript{41} align with realized Loss of Load risk.

MISO has not conducted a system-level loss of load modeling analysis of a technically high quality to assess the periods or hours in which there is greatest risk of not serving load. Nor has MISO applied a system-wide loss of load modeling analysis to understand whether this proposal ensures reliability under a potentially radically different resource mix. One important dimension lacking in the LOLE modeling is an accurate assessment of weather-related risks. The Clean Energy Coalition conducted an assessment of the data assumptions in the LOLE model and found numerous problems with this analysis. The methodologies MISO used to extrapolate the wind and solar datasets to the period of the synthetic load record are fundamentally flawed, resulting in non-time synchronized data. Thus, the analysis will not correctly identify periods where the combination of high load, and low wind and/or solar resources create system risk. In addition, LOLE alone is a limited metric and other metrics should be used in conjunction. We suggest that regular reporting of Normalized Expected Unserved Energy is also an informative metric for MISO to understand the magnitude and duration of potential loss of load. Below is a sample of some of the most significant issues related to the wind and solar datasets.\textsuperscript{42}

- The assumption that solar or wind profile shape on a given day is a function of MISO-wide temperature data for nearby calendar days from other years is physically invalid.
  - Correlating wind profiles to MISO-wide minimum temperature for November through March and MISO-wide maximum temperature for April through October is not substantiated and has no physical basis. Average temperature across a broad footprint cannot possibly predict local wind speeds and the notion that regional averages of minimum temperature correlate to local winds in the winter months, while maximum temperatures are more explanatory in the summer has no scientific basis.
  - Cloud cover is clearly a much larger determinant of solar output and daily shape than temperature, and cloud cover attributes are poorly correlated to temperature.
- Even the validation provided by MISO indicates a poor match between actual and synthesized shapes, even when the comparison is smoothed through averaging.
  - Attention to the tails of the distributions in figures presented to validate the appropriateness of this method indicate a poor match between actual and simulated data during high load periods.

\textsuperscript{41} Redline Tariff at 315 (Schedule 53).

• The data presented for wind generation don’t match regional attributes. The average generation is low relative to current technology expectations and diurnal shape is inconsistent with that seen in reality. This suggests that the data don’t properly account for factors including technology changes, large amounts of curtailment in the past, or factors like icing.

• Methods used to develop future wind and solar generation profiles for the 2025 queue receive only cursory mention and the information provided indicates that these methods don’t capture physical processes or expected diversity increases in a meaningful way.

Given the flaws in the analytical foundation on which MISO’s entire proposal is based, this raises great concerns about the entire proposal.

C. MISO’s proposal uses a flawed and unproven method to calculate seasonal wind ELCC that distorts MISO’s risk profile, counting low- or no-risk hours as high risk, and counting high-risk hours as low- or no-risk.

Though the Commission previously accepted MISO's ELCC construct for wind resource accreditation, it did so on an annual basis, and the approach would be inappropriate to use for calculating a seasonal construct as currently proposed by MISO. While we are not proposing that the Commission initiate an FPA section 206 proceeding to revise the related tariff provisions, we are taking this opportunity to highlight flaws with MISO’s proposed new application of this ELCC process on a seasonal basis, within the Proposal. Based on the flaws in MISO’s current ELCC methodology, wind resources may receive credit during hours of no risk, and they may not receive credit for contributions during periods of high risk. MISO has developed a seasonal ELCC metric that is flawed and does not accurately account for the actual risk of loss of load. MISO has shown that the periods of LOLE risk occur mostly in the summer, and some in the winter. Several months have no LOLP risk, which means that some seasons have little or no risk.

However, under the Proposal’s seasonal accreditation approach for wind, MISO arbitrarily re-allocates annual LOLP risk to each season for purposes of ELCC-based accreditation. It does this by assuming that 25 percent of the annual risk occurs in each of the 4 seasons, which directly contradicts the results from MISO’s own LOLP modeling and is contrary to the understanding of the need of a seasonal construct, which assumes different levels of risk in different seasons. MISO’s own analysis, calculating annual LOLP risk, shows that risk is not equally spread into each of the four seasons. The impact of allocating risk in this way therefore creates periods of artificial risk—periods during which MISO’s own calculation shows

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43 The Commission recently approved a modification to the existing annual ELCC methodology for wind. MISO, 173 FERC ¶ 61,139 (2020).


46 See supra note 44.
little or no risk, but are elevated to periods of risk by MISO’s arbitrary allocation of risk to each season.

Similarly, this arbitrary allocation method removes times of risk that were identified by the annual LOLE calculations used in the status quo approach. This is because some risk is “moved” out of the summer season and arbitrarily put in winter, spring, or fall seasons. This means that a wind resource that provides generation during actual times of risk may not receive credit; conversely, a wind plant that provides generation during periods of artificial risk would get credit, yet it would not be contributing to actual risk reduction in the system. Accordingly, MISO has not demonstrated that it performed the requisite analysis to establish a process for allocating seasonal loss of load risk based on reasonable assumptions; thus, the Commission should reject MISO’s Proposal.

IV. MISO’s Paired Processes For Adjusting The Auction Clearing Price And Then Offering Make-Whole Payments To Individual Impacted Resources Introduces A Market Adjustment And Outside Payment System That Warrants Further Study And Will Require Ongoing Review And Adjustments If MISO’s Proposal Is Approved.

As explained by Witness McFarlane, the bidding and auction clearing rules for each of the four seasons would allow Auction Clearing Prices (“ACPs”), in units of dollars per megawatt-day, as high as four times the annual Cost of New Entry (“CONE”).\(^\text{47}\) MISO’s proposal includes a mechanism called the ZRC Offer Revenue Sufficiency Credit,\(^\text{48}\) which stems in turn from a provision that would reduce the ACPs in certain circumstances to reduce the risk that LSEs are “exposed to ACPs that result in charges that amount to multiples of annual CONE” over the course of a year.\(^\text{49}\) The Clean Energy Coalition appreciates that MISO is taking steps to minimize the likelihood of astronomically high ACPs, but MISO has admitted that the ACP-adjustment protections are not complete: there are multiple plausible scenarios in which annual capacity revenues could be expected to exceed CONE, many of which center on a single tight season in which the ACP is authorized to soar well past CONE.\(^\text{50}\) In other words, the structure of the seasonal market exposes LSEs to a meaningful risk of periodic prices surging above the maximum possible auction results under the PRA.

Meanwhile, even as it takes steps to mitigate (but not eliminate) the likelihood of price spikes resulting from capacity-limited markets in certain Local Resource Zones (“LRZ”) for certain seasons, the Proposal goes out of its way to establish an ironclad Make-Whole payment system to protect generation owners from any risk associated with manual ACP Reductions. While it makes sense in theory to insulate capacity owners that may be forced to provide capacity while being paid less than they bid into the market, these make-whole payments will eventually come from LSEs and their ratepayers, and will be defined in part by facility-specific Reference Levels that are calculated independently through a process involving the IMM. MISO is proposing to introduce a massive market adjustment and payment infrastructure that is not

\(^{47}\) McFarlane Testimony at 41:6–8, 42:7–9.

\(^{48}\) McFarlane Testimony at 43:11–45:20; Redline Tariff at 102 (Section 1.Z), 300–301 (Section 69A.7.6).

\(^{49}\) McFarlane Testimony at 40:12–13, 41:9–43:10.

\(^{50}\) Id. at 41:22–42:7.
dictated by actual market forces, in order to tame the excesses of the new markets it is proposing to create.

MISO’s witness attempts to minimize possible concerns over this outside-the-market adjustment system by emphasizing that it will not often be needed, but his assertion is not particularly well supported. Mr. McFarlane suggests that Make-Whole payments would be rare because they will only be needed when a given region reaches shortage or near-shortage in multiple seasons, and generation owners report costs above the adjusted ACPs for those seasons. But past performance here is not a particularly useful indicator of expected future events: MISO has suggested that this change is needed in part to counteract a tightening capacity reserve across the region, and it is proposing a major restructuring of its capacity auctions while simultaneously proposing a major shift to its capacity markets. Thus, MISO has not provided enough information to justify the Make-Whole payment process, as analysis is needed to ascertain the extent to which it will be used so that Commission can determine whether the benefits justify the associated costs to ratepayers. Further, given the potentially high rate impact, ongoing tracking and evaluation of the market adjustment and make-whole payment system is necessary.

V. Certain Design Elements In The Proposal Erode The Potential Positive Reliability Impacts This Proposal Could Have And Therefore Fail To Incentivize Efficient Resource Development And Asset Management.

A. MISO has missed an opportunity to better coordinate planned outages.

MISO’s generating fleet consists of resources owned by multiple market participants, overseen by multiple state regulatory bodies. Individual asset owners generally make maintenance decisions based on their assets’ physical needs and various economic considerations but without a holistic assessment of the whole system’s resource adequacy needs at any given time. If maintenance schedules remain uncoordinated, this may lead to more outages and risk throughout the year, as well as possible price spikes due to unanticipated shortages. Building more capacity will not necessarily lead to better results if the new resources take outages at peak usage times, or during times when other capacity is also offline for maintenance. Instead, better coordinating outage schedules could maintain reliability without building new resources. A construct that results in acquiring new resources, when similar results could be achieved through more control over outages coordination, is going to result in higher costs and unjust rates to consumers.

MISO has suggested in its filing that its proposed tiered weighting structure will “incentiviz[e] the coordination of” planned outages by providing exemptions for planned outages that meet certain conditions. But the components of MISO’s Proposal that might actually provide incentives for generators to alleviate the planned outage problem (i.e., the historical availability-based accreditation of thermal resources) are undermined by: (1) exceptionally broad planned outage exemptions to the historical availability-based accreditation of thermal

51 McFarlane Testimony at 45:8–20 (observing that the annual PRA has seen any LRZ clear at a price above the economic withholding threshold only twice since 2013).
52 Proposal at 16; McFarlane Testimony at 19:17–21.
resources; and (2) provisions that allow for the replacement of cleared capacity on a planned outage during the planning year with a different, uncleared resource under which the accreditation of the cleared resource is shielded. In particular, the proposal grants a blanket exemption from availability-based accreditation allowing any unit to go offline and avoid an “unavailable” evaluation for a historical risky hour as long as it gave four months’ notice of the planned outage, up to three times a year; and it gives a partial exemption with one month’s notice up to 12 times a year. These exemptions severely limit the reliability value of the overall proposal and, together, offer little motivation for a resource owner—even one with a capacity commitment under the PRA—to think twice before scheduling an outage, even at peak times.

MISO has also missed a larger opportunity to assert far more direct control over planned outage coordination. Namely, MISO’s proposal here does not change the status quo in which MISO may only deny planned transmission outages where they present local reliability issues, and may not deny planned generation outages for any reason—despite MISO itself having admitted that “having such authority could improve outage management.” As MISO stated in its comments on the Commission’s Technical Conference on Climate Change, “RTOs/ISOs currently have differing levels of authority to approve or recall outages,” and the responses to the Commission’s question on the topic made clear that MISO’s authority is among the weakest. MISO admitted that more control over planned outage connections would help it better coordinate planned outages particularly in shoulder seasons. If it is going to dramatically restructure its capacity markets and create conditions in which planned periods of scarcity could lead to price spikes, it should at least improve its ability to avoid those spikes along the way.

The ability to replace a committed capacity resource without penalty also invalidates the proposed methodology for availability-based accreditation, since there may not be a strong correlation between a resource’s historic performance at peak times and its future inclination to perform. If a resource can find a replacement of its capacity when it is on a forced outage, eliminating the impact of that forced outage on its availability and its accredited capacity, the accreditation of this resource and the whole construct is no longer valid. Without appropriate implementation, it is possible that the replacement capacity may not be equivalent in performance and may impose additional costs to ratepayers or compromise reliability exactly in the risky periods for which resource adequacy programs are designed. Further, the entire accreditation process is an ex-ante methodology and if MISO’s analysis is factoring in resource

53 McFarlane Testimony at 46–50; Redline Tariff at 310–314 (Schedule 53).
54 McFarlane Testimony at 37–38; Redline Tariff at 18 (Section 1.C), 249–252 (Section 69A.3.1.h) (discussion of Capacity Replacement Non-Compliance Charge).
55 Proposal at 18–19; Redline Tariff at 310–314 (Schedule 53).
56 Post-Technical Conference Comments of MISO, at 18–19, Docket No. AD21-13-000 (Sept. 27, 2021), Accession No. 20210927-5148.
availability from resources that were actually not available, then the entire accreditation methodology is put into question. In addition, the methodology fails to consider transmission constraints of the replacement resource; moreover, the methodology allows the replacement resource to get credit based on Class Average even if the replacement resource was actually historically not available.\textsuperscript{58} MISO’s methodology under the Proposal allows resources to take up to a 31-day outage—one-third of the season—and still receive credit for performing in a season, without reference to how the resource’s unavailability may affect system reliability in the operating time frame.\textsuperscript{59} Again, the Clean Energy Coalition believes that outage rules and coordination are key to addressing the operation problem MISO is currently facing. Yet, these outage opportunities that do not impact accreditation fail to address the operational challenge.

\textbf{B. MISO has not sufficiently analyzed what the implications to utility planning might be from incorporating this new seasonal resource adequacy construct, which could potentially increase costs for customers unnecessarily. There is no evidence that MISO has engaged state commissions or electric utilities to better understand implementation risks.}

Planning analyses are where the rubber of MISO’s proposal meets the road of implementation. A central focus of any resource adequacy construct proposal ought to be whether it is implementable and whether the increased complexity is manageable as part of utility planning processes. MISO has not sufficiently explored these concerns. As an example of an implementation challenge, the MISO utilities use a wide variety of models including EnCompass, EGEAS, PLEXOS, and Aurora. At least Aurora is not currently capable of enforcing a multi-season reserve margin requirement in its optimization logic. One has to run multiple simulations enforcing the requirement in a single, different season per year and determine how the results of the simulations would be put together to produce a plan that meets the requirements of all four seasons. If load serving entities within MISO cannot effectively plan to meet seasonal capacity requirements along the timeline contemplated in the Proposal (beginning with Planning Year 2023-2024), the Proposal will be ineffective or will result in building higher amounts of capacity resources than are actually needed, resulting in higher and unnecessary costs to customers. The Clean Energy Coalition generally supports the use of more precise analytical approaches and advanced technological solutions to ensure resource adequacy, but notes that utilities, state regulators, and software vendors may not be ready for a seasonal construct by a little over 12 months from now, when the multi-season offers for the 2023-2024 PRA would be submitted.

\textbf{C. The seasonal accreditation methodology that MISO is proposing for Schedule 53 resources under the Proposal lacks transparency.}

As discussed above, the new Schedule 53 in the Proposal entails the use of identified historical hours of tight margin in order to evaluate thermal resources’ performance in times of risk. For example, to calculate the four seasonal accredited capacities of a single resource, one needs three years of the following resource-specific historical hourly data: a. planned outages; b. forced outages and/or derates; c. emergency max limit values. Next, one needs three years of the

\textsuperscript{58} McFarlane Testimony at 30; Redline Tariff at 249–250 (Section 69A.3.1.h), 320 (Schedule 53).

\textsuperscript{59} Redline Tariff at 249–251 (Section 69A.3.1.h).
following MISO-wide historical hourly data: a. max gen emergencies; b. operating margins. Finally, one needs the MISO system wide ratio of UCAP to ISAC (“UCAP/ISAC”) for all Schedule 53 resources, by season, over the last three years. Then one needs to take all of this data, in conjunction with the Schedule 53 calculation methodology, and execute the calculations, which takes at least 30–45 minutes per resource, assuming one has all of the required data. This process is data-intensive, time consuming and susceptible to errors. The calculation methodology is also complicated to the extent that it is difficult to obtain intuition around how a change in the inputs will affect the outputs. As a result, the methodology may not provide the intended incentive to utilities and market participants who should be incentivized to improve the performance of their generators but for whom it will be difficult to develop intuition about how a change in performance in particular hours or seasons would impact accreditation.

VI. Many Components Lack Clarity On Impacts, So The Overall Impact Cannot Be Reasonably Known Creating Risk For Consumers Of (I) Worse Reliability And/Or (II) Higher Costs With No Reliability Improvement.

MISO’s showing that risk occurs throughout the year does not necessarily demonstrate that its proposed seasonal construct would provide better reliability than the current annual construct at a just and reasonable cost to consumers. While this could certainly be the case, robust and transparent analysis should validate the assertion. The analyses performed to date have been intended to give key information about the proposal, such as when risk hours have historically happened and how wind resources will be accredited seasonally; however, no analyses have been conducted that demonstrate this proposal will improve reliability.

In addition, the analyses performed to date have not correctly accounted for correlated events in the risk assessment. An example of a correlated event is when an extreme weather event limits multiple generation sources, i.e. a heat wave that reduces the capacity of gas-based generation due to thermal derates, and increases demand. Such a heat wave is also more likely to be concurrent with low pressure gradients and thus there is a higher likelihood than normal of concurrent below average wind conditions. Another example is an extreme winter event where natural gas and coal availability may be limited due to freezing temperatures combined with increased demand and potentially lower levels of renewable generation, due to impacts like turbine blade icing.

It is also worth noting that the methods used in MISO’s LOLE modeling are often used by other utilities and Regional Transmission Organizations, and that the industry writ large requires a more robust solution to address weather-related risks (including the development of standardized, publicly available coincident weather, renewable output, and load profiles for many years that respects the laws of physics), which will increase as power systems become more dominated by renewable energy and storage.

Over the long term, the proposed solution is not sufficient for addressing resource adequacy of highly decarbonized systems that are dominated by energy limited resources. MISO initially proposed to use three scenarios to evaluate its solution proposal, which included a scenario with significant renewable generation additions, load growth due to electrification of buildings and vehicles, and thermal generation retirements. This particular scenario is important
to provide insight into how the Seasonal RA Proposal would perform given the system conditions the region is likely to experience in the future.

However, MISO has not evaluated its proposed design under this renewable-heavy scenario. These scenarios were only used to show that risk can occur in non-summer months. But underlying data for the Proposal has not been provided to stakeholders, and given the modeling concerns in other aspects of this work, it is not clear how much value those results actually bring to the design.

**VII. Broader Industry Implications.**

Other regions are, or will be, facing similar challenges to what MISO is facing as the U.S. power system is decarbonized. In addition to denying MISO’s Proposal, we recommend that FERC hold a technical conference to answer key questions that must be resolved and to provide a public stakeholder venue for hosting a robust discussion. A technical conference would benefit the industry as a whole. The technical conference can build on the ESIG Redefining Resource Adequacy initiative and other similar efforts. This conference could explore questions such as:

- What are the appropriate metrics to identify and characterize the frequency, size, duration, and timing of potential loss of load risk?
- What are the appropriate capacity accreditation methodologies based on availability of capacity when it is most needed?
- How can planned and unplanned outages be appropriately accounted for in capacity accreditation methodologies?
- How should seasonal risk tolerances be determined, and how does risk tolerance align with LOLP and other emerging metrics needed to characterize resource adequacy risk?
- What are best practices for coordinating resource outages across a region-wide fleet controlled by multiple asset owners with individual interests, answerable to multiple state authorities?
- What is the potential for alignment of state-led resource planning processes with seasonal capacity markets?
- What does atmospheric science tell us about weather-driven reliability and resilience risks (both for supply resources and load implications) and what market designs can mitigate these risks most effectively?

**VIII. Conclusion.**

For the foregoing reasons, the Clean Energy Coalition respectfully requests that the Commission deny MISO’s Proposal. If the Commission is not inclined to deny the Proposal, we request that the Commission issue a deficiency letter to MISO or initiate a paper hearing on this Proposal to gather sufficient information prior to issuing a decision. We recommend that the Commission ask MISO to carefully consider the following actions and issues:

- Separating planning vs. operational time frames
- Recognizing fuel supply risk
- Developing a more robust and consistent assessment of periods of system risk
• Use the Loss of Load Expectation modeling framework to estimate the level of acceptable maintenance throughout the year so as not to compromise reliability.
• Ensuring resource accreditation is consistent across different resource types and reflects actual availability during periods of system risk.
• Incorporating the principles and recommendations from the ESIG Redefining Resource Adequacy initiative which represents an industry-wide thought leadership and consensus effort.
• Working with member utilities to ensure any changes to the resource adequacy construct are practically implementable in state and utility planning processes, such as Integrated Resource Planning processes.

Dated: January 14, 2022

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CERTIFICATE OF SERVICE

I hereby certify that the foregoing has been served in accordance with 18 C.F.R. § 385.2010 upon each party designated on the official service lists in these proceedings listed above, by email.

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