

MISO's Responses to Stakeholder Questions

Original Posting October 5, 2021

Reposted December 17, 2021

Contents

A. Requirements	3
B. Accreditation.....	9
C. Must Offer Obligation/Capacity Replacement	21
D. Planned Outages.....	26
E. Non-thermal Resource Accreditation	30
F. Minimum Capacity Obligation (MCO).....	33
G. Tariff Language	36
H. General Filing Questions.....	39
I. Implementation Questions	40
J. Additional Analysis Requests.....	43
K. Questions & Comments In-process	59
L. Additional Comments.....	59
M. Post RA Construct Filing Initiatives	68

A. Requirements

10/06 Question 1: The 8/19 conceptual design document states that if a unit does not have “full NRIS granted for its seasonal output,” it should request additional NRIS. Schedule 53 does not mention NRIS or deliverability. Are the availability calculations for SAC dependent on the amount of deliverability that the unit has?

Answer: Yes, NRIS and ERIS+TSR MWs are determined to be deliverable for the SAC calculation. No, deliverability is not a factor in the determination of SAC in Schedule 53. Deliverability is a factor in the determination of ZRCs, and it is applied to SAC under the proposal in the same way it is applied to UCAP today. There is no change to deliverability in this proposal.

10/06 Question 2: In the September 1st RASC, MISO presented a slide on page 6 showcasing the volatility in Seasonal Accredited Capacity at footprint and MP levels. Can MISO clarify exactly what inputs went into these graphs and how these STD calculations were done? DTE’s interpretation of the three-year average SAC STD graph for the spring season is that 50% of market participants will experience SAC volatility between 4% - 16% every year. Is this understanding of the graph correct and, if so, can MISO state if they believe this level of volatility in accredited capacity is reasonable for market participants to plan to?

Answer: MISO calculated standard deviation of SAC values (in MW) across four Planning Years (PY17to18, PY18to19, PY19to20, PY20to21) and standard deviation of two three-year average SAC values (PY17to18 to PY19to20; and PY18to19 to PY20to21) at footprint and individual MP levels. The box and whisker plots are used to illustrate the MP level SAC standard deviation distribution. The left plot is based on the standard deviation of SAC values across four Planning Years in percentage of ICAP, while the right graph plots standard deviation of two three-year average SAC values in percentage of ICAP. For the spring season in the three-year average plot, 25% of MPs has less than 1% STD, 50% of MPs has less than 3.2% STD (median value), 75% of MPs has less than 7.6% STD, and only 25% of MPs has STD greater than 7.6% with greatest value (excluding outliers) being 15.5%. Overall, the majority of MPs three-year average standard deviation values are within 8%, which indicates a fairly low level of volatility.

10/06 Question 3: At what point in MISO’s RAN policy development process was the “Proof of Concept evaluation” (as referenced on slide 4) used? What were the bases of the parameters mentioned here (e.g. 15% credit for wind in spring, summer, fall and 20% in winter) in relation to the Proof of Concept evaluation?

Answer: The proof of concept evaluation took place from Q4 2020 through Q1 2021. The capacity credit values for wind and solar were estimated by comparing the difference between the gross peak and net peak demand (net peak = gross peak – wind/solar). MISO later revised the estimated values to reflect the actual seasonal ELCC/availability.

10/20 Question 4: AE expects that MISO’s proposed RAN construct will require an incremental ramp-up of capacity to satisfy the evolving obligations. This expectation is based on MISO’s July 7 presentation slide 20 showing a decrease of 2.1-2.2 MW in capacity position for zones 1 and 3, which have higher renewable penetration relative to other zones. Further, AE expects that other zones will soon be in a similar position due to increased retirements and renewable build-out. When considering incremental capacity needs under the proposed RAN construct:

- o What information is MISO providing to communicate the incremental capacity need under the RAN construct relative to the current annual construct? Is this mainly the July 7 presentation slides 17-22?

Answer: A series of modelled results have been shown as MISO has refined the proposal in response to stakeholder feedback. The August 4 RASC presentation appendix slides contain the most recent directional impact analysis results with assumptions described in slide 16. Overall excess reserve margins are going up in % terms, especially outside summer given the use of seasonal PRMR to set seasonal targets. That said, some zones in some seasons have seen reductions to excess reserve margins due to their share of seasonal peaks, relative performance during times of need or seasonal capacity import limits.

- o In light of the process time for the MISO queue, does MISO believe that there is adequate time for LSEs to increase capacity for the 2023 Planning Year?

Answer: By design, the use of a conversation ratio ensures there is not an aggregate reduction to the supply/demand balance and the modelled results have not shown such a reduction in excess reserve margins. The accreditation proposal is targeted at improving the relative capacity value of resources by tying them to performance during times of need. In some cases individual LSEs existing capacity surplus may be reduced. Independent of the proposed reforms, Market Participants continue to make decisions about individual resources and capacity needs. MISO expects these reforms may influence those decisions including; retirement plans, bilateral purchases, and some resource additions.

- o What specific actions does MISO believe LSEs can reasonably take to satisfy incremental obligations by the 2023 Planning Year?

Answer: To the extent individual LSEs capacity needs increase under the proposed reforms, Market Participants may reconsider resource retirement plans, bilateral purchases, or accelerating resource additions where possible.

10/20 Question 5: MISO currently proposes to require legacy resources either request additional NRIS through the interconnection queue or procure a TSR to obtain different capacity credits for each season. Has MISO considered other options and if so, what are they? If not, when does MISO expect to consider other options?

Answer: The current seasonal deliverability proposal is intended to be an incremental approach to accommodate the Planning year 23/24 implementation of overall RA construct reforms. Further enhancements or additional seasonal NRIS products may be considered and explored after the RAN RA reform filing.

10/20 Question 6: What metrics will be used to measure the reliability improvements contemplated by the seasonal construct proposal

Answer: The proposed reforms to MISO's Resource Adequacy Requirements will continue to set Planning Reserve Margins consistent with meeting the 1 day in 10 Loss of Load Standard. MISO is evaluating ways to perform post-implementation analysis to determine the impact and effectiveness of these Resource Adequacy Reforms.

10/20 Question 7: Please provide the name and description of any available seasonal reliability metrics that show the aggregate level of system reliability on a seasonal basis.

Answer: The proposed reforms to MISO's Resource Adequacy Requirements will continue to set Planning Reserve Margins consistent with meeting the 1 day in 10 Loss of Load Standard.

10/20 Question 8: Please provide any defined summary metrics on a seasonal basis demonstrating the system reliability for each of the historic seasons of the previous four years of available data.

Answer: MISO does not intend to perform retroactive analysis with application of the RA reforms. MISO performs seasonal outlooks that provide resource adequacy projections ahead of each season. See link for latest, Fall 2021.

[Seasonal Outlook Fall 2021 \(misoenergy.org\)](#)

[Summer Readiness Workshop 2021 \(misoenergy.org\)](#)

[Seasonal Outlook Spring 2021 \(misoenergy.org\)](#)

[Winter Readiness 2020 \(misoenergy.org\)](#)

[Seasonal Outlook Fall 2020 \(misoenergy.org\)](#)

[Summer Readiness Workshop 2020 \(misoenergy.org\)](#)

[Seasonal Outlook Spring 2020 \(misoenergy.org\)](#)

[Winter 2019 Readiness \(misoenergy.org\)](#)

[Seasonal Outlook Fall 2019 \(misoenergy.org\)](#)

[2019 Summer Readiness Workshop](#)

[Spring Outlook 2019.pptx \(misoenergy.org\)](#)

[20181213 Winter Outlook 2018 \(misoenergy.org\)](#)

[Summer Readiness Workshop 2018 \(misoenergy.org\)](#)

[20180308 MSC Item 06 Spring Readiness \(misoenergy.org\)](#)

10/20 Question 9: Comment regarding seasonal metrics in regard to the current proposed approach:

Answer: The proposed reforms to MISO's Resource Adequacy Requirements will continue to set Planning Reserve Margins consistent with meeting the 1 day in 10 Loss of Load Standard.

10/20 Question 10: What is the metric or means of evaluating the changes to electric system reliability impact of implementing the proposed method?

Answer: please refer to MISO response to Question 7 in Section A.

10/20 Question 11: How is the proposed reliability construct envisioned to provide LSEs an indication of either increasing or decreasing levels of system reliability when considering resource additions or retirements?

Answer: The proposed reforms to MISO's Resource Adequacy Requirements will continue to set Planning Reserve Margins consistent with meeting the 1 day in 10 Loss of Load Standard. Additionally, proposed changes to resource accreditation will incentivize resource availability in times of greatest system reliability needs.

10/20 Question 12: MISO is capping the RT offer for each hour at the ICAP value and then applying a ratio to account for the deliverability limit after the fact to the SAC. It seems to be an easy change and more appropriate to instead cap the RT offer by the deliverability limit within the calculation instead of applying a ratio after the fact.

Answer Revised 11/3: As MISO adopts the IMMs recommendation for the UCAP to SAC ratio concerns around deliverability should be addressed.

11/3 Question 13: If the IMM's recommendation to apply the SAC/UCAP conversion factor to the capacity side of the equation (rather than PRMR), how will that affect inclusion of deliverability, conversion to ZRCs?

Answer: MISO does not believe there will be impacts to existing processes related to deliverability and conversion of ZRCs based on the proposed Resource Adequacy reforms.

11/3 Question 14: How does creating a distribution newly derived SAC accredited MW values result in a proven improvement to reliability, when the net impact of the accreditation results in the MISO-wide total UCAP value, with the same MW of accredited capacity having a higher SAC MW value and the other half having a lower SAC MW accredited value?

Answer: The proposed reforms to MISO's Resource Adequacy Requirements will continue to set Planning Reserve Margins consistent with meeting the 1 day in 10 year Loss of Load Expectation planning standard. Additionally, proposed changes to resource accreditation will incentivize resource availability in times of greatest system reliability needs by allocating more accreditation value to resources that perform better during those times.

11/3 Question 15: The adjusted zonal SAC MW has the potential to be higher than the NRIS capacity for the interconnection. How can the accredited capacity for a generation unit be higher than its NRIS interconnection agreement?

Answer: The final SAC value for a Resource may exceed its NRIS or ICAP, however, the must-offer obligation will never exceed the Installed Capacity of the Resource. Conceptually, Resources whose SAC value exceeds its Installed Capacity have demonstrated they are providing more value than other Resources with the same ICAP but lower SAC values.

11/3 Question 16: RASC discussion and BPM updates on reforms to the seasonal ZIA methodology

Answer: Further enhancements on MISO transfer analysis to determine seasonal Capacity Import and Export Limits (CIL/CEL) has been included in the RASC management plan. Following the RAN construct reform filing, stakeholder discussion on this topic will kick off at the December 2021 RASC meeting with final enhanced methodology memorialized in the MISO Resource Adequacy Business Practices Manual.

11/3 Question 17: Does MISO believe that there is going to be any significant shift in the amount of PRMR required over the next 5-10 years?

Answer: The annual Loss of Load Expectation Study (LOLE) will continue determine Planning Reserve Margins for the upcoming Planning Year and for the next ten (10) Planning Years. During the RA construct reform evaluation phase, MISO conducted preliminary LOLE analysis against a range of plausible 5, 10, and 15 year generation resource portfolio scenarios to evaluate directional impacts on seasonal PRMs under the set of future scenario assumptions, via the link below:

https://cdn.misoenergy.org/20201202_RAN_Workshop_RAN_Reliability_Requirements_and_Sub-annual_Construct_Presentation498981.pdf

11/3 Question 18: Can MISO provide more explanation of how its proposed rules relative to a seasonal capacity construct and new accreditation rules will still ensure that there are sufficient capacity resources online in every hour to meet load? We would particularly like to better understand how the allowance of up to 30 days' outage in any season for a resource whose capacity is accredited in that season impacts MISO's "stack" of resources relative to what is expected to be available to meet the Planning Resource Margin in any hour. It would be very helpful to have a visual representation of how MISO considers available capacity that has cleared the PRA for a season, and expected outages relative to capacity requirements to meet peak load plus a margin.

Answer: MISO does not need sufficient available resource capacity to meet its Planning Reserve Margin in every hour throughout a Season. By construct, the Planning Reserve Margin accounts for resource unavailability through planned or forced outages. The 31 day Planned Generator Outage replacement requirement is designed to assure cleared resources have sufficient availability to provide a minimum reliability contribution. This provision balances accommodating a majority of Planned Outages without unduly sacrificing reliability.

11/3 Question 19: Has MISO conducted a system-level loss of load modeling analysis to assess the periods or hours in which there is greatest risk of not serving load? And if so, is this the same foundation for assessing the accreditation value for all resources, including thermal generators and renewable generators?

Answer: During the seasonal Proof of Concept analysis MISO produced heat maps showing the hours and months where loss of load risk is the greatest for a number of resource mix/load scenarios. While this analysis was not the foundation of the RA hours used for accreditation, there was a high degree of overlap between the heat map hours and max gen hours observed in real-time as shown on slide 16 in the link below.

<https://cdn.misoenergy.org/20201202%20RAN%20Workshop%20RAN%20Reliability%20Requirements%20and%20Sub-annual%20Construct%20Presentation498981.pdf>

11/18 Question 20: In Section M of the Q&A document for Post RA Construct Filing Initiatives, could MISO add the following:

If MISO does not adopt the IMM proposal for SAC to UCAP conversion, MISO will investigate if deliverability NRIS and ERIS levels should be impacted by SAC or whether it is simply better to just limit RT offer by the deliverability limit instead of applying a ratio after the fact?

Answer: MISO did adopt the IMM proposal for SAC to UCAP conversion.

11/18 Question 21: Resources that have increased output in non-summer months, RASC will look into whether there should be different seasonal deliverability values of NRIS/ERIS, since those are based on summer values.

Answer: MISO proposal accounts for seasonal resource deliverability, a resource can either request additional NRIS or procure firm Transmission Service Requests to align with seasonal deliverability needs. Further enhancements or additional seasonal NRIS products may be considered and evaluated after the RAN RA reform filing.

11/18 Question 22: Should September be in Fall season or Summer season? Since September is setting PRMR requirements for Fall season, is that fair since those values are based on summer-like conditions happening in September?

Answer: MISO evaluated the impacts of season definition with September being either in Fall or Summer during conceptual design phase and proposes to follow the existing definition of Seasons as laid out in Module A with September being in Fall to be consistent with MISO other processes such as FTR. Recognizing there are potential merits with September in Summer season, MISO will monitor system conditions and evaluate as needed after the RAN filing.

11/18 Question 23: Public Service Commission of Wisconsin staff would like to see numerical examples of how IMM's proposed PSAC ratio would uprate or derate above-average and below average performing thermal units.

Answer: The IMM proposed UCAP/SAC conversion ratio is to convert individual Schedule 53 resource ISAC values back to UCAP terms using the same system wide UCAP/SAC conversion ratio. MISO provided a detailed resource SAC step by step calculation workbook at the November RASC meeting that includes IMM proposed conversion ratio. The workbook can be accessed via the link below
<https://cdn.misoenergy.org/20211103%20RASC%20Item%2004a%20Step%20by%20Step%20SAC%20Calculation%20Example600793.xlsx>

12/17 Question 24: More information/explanation regarding MISO's analysis showing that most of the Entergy Operating Companies would have their highest Planning Reserve Margin Requirements in the Spring season, which is traditionally considered an off peak season in the South region during which significant maintenance outages are taken. Additionally, an explanation of when is the best time for MISO South generation owners to be scheduling planned maintenance outages according to the insight provided by MISO's proposed resource adequacy construct – recognizing that reasonable planned maintenance outages are essential to maintaining generation resources in good working order and thus to meeting customer demand at times of peak demand.

MISO Response: Entergy Operating Companies have their highest Planning Reserve Margin Requirements in the Spring season because of their relatively flat load profile across the year (spring is 92% of summer peak) and the MISO system-wide Spring Planning Reserve Margin being the largest of all the seasons (similar MWs of needed reserve margin but a higher % driven by lower load in the spring on the MISO system-wide level). When applying the high spring PRM % to the EOCs forecasted spring load forecast the result is a significant decrease in the previous surplus. Several factors are contributing to the spring values. There are several new resources that have not been factored in that could help the position moving forward. Also, the first year of data MISO used for the surplus/deficit analysis was Sep 2017 to Aug 2018 to calculate the PY21/22 SAC values. Outages occurring in this year that were not exempt have impacted some of the results and will fall off prior to implementation in PY 23/24. Additionally, actual load forecasts for each season will be submitted, which could change results as well. Since MISO does not currently collect MISO Coincident Peak Forecasts for each season, we have developed the seasonal load forecast factors using the monthly Non-Coincident Peak Forecasts (NCPF) to estimate seasonal PRMR with the following steps.

1. For each asset owner, determine the highest monthly NCPF for each season (i.e. the highest peak forecast for the fall is from the months Sep, Oct and Nov),
2. Calculate the Seasonal factors (%) from summer to the rest of the seasons using the data from Step #1 (i.e. summer factor = 1, fall factor = Fall NCPF forecast / summer NCPF),
3. Seasonal Load Forecast is calculated as Summer Coincident Peak Forecast * Seasonal factor calculated from Step #2.
4. Calculate the Seasonal PRMR, applying the LBA transmission losses and PRM to the Seasonal Load forecast calculated from Step #3.

Lastly, MISO provides multiple sources of useful information to help the EOCs determine when it may be best to plan outages throughout the year. MISO provides Maintenance Margin, Multi-Day Operating Margin (MOM) forecasts as well as historical RA hours. These combined can give EOC's a relatively good idea when it may be best to plan outages.

B. Accreditation

10/06 Question 1: In the Step-by-Step worksheet provided by MISO on 8/19, MISO specifically identified which hours are the RA hours for that season. The 8/19 conceptual design document says that RA hours are defined sub-regionally. When there are fewer than 65 hours in a season, the hours are substituted with annual RA hours. These are also defined sub-regionally. The tariff appears to be different from this proposal, saying that RA hours "will be determined specific to each Resource." In Schedule 53, Section IIA, the language appears to suggest that if a resource receives an exemption from certain RA hours, but there are other hours in that season that have an operating margin of less than 25%, these hours will count as RA hours for that resource. It appears that this process would be done before any substitution with annual RA hours occurs. Is this understanding correct? The language suggesting this reads, "If there are fewer than 65 hours identified for the Season in Section II.A.i above, additional hours will be identified up to a total of 65 starting with those hours with the lowest Operating Margin that is below a threshold of 25 percent excluding any operating hour where a Resource has a tier 2 outage exemption or has periods where the Resource was not committed for Capacity under Module E-1 of the Tariff."

Answer: When there are fewer than 65 (3%) declared MaxGen hours in a season then the tightest non-MaxGen hours in the season are identified until 65 hours have been reached. However, if 65 hours can't be met with hours where the operating margin was <25% or if a specific Resource has any exempt RA hours then MISO identifies annual RA hours (also defined sub-regionally). MISO then calculates the Annual Average Offer Capacity (AAOC) over these annual RA hours. MISO uses this AAOC to "supplement" the number of hours needed to reach 65 hours to complete the calculation of Tier 2 SAC. The example spreadsheet that MISO has posted in the workshop included details of both AAOC and SAC calculations.

10/06 Question 2: In the 8/19 workshop Step-by-Step example, it states that the availability in Tier 2 hours will be defined as the minimum of ICAP and the RT Emergency Maximum offer. However, in Schedule 53, the SAC calculation refers to the "Hourly Emergency Maximum Limit," but does not mention ICAP. Has ICAP been removed from the formula?

Answer: Thank you for catching this, we will add the needed reference to ICAP in Schedule 53. The "minimum of ICAP and the RT Emergency Maximum offer" has been used in the accreditation analysis shared with stakeholders.

10/06 Question 3: MISO's proposal will backfill seasons that do not have enough tight hours using a resource's annual average offered capacity. Will MISO include that season that does not have enough tight hours when calculating the annual number? If so, there may be double counting for that season of capacity credit penalties. Also, if a unit performs poorly in the summer season because, for example, the river water temperature is too warm that is being used to cool your plant requiring a derate, that derate should not extend into non-summer months. How does penalizing a unit in the fall for a summer issue correlate to a seasonal reliability objective?

Answer: The proposal's objective is to base Seasonal Accreditation on Seasonal Availability during tight, high risk hours. To the extent a season's tightest hours exceed the 25% Operating Margin threshold, such hours do not reflect high risk and will not be used as a basis for accreditation. For any season that lacks sufficient hours, set at 65 hours minimum, the accreditation will augment the deficient number of hours less than 65 for that resource with its Annual Average Offered Capacity (AAOC) over the tightest 3% of hours during the year, or 263 hours. While availability outside the season is not ideal, it is a reasonable approximation, just as annual UCAP is reasonable for the current Summer focused construct. To the extent any of the Seasonal RA Hours are also in the set of Annual RA Hours this would not statistically constitute double counting because the individual hours would be $1/65^{\text{th}}$ (1.538%) of the Resource Performance for any RA Hour but would only be $1/263^{\text{rd}}$ of the AAOC which itself would account for $1/65^{\text{th}}$ (0.006% combined) of the Resource Performance. Even in the unlikely event there were only 1 Seasonal RA Hour, that hour would only account for 1.913% of the Resource Performance, which is less than double counting (3.077%). Regardless it is reasonable and appropriate to include these hours in both cases as it represents seasonal and annual availability during high risk hours.

10/06 Question 4: Can MISO explain the logic behind class average SAC? SAC is heavily dependent on market participant behavior during the 3% tightest margin hours and is less dependent on generator type when compared to UCAP.

Answer: Utilizing a class average Seasonal Accredited Capacity is a reasonable approach to accrediting Resources with insufficient historical availability and offer data. It is consistent with how Resources are

accredited under the current rules based on class average forced outage rates. After one season the next time the resource is accredited for that season it will no longer require a class average.

10/06 Question 5: What is the basis for selecting the 25% operating margin for defining an RA hour?

Answer: MISO has evaluated the distribution of operating margin as illustrated in Figure 1 and Figure 2 of the Conceptual Design document presented at August 19, 2021 workshop. MISO found that the 25% threshold provides a good balance between having adequate number of RA hours and selecting the set of RA hours that are truly tight. 25% also captures the vast majority of declared MaxGens but more are missed at lower thresholds due to uncertainty in RT operations. If using 20% instead, we would exclude too many RA hours in seasons other than summer in multiple planning years and result in sample size of RA hours too small.

[Microsoft Word - Seasonal RA Conceptual Design - PublicFinal.docx \(misoenergy.org\)](#)

10/06 Question 6: What analysis has MISO completed to ensure that the high-load hours being evaluated for purposes of accrediting wind resources are aligned with periods of actual high risk on the MISO system?

Answer: the proposed seasonal wind accreditation methodology is merely to seasonalize the current annual wind accreditation methodology which allocates capacity credit based on each individual wind resource historical performance over the top eight daily peak demand hours. Further enhancements on wind accreditation will continue at the RASC after the RAN RA construct reform filing to enhance the further alignment between wind accreditation and its actual availability during times of need.

10/20 Question 7: Is MISO proposing any specific processes or measures to review an implemented RAN initiation. For example, will MISO assess unacceptable volatility issues for values like SAC, PRM, CIL/CEL, etc.? Volatility risk continues to be a primary concern for AE and other stakeholders. Such volatility issues have the potential to impact perceived accreditation fairness and reliability confidence / overbuild perception.

Answer: The design of Seasonal Accredited Capacity, averaging historical availability over 3 years, is intended to mitigate volatility. As presented in September 1 RASC meeting, in aggregate the proposal leads to very little volatility less than 2% at MISO footprint wide level, by design via use of the UCAP to SAC ratio. At the resource level there can be significant volatility, again by design, but it is tempered by continued use of the 3-year lookback period. If resources that aren't available when needed don't see reduced accreditation (and thus experience volatility) or if good performers don't see improved accreditation than our proposal is not achieving its explicit targeted outcome to improve incentives and align accreditation with the realized performance outcomes of resources during times of need.

10/20 Question 8: MISO's proposed SAC calculations are complex and not reasonable to independently produce by MPs. The SAC calculations are much more in-depth than the relatively straightforward UCAP, XEFORd calculations. Is MISO proposing any tools for MPs to tackle this transparency issue? Please explain and elaborate. AE recommends MISO commit to providing an online tool with actual data on all applicable resources to support SAC calculations.

Answer: MISO's MECT tool will contain all the relevant data needed for stakeholders to confirm their SAC values for all of their resources. Data will be available to stakeholders in the MECT tool prior to implementation for the 2023-2024 Planning Year.

10/20 Question 9: How often will SAC be lower than UCAP?

Answer: Based on the historical data, MISO has seen SAC values lower than UCAP for most resources although it is certainly possible that individual resources could see a SAC value exceed their UCAP value given the nature of how the two values are calculated. SAC is determined based 80% on RA hours in a given season and 20% on all other hours in that season across a three year period. UCAP is based on all hours across a three year period.

10/20 Question 10: If MISO reduces the setpoint for a resource during any hour, but particularly a Tier 2 RA hour, will the resource's accreditation be impacted or will it be exempt?

Answer: No, the Tier 2 accreditation is based on offered capacity, specifically the Emergency Maximum Limit of the resource. The accreditation is independent of MISO's dispatch or commitment instructions, to the extent a resource is available to participate in the market, assuming its start-notification time is 24 hours or less.

10/20 Question 11: MISO states the desired outcome of the current accreditation proposal is to "Increase confidence in capacity that MISO can count on" as well as that, "Utilizing offered availability, including actual performance during RA Hours provides an improved measure of expected availability." Has MISO done any analysis to show that the current proposal will meet this objective or improve overall system reliability? If not, DTE recommends that MISO review historic planning years using this new methodology to see if the capacity position expectation going into the planning year for SAC provides an improved picture of capacity MISO could count on during the tightest 3% of hours and MISO emergencies for that historic planning year.

Answer: The proposed reforms to MISO's Resource Adequacy Requirements will continue to set Planning Reserve Margins consistent with meeting the 1 day in 10 Loss of Load Standard. While the overall supply/demand balance is unchanged by the proposal the relative accreditation changes of resources will provide strong incentives to be available during times of need. Resources with increased accreditation will be more likely to remain designated for MISO's RAR and those with reduced accreditation will either work to improve their performance or consider whether they should continue to be committed for RAR going forward. Rerunning past auctions cannot demonstrate that committed resources would have been more available during times of need as the actual historical RT availability was not incentivized the way it would be in the future under MISO's proposal.

10/20 Question 12: The current proposed approach includes a target of 65 RA hours based on the number of hours based on the number of MaxGen hours, and hours where the operating margin was less than or equal to 25%. In addition to this, the MISO response to stakeholder concerns about using seasons with less than 65 hours(volatility of small sample) to define impacts on individual SAC values, was seeking to add more representative tight margin hours to get to target of 65 hours. The two means of "finding" the additional hours was to use a 12 hour startup threshold for including generation units that are not committed for the hour, and the inclusion of annual RA hours into the season using an average RA hour metric from the annual assessment of RA hours. This proposed approach results in

each season to have 65 hours. What is not being regarded, is that the initial seasonal measure of having less than 65 RA hours.

ii. Rather than having each hour being forced to have 65 hours using these two measures to “find” additional RA hours, there is a solid argument to be made that any season that doesn’t have 65 RA hours on its own measures for the season, should not be included in the seasons for assessing the impacts on generation unit SAC values. Removing these seasons is a way of more properly reflecting the de facto approach of using a seasonal metric of 65 RA hours per season. Using 65 RA hours as the threshold of defining if there are enough hours to indicate that the season has lower than desired reliability metric.

Answer: The proposal establishes a minimum number of RA Hours to ensure a sufficient sample exists as a basis for accreditation. To the extent a season falls short of the minimum number of RA Hours, any deficiencies are populated with a Resource’s Annual Average Offered Capacity. This method replaces missing or deficient hours with the Resource’s availability during other tight hours throughout the year. If one Season has 60 RA hours and another 65 it does not seem reasonable to only consider performance in the 65 RA hours of the one season and not consider at all the 60 hours in the other season just because the full 65 hour target was not met. Schedule 53 contains the provisions for defining the set of RA Hours and substitution with AAOC.

10/20 Question 13: Please provide the final annual and seasonal RA hour file for Planning Years 2018/19, 2019/20, 2020/21 using the methodology for selection that will be filed. We believe the last file provided was published prior to any changes made in August such as the use of a 12 hour lead time instead of a 24 hour lead time.

Answer: The final annual and seasonal RA hour file, which used a 12 hour lead time for offline units, have been post at the following location for the August 19, 2021 RAN RA Workshop.

<https://cdn.misoenergy.org/20210819%20RAN%20Workshop%20Hourly%20Operating%20Margin%20and%20RA%20hours581381.xlsx>

10/20 Question 14: What are the default SAC values that will be used for each class of thermal resource types?

Answer: Class average SAC values will be determined on MISO-system wide basis and be consistent with the current classes used for class average EFORd. Classes will be based on resource type and size.

10/20 Question 15: MISO has provided estimates of the SAC/UCAP generator variability, but LSEs need the SAC/UCAP system and zonal ratios that will be used for the calculation of the load obligation, based on expected resource mix transitions from the OMS survey or the RRA. Without guardrails on this ratio, it is impossible to create sensitivities within a resource plan for the next 20 years.

Answer: MISO appreciates the feedback received from stakeholders about the IMM’s proposal around a UCAP to SAC conversion ratio. Based on the supportive feedback, MISO is strongly considering adopting the IMM’s proposal. MISO will conduct some analysis and bring a formal recommendation and analysis to the November RASC.

10/20 Question 16: What data would be used to calculate the capacity accreditation for a historical non-capacity resource on an annual basis to a capacity resource for some seasons and a non-capacity

resource for other seasons? How does this change when only a portion of a unit's capacity cleared the annual construct?

Answer Revised 11/3: Section V of Schedule 53 describes how resources with insufficient historical performance data will be accredited. In this case accreditation would be based on class average. MISO proposal will not account for a partial clearing for a Resource for a Season, Accreditation will be based on offer volumes.

10/20 Question 17: MISO's SAC proposal results in higher supply excess than the current construct. With a vertical demand curve, all resources beyond the required demand are sent a retirement signal. As a result, more capacity resources are sent a retirement signal under MISO's SAC proposal. How does this result in improved reliability?

Answer: Aggregate excess reserve margins may increase but this is due to quantifying seasonal requirements and seasonal capabilities rather than using an annual approach and annual outage rates to meet summer peak. This reduced PRMR, especially outside summer, is a feature of the proposal which many stakeholders support. However, the proposed accreditation reforms match seasonal accreditation to seasonal capabilities to help ensure the resources committed in the seasonal auctions can be expected to be available when needed. Right now resources are expected (but not actually required) to offer in the DA energy markets during the summer but may take planned outages or derates for most of the year without impacting their accreditation so the higher annual PRMR applied all year does not translate into higher reliability as evidenced by >60% of MaxGens over the last 5+ years occurring outside of summer.

10/20 Question 18: If a single CP Node consists of multiple units (i.e. combined cycle unit with multiple CT and ST) how will accreditation be handled if each of the units has relatively short outages, but the overall period of time that one of the units is out exceeds 30 days?

Answer: The proposed capacity replacement tariff language refers to "full or partial Generator Planned Outages". Derates don't count as full outages for the unit but if a resource registers 400 ZRCs and then has 50 MWs on outage for >31 days it would accrue replacement obligations for just the ZRCs that are on planned outage > 31 days of the Season.

10/20 Question 19: When a Market Participant (MP) requested analysis of the impact of MISO's current proposal on their Resource Adequacy (RA) position, MISO provided a PDF with the results of applying a truncated version of their Seasonal Accredited Capacity (SAC) proposal to historical data. Using the spreadsheet provided with the 8/19 RAN Workshop materials to use that truncated method to calculate a resource's SAC, at least several MPs could not replicate the results with their data—nor could MISO explain the discrepancies in follow up meetings. Clearly MISO used input data to develop the results--could MPs please have it, and meet with MISO after having time to analyze it, so we truly understand the impacts of this new and untested RA approach? This would provide far more value than additional workshops.

Answer: MISO will provide example SAC calculations with all relevant raw data and formulas. MISO is also willing to have follow up meetings to ensure stakeholders are understanding the calculation and final SAC values.

10/20 Question 20: As we understand the proposal currently, exemptions are offered in three cases. If resources sufficiently schedule planned outages ahead of outage, if resources do not clear the auction or if resources have replacement ZRCs. While identified RA hours would remain same for all generators in specific sub-region, the RA hours used to calculate accreditation would be depending on when resources have exemptions. So each resource will have its own unique set of applicable RA hours for accreditation after accounting for exemptions.

Answer: Yes, that is what is specified in Schedule 53. The larger set of seasonal RA hours are determined by Planning Area (N/C & South separately) including MaxGens and the tightest 3% of hours with less than 25% operating margin needed to get to 65 hours. For specific resources, any RA Hours with a tier 2 exemption are removed from the calculations and the # of hours needed to get back to 65 hours are supplemented via the proposed AAOC methodology.

11/3 Question 21: Xcel Energy also requests more information regarding the transition of the seasonal GVTC cap on the RT Emergency Max hourly offer. The summer GVTC value is available but what source will MISO use to calculate the GVTC value for non-summer months for the first two years of implementation? What source was used in the data provided to MPs?

Answer: GVTC can vary seasonally and over time for the same season. It is the most recent seasonally-corrected GVTC values that MISO proposes to use to cap RT Emergency Maximum Limit offers in the Schedule 53 calculations as the past GVTC may no longer apply. GVTC values are due by October 31st and MISO plans to publish initial SAC values by December 15th in line with what it does for UCAP today. Market Participants will continue to conduct an annual GVTC test. MISO currently provides the historical date and time of the MISO coincident summer peak. MISO will provide historical coincident peak information for each of the four seasons. The single annual GVTC test will be corrected to each of the four seasonal peaks and the four seasonally corrected GVTC values will be submitted. For the values MISO has shared with stakeholders, the Net Dependable Capacity (NDC) entered in GADS was used as a proxy for the seasonal GVTC. For example, January NDC was used for winter, May NDC was used for spring, July NDC was used for summer, and September NDC was used for fall.

11/3 Question 22: How can resource adequacy be properly assessed when the historic levels of NSI are in the range of 10,000-12,000 MW (around 10% of hourly load) for multiple hours in the last two years?

- a. The observed impacts of NSI appear to be far too high to ignore and net out of the operating reserve calculation.
- b. There isn't any firm transmission or resource commitments that could allow assurance of this import being available in the future.
- c. How can an RA hour be assessed as being an actual tight hour, or an hour that is looking tighter than what is actually occurring due to the impacts of NSI?

Answer: As described in the MISO RA Conceptual Design document section 3.2.1.1 Hourly Operating Margin % Calculation, Net Scheduled Interchange (NSI) is captured implicitly in the Margin calculation.

Hourly Margin in MW is defined as equation (1):

$$\text{Margin (MW)} = \text{Total Offer} + \text{Net Scheduled Interchange} - \text{Load} - \text{Operating Reserve} \quad (1)$$

in which Load is calculated as equation (2):

$$\text{Load} = \text{Total Generation Injections} + \text{Net Scheduled Interchange}$$

(2)

where Total Generation Injections are generation schedules from the Unit Dispatch System (UDS)

Thus, the hourly Margin in MW can be calculated as outlined below

$$\text{Margin} = \text{Total Offer} - \text{Total Generation Injections} - \text{Reserve}$$

Net Scheduled Interchange is implicitly reflected in the margin calculation above but has no impact on the overall margin calculation used for RA hour identification.

11/3 Question 23: What data is used to create the RATIO UCAP/SAC ? (current Planning Year only or any earlier UCAP values used)

Answer: MISO adopted the IMM's conversion ratio presented at the October RASC. The UCAP/SAC Ratio values will be determined on a seasonal basis for the three historical years prior to the Planning Year, starting September 1 through August 31 prior to the start of the Planning Year per section V of Schedule 53.

11/3 Question 24: The adjusted zonal SAC MW has the potential to be higher than the ICAP MW. How can the accredited capacity for a generation unit be higher than its ICAP MW?

Answer: The final SAC value for a Resource may exceed its NRIS or ICAP, however, the must-offer obligation will never exceed the Installed Capacity of the Resource. Conceptually, Resources whose SAC value exceeds its Installed Capacity have demonstrated they are providing more value than other Resources with the same ICAP but lower SAC values.

11/3 Question 25: How is the newly derived zonal SAC MW accreditation used outside of the zonal capacity resource summary for the LSE?

Answer: The zonal SAC MWs will be used to meet Local Clearing Requirements similar to how UCAP MWs are used today.

11/3 Question 26: How does the proposed approach to scaling the SAC MW to UCAP on a MISO-wide basis for only thermal generation units avoid the issue of not being discriminatory?

Answer: The existing approach reduces the Planning Reserve Margin Requirement of each Load Serving Entity by the SAC/UCAP Ratio. This approach reduced the total PRMR volume procured in the auction, making the other non-thermal resources relatively more effective at meeting the auction requirements as their capacity has not been reduced. Adopting the IMM's recommendation and scaling thermal SAC values by the UCAP/SAC ratio eliminates this issue.

11/3 Question 27: If a MP does an upgrade to a unit that would increase their output/GVTC, how is that accounted for in the SAC calculation once the upgrade is completed? Is the MP not going to get full credit for their upgrade until 3 years after installation?

Answer: Uprates will be captured on an annual basis in the SAC values as RT Offers would be higher and the capping of the RT offers would use a higher GVTC value. Year over year the accredited value of the resource will increase until the third year which will fully account for the resource's upgrade.

11/3 Question 28: Will MP's continue to complete GVTC's on an annual basis and if so what will the GVTC data be used for?

Answer: Market Participants will continue to conduct an annual GVTC test. They will correct this value to the historical seasonal MISO coincident peaks. These four seasonal corrected GVTC values will be used in the seasonal LOLE studies to determine seasonal PRM and will be used to cap RT offers considered in Schedule 53.

11/3 Question 29: In the SAC calculation, recall time for a unit that is not online and not in an outage is 12 hours. If it takes 24 hours for the unit to get online and you are called to start, does the MP lose all credit for the event or just the 12 hours extra that it took them to get online and they will receive capacity credits once online?

Answer: To clarify, MISO will use a 12 hour start-notification time when determining Operating Margin for identifying RA Hours. MISO will use a 24 hour start-notification time to determine whether an offline Resource was available for an individual RA Hour and receive credit based on its offered capacity.

11/3 Question 30: Is it possible to have a SAC adjusted UCAP that is higher than the unit's ICAP if you had an overperforming unit?

Answer: The final SAC value for a Resource may exceed its NRIS or ICAP, however, the must-offer obligation will never exceed the Installed Capacity of the Resource. Conceptually, Resources whose SAC value exceeds its Installed Capacity have demonstrated they are providing more value than other Resources with the same ICAP but lower SAC values.

11/3 Question 31: In the SAC calculation example provided by MISO for the August 4, 2021 RASC meeting, MISO appears to be allowing for up to 24 hours of cold-start time. For example, according to the Step2 tab of the spreadsheet, column N: a unit that is offline (but not on outage) that will take 18 hours to start up is considered "available." At first glance, this seems to be inconsistent with the 12-hour cold-start time threshold that MISO is using for the operating margin calculation. Please explain this discrepancy.

Answer: MISO will use a 12 hour start-notification time when determining Operating Margin for identifying RA Hours. MISO will use a 24 hour start-notification time to determine whether an offline Resource was available for an individual RA Hour and receive credit based on its offered capacity. These two values do not necessarily need to be equal given their usage. The difference between the how RA Hours are determined and how Resources are accredited may have some impacts and will be monitored.

Please see slide 18 in MISO's August 19, 2021 Workshop presentation at
<https://cdn.misoenergy.org/20210819%20RAN%20Workshop%20Presentation581379.pdf>

11/3 Question 32: What process will MISO use to evaluate whether market participants are using the correct inputs to determine their accredited capacities under the SAC methodology?

Answer: MISO will provide the data for a specific resource as well as formulas in the determination of SAC. Stakeholders will be able to use this example to cross-reference any inputs that may differ from MISO's.

11/3 Question 33: What is the UCAP/SAC ratio for the 2019-2020 and 2020-2021 planning years?

Answer: MISO has adopted the recent IMM's proposal of a UCAP to SAC conversion ratio to convert individual thermal resource SAC values back to UCAP terms as presented in October RASC meeting. The table below summarizes the seasonal UCAP to SAC conversion ratio for the PY 21/22 based on the historical resource availability during a three-year time period from September 1, 2017 to August 31, 2020.

Season	System wide Ratio (UCAP/ISAC) thermal only
Summer	1.0680
Fall	1.1754
Winter	1.1310
Spring	1.1520

11/18 Question 34: Currently MISO is proposing that a unit that is offline but could be online within 24 hours would get credit during an RA hour based on the emergency max of that unit. Currently MidAmerican will offer in units that are in outage but can be recalled. For example, if a unit is undergoing a fire suppression inspection, the unit would be offered in as outage with a 1-hour recall, since we would just need to make sure the inspectors were in a safe location prior to starting the unit. If a unit is in an outage with a recall time of less than 24 hours, will MISO consider that unit as available for the purpose of determining accreditation during RA hours?

Answer: Only units in "economic" commit status are available for MISO to commit outside of an emergency. Market Participants should follow appropriate Transmission Provider directives, including conservative operations and Energy Emergency Alerts and Warnings, rules, regulations and business practices when conducting generator outages.

11/19 Question 35: MISO had indicated its inclination to adopt the IMM's proposal to increase conventional-resource accreditation by the UCAP/SAC factor. Please explain why MISO thinks it makes sense to increase conventional-resource accreditation, which is newly adjusted under MISO's proposal to account for some planned outages, but not accreditation of intermittent resources, which already reflects all planned outages. WPPI notes that our previous comments described how MISO could address this issue while retaining PRMR in UCAP terms.

Answer: The IMM's original recommendation and how it has informed MISO's proposal throughout is to try and keep the overall supply demand balance steady but to use the proposed changes to accreditation for "thermal" or what we now refer to as "Schedule 53" resources to accredit resources that are available when needed (during RA Hours) more highly than those that are not. Stakeholders and the IMM raised concerns that in practice the original approach to scale resources down by the amount of the decrease in accredited capacity had unintended consequences to the overall share of accreditation across resource types such as thermal, LMR and intermittent. The original approach was also cumbersome and hard to explain. MISO discussed the IMM's revised recommendation with stakeholders at the October RASC and received formal feedback that was primarily favorable to make the change to scale Schedule 53 resources so that their aggregate SAC was equal to their aggregate UCAP and avoid the unintentional changes to the relative accreditation for other resources and the requirements for LSEs. MISO does think that ELCC is somewhat aligned with an "availability-based" approach but discussions about further accreditation enhancements outside those that apply in Schedule 53 are planned for the RASC starting in early 2022.

11/18 Question 36: Thermal resources are the only generation resources whose UCAP would be affected by the Seasonal Accreditation proposal?

Answer: Primarily thermal but not just thermal. From the beginning of the new Schedule 53: "Seasonal Accredited Capacity (SAC) for a Capacity Resource that is a DRR or Generation Resource but not a Dispatchable Intermittent Resource, Intermittent Generation, Electric Storage Resource, or Use Limited Resource will be determined pursuant to this Schedule 53." And a new clarification in the redlines, we now refer to this collection of resources as "Schedule 53 Resources" to have a shorthand way to reference them. In addition, MISO proposes to move current accreditation methodologies for non-thermal resource to align with seasonal methods.

12/17 Question 37: At the last RASC, MISO mentioned they are proposing to limit generator RT Emergency Max offers to GVTC, could MISO provide the rationale for this requirement in an accreditation scheme based on historic availability?

- Also, how does this new limit help operationally?
 - Limiting a resource to its performance at MISO peaks is not a good representation of how the resource could perform throughout the season in non-peak conditions such as periods with lower ambient conditions. This will ultimately limit the amount of energy a unit could provide for MISO.

MISO Response: We have not proposed to limit actual RT Emergency Maximum Limit offers in the energy markets. For accreditation purposes only for Schedule 53 resources we propose capping the offers considered at the most recent seasonally corrected GVTC for each Season to reflect the current tested capacity of the unit which may change over time.

12/17 Question 38: With MISO deciding to adopt IMM's proposal for resource accreditation, we just want to confirm that as long as a resource's offer does not exceed its deliverability (sum of NRIS and incremental ERIS accompanied by firm transmission service) it will not have its total ZRCs be impacted for deliverability. Even in instances where the adjustment from SAC to UCAP may result in more ZRCs than their ICAP?

MISO Response: This is correct, see Schedule 53 which computes SAC, including conversion to UCAP terms without regard to interconnection service limitations. Also, Section 69A.4.5 contains the formulations for NRIS SAC and ERIS SAC calculations.

12/17 Question 39: Is the limitation to NRIS + Firm TSR calculation applied before or after the SAC is grossed back up to UCAP equivalent? It seems that using the gross-up method could further penalize generators without sufficient NRIS, especially when UCAP can be greater than ICAP by design of the calculation. So well-performing generators may not get all the benefit of converting UCAP>ICAP to ZRCs, which could defeat the purpose of using the gross-up method.

MISO Response: Schedule 53 computes SAC, including conversion to UCAP terms without regard to interconnection service limitations. Also, Section 69A.4.5 contains the formulations for NRIS SAC and ERIS SAC calculations.

12/17 Question 40: Considering that MISO seems OK with well-performing generators having UCAP>ICAP under the gross-up method, MISO should reconsider and eliminate its unnecessary provision in the hourly SAC calculation that limits any hourly offer to ICAP. If it is OK for UCAP to be greater than ICAP, then why can't any hourly offer value be greater than ICAP?

MISO Response: Resources with final Seasonal Accredited Capacity that exceeds ICAP is not a result of offers above ICAP but a result of the Resource's very high availability and performance especially during times of need such that it outperforms other Schedule 53 Resources. MISO does not agree that Resource offers above ICAP are appropriate as this value reflects contractual interconnection limits or physical performance limitations and therefore should not be considered in the Seasonal Accredited Capacity calculation.

12/17 Question 41: If MISO is able to run a system-wide UCAP/SAC ratio based on the SAC values of individual generation units, it is not understandable why generation owners are not able to get more than one CP node of the SAC values. Please provide SAC MW for each generation unit for generation owners so it will be more comprehensive of the capacity portfolio position for stakeholders.

MISO Response: MISO provided resource accreditation SAC values for all resources within each MP portfolio, MP level positions, and at least one CP node with detailed raw information for SAC calculation to illustrate how SAC is calculated upon request. Due to the large volume of data, currently MISO limits to one CP node for detailed raw information. In parallel, MISO is enhancing its MECT tool with the goal of providing needed transparency and all relevant data to calculate individual resource SAC values for each MP portfolio.

C. Must Offer Obligation/Capacity Replacement

10/06 Question 1: Duke asks if MISO can respond to DEI comments and include provisions in the calculations to address times when a generator is providing service to the system (online with positive net generation) but the offer is zero or otherwise less than the unit output, and/or the unit commit state is in outage (see Duke Energy Indiana Comments 7/21/2021)

Answer: The scenario describes a resource that is unscheduled or operating outside its limits. This should not be a frequent mode of operation and is inconsistent with MISO's Operating Procedures (SO-P-NOP-02). The Market Participant should take immediate action per operating procedures to address and alleviate this condition and therefore should not receive any special treatment regarding outage exemptions or resource accreditation under the proposed rules.

10/06 Question 2: Duke asks if MISO can clarify how it will treat intra-hour changes to unit offers for purposes of accreditation (i.e., use the offer at the start of the hour, the end of the hour, the average across the hour, the highest value within the hour, the lowest value within the hour, etc.) (see Duke Energy Indiana Comments 8/23/2021)

Answer: MISO's proposed tariff language specifies the **Hourly Emergency Maximum Limit** (Defined in Module A of the Tariff as: The maximum MW level at which a Generation Resource, an External Asynchronous Resource, Demand Response Resource Type II, or Stored Energy Resource – Type II may operate under Emergency conditions that may be submitted to override the default value submitted during the asset registration process.). The details around when and how this value will be determined for purposes of the Seasonal Accredited Capacity have not been developed and will be specified during detailed system design.

10/06 Question 3: MidAmerican's current understanding is that if a unit has a planned outage longer than 30 days within a season, the unit will be able to participate in that season's auction but must replace the capacity for any day longer than 30 days with another resource or will face a financial non-compliance charge for failing to replace the ZRCs. Can the replacement occur at anytime meaning if the unit has a 32-day outage could you replace the 2 days in the middle of the outage? Can another unit that has a 14-day outage in the middle of the 32-day outage be used to replace the ZRCs for those 2 days? Can it be during that other unit's 14-day outage or does it have to be when the unit is not in a planned outage? What if it is a forced outage? Can the unit that has the 32-day outage be used for replacement for any time during it's 32-day outage except for the 2 days?

Answer: MISO recently removed tariff language prohibiting the participation of resources in the Planning Resource Auction based on a Planned Outage duration threshold, like 30 days. Replacement capacity has a must offer requirement which must be satisfied through market available or must run offers such that the number of Planned Outage Calendar Days does not exceed 31 Days for the original and replacement resource. That said, a resource could be replaced at any time and does not need wait until it is over the replacement threshold. If the replacement resource were also on a Planned Outage those days would still count against the 31 day replacement threshold. After further discussions with the IMM, MISO intends to add language to Module D that will address Resources with Planned Outages greater than 31 Days and participation in the annual Planning Resource Auction.

10/20 Question 4: What recourse does a resource owner have if a resource needs an outage lasting over 30 days and no capacity is available to buy for replacement?

Answer: Only Generator Planned Outages count towards the >31 day capacity replacement requirement. If an outage that was planned is extended unexpectedly due to unplanned circumstances it may be more appropriate to submit the extension in CROW as a new outage not coded as planned that wouldn't count toward the >31 day tolerance band but would not be exempt from consideration in accreditation calculations. To the extent a Market Participant is unable to replace the ZRCs, that Capacity Replacement Non-Compliance Charge would be assessed.

10/20 Question 5: If an LMR is [Disqualified] for non-performance, are you forced to replace that capacity in addition to forfeiting remaining PRA payment? If so, for only that season or whole remaining planning year?

Answer: LMR non-performance provisions have been adjusted to conform to seasonal requirements, however, replacement provisions have not been added.

10/20 Question 6: When a resource utilizes replacement ZRCs to cover a planned outage greater than 30 days, does MISO have a process to make sure that the resource used for replacement ZRCs does not have any overlapping outages?

Answer: Compliance with this provision is the Market Participant's responsibility. The original Market Participant is responsible for ensuring the replacement ZRCs do not have or subsequently schedule Planned Outages that exceed the 31 day tolerance.

10/20 Question 7: Say have resource (R1) that will be in outage first 45 days of season and use another resource (R2) for ZRC replacement that is going to have 29 day outage in second month. In this instance, original resource (R1) needs 15 days of replacement coverage but the replacement unit (R2) will also be in outage overlapping those 15 days. Does MISO have visibility into seeing these overlapping outages? Will MISO deny the resource (R2) from being used as replacement? Which resource is responsible for making sure there are no overlapping outages?

Answer: The Market Participant with the originally committed resource is responsible for replacing ZRCs and responsible if additional planned outages from the replacement lead to additional days above the 31-day tolerance band. MISO tracks compliance with the must offer obligations after the fact and we will be able to combine the outages from the original resource and its replacement to determine any capacity replacement obligations or related non-compliance charges.

11/3 Question 8: The current BPM provides that ZRC replacement for Retirement/Suspension must occur at least 7 days prior to Retirement/Suspension. What are the timing requirements for replacement associated with planned outages exceeding 31 days?

Answer: This type of detailed process specifications is appropriately established in the BPMs and will be developed ahead of the 2023-2024 Planning Year implementation.

11/3 Question 9: What criteria will the IMM use to evaluate requests to forego participation in the seasonal PRAs? Is there a request queue?

Answer: Modifications to 64.1.1 of Module D establish a process for Market Participants with outages of 31 days or more in a season to provide documentation to the IMM and, upon acceptance from the IMM, forego participation in the PRA without being deemed to have engaged in Physical Withholding. Such requests will be evaluated and responded to on a first come first served basis and a deadline prior

to the opening of the auction window will be established if deemed necessary as part of implementation.

11/3 Question10: Per MISO's new proposal of allowing resources to forego offering resource's ZRCs if expected outage >31 days and reducing the economic withholding conduct threshold to ~\$25/MW-day, we believe these will ultimately limit market participants' freedom to offering into the auction in a manner befitting their circumstances. At the last RASC meeting though there were no assurances provided that the IMM would allow resources to either forego offering or adjusting their market offer to account for the non-compliance charge penalty (or include cost to replace in their offer). We find the need to involve the IMM simply to manage ZRC replacement risk very problematic.

For example:

If a resource has a 45 day outage, per the new rules they will face a non-compliance charge for 14 days (45-31). The options left to this resource are:

1. Replace
 - a. Due to the complexity to replace this would not be a desired avenue to pursue for most MPs.
 2. Modify Offer Price to account for Non-Compliance charge or costs to replace
 - a. This would likely be the desired approach by MPs. However, with the economic threshold limited to \$25/MW-day this would require MPs to request IMM approval of their new reference level.
 - i. As it stands, if a resource tries to account for Non-Compliance charge in market offer, any outage greater than 9 days would be subject to IMM approval, if adjusting one's market offer
 1. $\$90,000 \text{ (approx. annual Cone) / 365 days in year} = \text{\~\$250/MW-day}$
 2. $\$250/\text{MW-day} * 9 \text{ day outage / 90 days in season (to adjust to market offer of season)} = \$25/\text{MW-day}$
 - ii. What assurances do MPs have that the IMM would allow MPs to account for costs to replace or Non-compliance charges within their auction offer?
 - iii. Why can't MISO simply modify the tariff to create a presumption that a capacity offer may reflect expected Non-compliance charges consistent with planned outage days scheduled at the time of the auction?
 3. Choose not to participate in the season where resource is in outage >31 days
 - a. In this instance once again, MP would need IMM approval and is not guaranteed that IMM would allow. It seems that IMM may be pretty strict on the justification of the outage. Therefore, per the discussion at the last RASC it sounds unlikely that IMM would approve a resource to forego offering.
 - b. What assurances do MPs have that IMM will allow them to forego offering? In what instances will IMM deem the outage unjustified and deny the request?

As it stands, it seems resources will be forced to either replace or coordinate with IMM who may or may not approve any measures MPs try to use to mitigate the financial impacts of clearing. This will significantly constraint resource owners' choices in offering into the auction, and will give the IMM both more work and more involvement in deciding how and which resources are offered into the auction. We see this as an undesirable outcome. We note that we have suggested an alternative – allowing resource owners a fourth option of converting only a portion of capacity to ZRCs—which would address these problems, but MISO has declined to consider this proposal.

Answer: A Resource contemplating a Generator Planned Outage in excess of 31 days can request approval from the IMM prior to the PRA for exclusion from physical withholding market mitigation measures, and if approved, not offer the Resource. If such a request is approved, the IMM has indicated a Resource could still offer at its discretion and at that point that it would be able to offer the excluded portion of the resource at any price up to the offer cap without the need to get a facility specific

Reference Level. MISO has added the IMM's recommended provisions in section 64.1.1.g.xi of Module D.

11/3 Question 11: More explanation and clarity on whether replacement costs can be included in the offer price of a generation resource that will be in a planned outage for more than 30 days in a season.

Answer: The IMM stated at the October 2021 RASC that the IMM will not support or accept expected replacement or non-compliance charges in setting resource reference levels for ZRC Offers.

11/18 Question 12: Could MISO provide examples for when a resources will face a capacity replacement non-compliance charge for planned outages > 31 days? It is still unclear to some where certain thresholds of notification time before outage occurs will make one possibly face the capacity replacement non-compliance charge. Some examples are mentioned below:

1. If only learn that an outage >31 days was to occur 7 days before start of the season that the outage occurs, will you face the capacity replacement non-compliance charge?
 1. What about <48 hours before season starts?
 - 2.

Answer: Planned outages are discretionary by definition, just because they come up on short notice doesn't change that ZRCs needed to meet seasonal PRMR are unavailable >31 days of a Season which would require replacement or payment of the non-compliance charge for any days beyond the 31 day threshold. Any Generator Planned Outage that exceeds 31 days within a Season will require replacement or face non-compliance charges regardless of when the outage was scheduled.

11/18 Question 13: While we understand in the BPM-008 generators should "notify MISO immediately prior to the outage" but with the potential financial implications, it seems advantageous for a generator to take an accreditation hit by listing the outage as forced over letting MISO know right away and scheduling it as a planned outage thus having to pay the capacity replacement non-compliance charge. Therefore, this proposal incentivizes resources to limit notifying MISO of potential outages till the last minute.

1. How much visibility does MISO possess to make sure that resources did not delay notifying MISO of the potential outage?

Answer: The IMM is tasked with monitoring and mitigating physical and economic withholding per the provisions of Module D and can investigate to enhance its visibility into a resource's submission of planned and forced outages. While days on forced outage don't count towards the 31 day threshold (unless known or expected to be forced out prior to the PRA) the resource claiming a forced outage would still take the hit to future accreditation since forced outage impact resource accreditation including for committed resources in the Schedule 53 accreditation calculations.

11/18 Question 14: If there should be any additional changes to Module D to allow for varying offers (to account for replacement costs or capacity replacement non-compliance charge in the offer price) and economic resource suspensions.

Answer: The IMM has stated that capacity replacement non-compliance charges should not be included in facility-specific Reference Levels. However, a Market Participant with a Resource expecting an outage >31 days in a Season can ask the IMM prior to the auction to allow it to forego offering excess ZRCs from

the Resources. Tariff language to effectuate this mechanism has been redlined Module D and posted with RASC meeting materials.

12/17 Question 15: In instances where a generator has been granted permission to not participate in the capacity market for a specific season, MISO suggested that this information may not be available to all MPs. In regions that are tighter and lack surplus capacity, this could create instances where a MP may have insider knowledge that a specific zone may clear close to CONE, while the other MPs in the zone would be unaware. Does MISO see any issues with this uneven distribution of market knowledge and how it may impact MPs in that specific zone?

MISO Response: Under the currently effective tariff, Resources can and have been allowed to forego participation in the Planning Resource Auction due to planned outages, forced outages, or other conditions specified in Module D. The addition of the Planned Outage provisions in Module D does not introduce a new issue, or does a Market Participant's knowledge of its own portfolio introduce an unfair advantage.

12/17 Question 16: Reference MISO's response to Duke Energy's question regarding times when a generator is on line, but registering no offer or an outage commit state (10/06 Question 1 in the document "20211103 RASC Item 04a Resource Adequacy Reforms Q and A Document"). MISO's response does not seem to address the issue. Yet, in MISO's latest example calculation file ("20211103 RASC Item 04a Step by Step SAC Calculation Example"), data is provided in column J, the outage state, and column K, the on-line state, that appears to prove Duke Energy's point. Filtering the columns to show 1-1 groupings, indicating the unit is in a state of outage but in-service, reveals 156 hours in that condition. That, despite MISO's claims that such condition "should not be a frequent mode of operation and is inconsistent with MISO's Operating Procedures". MISO should reassess its position on this issue by looking at this data, which clearly shows such operating condition is more prevalent. MISO should alter the hourly SAC calculation per Duke Energy's recommendation to use, at a minimum, the actual net generation output of the generator for the hour, in such conditions that the offer is zero and/or the unit is in an outage commit state, even though the unit is on line. This will provide proper credit due for actual service to the system in such conditions when an offer may not have been available, for whatever reason.

MISO Response: MISO acknowledges the issue identified by Duke Energy and will address this issue in final implementation phase. Nonetheless, the 156 hours with potential discrepancy between the "Outage" and "Online" status only accounts for 0.6% of hours over three-year analysis period. If taking out the 156 hours in question, there is an average of 2MW impact to the "20211103 RASC Item 04a Step by Step SAC Calculation Example", which is not significant.

WEIGHTED ISAC by SEASON with outage exemption	Season	ISAC (CY17to20)	ISAC (CY17to20) taking out 156 hours	Conversion Ratio UCAP / ISAC CY17to20	Season	CY17to20 UCAP		Change (MW)
						SAC (CY17to20)	taking out 156 hours	
fall	436	441		1.1754	fall	512	518	6
winter	351	353		1.131	winter	397	399	2
spring	221	222		1.152	spring	255	256	1
summer	449	450		1.068	summer	479	480	1
							Average	2

12/17 Question 17: Stakeholders request further clarification on how the unit that experienced the catastrophic outage would be handled in future accreditations. Would it be similar as a new unit and have the peer group average for the first year? And then the offers there after?

MISO Response: MISO made minor enhancements to its proposal and added Catastrophic Generator Outage provision in Schedule 53 section VI to allow resources on a Catastrophic Generator Outage during a season they are designated for RAR to elect to use a SAC based Class Average SAC to ICAP ratio for its resource type if it obtains replacement capacity and successfully returns from the Catastrophic Generator Outage. Once it has at least 60 days of historical performance data for each season, it will be accredited based on its offers instead of using a class average.

D. Planned Outages

10/20 Question 1: MISO's current planned outage proposal utilizes a three-tier approach that is favorable for Tier 1 hours and restrictive for Tier 2 hours. Please explain why all approved planned outages are not exempt for all hours when maintenance margin is greater than zero. Please explain why MISO does not deny outage requests when maintenance margin is below zero.

Answer: For resources to receive a full exemption, they should be both timely (120 days or more in advance) and that the duration of the outage not overlap with days where Maintenance Margin would be negative if the outage were taken. When both conditions are not met however, MISO believes that Resources need to be incentivized to be available during RA Hours that might arise and that future accreditation should consider their performance during Tier 2 hours. To the extent both conditions cannot be met, the proposal incentivizes Resources to either; schedule timely or scheduled entirely during positive Maintenance Margin by providing the Tier 1 exemption to better coordinate generator planned outages. On the last item, MISO does not have the authority under the tariff to deny generator outages based on the potential for capacity emergencies.

10/20 Question 2: Will MISO exclude historic planned outages that occur prior to the date MISO files its proposed tariff changes from the dataset used to calculate the initial PY23/24 SAC values? If not, what is MISO's justification for applying new capacity accreditation requirements retroactively?

Answer: In the Conceptual Design Document, RASC presentations and in the proposed tariff redlines we've proposed that we'd use the RAN Phase 1 outage exemption rules for historic planned outages prior to the date we file. The proposed Schedule 53 specifies that outages that start prior to 9/1/2022 would be treated as fully exempt outages (tier 1&2) based on the RAN Phase 1 rules found in section 38.2.5.g. ix of Module C and that the new rules specified in section VI of Schedule 53 would be in effect for planned outages that start on or after 9/1/2022. MISO has been communicating the importance of coordinated outage scheduling since at least 2018 when the RAN Phase 1 proposal was crafted with stakeholders and every planned outage starting since June 2019 has been coded in our systems as being exempt or not based on the rules laid out in Module C. Stakeholders have asked for us to recognize and exempt planned outages and we have accommodated that request via our proposal and the transition described above.

11/3 Question 3: The CROW is a tool designed for operations rather than accreditation. How will MISO and IMM ensure that the CROW is not used to "hoard" maintenance margin?

Answer: MISO put in place protections in RAN Phase1 and has not seen behavior from that would indicate the need for tighter restrictions at this time. MISO will monitor and validate the implementation of the RA Construct and if there are undesirable unintended consequences, MISO will work with stakeholders to remedy the situation.

Below are portions of the Tariff and BPM which highlight policies already in places to prevent "hoarding":

- Submitting planned outages for longer duration
 - The date the outage change request received will reset or establish a new outage request queue position. Exemption will be evaluated off of the new queue position date. There is a 20% provision for shortening of outage. exemption will remain for a submitted outage if the submitted change request start and end dates remain within 20% of the originally scheduled outage window. BPM-008 Section 4.8.2
- Greater frequency than truly required in order to achieve exemption
 - No outage in the previous 120 days. BPM-008 Section 4.1. This limits generator(s) that had an outage in CROW with end date within 120 days of the start of specific units from being able to obtain exemption status. Current process Outage Coordination would evaluate and it was eligible for exemption. New Tiered construct it will still be evaluated for exemption, but would not be eligible for Tier 2 tight RA hour exemption.

11/3 Question 4: Due to the importance of outage exemptions and the requirement to provide 120 day notice to get an exemption, is MISO considering maximum number of days to respond to the MP's request? If not, how will MISO work with MP's to ensure they are getting proper reliability work done without exemptions if the outage is denied with short notice?

Answer: To qualify for a Tier 2 outage exemption there are two variables which factor into an approval. As long as the request is submitted at least 120 days from the start of the outage and the Maintenance Margin (MM) is positive for the duration of the outage. MM is a forward-looking tool that an MP can access and see the day they submit an outage. As long as the request meets those two qualifications at the time of the submission, stakeholders can rest assured the Tier 2 exemption will be approved.

11/3 Question 5: How will MISO determine retrospectively, for those years that predate the start of this new construct, whether a Tier 2 outage exemption applies or not?

Answer: See Section D, 10/20 Question 2. In the Conceptual Design Document, RASC presentations and in the proposed tariff redlines we've proposed that we'd use the RAN Phase 1 outage exemption rules for historic planned outages prior to the date we file. The proposed Schedule 53 specifies that outages that start prior to 9/1/2022 would be treated as fully exempt outages (tier 1&2) based on the RAN Phase 1 rules found in section 38.2.5.g. ix of Module C and that the new rules specified in section VI of Schedule 53 would be in effect for planned outages that start on or after 9/1/2022. MISO has been communicating the importance of coordinated outage scheduling since at least 2018 when the RAN Phase 1 proposal was crafted with stakeholders and every planned outage starting since June 2019 has been coded in our systems as being exempt or not based on the rules laid out in Module C.

Stakeholders have asked for us to recognize and exempt planned outages and we have accommodated that request via our proposal and the transition described above.

11/18 Question 6: We have outages already in CROW for 2023 and there is no exemption flag on those CROW outages. Does MISO know if they are exempt? How do I know if they are exempt?

Answer: Under the proposed exemption rules effective for outages beginning after September 1, 2022 planned outages scheduled for 2023 are >120 days in advance and will be fully exempt if there is positive Maintenance Margin (MM) during the duration of the outage provided that there isn't another outage submitted that ends <120 days from the start of that outage. Please consult the Maintenance Margin data files posted to [OASIS](#) for the day the outage was submitted and refer to the region in which the resource is located to see if there is sufficient MM to accommodate your planned outage. Please note, MM was implemented in 2013 and resource owners and operators are strongly encouraged to refer to it when scheduling their outages. RAN Phase 1 enhancements to Outage Coordination that became effective in the middle of 2019 rely on use of the MM tool and rules laid out in section 38.2.5.g.x of Module C of the tariff.

11/18 Question 7: We understand the current MISO rules to not allow generators to take Generator Planned Outages for other than “inspection, maintenance or repair,” thus precluding economic resource suspensions. This appears necessary in today’s resource-adequacy construct in which planned outages do not affect accreditation. At the October 20 workshop MISO suggested that, in MISO’s proposed construct, generators seeking to take economic suspensions would enter planned outages, while MISO’s IMM indicated that they would, instead, simply reflect their costs in their capacity offers. We request that MISO describe specifically how, under MISO’s proposed revised construct, a resource owner would implement an economic suspension and that MISO obtain the IMM’s concurrence on this approach. To the extent that this involves entering a Generator Planned Outage, we request that MISO’s response include specific outage parameters to be entered into CROW, and that MISO obtain the IMM’s concurrence on this approach.

Answer: If a Resource does not clear the PRA it does not have a must offer requirement with MISO for that period and it is free to offer (or not) the unit in line with applicable regulatory rules and good utility practice. A resource that does not plan to operate can adjust its notification and start up time along with other reference levels with the IMM to reflect that it will be offline with limited ability to make itself available in the energy markets. It is not necessary to enter an outage. Ideally, Resources will offer their relevant costs into the seasonal auctions of the PRA and then plan their outages and adjust their availability based on whether they cleared the auction. Schedule 53 specifically excludes offer data from its calculations when a Resource is not designated for Resource Adequacy Requirements, so the Resource’s lack of offers won’t impact future accreditation. Finally, a Resource can submit a Planned Generator Outage for >31 days in a Season and prior to the PRA request the IMM to determine if the Market Participant can forego offering excess ZRCs from a Resource into the PRA for that Season.

11/18 Question 8: At the October 20 workshop MISO suggested that an extension of a planned outage where the extension would put total length of the outage beyond 31 days, that this would not necessarily trigger a capacity replacement non-compliance charge to the extent that the extension might be entered into CROW as something other than a planned outage. To ensure that all stakeholders have a common understanding of the consequences of an outage extension, we request that MISO specify the criteria that would allow an outage extension to not trigger a capacity replacement non-compliance charge.

Answer: The capacity replacement obligation for >31 days applies primarily to Generator Planned Outages. Days with forced or other unplanned outages are not added to the total of days of planned outages relevant to the capacity replacement requirement.

11/18 Question 9: In response to a question from MidAmerican Energy at the October 20 Workshop, MISO indicated that scheduling a generator outage in multiple contiguous pieces to isolate periods of below-threshold Maintenance Margin would be treated by MISO as multiple distinct outages, only one of which could qualify for exemption if within 120 days of one another. Isn't the length of the outage what is significant for resource adequacy, rather than the number of pieces it is scheduled in, and shouldn't MISO's accreditation scheme reflect the material aspect of outages rather than arbitrarily base accreditation on an aspect not meaningful for resource adequacy?

Answer: Exemptions have to be limited to be meaningful. If all planned outages are exempt then there is no incentive to coordinate the outage sufficiently. In response to stakeholder feedback, MISO built off of RAN Phase 1 when developing a proposal to exempt certain outages under our revised accreditation proposal. The exemption rules in place since 2019 consider whether an outage is submitted 120 days or more in advance, whether MM is positive for the duration of the outage and whether the outage is not scheduled to start <120 days from the end of a previous outage.

11/18 Question 10: In CROW the outage priority typically falls under one of four categories based on lead time required: forced, emergency, urgent and planned. This differs from definitions in RA construct of either forced or planned, can MISO provide which outage priority fit in either Forced or Planned?

Answer: CROW outage priorities "forced", "urgent" and "emergency" fit in what is referred to as unplanned and the priority "planned" fits in what is considered planned.

11/18 Question 11: How will derates be handled in exemption process? It is our understanding derates are automatically accepted and not reviewed. How will MISO implement a system to allow exemptions for derates?

Answer: MISO does not currently exempt derates under RAN Phase 1 nor have they been proposed as exempt in the RA Construct proposal. Derates being included in the exemption process could be considered as a future enhancement.

12/17 Question 12: Under Question 1 of Planned Outages of the Q&A document presented at MISO RASC,

a. 10/20 Q1 - MISO's current planned outage proposal utilizes a three-tier approach that is favorable for Tier 1 hours and restrictive for Tier 2 hours. Please explain why all approved planned outages are not exempt for all hours when maintenance margin is greater than zero.

MISO Response: For resources to receive a full exemption, they should be both timely (120 days or more in advance) and that the duration of the outage not overlap with days where Maintenance Margin would be negative if the outage were taken. When both conditions are not met however, MISO believes that Resources need to be incentivized to be available during RA Hours that might arise and that future accreditation should consider their performance during Tier 2 hours. To the extent both conditions cannot be met, the proposal incentivizes Resources to either; schedule timely or scheduled entirely

during positive Maintenance Margin by providing the Tier 1 exemption to better coordinate generator planned outages.

b. Background for Minnesota Power's follow-up question – From Minnesota Power's perspective Question 1 was not answered. What is the basis for requiring that planned outages be made 120 days ahead to be allowed for Tier 2 exemption? Pushing all scheduled outages into the required timeframe of 120 days ahead of time will likely create an artificial congestion of planning outages in this timeframe, when there isn't any defined basis for establishing 120 days as being "well planned" or to "be incentivized to be available during RA hours."

i. So we ask the question again – "Please explain why all approved planned outages are not exempt for all hours when maintenance margin is greater than zero."

MISO Response: Maintenance Margin (MM) is just a forecast of room for outages that is made up to 3 years in advance. We don't know what the actual supply or demand picture will look like but MM builds in a buffer equal to the Planning Reserve Margin to account for uncertainty. We have had MaxGens driven largely by factors other than planned outages where we still had positive MM but needed every MW to serve load in actual operations. Positive MM indicates there should be room for the outage but the timeliness factor allows us to prepare for tightness in the upcoming season by knowing many of the planned outages in advance. If a resource wants to take a short notice outage and there is +MM they can do so and not have their accreditation impacted unless it turns out that we have an RA Hour during their outage in which case we needed them and their accreditation should reflect they weren't available.

E. Non-thermal Resource Accreditation

10/06 Question 1: Can the total of the seasonal LMR calls actually be greater than the annual requirement? Seasonal add up to 16, while annual is only 10.

Answer: The annual requirement of a minimum of 10 calls is only applied for the 2022/2023 Planning Year. Beginning in the 2023/2024 Planning Year, seasonal requirements will be applicable for each season, five for summer, five for winter, three for spring, and three for fall, and there will be no annual count or requirement.

10/06 Question 2: For Hourly Margin calculation, which is utilized to determine RA hours, MISO states that "Load Modifying Resource (LMR), and Emergency Demand Response (EDR) are excluded in the Online margin (MW) and Offline margin (MW) calculations." Can MISO clarify why it makes sense to ignore resources that were accredited in the PRA when determining the tightest 3% of hours in a season? LMR and EDR resources have accounted for approximately 5.5% of cleared capacity in the PRA for the past 3 planning years and should be considered when determining tight margin hours. (operating margin)

Answer: LMRs were excluded from the Operating Margin Calculation to best reflect the Operator's view of available capacity ahead of emergency declarations. Excluding LMRs also simplified establishing the Maximum Margin Threshold as LMR availability can vary throughout the year and season. Excluding LMRs provides a consistent measure as to how close the system is to capacity shortage emergencies, independent of the offered and actual availability of LMRs.

10/06 Question 3: Where does MISO intend to memorialize the methodology in written form for calculating wind and solar accreditation as summarized on slide 3 of this presentation? Is it roughly based on the methodology laid out in

<https://cdn.misoenergy.org/2021%20Wind%20&%20Solar%20Capacity%20Credit%20Report503411.pdf>?

Answer: The detailed wind and solar accreditation methodologies will be memorialized in the MISO Resource Adequacy Business Practices Manual. Wind resources will be based on seasonal Effective Load Carrying Capability (ELCC) with capacity credits allocated based on each individual wind resource historical performance over eight peak demand hours per season. Solar resources will be accredited based on three-year historical availability during hours 15,16, and 17 EST for spring, summer and fall months and during hours 8,9,19 and 20 EST for the winter months. The link documents wind and solar accreditation methodology under current annual summer focused construct.

10/06 Question 4: Please explain why it is optimal from a risk management perspective to use the following hours for evaluating historic availability for solar resources: Hours 15,16,17 ET for Spring-Fall; Hours 8, 9, 19, 20 ET for Winter. Please provide analysis showing that these hours are the appropriate hours of actual high risk to evaluate the accreditation for solar resources for each season.

Answer: Consistent with existing solar accreditation methodology based on peak load hours under current annual summer focused construct, the selected set of hours represent the typical seasonal peak demand hours which tend to be high risk hours for each season. The table below illustrate the monthly peak demand hours for the past five calendar years.

	2016	2017	2018	2019	2020
1	10	19	9	20	9
2	10	20	9	10	9
3	22	8	9	9	9
4	15	18	8	8	18
5	17	17	16	16	17
6	17	16	17	17	17
7	17	17	17	16	15
8	17	17	16	17	17
9	18	16	16	17	16
10	17	16	17	16	17
11	10	19	20	9	20
12	10	20	9	9	19

Further enhancements on solar accreditation will continue at the RASC after the RAN RA construct reform filing to evaluate ELCC or similar availability-based accreditation approaches.

10/20 Question 5: How to transition from an annual to seasonal construct to a seasonal construct for non thermal resources?

Answer: MISO proposes to align non-thermal resource accreditation with seasonal method by seasonalizing the current existing annual accreditation methodologies, as described in the August RASC meeting presentation and the RA construct conceptual design documentation via the link below:

[RAN Reliability Requirements and Sub-annual Construct \(misoenergy.org\)](#)

[20210901 RASC Item 03 Seasonal RA Conceptual Design585538.pdf \(misoenergy.org\)](#)

For example, wind resources will be accredited based on seasonal Effective Load Carrying Capability (ELCC) study with capacity credits allocated based on each individual wind resource historical performance over eight peak demand hours per season.

Further enhancements on non-thermal resource accreditation, including intermittent and Load Modifying Resources, will continue at the RASC after the RAN RA construct reform filing to enhance further alignment between non-thermal resource accreditation and their actual availability during times of need.

10/20 Question 6: With the observed impacts of having higher levels of wind dispatched and being unexpectedly not available driving the occurrence of RA hours, what is the basis for not including wind and solar resource availability assessment in the proposed construct?

Answer: As described in MISO's response to Question 20, MISO proposes to align wind and solar resource accreditation to seasonal method, reflecting wind and solar resource availability during typical seasonal peak demand hours that tend to be high risk hours for each season. Wind resources will be based on seasonal Effective Load Carrying Capability (ELCC) analysis with capacity credits allocated based on each individual wind resource historical performance over eight peak demand hours per season. Solar resources will be accredited based on three-year historical availability during hours 15,16, and 17 EST for spring, summer and fall months and during hours 8,9,19 and 20 EST for the winter months.

Further enhancements on wind and solar accreditation will continue at the RASC after the RAN RA construct reform filing to further align wind and solar resource accreditation with their actual availability during times of need.

10/20 Question 7: How will an expected subsequence filing including wind and solar be able to properly "merge" into the implementation of the currently proposed approach when the history of RA hours and impacts on individual generation unit SAC values have been created without wind and solar in the methodology?

- i. The history of creating RA hours will likely include the wind/solar resources as a driver to the RA occurrence. This is the time to get it more correct by looking at the availability of all resources during RA hours.

Answer: The Resource Adequacy (RA) hours are defined based on historical declared MaxGen alert, warning, and event hours supplemented by the tightest 3 percent of operating margin hours per season, which captures the impact of historical performance of both thermal and non-thermal resources, including solar and wind. In addition, the proposed seasonal wind/solar accreditation as described in the miso response to Question 28 reflects historical intermittent resource availability during typical seasonal peak demand hours that tend to be high risk hours for each season, followed by further enhancements post filing.

11/3 Question 8: Why isn't the performance-based accreditation proposal applied to all resources, including wind and solar? Shouldn't wind and solar receive credit for their contribution to availability during Tier 1 and Tier 2 hours?

Answer: Under current RA construct reform proposal, MISO will align wind and solar resource accreditation to the seasonal periods, reflecting wind and solar resource performance during typical seasonal peak demand hours that tend to be high risk hours for each season. Wind resources will be based on seasonal Effective Load Carrying Capability (ELCC) analysis with capacity credits allocated based on each individual wind resource historical performance over eight peak demand hours per season. Solar resources will be accredited based on three-year historical availability during hours 15,16, and 17 EST for spring, summer and fall months and during hours 8,9,19 and 20 EST for the winter months.

Following the filing of the current reforms, MISO will initiate further accreditation reforms for non-thermal resources, including wind, solar, and LMR accreditation will continue at the RASC to further align the accreditation of these resources with their actual availability and performance during times of need.

11/18 Question 9: Wind UCAP will continue to be based on ELCC?

Answer: Yes, wind accreditation will continue to be based on ELCC but it will be based on seasonal ELCC in the proposal we plan on filing this year. MISO plans to evaluate the IMM's recommended ELCC methodology along with other potential accreditation solutions for wind and other non "Schedule 53" resources with stakeholders at the RASC in Q1 2022.

11/18 Question 10: Solar UCAP will be initially based on class average 50% ELCC and continue to be based on 3-year historical availability during summer hours 15, 16, 17?

Answer: The proposed seasonal Solar accreditation methodology is merely to seasonalize the current annual approach. Solar resources will be initially accredited based on 50% of the resource registered capacity and then accredited based on three-year historical availability during hours 15,16, and 17 EST for spring, summer and fall months and during hours 8,9,19 and 20 EST for the winter months.

11/18 Question 11: Can wind resources receive exemptions for planned outages? For instance, a wind generator that has had to take a planned outage due to transmission work on nearby transmission facilities, where the outage is not due to generator limitations but request from local TO.

Answer: No, the proposed planned outage exemption rules are only applied to Schedule 53 resources, which do not include Dispatchable Intermittent Resource, Intermittent Generation, Electric Storage Resource, or Use Limited Resources. Wind resources will continue to be accredited through seasonal ELCC methodology.

F. Minimum Capacity Obligation (MCO)

10/06 Question 1: Please explain how the MCR can be implemented without creating market power in zones with retail choice?

Answer: The Market Power concerns we've discussed derive from limiting MPs with load serving obligation to resources in the same Local Resource Zone. Neither the initial nor final post-transition implementation limit capacity contracts in this way.

10/06 Question 2: Please explain how MISO proposes not to violate state laws regarding procurement strategies and what mechanisms are in place to track load switching in a retail choice state?

Answer: After consultation with the IPA (Illinois Power Agency), there is no singular law preventing compliance with a 50% procurement target. The larger concern seemed to be time to implement changes in current procurement practices. Regarding the tracking of load switching, sections 69A.1.1.1, 69A.1.2, 69A.1.2.1, and 69A.1.3 of the currently effective tariff govern how this is done. There are redlines of these sections to make them seasonal rather than annual and to clean up some sections that are no longer needed.

10/06 Question 3: Please explain how the MCR fully addresses and evaluates the value of the robust transmission system in MISO?

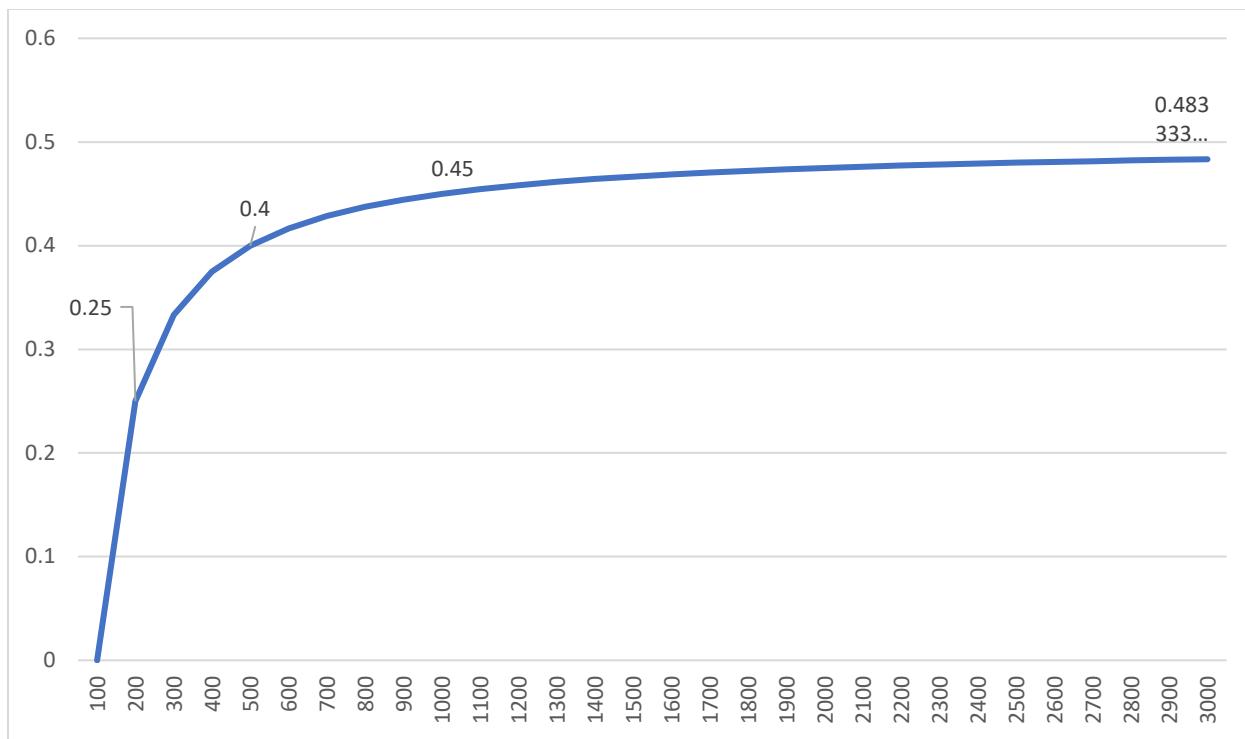
Answer: Because the MCO is not limited to compliance to resources and load in a given zone, MCO in either initial or final implementation accommodates full utilization of the transmission system and acknowledges current limits between the two Planning Areas.

10/06 Question 4: Based on preliminary import limits from the 9/7/21 LOLEWG meeting and using actual data from last year's auction, the current LCR estimates for Zone 4 is ~2260 MW. For the MCR calculation, 50% of 2021's PRMR is 4926. This is forcing Zone 4 to procure more than double the LCR to be in compliance. Is this the intent and if so, how is this fair to Load Serving Entities and their customers in Zone 4? Wouldn't this discount the sizeable import capability in Zone 4?

Answer: The MCO is not a local requirement. The capacity can come from anywhere across the system initially, and across the two Planning Areas (zonees 1-7 and 8-10 respectively) once it is applied sub-regionally.

10/06 Question 5: Zone 4 has ~ 40-50 ARES supplying load in Zone 4. Each being an LSE. In the MCR calculation, each get a 50 MW de minimis reduction. Is this true even if their load obligation is less than 50 MW (which totals over 2000 MWs)? Will the excess be spread over the remaining LSEs within the zone?

Answer: The MCO applies to each Market Participant's Planning Reserve Margin Requirement and each MP's MCO is calculated with a single de minimis threshold (that it would have to share with any Affiliates per the posted tariff redlines). To the extent an ARES is an MP, it would deduct the de minimis threshold from 50% of its PRMR. The excess is not shared from one MP to the next. Any MP 100 MW or less has no MCO obligation. If an MP has 200 MW of PRMR, their MCO is effectively only 25% and this scales up asymptotically until PRMR of 3 GW has a 48% MCR and those with 10 GW then finally round up to a true 50%. See the graph for more detail.



10/06 Question 6: In Section 69A7.1.a at subsection (e), we are unsure what is meant by this proposed new passage:

MCR Transition Period: To respect the limitations on unit deliverability across the Sub-Regional Power Balance Constraint, the MCR will be determined on a Sub-Regional basis commencing with the 2025/2026 Planning Year. MCR compliance will be determined separately on a Sub-Regional basis, where the Sub-Regions will consist of the First Planning Area and the Second Planning Area. Commencing with the 2025/2026 Planning Year, MCR Non-Compliance Charges will be calculated on a Sub-Regional basis.

Does this mean that the Minimum Capacity Requirement will be determined on a MISO-wide basis for 2023/2024 and 2024/2025? Since MCR compliance is determined for each Market Participant based on its Planning Resource Margin Requirement and the resources it controls, what does it mean for MCR compliance to be determined on a Sub-Regional basis, or not determined on a Sub-Regional basis?

Answer: That is the correct interpretation in the 23/24 and 24/25 planning years. Then in 25/26, the implementation would be based on load and resources in each individual planning area. Planning Areas 1 and 2 (Local Resource Zones 1-7 and 8-10 respectively), so MPs with PRMR in zones 1-7 would be limited to resources in zones 1-7 starting in 2025/2026 planning year, and the same respectively for MPs in Zones 8-10. For those few MPs serving load in both Planning Areas, they would have two respective MCR obligations needing to be met with resources in the respective planning areas.

10/06 Question 7: MISO Staff stated the reason for the Minimum Capacity Obligation is because there is no “regulatory backstop” in retail choice areas.

Question 7A: What is the expected supply excess over local clearing requirements in retail choice areas for the 2022/23 Planning Year? How does the MCR proposal result in more or less excess in future years?

Answer: With the upcoming changes in the make-up of the system-wide generation fleet, acknowledging that RERRA oversight only applies to about 70% of MISO's peak demand, and that there is currently no formalized expectation that MPs with load serving obligation (PRMR) are expected to show up with some level of ZRCs, the MCO establishes a formal expectation that no parties of a given size show up to the auction without making some modest level of commitment to fulfilling their load serving obligation beyond just last-minute purchases in the annual Planning Resource Auction.

As the fleet continues to evolve, the MCO will help ensure all sizable MPs are participating in maintaining Resource Adequacy by establishing a firm expectation for self-provided or contracted Zonal Resource Credits. This is not about regulated or un-regulated state jurisdiction but acknowledging the important and shared task of meeting the Reliability Imperative.

Question 7B: What is the average XEFORD of thermal units in retail choice areas? What is the average XEFORD of thermal units in regulated areas?

Answer: MISO does not track this information. Additionally, it is not pertinent to MISO's proposed Resource Adequacy reforms.

G. Tariff Language

10/06 Question 1: Duke also wanted to clarify if MISO has answered a question provided early this month regarding the proposed tariff language. The question revolves around whether this applies to both planned and forced outages.

Answer: The Capacity Replacement requirements only apply to Generator Planned Outages, see revised tariff sheets.

10/06 Question 2: “Where can we find the definition of Tier 1 and Tier 2? They don’t seem to exist in the Module A, Module E-1, or Schedule 53 drafts.”

Answer: Tier 1 and Tier 2 are terms defined and contained exclusively in Schedule 53 and do not require broader definition in Module A of the Tariff.

10/20 Question 3: How will the new tariff/process handle diversity exchange contracts when the contract switches from a resource to an obligation within a 3-month season?

Answer: Resource associated with a diversity contract can register and offer their ZRCs as they do today. MISO is removing the requirement for resources to be available to MISO from June through September to move to a seasonal construct. The proposal requires replacement of ZRCs when they can't meet the must offer for one calendar month of a 3-month season. Failure to replace results in the Capacity Replacement Non-Compliance Charge. Consideration of this charge may lead them not to offer or to reduce the chance of being committed by increasing their offer price.

10/20 Question 4: How would MISO explain the different uses or applications of “CONE”?

- a. Exactly what US dollar (\$) value per what quantity-unit time (e.g., MW-Year, MWSeason, or MW-Day) over what period of time (i.e., so as to be able to clearly understand the total \$ value) that will be used for settlement purposes applies to each of the following different references to "CONE"? (It is understood that each of these uses of CONE involve different implied or explicit scalars, and that MISO's answer might need to reference those scalar values for a full explanation.)
- b. "the CONE value (1/365 times CONE)" for non-replacement and MCR penalties;
- c. "annual CONE" for auction clearing price in case of auction shortages;
- d. "daily CONE value (i.e., 1/365 times CONE)" for ICAP deferral non-compliance charge; and,
- e. "[t]he CONE" for the Capacity Deficiency Charge (CDC).

Answer: CONE in all instance refers to the annual value that is calculated and filed for each LRZ on an annual basis per the currently effective tariff. Where applicable, how the annual CONE is allocated over time is specified for example "1/365" in b above. Note, for c above in regard to auction shortage CONE is divided by the # of deficient seasons so somewhere between CONE/4 up to CONE/1.

10/20 Question 5: What is the policy rationale for referring to the subject LSE being "deficient" as part of the CDC tariff language?

Answer: Thanks for calling attention to this existing issue. We have clarified the language to no longer refer to "LSE is deficient" in section 69A.10 of Module E-1. Per the proposed tariff language the Capacity Deficiency Charge will only "impose a Capacity Deficiency Charge on an LSE that has provided notification prior to the Planning Resource Auction that they will meet their PRMR in part or in whole by paying the Capacity Deficiency Charge".

10/20 Question 6: If MISO maintains that reference, then what sort of showing would MISO require for the "deficient" determination?

Answer: The Capacity Deficiency Charge language in question has been clarified. MISO does not impose the Capacity Deficiency Charge unless an LSE indicates to MISO they've decided "they will meet their PRMR in part or in whole by paying the Capacity Deficiency Charge."

11/3 Question 7: ITC suggests adding the following language to Module E 1 concerning Capacity Replacement Non-Compliance Charges and Distribution:

- i. Capacity Replacement and Non-Compliance Charges that are levied in any given planning year will be included in the publicly-available PRA materials for the respective planning year at the LRZ level.

Price signals from the PRA are an important source of public information for generation and transmission planning. Non Compliance charges that are levied ex-post represent important information on de facto final auction prices and should be made publicly available just as actual auction results are.

Answer: Every year as MISO conducts the PRA, information is published and provided to stakeholders. MISO will consider publishing the requested resettlement information as part of that effort. However, these efforts do not require Tariff changes. Also, please note that the current market resettlement procedure is to send out a notification when there is a resettlement equal to or greater than \$100,000.

11/3 Question 8: EOCs would express on the tariff redlines is regarding the number of hours that LMRs would need to respond. The redlines indicate that for PY 23/24 a resource must have a notification time of less than 6 hours, whereas the EOCs believe it should read “less than or equal to 6 hours”.

Answer: Current Tariff Redlines reflect the language above.

11/3 Question 9: A primary goal of the seasonal construct was to facilitate seasonal economic resource suspensions. How does MISO’s proposed tariff accommodate such suspensions?

Answer: There are a couple of alternatives for Market Participants to effectuate seasonal suspensions or outages. First is through participation in the Planning Resource Auction, Market Participant planning a seasonal suspension can utilize the technology specific avoidable costs or facility-specific Reference Levels per section 64.1.4 of Module D of the Tariff for developing Offers. Additionally, modifications to 64.1.1 of Module D establish a process for Market Participants with outages of 31 days or more in a season to provide documentation to the IMM and, upon acceptance from the IMM, forego participation in the PRA without being deemed to have engaged in Physical Withholding.

11/3 Question 10: How are transmission constraints considered when allowing uncleared ZRCs to replace cleared ZRCs in the Planning Resource Auction?

Answer: ZRC Replacement administration provisions and procedures related to location, LRZs, in the Tariff and Business Practices Manuals are not substantively changing with MISO’s proposed reforms. See section 69A.3.1.h.

“Cleared ZRCs can be replaced with uncleared ZRCs that are not from the same LRZ or ERZ by examining post-replacement clearing as if it were the PRA clearing results, so that such replacement: (1) does not violate any CIL used in the PRA; (2) does not violate any CEL used in the PRA; (3) does not reduce the remaining total ZRCs for any LRZ of cleared ZRCs below the LCR for that LRZ; and (4) does not exceed any intraregional flow ranges established under applicable seams agreements, coordination agreements, or transmission service agreements. ZRC replacements from LRZs or ERZs other than that of the cleared ZRCs will be processed in accordance with the following parameters:

- i. ZRC replacement shall be processed on a first come, first served basis.
- ii. The amount of cleared ZRCs in each LRZ or ERZs at the time of a ZRC replacement shall be based upon the current amounts of cleared ZRCs, including any previous replacement transactions.

ZRC replacement shall have no impact on settlements from the PRA and FRAPs.

11/3 Question 11: Regarding the language “New or existing Resources that do not have at least 60 days of Real- Time offered availability when designated for RAR over the last three (3) years for each Season (Summer, Fall, Winter, Spring) will have a SAC based on the Class Average SAC to ICAP Ratio for its Resource type” in Section V of the most recent (October 1) draft of new Schedule 53, we have the following question: Does this mean that if a particular Resource does not clear or is routinely withheld from the Planning Resource Auction and is used for the purpose of providing potential replacement ZRCs later (cf. August 4 presentation at slide 23, final bullet point), then whenever it is ultimately used for capacity replacement in the PRA (cf. Section 69A.3.1.h of proposed Module E-1 language), its accreditation will be based on a Class Average accreditation ratio, even though it was historically functioning to essentially boost the accreditation of another resource? Isn’t that double counting the

capability of the replacing Resource and/or artificially boosting the accreditation of the replaced resource (i.e., the cleared resource that underperformed)?

Answer: MISO's proposed SAC calculation in Schedule 53, only includes periods where a Resource was cleared in the PRA or otherwise had a must-offer obligation due to serving as a replacement. Resources without a must offer obligation for greater than 60 days during the three-year lookback period for a Season would be accredited based on class average information per the proposed tariff language.

11/18 Question 12: 69A.4.5.A(iii):

- Sections a and b - Both sections refer to a "Capacity Resource's Network Resource Interconnection Service *Unforced* Capacity value" and a "Capacity Resource's Energy Resource Interconnection Service *Unforced* Capacity value". We believe *Unforced* should be replaced with "***Seasonal Accredited***".
- Section d requires a correction to the formula:
ERIS SAC = ***Total Interconnection ICAP X (SAC/ICAP ratio X max(0,(ICAP-NRIS)))***

MISO Response: 69A.4.5.A(iii) – both references in A and B now state "Seasonal Accredited". Section D reflects the current RA Construct proposal with respect to deliverability. It states, ERIS SAC = MAX (0, (ICAP-NRIS)) X (SAC/ICAP Ratio)

11/18 Question 13 Module D, Section 64.1.1(g)(xii):

- *Suggested language:*
Market Participants with capacity expected to be on outage for thirty-one (31) or more Calendar Days in a Season of the Planning Year may submit documentation of such circumstances to the IMM ***not later than forty-five (45) days prior to the deadline for submitting ZRC Offers***, and the IMM shall provide a written explanation upon request of its determination to the Market Participant, ***not later than seven (7) days prior to the deadline for submitting ZRC Offers***, regarding whether that capacity can forego participation without being deemed to have engaged in Physical Withholding.

MISO Response: Module D, Section 64.1.1(g)(xii) – MISO views this as an implementation detail and MISO will work with the IMM to address the proposed schedule prior to adoption.

H. General Filing Questions

10/20 Question 1: Will the delay in filing the Seasonal Resource Adequacy proposal further delay work on Solar Seasonal ELCC discussions (which were meant to begin in Q4 2021) or will the Solar Seasonal ELCC methodology be incorporated into this proposal due to the later filing date? Relatedly, will this impact expected implementation of Solar ELCC, and when does MISO anticipate Solar ELCC implementation to take place?

Answer: In order to focus on the development and filing of the RA Construct, MISO will begin working on Solar Seasonal ELCC in Q1 of 2022. Changes to Solar ELCC will not be incorporated into the RA Construct reform filing. The timing of expected implementation of Solar ELCC will not be impacted by the later filing date of the seasonal RA construct proposal and largely depend on stakeholder process.

10/20 Question 2: Will the delay in filing the Seasonal Resource Adequacy proposal delay work on Seasonal Accreditation rules for energy storage resources (which were meant to begin Q4 2021), or will seasonal accreditation for energy storage resources be incorporated into this proposal?

Answer: In order to focus on the development and filing of the RA Construct, MISO will begin working on Seasonal Accreditation rules for energy storage resources in Q1 of 2022. Changes to accreditation rules for energy storage resources will not be incorporated into the RA Construct filing. As of October 1, 2021 MISO has not identified when any changes will be implemented.

10/20 Question 3: Does MISO believe that FERC should consider the amount of time LSEs need to react to, and implement, portfolio changes to satisfy the RAN implementation schedule?

Answer: These proposed reforms are part of MISO's Reliability Imperative. MISO is dedicated to continue working with its stakeholders to meet the one day in ten year reliability planning standard. Current and emerging risks necessitate prompt action to mitigate them by appropriately incentivizing decisions that can be taken now and in the near future to maintain system reliability.

I. Implementation Questions

10/20 Question 1: Does MISO perform an audit of the CROW data compared to the GADS data? If not, does MISO have any concerns about different outage designations between CROW and GADS?

Answer: As part of the RA reform evaluation phase, MISO has performed comparison between CROW and GADS and found on system-wide basis, the outage records in general aligned with each other (See Section III.1 of MISO Technical Whitepaper at

<https://cdn.misoenergy.org/20200630%20RAN%20Workshop%20MISO%20Technical%20Paper%20Conditional%20Forced%20Outage455550.pdf>); MISO will use planned outage exemption recorded in CROW as the basis for the proposed SAC calculation.

10/20 Question 2: MISO has indicated that they will address open issues and/or further changes in the future. Has MISO maintained a log of these issues? If yes, does MISO have a plan/timeline to address and resolve the issues?

Answer: See Section M of this document. MISO will develop a timeline to address the issues and communicate at a future RASC meeting.

10/20 Question 3: What dataset time period will be used by MISO to calculate the initial PY 23/24 SAC values?"

Answer: The PY23/24 SAC values will be determined on a seasonal basis for each of the three historical years prior to the PY23/24, starting September 1, 2019 through August 31, 2022. The existing RAN Phase 1 outage exemption rules will be used for the PY23/24 SAC calculations.

10/20 Question 4: Is MISO developing a process for MPs to dispute SAC values?

Answer: MISO's tariff contains dispute processes. MISO will evaluate the need for a special dispute procedure specific to SAC values.

10/20 Question 5: How will MISO prevent over-conservative actions (i.e. submitting planned outages for longer duration and/or greater frequency than truly required in order to achieve exemption)?

Answer: MISO leverages a product development process in which it validates the implementation of processes, products and procedures to ensure that the desired intent of the enhancement is achieved. MISO will monitor and validate the implementation of the RA Construct and if there are undesirable unintended consequences, MISO will work with stakeholders to remedy the situation.

10/20 Question 5: Can MISO's internal processes truly handle the proposed accreditation calculation and handling of exemptions?

Answer: MISO recognizes the needs to enhance current tools and systems such as MECT and CROW to manage the increased volume of raw data and SAC calculations and identify proper planned outage exemptions. The needed enhancements to CROW have been identified and scheduled for completion by April 2022, which is greater than 120 days prior to the beginning of a new accreditation look back period on Sept. 1st. MISO is conducting a series of stakeholder workshops starting November 12th to gather stakeholder requests/inputs on functionality of MISO tools to ensure enhancements can be made to the tools and systems to handle the proposed RA construct reform changes.

10/20 Question 6: The tracking of these exemptions would be an arduous task relying on pulling information from multiple areas of the MISO market portal (CROW, MUI, MECT). Does MISO believe they can feasibly track and calculate the accreditation on a per unit basis?

Answer: Please refer to MISO answer to Question 5 in Section I. With the needed enhancements in MISO tools and systems, MISO will be able to track the outage data including exemption status, the resources committed in MECT and when they are replaced and the RT offers for each resource in each hour of the PY. The preliminary information has been shared with stakeholders for one of their resources upon request to ensure clarity in how the calculations work.

10/20 Question 7: Due to the complexity of the RA construct, some Market Participants won't be willing or able to replicate MISO's calculation. Therefore, assurances MISO's systems can handle these calculations would be helpful.

Answer: MISO's MECT tool will contain all the relevant data needed for stakeholders to confirm their SAC values for all of their resources. Data will be available to stakeholders in the MECT tool prior to implementation for the 2023-2024 Planning Year.

10/20 Question 8: For MPs that will shadow MISO's calculations, does MISO's proposal take into account the amount of work it will take MPs to track these complex parameters? What is MISO going to do to facilitate shadow calculations?

Answer: MISO's MECT tool will contain all the relevant data needed for stakeholders to confirm their SAC values for all their resources. MISO is conducting a series of stakeholder workshops starting November 12th to gather stakeholder requests/inputs on functionality of MISO tools to ensure ease of use and transparency.

11/3 Question 9: Does MISO and the IMM have the resources to review multiple requests (perhaps dozens) to forego participation in PRA each season (for outages or partials > 31 days)?

Answer: MISO and the IMM will monitor this business impact and make appropriate changes where necessary.

11/3 Question 10: Has MISO worked with affected state utility commissions and/or electric utilities to plan for the incorporation of this new seasonal resource adequacy construct in integrated resource planning or other state generation planning processes? Does MISO believe that LSEs and utility commissions have the tools to successfully model and plan for seasonal capacity requirements? If so, based on what information; which state processes and planning/modeling software packages models have been specifically analyzed?

Answer: MISO continues to discuss the proposal with our stakeholders including the Organization of MISO States (OMS). During the implementation phase MISO is committed to working with states to adapt planning and modeling to reflect the RA Construct. It is not appropriate for MISO to comment on whether states have the tools to successfully model and plan for the seasonal capacity requirements.

12/17 Question 11: Could MISO and the IMM provide examples of when they will allow a resource with >31 days of planned outage to not offer into the seasonal auction? What “documentation of such circumstances” would be sufficient to satisfy the IMM that the resource may forego participation in the auction?

MISO Response: MISO will work with the IMM to develop the business practices and associated information Market Participants will need to submit for this type of auction exclusion. At recent RASC and workshops MISO has discussed this process with stakeholders. Stakeholders desiring to take a seasonal outage would need to offer their capacity unless they qualify for an exclusion in Mod. D otherwise can be investigated for physical withholding. MISO added the provision saying that a Resource can ask IMM for permission to forego offering if have planned outage >31 days. If stakeholders can't use one of the exclusions in Mod. D then they can offer high via a facility specific reference level or Technology Specific Avoidable Cost by consulting with the IMM.

12/17 Question 12: MISO is providing for three transition years for phase-in of the outage exemptions, consistent with the three year lookback for XEFORd, but has only proposed to provide two transition years for phase-in of the Tier 1 weighting. MISO should align the transitional aspects and provide for three transition years of the Tier 1 weighting as well. Duke Energy recommends 50/50 in 23-24, 40/60 in 24-25, 30/70 in 25-26, and finally 20/80 in 26-27.

MISO Response: MISO adopted a stakeholder recommendation which has the following weighting as a transition period outlined in Schedule 53. Please note, regarding the phase-in for exemptions, Generator Planned Outages starting 9/1/22 or later will be subject to the new rules per Schedule 53.

Weighting by Planning Year			
Tier	2023- 2024 Planning Year	2024-2025 Planning Year	2025-2026 Planning Year and beyond
<u>ISAC_{Tier1} weighting</u>	<u>40%</u>	<u>30%</u>	<u>20%</u>
<u>ISAC_{Tier2} weighting</u>	<u>60%</u>	<u>70%</u>	<u>80%</u>

J. Additional Analysis Requests

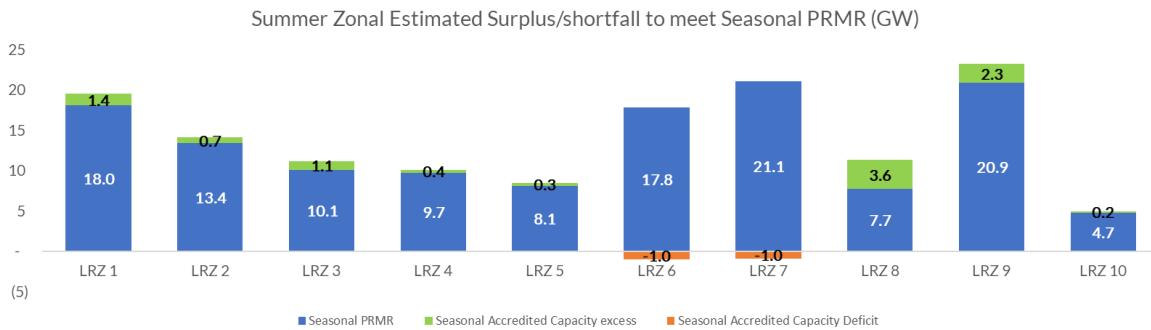
Request 1: Provide July 7 presentation slide 21 (LCR capacity position for all individual zones and seasons) at the PRMR level, which is an obligation for LSEs.

Zonal net positions vary across seasons driven by seasonality of Capacity Import Limits (CIL) and resource availability



Based on preliminary analysis, all zones are observed to have sufficient capacity to cover seasonal LCRs with the exception of Zone 10 in winter driven by lower SAC and significant reduction in its winter CIL

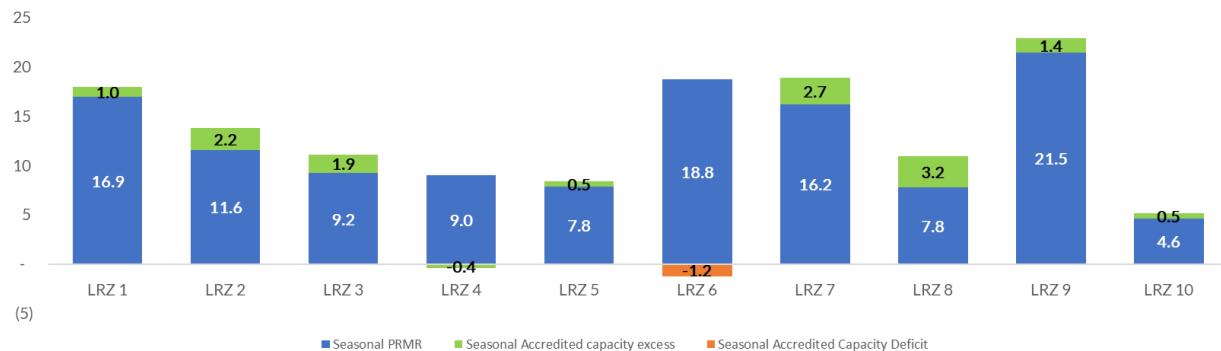
MISO Response: MISO has revised its RA construct proposal since July 7, 2021 and adopted the recent IMM's proposal of a UCAP to SAC conversion ratio to convert individual thermal resource SAC values back to UCAP terms. The system wide and zonal impact analysis results are refreshed and included in the materials for the November 3, 2021 RASC meeting, reflecting the revised RA proposal. The zonal impact analysis results at the PRMR level are illustrated below:



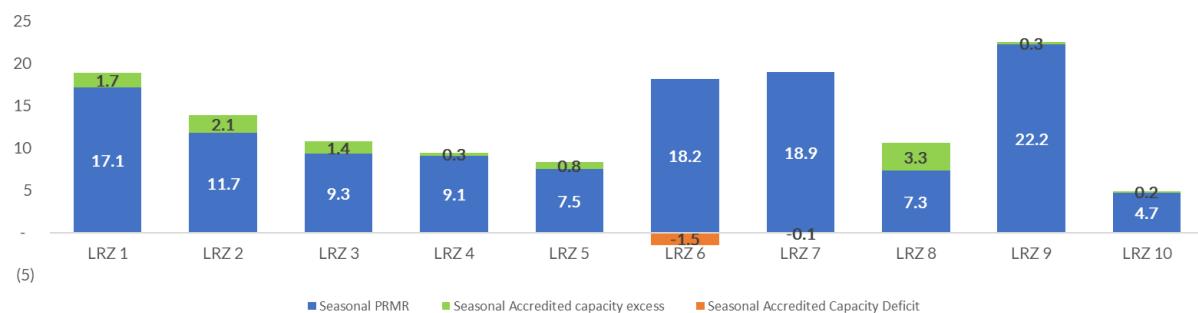
Fall Zonal Estimated Surplus/shortfall to meet Seasonal PRMR (GW)



Winter Zonal Estimated Surplus/shortfall to meet Seasonal PRMR (GW)



Spring Zonal Estimated Surplus/shortfall to meet Seasonal PRMR (GW)



Request 2: Related to the “Seasonal and SAC Update for Alliant.pdf” Surplus / Deficient data sent to AE from MISO Staff on August 2nd:

O Provide the data broken up by utility and zone (e.g., ALTW Zone 2 & 3, ALTE Zone 1 & 2) as opposed to rolled up into ALTM.

MISO Response: MISO has provided Surplus/Deficit information by Market Participant. MISO will consider providing more granular data on a case-by-case basis. Requests should be made through a Client Relations Service Request.

Request 3: Provide the individual seasonal accreditation values assumed by resource for non-thermal units (wind, solar, hydro, etc.).

MISO Response: At the September 8, 2021 RAN workshop MISO presented preliminary seasonal accreditation impact analysis results for both wind and solar under MISO’s proposed seasonal

accreditation methodologies for these types of resources. Details can be accessed via the link:
<https://cdn.misoenergy.org/20210908%20RA%20Construct%20Tariff%20Review%20Workshop%20Item%2002%20Renewable%20Impact%20Analysis587681.pdf>

Request 4: Provide estimated LCR and PRMR position for 2023 and 2026 by individual zones and seasons. Use MISO-OMS Survey data if needed. If MISO cannot provide this data before the filing date, when would MISO be willing to provide this information?

MISO Response: The annual Loss of Load Expectation Study (LOLE) process will continue determine Planning Reserve Margins and Zonal Local Reliability Requirements for the upcoming Planning Year and for the four-year out and the six-year out Planning Years. The PRMR/LRRs for PY 2023/2024 and PY2026/2027 will be produced as part of the annual LOLE study in 2022.

Request 5: Provide a volatility analysis of the existing UCAP method as a comparison against MISO's SAC volatility illustration.

MISO response: The existing UCAP method is based on general availability across all hours of the year and does not differentiate periods of tight operating conditions or high risks. By design, the proposed SAC method reflects general availability while emphasizing availability during times of greatest needs or RA hours with a tiered weighting structure. Comparing these two methods will not provide meaningful insights on volatility given fundamentally different design by nature.

Request 6: Duke requests that MISO provide unit-level example calculations that demonstrate all features and nuances of the proposal, including

- o Addressing integrity issues with the hourly margin data identified by DEI (see Duke Energy Indiana Supplemental Comments 8/25/2021)
- o Calculating SAC over the defined 9/1 to 8/31 performance period, rather than over plan years as MISO has done thus far. This would include re-calculating the annual RA hours to reflect such period
- o Calculations reflecting the appropriate treatment of the outage exemption process, not just calculations that assume no outages are exempt as MISO has done thus far
- o Calculations for treatment of exempt planned derates, which MISO has not addressed at all to date (see Duke Energy Indiana Comments 7/21/2021 and 8/23/2021), including how exempt planned derates are removed from the annual average offer calculation
- o Calculations reflecting the use of the hot-to-warm-to-cold unit state progression, not just the cold unit startup+notification time that MISO as done thus far

MISO Response: MISO has revised its unit level sample SAC calculation workbook and posted for the November 3, RASC meeting. The revised unit sample SAC calculation workbook reflects the final resource accreditation proposal, which includes the defined 9/1 to 8/31 performance period, appropriate RAN phase I planned outage exemptions, and the adopted IMM's proposal of a UCAP to SAC conversion ratio to convert individual thermal resource SAC values back to UCAP terms. The cold unit startup plus notification time is applied in MISO impact analysis to provide a more conservative look of SAC calculation.

Request 7: A more appropriate reconciliation of SAC with PRM: What MISO has provided they portray as conservative because MISO doesn't include any outage exemptions; this results in the lowest SAC accreditation possible (hence the conservative portrayal). However, SAC is only one side of the equation, as position is what matters. MISO is calculating the PRMsac = PRMucap * SAC/UCAP. So when MISO understates SAC by ignoring outage exemptions in their example calculation, MISO is at the same time then understating the PRM. So when MISO finally gets around to calculating SAC correctly and the number goes up, the PRMsac will go up too. The obvious question is then, for any individual utility what goes up faster, SAC or PRM?

MISO Response: MISO has revised its RA construct proposal since July 7, 2021 and adopted the recent IMM's proposal of a UCAP to SAC conversion ratio to convert individual thermal resource SAC values back to UCAP terms. The PRMR derived from seasonal LOLE analysis will remain at the UCAP terms without any conversion ratio adjustment.

Request 8: Will MISO provide SAC calculations for all existing generation resources based on data available today so they can be used by stakeholders for planning projections?

Answer: MISO will provide full SAC calculation details limited to one CPNode per Market Participant. Data request must be submitted through a Client Relations Service Request. Please include the CPNode name with the request. MISO has also provided annual and seasonal RA hours in the response to Request 9 below. MISO will not provide detailed calculations for all existing resources given large volume of data involved.

Request 9: Did MISO provide the revised RA hours numbers after adjusted the lead time from units from 24 to 12 hours.

MISO Response: Please refer to miso response to 10/20 Question 13 in Section B.

The final annual and seasonal RA hour file, which used a 12 hour lead time for offline units, have been post at the following location for the August 19, 2021 RAN RA Workshop.

<https://cdn.misoenergy.org/20210819%20RAN%20Workshop%20Hourly%20Operating%20Margin%20and%20RA%20hours581381.xlsx>

Request 10: Generation that is not available for RA hours has been displayed in scatter plot charts showing the total MW that is unavailable on the Y axis, and the MISO Load on the X axis. This display of information is not actually helpful to understand the need for additional enhancements to the resource adequacy construct.

- a. Please show the unavailable generation MW data for each RA hour. Include the data for PY 2017-2018, PY 2018-2019, PY 2019 2020, PY 2020-2021 showing the date, hour, planning year, season, and MW value for 1)exempt planned outages, 2)shorter-term planned outages, and 3)forced outages.

MISO Response: The purpose of the scatter plot is to illustrate that times of high risk conditions largely occur during high load and/or high outages across seasons and emphasize the needs of resource reliability contribution during times of highest risks and greatest needs. Additional analysis to further break down the unavailable generation MW values is not needed as the scatter plot sufficiently demonstrates the importance of resource availability in times of system reliability needs and aligning

resource accreditation with the actual availability of resources during times of need provides strong incentives for resources to be available during high risk hours.

Request 11: Proposed Design Questions/comments

a. Please provide the analysis and basis for using 25% operating reserve as the criteria for defining an RA hour.

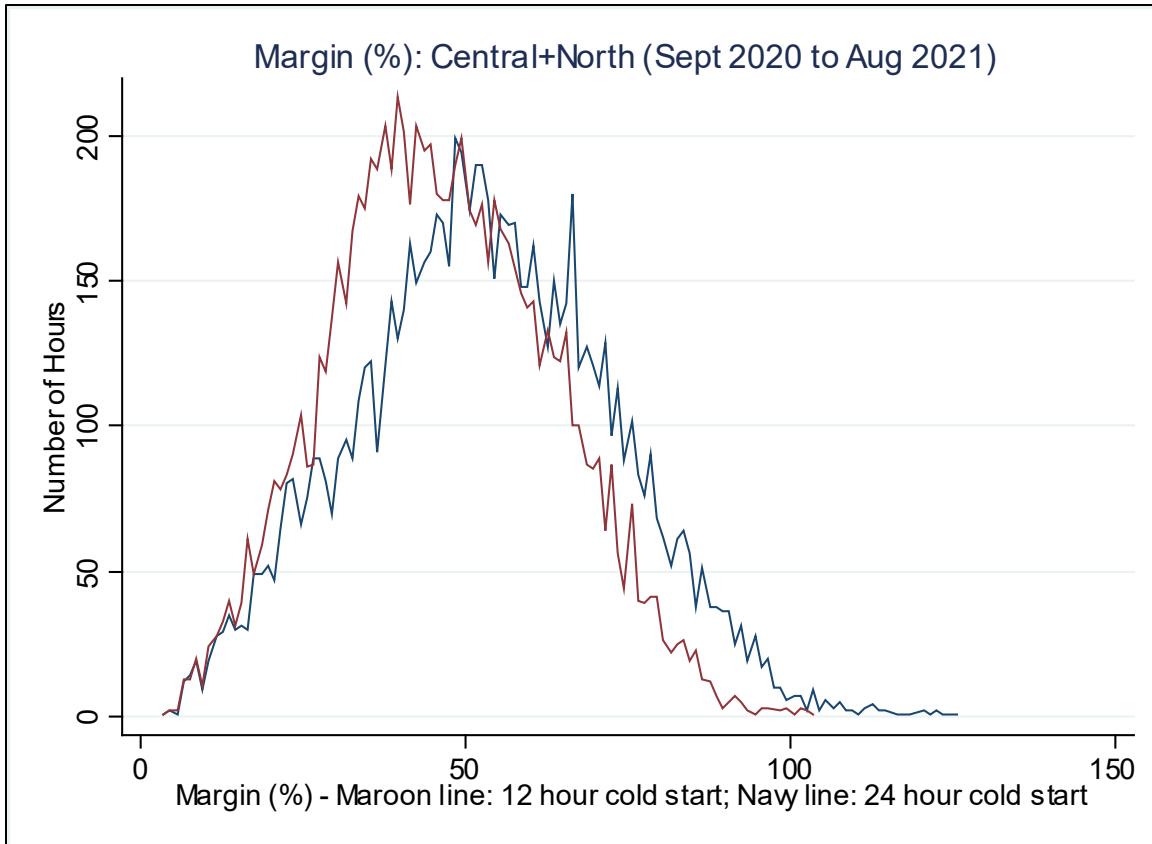
MISO Response: MISO has evaluated the distribution of operating margin as illustrated in Figure 1 and Figure 2 of the Conceptual Design document presented at the August 19, 2021 workshop. MISO found that the 25% threshold provides a good balance between having adequate number of RA hours and selecting the set of RA hours that are truly tight. Utilizing the 25% threshold also captures the vast majority of declared MaxGens but more are missed at lower thresholds due to uncertainty in RT operations. If using 20% threshold instead, too many RA hours in seasons other than summer would be excluded in multiple planning years, resulting in sample size of RA hours too small.

See [Microsoft Word - Seasonal RA Conceptual Design - PublicFinal.docx \(misoenergy.org\)](https://misoenergy.org)

b. Please provide the analysis and basis for using 12 hour startup requirement for adding more RA hours to a season that doesn't have its own 65 RA hours.

MISO Response: As presented in the August 19 RAN workshop, reducing lead time to 12 hours for offline margin better reflects RT uncertainty and reduces instances of deficient hours significantly.

In addition, MISO has evaluated the impact of using different cold start-up hour on the offline margin (MW). MISO found that using 24 hour cold start-up would result in high offline margin MW and eventually a larger system margin %, comparing with the overall margin distribution when using 12 hour cold start lead time (as illustrated in figure below). Hence MISO determined that using 12 hour startup threshold would avoid inflating the system margin (%) and is adequate for obtaining 65 need RA hours in most seasons after applying the 25% threshold.



c. Please provide the analysis and basis for using the annual RA hours as a proxy for adding more seasonal hours to a season that doesn't have its own 65 RA hours.

MISO Response: Stakeholders shared concerns on including hours that were not “tight” and after discussion and deliberation an operating margin of 25% was used as the cutoff for RA Hours. This means that in some seasons (or for Resources with Tier 2 planned outage exemptions for seasonal RA Hours) there may not be 65 hours from within the season to use for the Schedule 53 calculations. To strike a good balance between focusing on a resource’s availability during times of need and having sufficient RA Hour sample sizes to avoid undue volatility (that could expose a resource to large accreditation changes based on the luck or bad luck to be available for a more limited set of RA Hours), MISO’s proposal supplements the seasonal RA Hours for a resource with the average offers during other seasons in the same PY where it was not on an exempt outage. Analysis of unit level, zonal and MISO-wide results indicate improved stability and appropriate relative accreditation based on resource performance during times of need.

d. Please provide the analysis and basis for using the 80/20 ratio for weighting the tier 2 hours and tier 1 hours in defining the SAC.

MISO Response: The initial ACAP proposal had a weighting of 100% towards a unit’s performance during Tier 2 hours which reflect the importance of being available during tightest operating conditions. MISO will also be transitioning to a seasonal construct and providing opportunities for Stakeholders to take seasonal outages. Because resources have general flexibility to participate in seasons, MISO feels it is

important to accredit resources based on their availability when they indicated a resource would be available (through participating in the PRA).

Stakeholders requested a method that recognized a Resource's Reliability Contribution during non-RA Hours, basing some portion of accreditation on general availability. MISO responded by developing the two-tier method and setting the Tier 1 weighting to 20%, acknowledging a Resource's general availability and its contribution to avoiding capacity emergency events.

e. What value of the shared reserves for each LSE that is reflected in this method?

- i. The LOLE analysis provides a robust total portfolio basis for defining the planning reserve requirements. The shared reserve approach provides a means for all LSEs to provide the additional capacity that reflects the impacts of both forced and scheduled outages.
- ii. The SAC approach is defining the reliability of each dispatchable generation unit without regard to the "credit" that is generically provided to all generation units through the shared reserve approach. By using the term "credit" the shared reserves assessing the additional capacity required that allows for the occurrence of forced outages.
- iii. The SAC approach doesn't have any means of contemplating the assumed level of outages in its method of defining the reduced accreditation during RA hours. Please explain how the LOLE / UCAP and SAC methodologies can be meshed in either principle or application.

MISO Response: The proposal retains the value of "shared reserves" because it is not changing the overall level of accreditation (which will still be commensurate with the UCAP used in LOLE). Instead, it simply reallocates accreditation within the group of Schedule 53 resources to recognize the higher reliability value of resources that are available during times of need.

f. Please provide the analysis and basis for how the threshold of defining a critical level operating reserves metric (25%) aligns with the LOLE PRM.

MISO Response: Please refer to the response to Request 11A. As illustrated in Figure 1 and Figure 2 of the Conceptual Design document presented at August 19, 2021 workshop. MISO determined the 25% threshold for the purpose of identifying the needed 65 RA hours based on review and analysis of historical margin distribution of each season. The purpose of historical operating margin is to identify a set of tight system operating conditions for accrediting resources, while the Planning Reserve Margin derived from the annual LOLE analysis is to set PRA requirements to meet one day in ten year LOLE reliability standard.

Request 12: Additional comments regarding this question(Presented by Affiliate Sector member at September 21, 2021 Advisory Committee Meeting):

1. The MISO generation portfolio is expected to continue a transformation into higher penetrations of renewable energy and more retirements of baseload coal generation. Stakeholders continue to express the need to have an adequate representation of the MISO market when considering individual decisions

along this pathway of generation transformation. The Affiliate sector has stated the following objectives at the :

- (1) Resilience — Place more emphasis on ensuring the MISO grid is resilient, especially in light of extreme operating conditions such as those experienced by CAISO (last August) and ERCOT (February), as well as other infrequent but highly disruptive disturbances.
- (2) Coal Retirements — Analyze the potential reliability and resilience impacts of greater-than-announced coal retirements.
- (3) Renewables — Continue evaluating the implications of high penetration levels (30 percent and greater) of renewable energy. This is especially important in light of federal proposals aimed at increasing the penetration of renewables.

More information/explanation regarding MISO's analysis showing that most of the Entergy Operating Companies would have their highest Planning Reserve Margin Requirements in the Spring season, which is traditionally considered an off peak season in the South region during which significant maintenance outages are taken. Additionally, an explanation of when is the best time for MISO South generation owners to be scheduling planned maintenance outages according to the insight provided by MISO's proposed resource adequacy construct – recognizing that reasonable planned maintenance outages are essential to maintaining generation resources in good working order and thus to meeting customer demand at times of peak demand.

MISO Response: As the result of LOLE analysis to determine seasonal PRM%, The spring has the highest system wide PRM% and paired with the South's relatively flat load profile makes the spring on a MW basis have a higher requirement than other seasons. MISO will provide the tools and information for resource owners to help them decide when the best time to take outages would be through the outage coordination process.

Request 13: Analysis showing the number of planned outages in recent years that exceeded 30 days across MISO and an estimate for how much replacement capacity would be needed as a result. More specifically, data showing the average length of time for nuclear refueling outages in MISO.

MISO Response: MISO reviewed planned outage for the last three Planning Years (June 1, 2018 through May 31, 2021). The GADS event type planned outage (PO) and planned outage extension (PE) were used for this analysis. MISO defined a planned outage as one or more PO and PE events that may be contiguous or have gaps between events of no greater than one day. The table below is a summary of this data in aggregate and by unit type. For these three Planning years, 86.4% of the planned outages were less than 31 days. Events may span PYs and seasons and therefore may not reflect seasonal outage duration. On a seasonal basis the percentage of planned outages less than 31 days is likely greater than 86.4%.

Planned Outage Analysis June 1, 2018 through May 31, 2021.										
Events may span PYs and seasons and therefore may not reflect seasonal outage duration.										
Event Type - Planned Outage (PO) and Planned Outage Extension (PE)										
Resource Type	Event Count	Total Duration Hours	Event Count		Event Count				Average Duration Hours	Duration Days
			<31 Days	>31 Days	31-45 Days	45-60 Days	60-90 Days	>90 Days	Min	Max
Combined Cycle	681	284,794.29	572	109	52	26	18	13	418.20	17.43
Combustion Turbine	1,695	639,947.58	1,519	176	47	36	34	59	377.55	15.73
Diesels	403	65,728.95	387	16	11	1	2	2	163.10	6.80
Fluidized Bed Combustion	35	20,443.54	26	9	6	0	2	1	584.10	24.34
Fossil Steam	885	609,231.90	638	247	87	52	60	48	688.40	28.68
Hydro	1,424	421,419.63	1,289	135	46	37	16	36	295.94	12.33
Nuclear	32	28,086.22	15	17	7	5	4	1	877.69	36.57
Pump Storage	170	64,898.20	154	16	7	0	4	5	381.75	15.91
All Resource Types	5,325	2,134,550.31	4,600	725	263	157	140	165	400.85	16.70
Resource Type	Total Duration MWh	Average MW	Event Count		Event Count					
			<31 Days	>31 Days	31-45 Days	45-60 Days	60-90 Days	>90 Days		
Combined Cycle	427,567,793	1,501.3	84.0%	16.0%	7.6%	3.8%	2.6%	1.9%		
Combustion Turbine	45,218,112	70.7	89.6%	10.4%	2.8%	2.1%	2.0%	3.5%		
Diesels	462,424	7.0	96.0%	4.0%	2.7%	0.2%	0.5%	0.5%		
Fluidized Bed Combustion	3,664,425	179.2	74.3%	25.7%	17.1%	0.0%	5.7%	2.9%		
Fossil Steam	193,327,256	317.3	72.1%	27.9%	9.8%	5.9%	6.8%	5.4%		
Hydro	17,976,458	42.7	90.5%	9.5%	3.2%	2.6%	1.1%	2.5%		
Nuclear	27,846,041	991.4	46.9%	53.1%	21.9%	15.6%	12.5%	3.1%		
Pump Storage	20,541,549	316.5	90.6%	9.4%	4.1%	0.0%	2.4%	2.9%		
% of All Planned Outage Count	736,604,058	345.1	86.4%	13.6%	4.9%	2.9%	2.6%	3.1%		

For this time period there were 32 planned outages for 17 Nuclear units. Thirty were coded 2070 – Refueling. One of these was a 5-day event and is excluded from this discussion. The remaining 29 refueling planned outages averaged 41 days, the shortest was 17 days, and the longest was 107 days. These 29 outages occurred in 36 seasons and 6 spanned two seasons. Nineteen of the 36 seasonal outages were 31 days or less. Seventeen were greater than 31 days – average 46 days, shortest 32 days, and longest 77 days.

- Analysis comparing the level of volatility associated with UCAP unit ratings vs Seasonal Accredited Capacity (SAC) unit ratings.

MISO Response: Please refer to the response to Request 5.

- Analysis showing how MISO determined the 20/80 tier 1 to tier 2 weighting and data showing the impact of using a 50/50 tier 1 to tier 2 weighting.

MISO Response: Please refer to the response to Request 11.d.

MISO Response: MISO has revised its RA construct proposal and adopted the recent IMM's proposal of a UCAP to SAC conversion ratio to convert individual thermal resource SAC values back to UCAP terms without adjusting PRMR requirements derived from LOLE analysis. Recognizing the Planning Reserve Margin is established on a footprint wide basis, MISO believes it is appropriate to apply a MISO wide SAC to UCAP conversion ratio to convert individual thermal resource SAC values back to UCAP terms.

- Updated analysis showing the projected LRZ surplus/deficit position relative to the LCR requirement when using the new RA hour selection methodology described by MISO in August 2021.

MISO Response: MISO has revised its RA construct proposal since July 7, 2021 and adopted the recent IMM's proposal of a UCAP to SAC conversion ratio to convert individual thermal resource SAC values back to UCAP terms. The system wide and zonal impact analysis results are refreshed and included in the materials for the November 3, 2021 RASC meeting, reflecting the revised RA proposal.

Request 13: 2021/2022 Planning Year Performance

- a. How many ZRCs did MISO clear in the 2021/2022 Planning Resource Auction?
- b. What was MISO's peak load on June 10, 2021?
- c. How many MWs from resources that cleared in the 2021/2022 Planning Resource Auction were unavailable during the daily peak due to Planned Outages on June 10, 2021?
- d. How many MWs from resources that cleared in the 2021/2022 Planning Resource Auction were unavailable during the daily peak due to Unplanned Outages on June 10, 2021?
- e. What were the causes of the Unplanned Outages for capacity resources that cleared in the 2021/2022 PRA during the operating day of June 10, 2021?

MISO Response: In the [July 8th Market Subcommittee](#) and the [July 29th Reliability Subcommittee](#) MISO provided an overview of the June 10th event. For the information requested in this question, MISO would point stakeholders to those materials for answers.

- f. How would MISO's proposed Seasonal Reforms have reduced the risk of those Unplanned Outages occurring?

MISO Response: These reforms are intended to incentivize prudent planned outage planning and availability during times of need. Recognizing that actual market outcomes may vary, it's hard to predict what will or would have happened had they been in place.

- g. How would MISO's proposed Minimum Capacity Requirement have reduced the risk of all outages occurring?

MISO Response: This is a measure to prevent future capacity shortfalls in future planning year auctions. In this question, Minimum Capacity Obligation would not have reduced the risk of all outages occurring. MCO is what LSEs bring to the auction and is decoupled from outages. The June 10th event is not a capacity shortfall. On Slide 5 [of the July 29th RSC presentation](#) it was noted that 22 GW of the 32GW on outages were non-planned which was the primary contributor to tight conditions.

- h. On June 10, 2021, MISO relied on more than 13 GWs of non-firm external support, far exceeding the amount of non-firm external support modeled in the 2021/2022 LOLE Study. Does MISO view the need to rely on 13 GWs of non-firm external resources during as indicative of higher or lower loss of load risk?

MISO Response: Please see the response below in i. as to why leveraging non-firm external resources during this particular event. In addition, individual events can inform RA requirements, however they should not be relied on exclusively to design to enhance RA needs as each event is unique to itself.

- i. How would MISO's Seasonal Reforms and Minimum Capacity Requirement proposals have reduced reliance on non-firm external commitments?

MISO Response: These RA Construct modification would not have reduced reliance on non-firm external commitments. During this event non-firm energy was economic therefore it was ideal to leverage those resources during this event.

Request 14: 2020/2021 Planning Year Performance

- a. How many ZRCs did MISO clear in the 2020/2021 Planning Resource Auction?
- b. What was MISO's peak load on February 15, 2021?
- c. What was MISO's peak load on February 16, 2021?
- d. What was MISO's peak load on February 17, 2021?
- e. What was MISO's peak load on February 18, 2021?
- f. How many MWs from resources that cleared in the 2020/2021 Planning Resource Auction were unavailable during the daily peak due to Planned Outages on February 15, 2021?
- g. How many MWs from resources that cleared in the 2020/2021 Planning Resource Auction were unavailable during the daily peak due to Planned Outages on February 16, 2021?
- h. How many MWs from resources that cleared in the 2020/2021 Planning Resource Auction were unavailable during the daily peak due to Planned Outages on February 17, 2021?
- i. How many MWs from resources that cleared in the 2020/2021 Planning Resource Auction were unavailable during the daily peak due to Planned Outages on February 18, 2021?
- j. How many MWs from resources that cleared in the 2020/2021 Planning Resource Auction were unavailable during the daily peak due to Unplanned Outages on February 15, 2021?
- k. How many MWs from resources that cleared in the 2020/2021 Planning Resource Auction were unavailable during the daily peak due to Unplanned Outages on February 16, 2021?
- l. How many MWs from resources that cleared in the 2020/2021 Planning Resource Auction were unavailable during the daily peak due to Unplanned Outages on February 17, 2021?
- m. How many MWs from resources that cleared in the 2020/2021 Planning Resource Auction were unavailable during the daily peak due to Unplanned Outages on February 18, 2021?
- n. Under MISO's proposed Seasonal Reforms, how many MWs of Planned Outages from capacity resources that cleared the PRA would MISO have expected to see during each of the above-mentioned days?
- o. Under MISO's proposed Seasonal Reforms, how many MWs of Unplanned Outages from capacity resources that cleared the PRA would MISO have expected to see during each of the above-mentioned days?
- p. What were the causes of Unplanned Outages for capacity resources that cleared in the 2020/2021 PRA during the period of February 15-18, 2021?

q. How would MISO's proposed Seasonal Reforms have reduced the risk of those outages occurring?

r. During the period of February 15-18, 2021, what were the daily peak imports and exports?

s. 2,987 ICAP MWs and 2.331 UCAP MWs of non-firm external support were modeled in the 2020/2021 LOLE Study. MISO saw upwards of 10.3 GWs of non-firm external support during the February 2021 winter weather events. Relying on more non-firm external resources than assumed in the LOLE Study indicates a higher Loss of Load Expectation risk.

MISO Response: On March 23, 2021 at the Market Committee of the Board of Directors meeting MISO provided an overview of the February 2021 Artic Weather event. A link to those materials can be found [here](#). In addition, MISO published a white paper of findings and lessons learned from the February Artic Event. That paper can be found [here](#). These resources provide a timeline of events, impacts to the system and lessons learned. For the information requested in this question, MISO would point stakeholders to these artifacts.

i. What does MISO expect would have happened if only 2.3 GWs of non-firm external support committed to MISO during the February 15-18, 2021 period? What additional operating actions would MISO have needed to take?

MISO Response: MISO follows it's established Emergency Operations Procedures to make decisions during tight operating conditions. Depending where MISO was in that process, that would dictate the additional actions MISO would have taken.

ii. Under MISO's Seasonal Reforms, how will non-firm external UCAP be converted to SAC?

MISO Response: Will continue to use UCAP for external resources for initial implementation.

iii. Under MISO's Seasonal Reforms, how many more internal capacity resources would have been available to serve MISO load during the February 15-18, 2021?

MISO Response: This cannot be determined.

Request 15: Please develop a historical simulation of MISO's proposal over one or several recent emergency event (e.g. Feb 2021 extreme winter weather). As a part of this, please quantify and demonstrate the potential impact of MISO's proposal on the reliability experienced during the event.

MISO Response: Please see response to request 14 for the answer.

Request 16: Please provide justification for adjusting the PRMR and LCR post-LOLE modeling by the SAC/UCAP ratio. Provide evidence that proves reliability will at least be maintained by adjusting the PRMR and LCR post- LOLE analysis using the adjustment ratio.

MISO Response: MISO has adopted the IMM's recommendation to leverage a UCAP/SAC conversion ratio which will not adjust the PRMR and LCR. PRMR and LCR derived from seasonal LOLE analysis will remain at the UCAP terms without any conversion ratio adjustment to maintain the one day in 10 reliability standard.

Request 17: Please provide any defined summary metrics on a seasonal basis demonstrating the system reliability for each of the historic seasons of the previous four years of available data.

MISO Response: MISO publishes an LOLE report each year that covers the results of the most recent LOLE study. However, due to the annual assumptions that go into that study, the summer is the only season that shows risk historically. As a result, breaking out the past annual LOLE metrics to a seasonal basis would be misleading.

<https://cdn.misoenergy.org/PY%202021%202022%20LOLE%20Study%20Report489442.pdf>

Request 18: Please provide at least 10 years of historical peak date / times for MISO and each LRZ on a seasonal basis in a format similar to what is provided under the current annual construct. If MISO is unable or unwilling to provide historical peak information, please explain why.

MISO Response: MISO compiled and posted with November RASC materials the historical peak date/times for MISO and each LRZ on a seasonal basis for the past 10 Planning Years.

Request 19: Please provide a guide to explain what information market participants can request from MISO related to its RA proposal, how that information is organized, relevant assumptions / sources of data, and how the data should be interpreted.

MISO Response: MISO will provide net surplus/deficit positions by Market Participant related to the RA proposal, individual CPNode level SAC values as well as the detailed data related to the SAC calculation for one resource. This data will be exactly like the sample data that was posted in previous Workshops. The net surplus/deficit position should be interpreted similar to how market participants interpret their current net positions in the existing annual construct.

Request 20: ETEC has identified issues related to the data it has received from MISO thus far and is working with MISO staff to understand and correct those issues.

MISO Response: MISO continues working with ETEC to address the set of identified issues related to SAC calculation in a collaborative fashion.

Request 21: Will a simulated Planning Reserve Auction be performed to show the projected impacts of capacity balances at a zonal level?

MISO Response: MISO does not intend to re-run or simulate Seasonal Planning Resource Auctions. This type of simulation would require significant assumptions in order to develop ZRC Offers, availability, and changes to outage decisions Market Participants might have made given different tariff provisions and time periods.

Request 22: The IMM proposed method of scaling SAC MW to the zonal SAC MW using the RATIO UCAP/SAC results in a distribution of adjusted SAC MW values. Half of the distribution is higher accredited SAC MW than the base SAC MW values, and half are below the base SAC MW values. MISO has stated that they will only provide detailed SAC MW accreditation calculations for one CP Node. Given the need to show the adjusted SAC MW values for each generation unit in order to properly assess the generation and load balance, MISO must provide the SAC MW values for each generation unit.

MISO Response: MISO will evaluate providing updated ZRC/PRMR surplus deficit positions to individual Market Participants, likely after the filing has been submitted.

Request 23: Currently the SAC data is calculated using the “RT Offer EmerMax.” average over the previous 3 years

a. Where can MP get this number for their units?

MISO Response: Market Participants can make this request through MISO’s External Affairs team. Much of this data has already been shared with stakeholders. Market Participants may have this data available internally as they are portal submittals. MISO will incorporate this data into the Module E Capacity Tracking Tool (MECT) as part of implementation.

Request 24: WPPI would like to thank MISO for the response to Request 13 in the Additional Analysis Requests in the Q&A document providing an analysis showing the number of planned outages in recent years that exceeded 31 days across MISO. We found this very informative. We would ask that MISO expand upon this information and provide some additional details to help stakeholders understand the amount of potential capacity that may be unavailable in each season by providing additional analysis mentioned below.

- Could MISO expand upon this table by breaking down the number of outages >31 days by season?
- Also, the average size of the generators that were in outage by season.

MISO Response: The table below is for the 3 planning years 2018-19, 2019-20, and 2020-21 which covers the 36-month period June 2018 through May 2021. The data is for units that report in MISO PowerGADS. The top 4 sections of the table provide the number of outages greater than 31 days, the total number of outages, and the average unit size in MW for outages greater than 31 days by season.

The bottom section are the totals by season for the three planning years.

Season	Winter	Spring	Summer	Fall
2018				
Months			Jun-Aug 2018	Sep-Nov 2018
# outages > 31 days			30	114
# total outages			212	501
Avg. Outage > 31 days (MW)			97.0	197.3
2019				
Months	Dec 2018-Feb 2019	Mar-May 2019	Jun-Aug 2019	Sep-Nov 2019
# outages > 31 days	50	95	33	77
# total outages	279	617	224	516
Avg. Outage > 31 days (MW)	235.8	216.3	105.3	214.2
2020				
Months	Dec 2019-Feb 2020	Mar-May 2020	Jun-Aug 2020	Sep-Nov 2020
# outages > 31 days	41	62	17	117
# total outages	296	458	272	576
Avg. Outage > 31 days (MW)	143.0	236.0	106.2	197.1
2021				
Months	Dec 2020-Feb 2021	Mar-May 2021		
# outages > 31 days	48	103		
# total outages	291	607		
Avg. Outage > 31 days (MW)	84.4	210.4		
Summary Total	PY 2018-19 through PY 2020-21			
Months	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
# outages > 31 days	139	260	80	308
# total outages	866	1682	708	1593
Avg. Outage > 31 days (MW)	176.4	228.8	102.4	201.4

Request 25: Please provide an updated hourly RA hours file, calculated as per the specified performance period (9/1 – 8/31), for 9/1/2017 through 8/31/2021. The latest example calculation file appears to only contains data for MISO South.

MISO Response: MISO will provide the file at the January RASC.

Request 26: Please provide the seasonal planning reserve margin percentages that are consistent with the seasonal UCAP/SAC gross-up factors presented in MISO's latest example calculation file.

MISO Response: The IMM's proposal of a UCAP to SAC conversion ratio MISO adopted in its revised proposal is intended to convert individual thermal resource SAC values back to UCAP terms without adjusting the PRMR derived from seasonal LOLE analysis which will remain at the UCAP terms. The table below illustrates the seasonal PRM results based on PY21/22 LOLE modeling assumptions.

PRM% SUMMER	7.51%
PRM% FALL	11.82%
PRM% WINTER	21.35%
PRM% SPRING	26.27%

Is it likely that each season will have very divergent Planning Reserve Margins?

MISO Response: Yes, depending on a combination of factors such as resource mix and availability, load factors, and outage scheduling patterns.

When attempting to recreate our capacity position, is it reasonable at this time to assume that the Planning Reserve Margin will be close to 8.9%?

MISO Response: No, the Planning Reserve Margin percentage will vary by season as seen in the table above based on the Planning year 21/22 study assumptions, driven by seasonality of resource mix, performance, load factors, outage scheduling, etc.

If generators with >31 days are excluded from participation in the PRA, will these outages also being used in the LOLE study result in an effective double counting of outages during those times?

MISO Response: No, although MISO will continue to strive to improve planned outage modeling. There is no exclusion from participation for > 31 days of Generator Planned Outages but such resource may forego offering excess ZRCs into the auction for one or more Seasons if the IMM determines that they can do so. The LOLE study helps set the requirements and accreditation helps demonstrate the requirements are met. Currently we count forced outages in LOLE and in UCAP accreditation and it isn't considered double counting.

Request 27: Analysis comparing the level of volatility associated with UCAP unit ratings vs Seasonal Accredited Capacity (SAC) unit ratings.

MISO Answer: MISO would like to reiterate that the existing UCAP method is based on general availability across all hours of the year and does not differentiate periods of tight operating conditions or high risks. The proposed SAC method reflects general availability while emphasizing availability during times of greatest needs or RA hours with a tiered weighting structure. Comparing these two methods will not provide meaningful insights on volatility given fundamentally different design by nature. The key principle of the proposed accreditation is to determine the relative accredited values among different resources to align with their actual performance during times of needs while maintaining the overall supply and demand balance at the footprint level. By design, more resource level volatility with the proposed accreditation methodology would be expected but in aggregate the proposal leads to very little volatility at the MISO system wide level from year to year, especially over time. Averaging historical availability over 3 years and the 20 % weighting towards the general availability help mitigate volatility in SAC values. Any one season represents ~1/3rd of accreditation potential similar to today where one PY represents ~1/3rd of accreditation potential.

Request 28: Analysis showing how MISO determined the 20/80 tier 1 to tier 2 weighting and data showing the impact of using a 50/50 tier 1 to tier 2 weighting

MISO response: MISO proposes a two-tiered calculation to determine individual resource accreditation by season. The first tier will determine each resource's real time offered availability during non-tight operating condition hours and the second tier will determine each resource's real-time offered availability during hours with the tightest operating conditions, including declared MaxGens. The second tier will be more heavily weighted so that the majority of a Resource's accreditation will be based on its availability during times of need. MISO supported the IMM's recommendation to base 100% of accreditation on availability during times of need but introduced a revised two-tier proposal in May with 20% weighting based on availability during hours that aren't tight to accommodate stakeholder requests that these hours should still be relevant to resource accreditation. We modified the proposal to recognize that general availability supports reliability by allowing resources to take needed maintenance outages and that general availability reduces the time the system is operating within the margin of error for capacity sufficiency. Each tier calculation will account for exemptions obtained by sufficiently coordinating planned outages when determining availability.

MISO has provided EOCs with surplus/deficit positions using a Tier 1 weighting of 40% and a Tier 2 weighting of 60%. This will be the first weighting applied as part of a transition to the 20%/80% weightings in Year 3.

Request 29: Analysis demonstrating how the LSE PRMR requirements and surplus/deficit positions would change if MISO calculated the SAC to UCAP ratio on a regional basis (in alignment with how RA hours are selected), as opposed to on a MISO wide basis as currently proposed.

MISO Answer: The purpose of applying a SAC to UCAP ratio to convert SAC back to UCAP terms is to provide a better alignment between PRMR requirements derived from LOLE analysis and the resource accreditation values. MISO's LOLE analysis is performed on a system-wide basis, which is what the current SAC/UCAP ratios are based upon. Using a regional SAC/UCAP ratio would misalign the LOLE study with the accreditation values.

MISO did determine regional RA hours because the North/Central region may not always be tight when the South region is tight or vice versa. The accreditation proposal is based on availability when system conditions were tight or times of need. Basing accreditation without determining RA hours on a regional basis would not align with that principle.

K. Questions & Comments In-process

MISO has responded to all stakeholder comments and questions received through the stakeholder feedback submission tool.

L. Additional Comments

11/3 Comment 1: It seems to MidAmerican, based on an accumulation of MaxGen events and capacity advisories, MISO's real-time operating issues are a result of planned and forced outages combined with a lack of wind generation. The current proposal does not at all address intermittent resources and if the current construct gets approved by FERC and any future efforts addressing intermittent resources does not get approved, MISO will find itself with a resource adequacy construct that is unjust and unreasonable. In fact, the IMM indicates in their October 6 presentation at the RASC that the current proposal does discriminate in favor of non-thermal resources. MidAmerican would support a more encompassing approach where all resource types are addressed in one single filing. Until this fully gets

address resource planners, especially those with large amounts of intermittent resources, are just in a holding pattern waiting to see how intermittent resources are addressed in Q1 of 2022.

MidAmerican is also concerned about the capacity replacement requirement for planned outages that exceed 30 days. Given a seasonal construct, a load serving entity could have their peak load change throughout the season significantly. For example, a peak load in September could be 15% higher than the peak load in November, yet a 30-day outage in September and early October is treated identical to an outage in late October and November. Although MidAmerican believes this approach has not been properly vetted, MidAmerican would like to recommend that MISO does not implement the capacity replacement requirement for planned outages that exceed 30 days during the first four years.

MidAmerican would be fine if a unit with a schedule outage lasting more than 2/3 of the season be ineligible for capacity during that season.

MidAmerican would prefer an enhanced UCAP seasonal approach including both forced outages and scheduled outage that are not scheduled with a positive operating margin so that the LOLE study would result in a higher overall PRMR, which would increase overall reliability. In addition, MidAmerican would also support a requirement for a portion of the PRMR having specific characteristics that would include things such as start time or ramp rate. For example, the RA construct could require 10% of your PRMR be able to be online within 4 hours from a cold start. Of course, the actual values would be based on technical analysis and not what "feels" appropriate.

MISO Response: While it would be ideal to address all resource types at one time, MISO believes it is urgent to take action sooner rather than later and the current proposal reflects the majority of the current resource fleet. MISO will continue to address other resources (ELCC for solar, LMR accreditation) in subsequent filings.

Regarding Capacity Replacement, because MISO is transitioning to seasonal and lowering requirements across many seasons while also facilitating planned outages (to take entire seasons off), MISO believes capacity replacement for the seasons in which they offer in is a high priority. MISO believes resources should be available for at least 2/3 of a season. To allow resources to be on outage greater than 1/3 a season without replacing their capacity is inconsistent with sufficient reliability commitments from a resource for the season.

Finally, MISO's accreditation needs to reflect resources availability during times of greatest risk and need. Consistent with the findings in the RAN white paper of August 2020, MISO is not considering flexibility requirements in this wave of RA enhancements. MISO will be considering additional flexibility needs and approaches in the future.

11/3 Comment 2: Duke does not agree with the IMM's belief that expected replacement costs, which may be the penalty of days of 30 for an outage, should not be allowed to be included in the participants offer. Duke feels that capacity may be artificially withheld as the generator will be forced into two choices of participate or not participate in the auction. If costs could be included, there would be more of an offer curve that may keep an artificially high clearing price from occurring.

MISO Response: Please refer to miso response to 11/3 Question 10 in section C.

A Resource contemplating a Generator Planned Outage in excess of 31 days can request approval from the IMM prior to the PRA for exclusion from physical withholding market mitigation measures, and if approved, not offer the Resource. If such a request is approved, the IMM has indicated a Resource could still offer at its discretion and at that point that it would be able to offer the excluded portion of the resource at any price up to the offer cap without the need to get a facility specific Reference Level. MISO has added the IMM's recommended provisions in section 64.1.1.g.xi of Module D.

11/3 Comment 3: Minnesota Power appreciates the opportunity to ask MISO additional clarifying questions on elements of MISO's proposed Resource Adequacy reform. Minnesota Power believes in order to develop consensus among stakeholders and understanding, having MISO response to these questions is valuable to MISO market participants so that they can evaluate, comprehend, and participate fully in discussions of solutions. Minnesota Power does continues to believe that the schedule proposed by MISO at the "RA Construct Filing: Timeline Update" meeting on September 20th, 2021 for a RA construct filing date no later than December 1, 2021 is not sufficient time. Minnesota Power continues to support the timing proposed in the September 1, 2021 motion of a FERC filing date of no sooner than the 2nd quarter of 2022.

MISO response: MISO appreciates the desire but feels strongly that the footprint faces a reliability imperative that requires action in timely fashion.

11/18 Comment 4: The EOCs believe that if MISO adopts the IMM's proposal on adjusting for the UCAP to SAC shift, that the Local Clearing Requirement (LCR) should be scaled by the zonal SAC to UCAP ratio to ensure that the new SAC accreditation methodology does not result in a worse zonal LCR surplus/deficit position than the LCR surplus/deficit position calculated using the existing UCAP accreditation method.

The EOCs believe that MISO has failed to demonstrate that 31+ day outages, and more specifically nuclear refueling outages, are causing system reliability problems. Additionally, even if MISO is able to demonstrate that these longer planned outages are the source of system risk, the EOCs believe this issue would be better addressed through reforms to the outage coordination process, not the resource adequacy construct. If MISO insists on addressing 31+ day planned outages via reforms to the PRA, the EOCs believe it would be more reasonable to pro-rate a unit's accredited capacity for the season in which the 31+ day outage occurs rather than requiring an owner to find and purchase replacement capacity or encouraging resources to be held back from the PRA.

The EOCs continue to support and would request that MISO consider the following transition mechanisms listed below. The EOCs believe that implementing these mechanisms will not delay the ultimate benefits that MISO is looking to accomplish via the proposed resource adequacy construct, instead these mechanisms will lower the risk of significant decreases in accredited capacity and large PRA price increases during the transition period.

- During the first three years under the new construct, use UCAP unit ratings measured on a seasonal basis; [2]
- During the first three years under the new construct, constrain the Local Clearing Requirements (LCR) for the non-summer seasons so the non-summer LCRs do not exceed the summer LCR value;
- During the first four years, do not implement the capacity replacement requirement for planned outages that exceed 30 days; and
- During the first four years under the new construct, do not adjust the daily CONE value based on the number of seasons an LRZ is deficient relative to the LCR requirement. To explain further, during this four-year period, the daily CONE value should always be equal to the annual CONE value divided by the number of days in the planning year.

MISO's Response: MISO appreciates the feedback and desire to include the above items as part of the transition. Because MISO believes the footprint faces a reliability imperative, the need to transition to a

new RA Construct requires adoption sooner rather than later. MISO did accept a stakeholder recommendation to phase in the weighting between Tier 1 and Tier 2 over a three year period. Beginning in 2023/2024 with a weight of 40/60, to 30/70 in 2024/2025, and ending up with the full adoption of the 20/80 weighting in 2026/2027. Adopting this transition will lessen the impact of any accreditation changes in the near-term while providing more time for stakeholders to adjust operations before the entire weighting takes effect.

11/18 Comment 5: CE reiterates its support for working toward a new performance-based accreditation. The challenge at this time is that MISO has not presented finalized Tariff Language and proposal details, nor has MISO addressed outstanding stakeholder questions and concerns.

This ambiguity limits stakeholders' ability to evaluate the final proposal's impact to their generation fleets and reduces the time to evaluate what changes operations will need to make. Consumers Energy continues to recommend that MISO separate the Seasonal Auction component of the proposal filing from the Seasonal Accredited Capacity (SAC) portion and to delay filing of the SAC portion until the outstanding proposal details cited below are finalized and a reasonable and feasible transition plan has been presented and vetted through the stakeholder process. This allows sufficient time to finalize and address outstanding questions regarding the SAC portions of the proposed construct including outstanding final proposal details that MISO was still considering as of the October 20, 2021 workshop. Such outstanding items include the IMM's recommendations regarding discretion to replace capacity for committed resources, the IMM's recommendation regarding the UCAP/SAC ratio, and the transition plan.

Furthermore, Consumers Energy disagrees with MISO's assertion that that the seasonal and accreditation components of the proposal cannot be separated and the latter delayed. In essence, MISO stated that filing the seasonal portion of the construct without the accreditation portion of the construct would mean that there is no performance metric or obligation on the generator. This is incorrect. Generation resources would still be subject to the existing EFORD/UCAP methodology which, while imperfect, also penalizes generation resources for unavailability. Also, MISO has not presented evidence for Stakeholders to validate that the proposed SAC methodology would work any better than the existing EFORD/UCAP methodology.

With the many layers of this still-to-be-finalized Resource Adequacy Construct Proposal, after separating the seasonal and accreditation portions of the filing (and delaying the latter), any new accreditation methodology implementation should be through a phased approach. For example, instead of beginning with an 80/20 accreditation (80% of accreditation determined during tight hours, 20% of accreditation determined during non-tight hours), a phase in of this accreditation allocation is more appropriate.

The above three suggestions (separating the seasonal from the accreditation filings, delaying the accreditation portion of the filing for further development, phasing in the tight hour/non-tight hour accreditation allocation) will allow Generation Owners the ability to evaluate each component in isolation and lessen the likelihood of unintended negative resource adequacy consequences from occurring, especially when one considers that the current EFORD/UCAP methodology is the industry standard and the proposed SAC methodology is completely untested.

This necessary delay might also allow for renewable resource seasonal accreditation review which would then align the accreditation of a Market Participant's entire generation fleet (both thermal and renewable).

MISO's Response: MISO respects stakeholder's perspectives to disagree with potential negative impacts decoupling requirements from accreditation. As reviewed in stakeholders in a presentation June of 2020, in order to meet future reliability risks, there needs to be an alignment between Resource Adequacy Requirements and Resource Accreditation. To adjust requirements on a seasonal basis without adjusting resources seasonal accreditation could potentially create more risk for the MISO system. Since 2016, over 60% of MaxGen events have occurred outside of the summer. Creating a scenario where requirements are considered on a seasonal basis and resources are accredited on an annual basis could exacerbate capacity shortfalls.

See MISO's response to comment 4 of this section respect to adoption of Tier 1 and Tier 2 weighting.

12/17 Comment 6: The EOCs believe that MISO's proposed implementation schedule does not allow enough time for market participants to adapt to the new resource adequacy construct and may unreasonably result in EOC customers being exposed to elevated PRA clearing prices for the initial years that the construct is implemented with no meaningful opportunity to plan for or mitigate exposure to such costs. Regardless of whether sharply increased PRA clearing prices represent an efficient result – and the EOCs believe strongly they do not – it is beyond reasonable dispute that implementing a dramatic change in the market design that causes clearing prices to increase sharply with no opportunity for LSEs to react or mitigate exposure to such prices is unjust and unreasonable. The EOCs concern of elevated PRA risk is based on MISO's latest projected impact data presented in the November RASC which shows that the MISO proposal would reduce the current 21/22 LRZ 10 Local Clearing Requirement (LCR) surplus position from ~1,700 MW to ~100 MW for the winter season ("with the stroke of a pen") and would reduce the LRZ 7 LCR surplus position from ~2,000 MW to ~0 MW for the winter season. It should be noted that MISO's projected impact numbers do not take into account the amount of capacity that generation owners may newly withhold from the auction due to planned outages that exceed 31 days (e.g., nuclear units on refueling outages) in response to new rules penalizing resources that incur such outages, which would only worsen the surplus/deficit LCR positions.

EOCs have not objected to moving to seasonal RA planning auctions, but the projections noted above should be cause for significant concern by MISO regarding its design of the sub-annual construct. The seasonal planning auctions contain an RA hours selection methodology using historic, operational real time events that vary from year to year. Using tight margin hours across an entire year to establish an average accreditation value can be a poor predictor of a resource's future performance for a given season. Stated another way, the link between the cost consequences and the planning behavior MISO wants to incent is marginal at best. EOCs support MISO's Minimum Capacity Requirement (now Minimum Capacity Obligation or "MCO") and believe may afford some modest incremental benefit with respect to the planning resource issues MISO wants to address. MISO should file the MCO changes separately and consider the EOC's transition suggestions (see below) allowing for a gradual transition to, and an assessment of, MISO's proposed Sub-Annual Construct changes.

The time between when FERC would likely approve MISO's proposal and the first day the proposal would go into effect (June 1, 2023) is roughly ~15 months. Given the length of time it takes to plan and construct new generation and transmission assets, this is not enough time for market participants to take any meaningful actions or make system investments to improve

their zone's LCR position. Additionally, the 23/24 PY will use unit accreditation ratings that are based on historic unit performance from September 2019 through August 2022, meaning that at the time FERC would approve this proposal, the facts and circumstances that drive over 2/3 of the period dictating a unit's rating will already have occurred, leaving little opportunity for generation owners to take any actions to try to improve unit accreditation ratings before the 23/24 PY.

It should be undisputed that sweeping changes to the design of the resource adequacy construct in MISO should include reasonable safeguards to protect LSEs and their customers from unreasonable harm. Even if it were accepted that MISO's sweeping changes are necessary to ensure reliability, to implement those changes with no opportunity for LSEs to react and adapt their behavior to mitigate risk would be unreasonable. The occurrence of clearing prices at or near CONE may or may not be an efficient outcome, but to force customers in MISO to bear those costs on day 1, based solely on MISO's decision to change the market rules, and with no opportunity to react, amounts to an unreasonable penalty and a wealth transfer – and it does nothing to improve or ensure reliability or resource adequacy in MISO. Despite the elevated risk of CONE pricing and the short implementation timeline, MISO has not proposed any meaningful transition mechanisms to safeguard customers from the risk of exorbitant PRA clearing prices during the transition period from the old construct to MISO's proposed construct. The one transition mechanism that MISO has proposed, phasing in the tier 1 and 2 accreditation weightings, will likely not result in a significant increase in supply across MISO, and could possibly result in a loss of capacity for some zones and seasons.[\[2\]](#) For this reason, the EOCs are not confident that this transition mechanism is sufficient to mitigate CONE pricing during the transition period. In past feedback requests, the EOCs have proposed the following transition mechanisms, all of which MISO has not only failed to incorporate into its proposal but also failed to respond to in any meaningful way or to explain why such transition mechanism is unacceptable or unworkable in whole or in part:

- During the first three years under the new construct, use UCAP unit ratings measured on a seasonal basis; [\[3\]](#)
- During the first three years under the new construct, constrain the LCRs for the non-summer seasons so the non-summer LCRs do not exceed the summer LCR value;
- During the first four years, do not implement the capacity replacement requirement for planned outages that exceed 31 days[\[4\]](#); and
- During the first four years under the new construct, do not adjust the daily CONE value based on the number of seasons an LRZ is deficient relative to the LCR requirement. To explain further, during this four-year period, the daily CONE value should always be equal to the annual CONE value divided by the number of days in the planning year.

The EOCs again request that MISO include all, or at least some, of these mechanisms in the proposal in order to lower the risk of large PRA price increases during the transition period with no reasonable opportunity for LSEs to react or mitigate their exposure.

The EOCs request that MISO answer the following questions:

- Given that (1) the amount of time between FERC approving MISO's tariff and the day the proposal would be implemented is roughly ~15 months, and (2) 2/3 of a unit's historical performance hours for the 23/24 PY will already have occurred by the time FERC would accept MISO's proposal, what actions does MISO believe market participants reasonably can take over 15 months to improve their zone's LCR surplus/deficit position?
- What impact will MISO's proposed transition mechanism (change to the tier weightings) have on the projected zonal LCR positions?
- If MISO's proposed construct causes customers to pay CONE pricing in the PRA in the first year the construct is implemented (~15 months after FERC approves the construct) with no opportunity to mitigate their risk of such pricing, does MISO believe this is an acceptable outcome?
- An explanation of how exposing an LSE to CONE pricing based solely on sweeping market design changes is consistent with MISO's value proposition for membership.
- A calculation of how the net benefits of MISO participation would be affected if a substantial number of MISO LSEs incur CONE pricing in the initial year the RAN proposal is implemented with no opportunity to mitigate their exposure to such pricing.
- Please provide analysis showing the correlation between system reliability events and planned outages that exceed 31 days.
- Please provide the following data for all system reliability events over the prior 5 years:
 - The amount of nuclear capacity offline in a refueling outage that ended up being greater than 31 days.
 - The amount of nuclear capacity offline in a refueling outage that was less than 31 days.
 - In recent years, how many of the 31+ day nuclear refueling outages were planned during times with a positive maintenance margin?

MISO Response: The RAN initiative was launched at the RASC in September 2017 with particular focus on planned outage correlation contribution to MaxGen declarations. The MISO region is increasingly facing complex reliability risks outside of the typical summer peak load periods with increasing non-summer Emergency operations MISO experienced in the past several years, creating a Reliability Imperative for the region. The February Arctic Event is a great example that reinforces the urgency for change including the proposed RA reforms to ensure system reliability. The proposed RA changes are to address the near-term reliability risks we are facing today and to prevent future risks driven by ongoing changes to the resource portfolio.

MISO doesn't have the luxury to take a "wait and see" approach to address these critical reliability issues. MISO believes it is a shared responsibility between MISO, its members, and regulatory authorities to address the challenges that threaten reliability in the MISO region. As explained by MISO's Chief Executive Officer, John Bear: "Utilities, states, and MISO all have roles to play to address these challenges. MISO calls this shared responsibility the Reliability Imperative. We think the word "imperative" is appropriate for several reasons. First, the work we are doing is not optional—to maintain system reliability, we must respond to the unprecedented change we and our members face. Second, this work cannot be put off for months or years—much of it has long lead times, so we need to act now. And third, our stakeholders are counting on us—regulatory agencies, utilities and other entities are looking to MISO to identify problems and find solutions."

Transition mechanisms: MISO proposes to implement the new seasonal RA construct in PY 2023/24 with certain transitional mechanisms. Specifically, the existing RAN Phase I outage exemptions will be applied for PY 2023/24 – 2024/25 until they phase out in 2025/26. The RAN Phase 1 exemptions will provide full Tier 1&2 exemption for Generator Planned Outages that begin prior to September 2022. Additionally, MISO also adopted stakeholder proposal of a transition period to phase in Tier 1 and Tier 2 weighting for SAC calculation. Resources with better tier 1 general availability will retain more accredited value with 40/60 transitional weighting until they reach the proposed final 20/80 weighting at the year 3.

MP possible actions: The projected zonal impact analysis results presented at the Nov RASC meeting reflects the current trends of zonal positions on a seasonal basis. The goal of the proposed accreditation is to improve relative accredited capacity values among resources by aligning accreditation with resources' availability during times of need. Market Participants may make upgrades to their fleet and request class average treatment for year 1, take actions to enhance availability of current assets and sufficiently coordinate Generator Planned Outages to receive exemptions, reconsider resource retirement plans, renew or acquire PPAs, procure existing assets or accelerate resource additions, or enhance transmission buildout to increase Zonal Import Limits where possible to meet the projected seasonal LCR requirements, beyond the proposed transitional mechanisms described above.

MISO also provides detailed responses to some specific comments regarding zonal LCR position, RA/SAC volatility and AAOC rationale, and planned outage analysis.

- 1) Zonal LCR position drivers and impacts: Zonal net positions to meet seasonal LCRs are driven by a number of factors, resource mix and resource performance and availability within the zone, load profiles, and seasonal Capacity Import Limits. The current annual zonal LCR positions are derived based on summer focused assumptions and doesn't reflect seasonality of resource capabilities, load and capacity import limits under proposed seasonal construct. Specifically for Z10, the reduction in its LCR surplus in winter season is primarily driven by a significant reduction in its winter CIL value which reflects the winter system conditions.
- 2) RA hour/SAC volatility and AAOC for deficient hours. MISO proposes to have a minimum 65 RA hours for any season to support stability of accreditation values and avoid situations where resource accreditation will be based on a small number of consecutive days or hours that a resource might miss entirely. For any season that lacks sufficient hours, the accreditation will augment the deficient number of hours less than 65 for that resource with its Annual Average Offered Capacity (AAOC) over the tightest ~3% of hours during the year, or 260 hours (65x4). We believe it is prudent to supplement deficient seasonal RA hours with a proxy based on AAOC as it reflects the next best available information about a resource's availability during times of need. However, use of a twelve hour notice requirement for offline resources when identifying RA Hours gets most Seasons to or near the 65 hour per Season target.
- 3) Planned outage analysis. MISO reviewed planned outages for the last three planning years (June 1, 2018 through May 31, 2021) and shared summaries in the QA document. Overall, 86.4% of planned outages within the three planning years are less than 31 days and average refueling planned outages for nuclear resources are 41 days. All "timely" nuclear planned outages submitted >3 years in advance per Module C of the Tariff would get full exemption under the proposed outage exemption rules for SAC calculation as MM doesn't even track 3 years forward and so would not result in negative MM.

Specifically, the table below summarizes the planned outages occurred during the 2021 February event by sub-region. There were no nuclear resource planned outages during the event.

2021 February Arctic Event

Region	Date	All PO + PE		>31 days PO+PE	
		Events	Total MW	Events	Total MW
North and Central	2/16/2021	54	3,448.2	35	2,117.9
South	2/15/2021	12	1,435.2	8	1,142.9

This is for units that report GADS events to MISO.
PO is planned outage and PE is planned outage extension.

Comment 7: While CE supports performance based accreditation, the current SAC proposal is complicated, continues to evolve, and generates additional questions each time new information is presented and stakeholder questions are addressed or partially addressed. We strongly reiterate the request to delay filing the SAC portion of the current RA Construct until a final proposal is reached, outstanding questions addressed and stakeholders have the opportunity to review the proposal's impacts on their fleets, whether through MECT or other manual calculations that can be reasonably replicated to address necessary changes in operations or planning.

- CE asked previously about upgrades to a unit capacity/GVTC and how this would be addressed in the SAC calculation. MISO's response was that accredited values would only be fully reflected the third year after the upgrade occurred. This leads to our current question regarding differences in capacity and accreditation values as well as offer requirements in the Day Ahead and Real Time auctions, especially with regard to what clears in the annual seasonal auction as compared to a unit's entire capability. What happens if a unit has 400 MW but only clears 300 MW in the auction. If we do not offer the other 100 MW capacity in some form or put it into an extended derate to complete maintenance, would we be taking capacity accreditation hits for this uncleared but otherwise available capacity?

MISO Response: MISO included the tariff redline on resource upgrade treatment in Schedule 53 to reflect capacity increase due to resource upgrades.

M. Post RA Construct Filing Initiatives

Additional Impact Analysis

Additional process enhancements, such as CIL/CEL methodology

RA Construct Reforms Implementation, tool enhancements (MECT, CROW)

Accreditation Modifications

- Evaluation of ELCC for non-thermal resources
- LMR/DR availability
- AME resources
- External resources

Market Power study and potential development for mitigation rules for Minimum Capacity Obligation

BPM changes to reflect implementation of RA Construct