

## **Schedule 53**

### **Seasonal Accredited Capacity Calculation**

#### **I. General**

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, External Resource, Use Limited Resource or Distributed Energy Aggregated Resource will be determined pursuant to this Schedule 53. The resources accredited pursuant to this Schedule 53, as described above, are here and after referred to as “Schedule 53 Resources”. A two-tiered weighting structure is used to calculate Seasonal Accredited Capacity for Schedule 53 Resources. Outage exemptions for planned outages and exemptions for any operating limitations, such as thermal, voltage, or stability limits referenced in the BPM for Outage Operations, provided by the Transmission Provider or Transmission Operator to preserve the reliability of the Transmission System, that modify the must offer obligation set forth in Section 69A.5.a will be factored into calculating the tiers of a Schedule 53 Resource’s Seasonal Accredited Capacity.

#### **II. Tier 1 and Tier 2 Planned Outage Exemption Requirements**

Generator Planned Outages scheduled to begin before September 1, 2022, will be granted a Tier 1 and Tier 2 exemption based on Section 38.2.5.g.ix., and as set forth in the Business Practices Manual for Resource Adequacy. Generator Planned Outages scheduled to begin on or after September 1, 2022, will be evaluated for Tier 1 and Tier 2 exemptions based on the following requirements. Only full Generator Planned Outages or full Proposed Generator Planned Outages shall be eligible for the Tier 1 and Tier 2 planned outage exemptions set forth below.

<b>Generator Outage Submission Criteria</b>	<b>Maintenance Margin <math>\geq 0</math> for duration of outage</b>	<b>Maintenance Margin <math>&lt; 0</math> for any day in the duration of outage</b>
>120 days prior to outage start date, and >120 days from end of previous outage for unit	Exempt Tier 1 & 2	Exempt Tier 1 Only
>120 days Prior to Outage Start date and <120 days from end of Previous outage for unit or Outage submitted between 31-119 days Prior to outage start date	Exempt Tier 1 Only	No Exemption
14-30 days prior to outage start date and passes No Harm Test	Exempt Tier 1 Only	No Exemption
Outage moved per MISO request	Exempt Tier 1 & 2 (Weather, forced outages, other conditions in BPM-008)	Exempt Tier 1 & 2 (Weather, forced outages, other conditions in BPM-008) at Transmission Provider's discretion or Tier 1 only at Transmission Provider's discretion

A. Tier 2 Planned Outage exemptions

- i. The Generator Owner or Generator Operator: (a) schedules its first Generator Planned Outage 120 days or more in advance of the outage start date and 120 days or more beyond the end date of any previously scheduled outages for the generator unit; and (b) the Proposed Generator Planned Outage is to occur entirely during a period in which there is adequate Maintenance Margin at the time advance notice of the outage is provided to the Transmission Provider. There is adequate margin when the Maintenance Margin is greater than or equal to zero megawatts after subtracting the megawatts of the requested Proposed Generator Planned Outage. The request shall be determined based on highest queued request.

- ii. The Generator Owner or Generator Operator reschedules its Generator Planned Outage at the Transmission Provider's request: (a) the Proposed Generator Planned Outage is to occur 120 days or more in advance of the outage start date and 120 days or more beyond the end date of any previously scheduled outages for the generator unit; and (b) Generator Planned Outage has inadequate Maintenance Margin at time of submittal and moves to a time of adequate Maintenance Margin.
- iii. The Transmission Provider may, at its discretion, grant a Tier 2 Planned Outage exemption if the Generator Owner or Generator Operator reschedules its Generator Planned Outage at the Transmission Provider's request due to weather, forced outages, or other conditions listed in the Business Practices Manual for Outage Operations without regard to how many days in advance the outage was submitted or whether there was projected to be adequate Maintenance Margin for the duration of the outages.

B. Tier 1 Planned Outage exemptions

- i. The Generator Owner or Generator Operator receives a Tier 2 Planned Outage exemption under section A.i above.
- ii. The Generator Owner or Generator Operator: (a) schedules its first Generator Planned Outage 120 days or more in advance of the outage start date and 120 days or more beyond the end date of any previously scheduled outages for the generator unit; and (b) the Proposed Generator Planned Outage is to occur

during a period when there is inadequate Maintenance Margin at the time the outage is provided to the Transmission Provider. There is inadequate margin when the Maintenance Margin is less than or equal to zero megawatts, for any day of outage, after subtracting the megawatts of the requested Proposed Generator Planned Outage. The request shall be determined based on highest queued request.

- iii. Subsequent generator unit outage requests 120 days or more in advance and/or Generator Owners or Generator Operators Generator Planned Outage less than 120 days in advance and at least 31 days in advance of outage start date.

Proposed Generator Planned Outage to occur entirely during a period in which the generator unit has an adequate projected margin, at the time the outage is provided to the Transmission Provider. There is adequate margin when the Maintenance Margin is greater than or equal to zero megawatts after subtracting the megawatts of the requested Proposed Generator Planned Outage. The request shall be determined based on highest queued request.

- iv. Generator Owners or Generator Operators Generator Planned Outage less than 31 days in advance and at least 14 days in advance of outage start date. A Proposed Generator Planned Outage to occur entirely during a period the generator unit has an adequate Maintenance Margin at the time the outage is provided to the Transmission Provider and the outage passes the No Harm Test. There is adequate margin when the Maintenance Margin is greater than or equal to zero megawatts after subtracting the megawatts of the requested

Proposed Generator Planned Outage. The request shall be determined based on highest queued request.

- v. Generator Owner or Generator Operator reschedules its Generator Planned Outage at the Transmission Provider's request due to inadequate Maintenance Margin for the duration of outage, at the time the outage is provided to the Transmission Provider. Maintenance Margin is less than zero megawatts after subtracting the megawatts of the requested Proposed Generator Planned Outage. This requirement does not include outages submitted less than 14 days in advance of the start date.
- vi. The Transmission Provider may, at its discretion, grant a Tier 1 Planned Outage exemption if the Generator Owner or Generator Operator reschedules its Generator Planned Outage at the Transmission Provider's request due to weather, forced outages, or other conditions listed in Business Practices Manual for Outage Operations without regard to how many days in advance the outage was submitted or whether there was projected to be adequate Maintenance Margin for the duration of the outages.

C. No Harm Tests

Outages submitted between 14 to 30 days of start date will be evaluated for final approval and exemption status together. The No Harm Tests include, but are not limited to, outage approval, compliance with all applicable operation guides, review of possible conflicting outages or system conditions, and system capacity (Maintenance Margin, Multiday Operational Margin, 30-day margin). It also

includes the criteria outlined in the Business Practices Manual for Generator Outage.

**D. Limitation Provided by Transmission Provider or Transmission Operator**

The Transmission Provider will grant the equivalent of a Tier 2 Planned Outage exemption if a Schedule 53 Resource is provided an operating limitation, such as thermal, voltage, or stability limits referenced in the BPM for Outage Operations, provided by the Transmission Provider or the Transmission Operator to preserve the reliability of the Transmission System, that is lower than the must offer obligation described in Section 69A.5.a.

**III. Resource Adequacy Hours**

Resource Adequacy (RA) Hours represent the periods of highest risk and greatest need during a Season and throughout the year. They include hours during Maximum Generation Emergency declarations and the hours when the operating margin, a measure of available supply capacity above demand and reserve requirements, is at its lowest.

Resource Adequacy Hours will be identified based on an evaluation of the three (3) most recent completed years using the period beginning September 1st and ending August 31<sup>st</sup>, which will be used to determine Resource Adequacy Hours for each Season (Seasonal RA Hours) and for each annual period (Annual RA Hours). Both Seasonal RA Hours and Annual RA Hours will be determined for the First Planning Area and Second Planning Area separately. The RA Hours determined in subpart III.A & III.B below are the only RA Hours that will be used to calculate Tier 2 ISAC in subpart V.C below. Where certain Seasonal RA Hours do not apply for a Resource due to a Tier 2 Planned Outage exemption or for periods where the Resource was not

designated for RAR under Module E-1 of the Tariff and the Resource does not otherwise have 65 RA Hours identified for the Season then a Seasonal RA Hour Deficiency exists per subpart III.A.iii and the Resource's Annual Average Offered Capacity is multiplied by the Seasonal RA Hour Deficiency per subpart V.C of this Schedule 53.

- A. Seasonal RA Hours. Seasonal RA Hours will include a target of 65 hours for each Season consisting of:
  - i. All operating hours during any declared Maximum Generation Emergency in a Season, excluding any operating hour where a Resource has a Tier 2 Planned Outage exemption or has periods where the Resource was not designated for RAR under Module E-1 of the Tariff. If more than 65 of such hours exists for any Season, all will be considered Seasonal RA Hours, and;
  - ii. If there are fewer than 65 hours identified for the Season in Section III.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 Planned Outage exemption or has periods where the Resource was not designated for RAR under Module E-1 of the Tariff, and;
  - iii. If 65 hours have still not been identified, then a Seasonal RA Hours Deficiency exists which is the number of hours less than 65 for any Season.

- B. Annual RA Hours will include of a target of 260 hours for each of the three (3) most recent periods beginning September 1<sup>st</sup> and ending August 31<sup>st</sup> consisting of:
- i. All hours during Maximum Generation Emergency declarations excluding any operating hour where a Resource has a Tier 2 Planned Outage exemption or has periods where the Resource was not designated for RAR under Module E-1 of the Tariff. If more than 260 of such hours exists for any period, all will be considered Annual RA Hours, and;
  - ii. If there are fewer than 260 hours identified for the period in Section III.B.i above, additional hours will be identified up to a total of 260 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 Planned Outage exemption or has periods where the Resource was not designated for RAR under Module E-1 of the Tariff.
- C. Seasonal Non-RA Hours. Seasonal Non-RA Hours will consist of all hours not included in Section III.A.i-iii. If a Resource has a Tier 1 and/or Tier 2 Planned Outage exemption for any of the operating hours identified as Seasonal Non-RA Hours or has periods where the Resource was not designated for RAR under Module E-1 of the Tariff, such hours will not be included in the applicable Seasonal Accredited Capacity calculation.
- D. Tier 1 Planned Outage exemptions apply only to Non-RA Hours. Tier 2 Planned Outage exemptions apply for both RA Hours and Non-RA Hours referenced in this Schedule 53.



#### IV. Operating Margin Calculation

The Operating Margin is determined using historical information to identify Seasonal RA Hours and Annual RA Hours within the three (3) most recent periods beginning September 1<sup>st</sup> and ending August 31<sup>st</sup>.

Operating Margin Equation

$$\text{Operating Margin (\%)}_j = \frac{\text{Online margin (MW)}_j + \text{offline margin (12 - hour lead time)}(\text{MW})_j}{\text{Real Time (RT) Load (MW)}_j}$$

Where:

$$\text{Online margin (MW)}_j = \sum_{\text{unit } i \text{ in region } j} (\text{EmergencyMax}_i - \text{Energy MW}_i - \text{cleared operating reserve}_i)$$

For all Resources online and under normal dispatch control.

$$\text{Offline margin (MW)}_j = \sum_{\text{unit } i \text{ in region } j} \text{Emergency Max}_i - \text{cleared offline supplemental reserve}(\text{MW})_j$$

For Resources where all of the following is true: (i) Resource is Offline; (ii) it's cold-start lead-time is less than or equal to 12 hours; and (iii) is not on outage.

#### V. Seasonal Accredited Capacity Calculation

- A. Annual Average Offered Capacity (AAOC) will be determined for each Resource subject to this Schedule 53 and utilized in the Seasonal Accredited Capacity calculation as applicable. The AAOC for a Resource is calculated by averaging Hourly Emergency Maximum Limit, or Targeted Demand Reduction Level for DRR-1, during the Annual RA Hours identified in Section III.B above for each

12-month period within the three (3) most recent periods beginning September 1st and ending August 31st. For any Annual RA Hour where a Resource is offline and the sum of the Resource's Start-Up Time and Start-Up Notification Time Offers exceeds 24 hours, the Resource's Hourly Emergency Maximum Limit, or Targeted Demand Reduction Level for DRR-1, will be set to zero (0).

- B. Tier 1 Intermediate SAC (ISAC) is calculated as the sum of Hourly Emergency Maximum Limit, or Targeted Demand Reduction Level for DRR-1, during each of the Resource's Seasonal Non-RA Hours, divided by the total number of Seasonal Non-RA Hours for each Season within the three (3) most recent periods beginning September 1st and ending August 31st.
- C. Tier 2 ISAC is calculated as the sum of Hourly Emergency Maximum Limit, or Targeted Demand Reduction Level for DRR-1, for the Resource's Seasonal RA Hours, plus the product of: Annual Average Offered Capacity multiplied by the Seasonal RA Hour Deficiency; divided by the total number of Seasonal RA Hours plus the Seasonal RA Hour Deficiency for each Season within the three (3) most recent periods beginning September 1st and ending August 31st. For any Seasonal RA Hour where a Resource is offline and the sum of the Resource's Start-Up Time and Start-Up Notification Time Offers exceeds 24 hours, the Resource's Hourly Emergency Maximum Limit, or Targeted Demand Reduction Level for DRR-1, will be set to zero (0).
- D. For purposes of paragraphs A through C above, the Hourly Emergency Maximum Limit, or Targeted Demand Reduction Level for DRR-1, will be capped at the

currently effective GVTC value of the Resource. If a Resource is committed for a portion of its ICAP due to partial clearing, the partial clearing will not reduce the values in the Offers considered in the accreditation calculations, which will be capped at the currently effective GVTC value of the Resource.

- E. In the case of an increase in generating Capacity of a Generation Resource, for purposes of paragraphs A through C above, the historical values for Hourly Emergency Maximum Limit will be adjusted up for those hours prior to such increase going into effect as set forth in the Business Practices Manual for Resource Adequacy.
- F. RA Hours will receive a greater weight than non-RA hours.
- G. ISAC will be calculated using the following equation:

$$ISAC = ISAC_{Tier1\_value} \times ISAC_{Tier1\_weighting} + ISAC_{Tier2\_value} \times ISAC_{Tier2\_weighting}$$

Where:

	Weighting by Planning Year		
Tier	2023- 2024 Planning Year	2024-2025 Planning Year	2025-2026 Planning Year and beyond
$ISAC_{Tier1\_weighting}$	40%	30%	20%
$ISAC_{Tier2\_weighting}$	60%	70%	80%

- H. A system-wide conversion ratio will be determined using the following equation:

$$RATIO \frac{UCAP}{ISAC} = \frac{Sum(UCAP_{Schedule\ 53\ Resources})}{Sum(ISAC_{Schedule\ 53\ Resources})}$$

The system-wide conversion ratio will be determined on an annual basis consistent with the schedule established in the BPM.

- I. Seasonal Accredited Capacity will be calculated for each Resource by multiplying its ISAC by the system-wide conversion ratio determined above using the following equation:

$$SAC_{Resource_i} = ISAC_{Resource_i} \times (RATIO \frac{UCAP}{ISAC})$$

**VI. New Resources or Resources with Insufficient Performance Data**

New Resources 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. For Planning Year 2022/23 Schedule 53 Resources that were not committed under the annual construct during the period considered in the SAC calculations can direct MISO to accredit them in accord with their offers as described in Section IV above instead of using a class average. Resources on a Catastrophic Generator Outage during a Season they are designated for RAR may elect to use a SAC based on the Class Average SAC to ICAP Ratio for its Resource type the next time it is accredited for that Season provided all of its committed ZRCs were replaced with uncleared ZRCs and that it has successfully returned from the Catastrophic Generator Outage.