Comments on Resource Adequacy Enhancements Working Group June 10, 2020

Department of Market Monitoring

June 26, 2020

I. Summary

The Department of Market Monitoring (DMM) appreciates the opportunity to comment on topics presented at the ISO's *Resource Adequacy Enhancements Working Group* held June 10, 2020. The ISO's working group focused on updated proposals related to portfolio assessments and unforced capacity (UCAP) counting evaluations and rules.

DMM has supported the concept of developing a UCAP framework for determining resource capacity values, and agrees that a UCAP framework could improve incentives for all resources to increase availability and maximize capacity sales at the system level. The ISO proposes that the UCAP framework would replace the existing resource adequacy availability incentive mechanism (RAAIM) and forced outage substitution rules. Because a UCAP framework is intended to replace existing availability incentive mechanisms, the methodology used to derive UCAP values will be very important in order to ensure that resources are incentivized to be available, especially when the ISO needs capacity the most on the system.

The ISO proposes to calculate UCAP "based on the top 20% of tightest "supply cushion" hours for peak and off-peak months."[1] This proposal replaces the ISO's previous approach which was to base UCAP values on the top 100 hours with the tightest supply cushion in a season. The updated proposal results in significantly more hours being evaluated in UCAP calculations than the ISO's prior proposal, and a greater number of hours evaluated than current availability assessment hours.[2] The ISO's proposal also does not apply a weighting to observations based on magnitude of supply cushion.

DMM previously suggested that the ISO consider calculating availability factors across all hours each season and weight each hour by the magnitude of the gap between resource adequacy availability and system demand (where hours with smaller margins are weighted

[1] *Resource adequacy enhancements working group presentation*, California ISO, June 10, 2020, Slide 31: http://www.caiso.com/InitiativeDocuments/Presentation-ResourceAdequacyEnhancements-Jun102020.pdf

[2] Availability assessment hours are based on 5 consecutive hours on non-holiday weekdays. In 2019-2020, this amounted to 535 hours in May- September and 750 hours in October-April. This is in contrast to 735 hours in May-September and 1,022 hours in October-April that the ISO shows it would have evaluated in 2019-2020.

more heavily).[3] DMM continues to suggest that a weighting mechanism be applied to hours used in UCAP calculations.

The ISO states that an approach with no weighting and using a broad range of hours will incentivize resources to always be available.[4] However, this approach also suggests there is no difference in value between availability when there are actual shortages of resource adequacy, versus when there are potentially thousands of megawatts of resource adequacy capacity available in excess of net load and reserve requirements. DMM continues to suggest that the ISO consider UCAP methodologies that distinguish between these two types of scenarios and that drive incentives for capacity resources to be available when the ISO needs these resources the most.

The ISO also introduces approaches to calculate UCAP values for non-conventional generators. DMM appreciates the ISO reviewing market parameters that can be used to limit resource availability outside of submitting outages, and supports the ISO's proposal to factor in the use of certain market parameters in determining UCAP values. There are existing and proposed market parameters that can significantly limit how resources operate in the market but which are not considered under the ISO's current resource adequacy availability incentive mechanism (RAAIM) framework. These parameters include maximum state-of-charge and the proposed end-of-hour state of charge constraints for battery resources. For demand response resources, these parameters include maximum daily energy limit constraints and the proposed maximum run time parameter. While DMM supports the ISO's general approach, DMM believes the ISO's proposal for determining UCAP values for storage resources may be too restrictive and could benefit from further discussion and development.

DMM provides additional comments on these issues below.

II. Comments

Replacing existing availability incentive mechanisms with UCAP

By transitioning to a UCAP framework, the ISO explains that removing forced outage replacement and RAAIM is justified because "RAAIM is not providing adequate incentive to provide substitute capacity for forced outages."[5] DMM notes that while levels of substitute capacity may appear to be low, the ISO should also consider that RAAIM provides incentives for resources to be available and bid into peak net load hours on a regular basis. The ISO should consider the impact that RAAIM has had on capacity that is routinely bid into ISO markets during assessment hours, which does not require substitution capacity.

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[3] *DMM comments on third revised straw proposal*, January 30, 2020, p. 5: http://www.caiso.com/InitiativeDocuments/DMMComments-ResourceAdequacyEnhancements-ThirdRevisedStrawProposal.pdf

[4] *Ibid*., Slide 31.

[5] *Ibid.,* Slide 58.

Because a UCAP framework is intended to replace existing availability incentive mechanisms, the methodology used to derive UCAP values will be very important to ensure that resources are incentivized to remain available, especially when the ISO needs capacity the most on the system.

UCAP evaluations

The ISO proposes to calculate UCAP "based on the top 20% of tightest supply cushion hours for peak and off-peak months."[6] This proposal replaces the ISO's previous approach which was to base UCAP values on the top 100 hours with tightest "supply cushion" in a season. The updated proposal results in significantly more hours being evaluated in UCAP calculations than the ISO's prior proposal, and a greater number of hours evaluated than current availability assessment hours. The ISO's proposal also does not apply a weighting to observations based on magnitude of supply cushion.

DMM previously suggested that the ISO consider calculating availability factors across all hours each season and weight each hour by the magnitude of the gap between resource adequacy availability and system demand (where hours with smaller margins are weighted more heavily).[7] DMM continues to suggest that a weighting mechanism be applied to hours used in UCAP calculations. The ISO states that an approach with no weighting and using a broad range of hours will incentivize resources to always be available.[8] However, this methodology also suggests there is no difference in value between availability when there are actual shortages of resource adequacy, versus when there are thousands of megawatts of resource adequacy available in excess of net load and reserve requirements.

For example, as shown in the ISO's analysis, there were hours in 2019 peak months where the ISO observed shortages of available resource adequacy compared to net load and reserve requirements.[9] The ISO's proposal would treat those hours the same as hours where supply cushions reached up to 8,800 MWs.[10] In practice, a supplier would be indifferent between taking a forced outage in intervals with thousands of megawatts of excess resource adequacy capacity and intervals with capacity shortages as both intervals would impact a resource's UCAP equally. However, the availability of resources in hours with the tightest, or even negative, supply cushion has more value from an operational perspective than availability when there is still a large pool of capacity available in excess of system demand and reserve requirements. The UCAP methodology should attempt to distinguish between these two types of scenarios

[6] *Ibid*., Slide 31.

[7] *DMM comments on third revised straw proposal*, January 30, 2020, p. 5.

[8] *Ibid*., Slide 31.

[9] *Ibid*., Slide 34.

[10] *Ibid*., Slide 34.

and drive incentives for capacity resources to be available when the ISO needs these resources to be available the most.

Outages types impacting UCAP vales

DMM supports the ISO's proposal to simplify the classification of outages that will impact a resource's UCAP, compared to outage types today that may exempt resources from being exposed to RAAIM. DMM agrees that some forced outage types which exempt resources from RAAIM today (e.g. use-limit reached and ambient de-rates), should have the potential to impact a resource's UCAP values.

DMM also supports the ISO's proposal to identify outages due to events outside of resource owners' control and exempt those outages from impacting a resource's UCAP calculation.

UCAP methodologies for non-conventional generators

In the working group, the ISO introduced approaches to calculate UCAP values for non-conventional generators including storage and demand response. DMM appreciates the ISO's efforts to examine how these energy and availability-limited resources will be evaluated under a UCAP framework as these types of resources may have access to tools to reflect limited availability to the ISO outside of the outage management system.

DMM appreciates the ISO considering how maximum and minimum state-of-charge parameters and the end-of-hour state of charge parameter being proposed in the Energy Storage and Distributed Energy Resources Phase 4 (ESDER 4) initiative might impact UCAP calculations for storage resources. DMM has raised concerns that the maximum state of charge and end-of-hour state of charge parameters could be used to limit storage resource availability below 4-hour resource adequacy values, while resources can avoid exposure to RAAIM penalties.[11]

DMM has already observed that some storage resources' 4-hour resource adequacy values have been limited by daily maximum state-of-charge bids. Because these resources' Pmax values are not de-rated through outage submissions, these resources are not exposed to RAAIM penalties. DMM has suggested that the ISO determine whether supplier's use of the maximum state of charge constraint, or the end-of-hour state of charge constraint proposed under ESDER 4, should constitute a type of outage or de-rate or be linked to RAAIM if a resource's charge is limited by these constriants going into peak net load hours.[12]

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[11] *Comments on ESDER 4 Revised Straw Proposal*, Department of Market Monitoring, November 25, 2019, pp. 6-7: http://www.caiso.com/InitiativeDocuments/DMMComments-EnergyStorage-DistributedEnergyResourcesPhase4-RevisedStrawProposal.pdf

[12] *Ibid*., p. 6.

To determine a storage resource's UCAP value, DMM understands that the ISO proposes to consider suppliers' use of maximum state of charge, minimum state of charge, and end-of-hour maximum and minimum state of charge constraints in UCAP calculations. The impact of these parameters would be considered together with any de-rate or outage submissions.

While DMM appreciates the ISO beginning to consider the impact of these market parameters on storage resource availability, some aspects of the ISO's UCAP proposal for storage resources appear to be restrictive and could benefit from further discussion and development:

1) The ISO proposes that use of *maximum state of charge* constraints will impact a resource's UCAP value if this type of constraint was used in a UCAP assessment hour.[13] DMM agrees that use of a maximum state of charge constraint below a resource's 4-hour resource adequacy value should have the potential to impact a resource's UCAP value, limited to certain scenarios. However, the ISO's proposed approach appears to be overly conservative.

   DMM understands that the ISO proposes to derive a resource's unavailability when a maximum state of charge constraint is used, by calculating a resource's 4-hour energy "de-rate" and dividing that value by four.[14] This approach could be excessively punitive for a storage resource if the calculation is applied to each UCAP assessment hour.

   For example, suppose a battery resource with a storage capacity of 100 MWh and operating range between -25 MW and 25 MW sets a maximum state of charge at 75 MWh in Hour 21. The maximum state of charge constraint may not have impacted the resource's market schedules in Hour 21 (i.e. the market may have optimally scheduled the resource to be charged at or below 75 MWh at the end of Hour 21 despite the constraint being in place). Additionally, it may be unlikely that the ISO would need the resource to be charged in Hour 21 such that it could provide four consecutive hours of energy at its resource adequacy value starting Hour 22. In this type of scenario, DMM does not believe the resource should be penalized for using the maximum state of charge constraint used in Hour 21.

   On the other hand, if a maximum state of charge constraint was in place in Hour 17 and Hours 18-22 were high load hours, the maximum state of charge constraint could limit the ISO's ability to access the resource at its resource adequacy value for four consecutive hours. In this type of scenario, it seems reasonable for the ISO to consider the impact of the maximum state of charge constraint in UCAP calculations.

   If the ISO continues to propose to use a fixed number of UCAP assessment hours, DMM suggests that the ISO consider a more nuanced approach to factoring use of a maximum state of charge constraint in availability calculations. Since the ISO's UCAP calculations will be based on ex post data, the ISO could consider for example, whether a storage resource's

[13] *Resource adequacy enhancements working group presentation*, California ISO, June 10, 2020, Slide 50.
[14] (4-hour resource adequacy energy capability – maximum state of charge)/4 hours

use of state of charge constraints limited its availability below its resource adequacy obligation across four consecutive UCAP assessment hours, or four consecutive hours across peak net load periods. Note that DMM's recommendation above to weight all hours in UCAP calculations could alleviate some of this concern.

2) The ISO proposes that use of *minimum state of charge* constraints could limit a resource's availability and impact a resource's UCAP value if this type of constraint was used in a UCAP assessment hour.[15] While DMM agrees that holding a minimum state of charge on a resource could limit a resource's ability to be dispatched, the ISO's proposal for considering minimum state of charge constraints also appears overly conservative.

   For example, in the ISO's Hour 3 example on Slide 50, if Hours 4-7 had lower supply margins than Hour 3, the supplier's use of the minimum state of charge constraint may actually have been in line with the ISO's needs, allowing the resource to be positioned to be discharged across hours with greater system demand or less available supply. Additionally, the minimum state of charge constraint may not have impacted the resource's market schedules (i.e. the market may have optimally scheduled the resource to be charged at or above 25 MWh at the end of Hour 3 despite the constraint being in place). In this type of scenario, DMM does not believe the resource should be penalized for using the minimum state of charge constraint used in Hour 3.

   DMM suggests that the ISO could consider a more nuanced approach to factoring use of minimum state of charge constraints in availability calculations. The ISO could instead calculate ex post how a storage resource's use of minimum state of charge constraints limited a resource's availability across four consecutive UCAP assessment hours. Again, note these concerns could be alleviated if the ISO considers DMM's recommendation to weight all hours and then use all weighted hours as assessment hours.

3) The ISO proposes to consider *outages on the charging portion of a storage resource* in UCAP calculations, where availability will be determined by taking the lower of the absolute value between the resource's upper and lower limit.[16] Under this rule, a battery resource with a storage capacity of 100 MWh and operating range between -25 MW and 25 MW which de-rates its Pmin to -20 MW would be considered unavailable for 5 MW. However, absent any state of charge constraints, this resource *could* still feasibly be charged to 100 MWh and provide its resource adequacy value for 4 continuous hours – it may just take longer for the resource to charge if charging schedules are limited by the resource's de-rated Pmin.

   Additionally, the resource's state of charge in a UCAP assessment hour may be sufficient for the resource to deliver up to its resource adequacy value. The de-rated Pmin in this scenario would not limit the resource's ability to produce up to its resource adequacy value.

[15] *Ibid.*, Slide 50.
[16] *Ibid.*, Slide 51.

Local resource adequacy

The ISO has not fully addressed in its UCAP proposals how it will ensure that local resources are incentivized to remain available if RAAIM is replaced by the UCAP framework and local requirements continue to be defined in terms of NQC.[17]

While a UCAP framework could improve incentives for all resources to maximize availability and therefore capacity sales at the system level, more targeted UCAP calculations or a revised availability incentive mechanism may be needed to incentivize local resources to remain available when the ISO needs resources the most. The ISO should revisit incentives for local resources to remain available under the UCAP framework in subsequent proposals.

[17] *Comments on Resource Adequacy Enhancements third revised straw proposal*, Department of Market Monitoring, January 30, 2020, pp. 5-6: http://www.caiso.com/InitiativeDocuments/DMMComments-ResourceAdequacyEnhancements-ThirdRevisedStrawProposal.pdf