BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Reforms and Refinements, and Establish Forward Resource Adequacy Procurement Obligations.	Rulemaking 23-10-011 (Filed October 12, 2023)

COMMENTS ON TRACK 1 PROPOSALS BY THE DEPARTMENT OF MARKET MONITORING OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

The Department of Market Monitoring (DMM) of the California Independent System Operator Corporation (CAISO) submits these comments to parties' February 13, 2023 and February 29, 2024 Track 1 proposals.

I. Unforced capacity (UCAP) accreditation

UCAP accreditation provides better resource-level incentives for a long-term resource accounting framework and resource adequacy (RA) market.

DMM supports resource adequacy accounting based on unforced capacity (UCAP), as it creates a framework that more accurately accounts for resource availability after derates and outages to ensure that all resources during constrained hours will be able to provide for system reliability. The availability rating derived from a UCAP framework also allows for load serving entities (LSEs) to have a fungible capacity rating across (and within) all resource types, and lessens the need for LSEs to procure RA capacity with different dimensions of quality and quantity. UCAP simplifies RA procurement to a quantity based framework. This homogeneity facilities capacity sales and procurement in both bilateral and centralized market frameworks.

Even with a UCAP framework, qualitative differences will still exist across the RA fleet in terms of operational performance. These differences can be addressed through the resource availability incentive mechanism (RAAIM) in the CAISO market. The up-front

UCAP framework levelizes differences between and within resource types, and any deviations from historical resource availability can be incentivized appropriately in the RAAIM framework. Therefore, DMM recommends pursuit of the UCAP framework, while also recommending that the CAISO maintain and enhance RAAIM. Enhancements of the RAAIM framework will provide the availability incentives required of capacity during constrained hours.

DMM encourages the CPUC and the CAISO to continue to work together and understand specifically which forced outages should be included to generate a more fungible market.

DMM supports a resource-level UCAP framework that incorporates all forced outages, but allows different treatment for outages for grid or system conditions outside the control of the scheduling coordinator and asset owner.

As was discussed in the CAISO workshops and the recent CAISO Market Surveillance Committee meeting, UCAP accounting at a group level may create poor incentives.[1,2] DMM believes an individual resource-level UCAP is appropriate for the following two reasons:

1. Attribution to individual resources will create appropriate incentives to demonstrate improved performance over time to increase the resource's net qualifying capacity (NQC), and thus increase the volume of RA the resource can sell.

[1] *Resource Adequacy Modeling and Program Design Workshop,* CAISO, February 13, 2024: https://www.caiso.com/InitiativeDocuments/Presentation-ResourceAdequacyModeling-ProgramDesignWorkingGroup-Feb132024.pdf

[2] *Capacity Evaluation and Performance Incentives in RA Programs,* Market Surveillance Committee, February 23, 2024: https://www.caiso.com/Documents/ResourceAdequacyBushnell-Presentation-Feb23_2024.pdf

2. Individual resource-level curtailment data are not confidential. DMM notes that these data are publically available in the CAISO's Daily Curtailment Reports, and suggests the CAISO and CPUC work together to use publically available curtailment data.[3]

DMM also encourages the CPUC and the CAISO to incorporate all forced outages into the UCAP accounting framework. However, forced outages should be separated into two categories for grid planning and management: (1) forced outages under the control of the scheduling coordinator and asset owner, and (2) forced outages for system or grid conditions out of their control. With resource-level UCAP accounting and regular NQC updating through the UCAP framework, this will incentivize resources to reduce all unnecessary forced outages. However, no adjustments to a resource's NQC should be made in cases of forced outages that are due to system or grid conditions beyond the control of the scheduling coordinator and asset owner (e.g. a transmission line outage). In such cases, the planning reserve margin (PRM) should be used to ensure proper grid planning.

The adoption of UCAP creates a level playing field in the RA valuation of resources to meet stressed grid conditions. DMM has recommended creating performance standards in place of availability standards, and believes this would further enhance planning and grid operations.[4,5,6] Until the creation of such performance standards, the UCAP

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[3] *Curtailed and non-operational generators in California and neighboring balancing authorities*, CAISO: https://www.caiso.com/market/Pages/OutageManagement/CurtailedandNonOperationalGenerators.aspx

[4] *2022 Annual Report on Market Issues and Performance*, CAISO DMM, July 11, 2023, p 249: https://www.caiso.com/Documents/2022-Annual-Report-on-Market-Issues-and-Performance-Jul-11-2023.pdf

[5] *Comments by Department of Market Monitoring on Resource Adequacy Enhancements Issue Paper*, CAISO DMM, November 30, 2018: http://www.caiso.com/InitiativeDocuments/DMMComments-ResourceAdequacyEnhancements-IssuePaper.pdf

[6] *Comments by Department of Market Monitoring on Resource Adequacy Enhancements*, CAISO DMM, October 20, 2023: https://stakeholdercenter.caiso.com/Comments/AllComments/5860a092-9299-4cf2-a3f7-60efa5105b32 - org-bde68f42-bf0e-4842-b152-d0cc02a2140e

framework and increased RAAIM payments should serve to enhance resource accounting, availability, and performance.

Regular updating of NQC that weights nearer-term availability and performance data should provide better incentives for availability and adapt to the new UCAP policy.

DMM believes that it will be important to regularly update resource NQC under a UCAP framework. Such updating could be annual, and there could be greater weight given to the most recent year. In addition to providing incentives to improve resource availability, this will also facilitate any future policy changes that may modify resource availability and thus forced outage accounting. Such changes could include enhancements to the market design for energy storage resources, or modification in rules for substitution capacity.

The CPUC should use public outage data and work with the CAISO on UCAP implementation.

DMM sees two main advantages to using publically available outage data published by the CAISO instead of the Generating Availability Data System (GADS) data for UCAP reporting.

- First, the use of public data will increase the transparency of the program. Increased transparency will allow for greater stakeholder engagement and understanding of the changes from adopting UCAP. This will be especially important in the regular updating of resources' NQC under the UCAP framework.

- Second, using publically available data will allow for adoption of UCAP at the unit-level. As previously explained in these comments, DMM believes adopting UCAP at the unit-level will provide improved incentives for availability of resources.

The CPUC already uses the public outage data to generate NQC values for energy storage resources. Expanding the use of public data in the UCAP framework would have the added benefit of eliminating the need for the CPUC to use a regression technique to estimate "ambient due to temperature" derates. Data on such outages are available in the public CAISO outage data, but are not available in GADS data.

One final consideration in the development of a UCAP framework is the interaction of the CPUC and CAISO's resource adequacy program with the Western Resource Adequacy Program (WRAP). The WRAP is expected to use the GADS data for thermal plant derates.[7] DMM recommends that alignment between these two programs can be achieved by statistically comparing the GADS data to the CAISO's publically available data.

II. Storage resource availability

RA ratings for storage resources should reflect actual availability of batteries taking into account state of charge (SOC) limitations and operational resource constraints.

DMM recently presented in a CAISO working group on the availability of storage resources during stressed grid conditions.[8] DMM has observed that a significant portion of storage resources may not be positioned to provide their full capacity and duration during critical periods. The availability of storage capacity has two different dimensions:

(1) resource availability after considering outages or derates, and

(2) state-of-charge availability, or ability to cycle, with respect to observable or unobservable constraints.

DMM has performed extensive analysis of availability accounting for this first dimension, i.e., defining availability as capacity bid into the market after considering outages and derates. DMM's analysis of the summer 2023 period has focused on the ability of storage resources to cycle and provide their RA capacity value during restricted

[7] *Western Resource Adequacy Program Business Practice Manual 105: Qualifying Resources*, Western Power Pool, December 7, 2023: https://www.westernpowerpool.org/private-media/documents/V1.0_BPM_105_Forward_Showing_Qualifying_Resources_12-07-2023.pdf

[8] DMM has found that, on average, storage resources are on outage/derate 88 percent of their RA capacity, but are bidding 90 percent of capacity: *Resource Adequacy Modeling and Program Design – Working Group Meeting*, CAISO, January 16, 2023 [*sic*], slides 71 and 74: https://www.caiso.com/InitiativeDocuments/Presentation-ResourceAdequacyModeling-ProgramDesignWorkingGroup-Jan162024.pdf

maintenance operations (RMO) days, plus additional days with expected tighter grid conditions, i.e., days where the CAISO declared an energy emergency alert (EEA). DMM refers to this set of days as RMO+ days.

Analysis using this definition of availability indicates that during stressed grid conditions in 2023, storage used to meet RA requirements had an average fleet-wide availability of about 88 percent to 90 percent of these resources' full RA capacity.[9,10] During these days, the fleet average does not vary much across days, or during the availability assessment hours (AAHs).[11] The average availability was about 89 percent across the AHHs, with total fleet availability in different hours ranging between 87 percent and 90 percent.

Figure 1 shows the storage fleet's average charging and discharging rate across the RMO+ days, as a percentage of the total RA fleet charging and discharging capacity. Based on this analysis, the highest hourly average charging rate is about 40 percent of the RA fleet capacity, while the highest hourly average discharge rate is about 50 percent.[12] Potential reasons why average fleet-wide charging and discharging rates are not closer to 100 percent of the RA storage capacity on these days are addressed later in these comments.

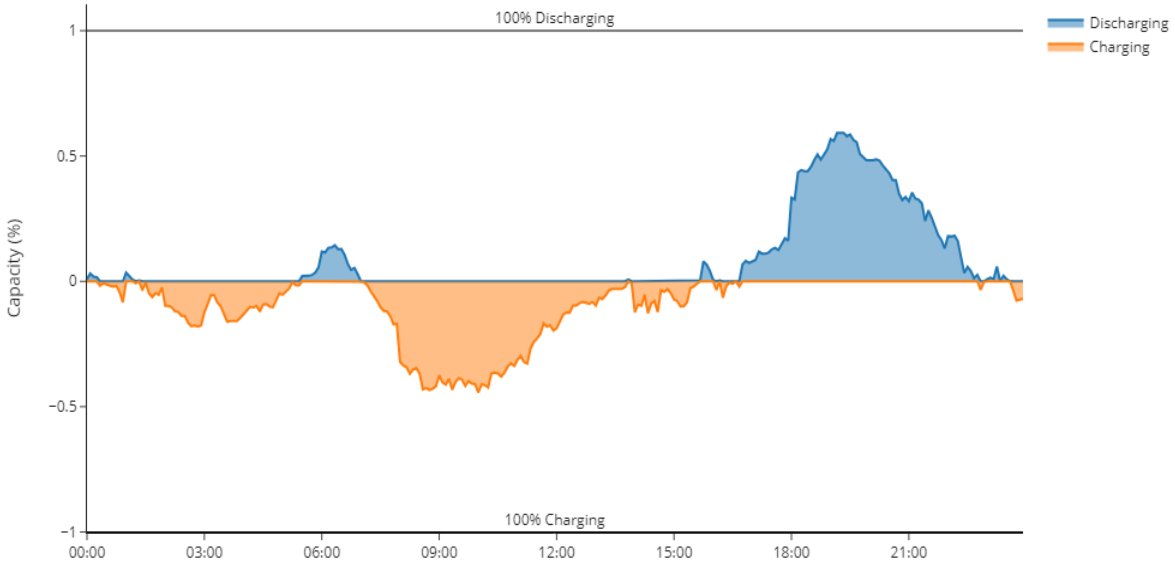
[9] Due to few EEA+ days in 2023, in this analysis DMM is using restricted maintenance operation (RMO) hours, or more stressed conditions, which we refer to as RMO+ hours, and this includes any days that were declared RMO or EEA+.

[10] DMM has found that, on average, storage resources are on outage/derate 88 percent of their RA capacity, but are bidding 90 percent of capacity: *Resource Adequacy Modeling and Program Design – Working Group Meeting*, CAISO, January 16, 2023 [*sic*], slides 71 and 74: https://www.caiso.com/InitiativeDocuments/Presentation-ResourceAdequacyModeling-ProgramDesignWorkingGroup-Jan162024.pdf

[11] *Resource Adequacy Modeling and Program Design – Working Group Meeting*, CAISO, January 16, 2023 [*sic*], slide 75: https://www.caiso.com/InitiativeDocuments/Presentation-ResourceAdequacyModeling-ProgramDesignWorkingGroup-Jan162024.pdf

[12] This would imply that the highest average hourly total discharge megawatts is 50 percent of the total RA fleet megawatt discharge capacity. The charging rate is interpreted analogously.

Figure 1. Average capacity utilization of RA storage fleet (2023 RMO+ hours): Total dispatch megawatts percentage of total RA storage capacity



Storage capacity utilization is only part of battery availability. Storage discharging capacity may not have been needed, but could have still been available for dispatch. To assess availability from this perspective, DMM also assessed the availability of the RA fleet based on state-of-charge (SOC).

DMM analyzed the average SOC of the RA storage fleet over the RMO+ days in 2023. The average amount of capacity available after taking the SOC into account peaks at approximately 80 percent, and ends the day around 35 percent. At the beginning of the AAHs, an average of 70 percent of the SOC is available. These data suggest that on average, the RA storage fleet is not positioned to provide its full RA capacity during hours of the highest net load and other stressed grid conditions.

DMM understands there are many constraints on storage resources, and has published a report on the battery fleet in 2023 with further detail.[13] As discussed in that report, DMM believes the full capacity potential of RA storage resources is not being realized because of a combination of issues:

- constraints in the market, such as state-of-charge constraints and charge limits;
- constraints not observable in the market model, such as cell balancing needs and foldback around the SOC extremes; and
- bidding behavior, market rules, and system operation needs.

Finally, DMM notes that storage resources are commonly used to provide ancillary services (AS). The energy capacity of storage resources can be constrained at times to facilitate the provision of ancillary services. While provision of ancillary services may be a valuable use of storage capacity, this limitation should be taken into account when considering RA storage resources' potential to provide energy during critical periods.

DMM recommends the CPUC and stakeholders further study limitations in the RA storage fleet and address these issues in a future storage enhancements proceeding. Additionally, DMM suggests the CPUC compare operations of the RA storage fleet during stressed conditions with the modeled operations of the fleet in the RA showing tool.

Development of a system-wide charging sufficiency proposal should include consideration of the grid charging limitations of co-located and hybrid resources.

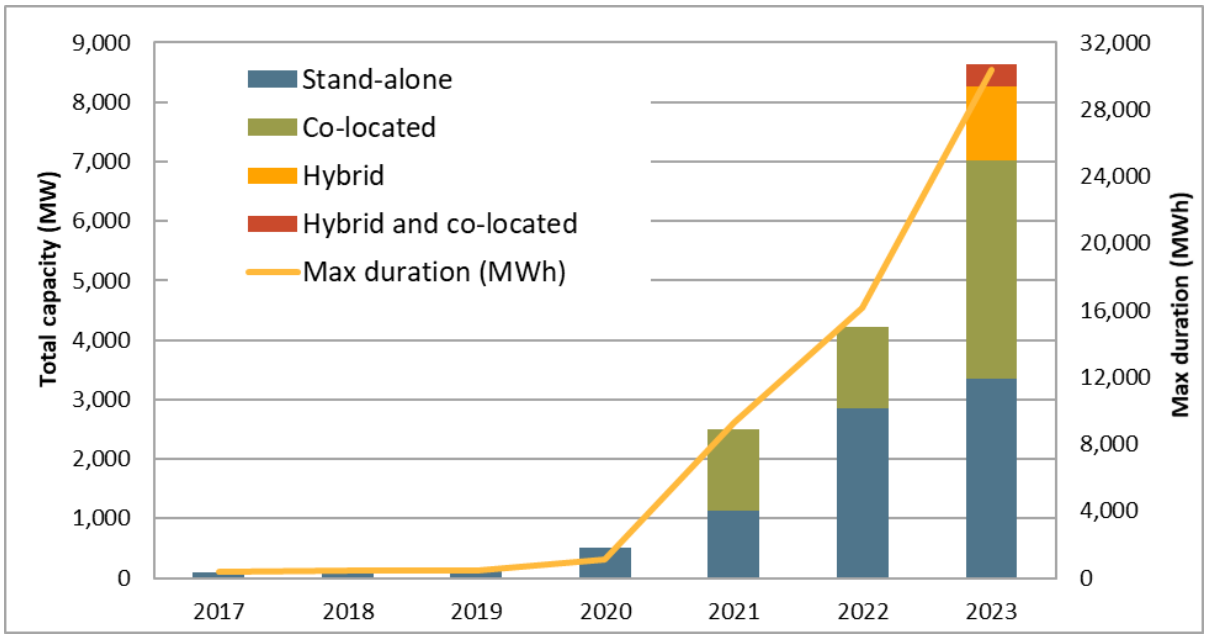
California Energy Storage Alliance (CESA) recommended the CPUC permit more flexibility in meeting the charging sufficiency requirements. The proposal suggests implementing a system-wide charging sufficiency requirement that, if passed, would remove LSE-specific requirements. In theory, this is a parsimonious approach to the energy sufficiency test. However, as shown in Figure 2, as of December 2023, approximately 60 percent of installed storage resources are either co-located or hybrid.

[13] *Special Report on Battery Storage*, CAISO DMM, July 7, 2023: https://www.caiso.com/Documents/2022-Special-Report-on-Battery-Storage-Jul-7-2023.pdf

Co-located and hybrid resources typically have constraints that limit their ability to charge from the grid. This negates the ability of these resources to benefit from excess system-wide energy generation for charging. Such charging restrictions are a result of the federal investment tax credit and local property tax exemptions that require the storage resource to charge from the output of onsite renewable generation.

DMM recommends that the CPUC ensure LSEs properly submit their grid-charging constraints into their RA showing template when considering CESA's system-wide charging sufficiency proposal.

Figure 2. Storage capacity installed on the CAISO as of December 20, 2023



III. Bid cap for RA imports

DMM supports a bid cap above $0/MWh for non-specified import RA.

DMM reiterates its support for increasing the bid cap for non-specified import RA above $0/MWh.[14] DMM believes a requirement for non-source specific import RA resources to bid at or below $0/MWh can be as effective as a self-schedule requirement for incentivizing the supplier to contract with a physical resource to help ensure delivery during tight system conditions. Furthermore, DMM continues to support the CPUC requiring an import RA bid cap during availability assessment hours that is sufficiently low, to incentivize the supplier to contract in advance for supply committed to deliver to CAISO.[15] These current CPUC rules have significantly reduced concerns about import RA capacity that can receive capacity payments, but which provide no real benefits in terms of either system reliability or market competiveness.

However, DMM believes an appropriately designed import RA bid cap above $0/MWh, such as that proposed by the California Community Choice Association (CalCCA), could maintain similar incentives for physical resource procurement as a self-schedule or $0/MWh bid requirement.[16,17] CalCCA suggests a dynamic import RA bid cap set based on the approximate marginal cost of a typical gas plant each day. With this type of approach, suppliers would still expect to receive a CAISO import schedule, except during hours when bilateral electricity spot market prices are relatively low, and would certainly expect to receive a CAISO schedule on days when conditions are so tight that they might not be able to buy power from bilateral electricity markets. Thus, DMM

[14] DMM reply comments on proposed decision adopting local capacity obligations for 2024-2026, flexible capacity obligations for 2024, and program refinements in R.21-10-002, June 19, 2023, pp 3-5: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M511/K719/511719076.PDF

[15] DMM comments on Track 1 Proposals in R.19-11-009, March 6, 2020, pp 9-11: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M328/K860/328860728.PDF

[16] See CalCCA's presentation at the R.21-10-002 Workshop on Proposals for Implementation Track Phase 3, February 8, 2023, pp 104-110: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resource-adequacy-homepage/r21-10-002/r2110002-slide-deck-for-implementation-track-phase-3.pdf

[17] CalCCA's comments on assigned commissioner's scoping memo and ruling, CalCCA, January 19, 2024, pp 12-20: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M524/K571/524571013.PDF

believes an appropriately low import RA bid cap could provide many of the same reliability benefits as the current $0/MWh bid requirement or self-schedule requirement.

Meanwhile, increasing the import RA bid cap above $0/MWh as suggested by CalCCA, could provide the benefit of increasing the overall efficiency of CAISO market schedules. With this approach, suppliers of RA imports could be expected to bid at the lower of (1) marginal cost of the physical resource backing the import RA, (2) bilateral electricity spot market prices, or (3) the RA import bid cap. These RA imports would not clear the CAISO market in periods when the CAISO market prices were less than these bid prices. This would allow more expensive resources that would have produced power outside of the CAISO to support the import RA schedule to be displaced by a less expensive resource within the CAISO. This increased efficiency could presumably be passed along to load serving entities through lower resource adequacy contract costs.

With this approach, it could be important to maintain a real-time must-offer obligation for RA imports, to ensure these imports are available when real-time market conditions are much different than in the day-ahead market. DMM is not proposing a particular bid cap, and these comments should not be construed as support for any particular bid cap over $0/MWh proposed by CalCCA. However, DMM believes there could be value in continuing to consider an import RA bid cap over $0/MWh that is designed to be sufficiently low so that import RA suppliers can still expect to frequently receive CAISO import schedules.

IV. Soft-offer cap for local RA through central procurement entity

Local market power must be considered when developing a soft-offer cap for local RA through the central procurement entity (CPE).

A soft-offer cap helps ensure the mitigation of market power in the RA market. The current proposals by CESA and the Western Power Trading Forum (WPTF) argue that the soft-offer cap should be set at the CAISO's current capacity procurement mechanism (CPM) soft cap, plus CPUC RA penalties.

The CPM soft-offer cap was instituted to protect against local market power for backstop procurement by the CAISO. To prevent the exercise of market power, the

CAISO instituted the soft-offer cap from estimates by the California Energy Commission (CEC) of a combined cycle gas-fired turbine's going forward fixed costs (GFFC). The GFFC is comprised of fixed annual operating and maintenance (O&M) costs. DMM analysis provides strong evidence that the annual fixed O&M cost estimates produced by the CEC, and used by the CAISO to set the CPM soft-offer cap, significantly overstate the GFFC of a combined cycle gas unit.[18]

DMM believes setting the CPE soft-offer cap at the CPM plus RA penalties for units with local market power that may be needed for local reliability throughout the year (rather than just one or two summer months) would result in payments that far exceed the actual GFFC, and encourage sellers of local RA to exert local market power. This concern is especially acute with an administratively set price that would send a market participant's information or signals that could allow sellers to bid their capacity above their true annual GFFC.

Additionally, CESA suggested in their proposal that the CPUC is leaning on the CPM. DMM notes that despite local RA deficiency, 99 percent of the backstop capacity procurement at CAISO through the CPM from 2020 to 2023 has been for system capacity.[19] This indicates that despite local RA deficiencies, the CAISO has not needed to procure local RA through the CPM. As a result, DMM recommends the CPUC and the CAISO work to more consistently reflect local needs in the local capacity technical study analyses.

[18] *Answer and motion for leave to answer of the Department of Market Monitoring of the California System Operator*, ER20-1075, April 3, 2020, https://www.caiso.com/Documents/AnswerandMotionforLeavetoAnswer-DMMCommentsonCPMTariffFilingER20-1075-Apr32020.pdf

[19] DMM Memorandum to the ISO Board of Governors, September 13, 2023: https://www.caiso.com/Documents/DepartmentofMarketMonitoringComments-CapacityProcurementMechanismEnhancementsTrack2-Memo-Sep2023_final.pdf

V. Path 26 stress testing in the loss of load expectation studies

Path 26 stress testing in the loss of load expectation (LOLE) studies should consider ratings less the rated full capacity of the path.

The LOLE stress testing uses a base case of 4,000 MW of imports where there are the original level transfers between the Pacific Gas & Electric (PG&E) and Southern California Edison (SCE) transmission access charge (TAC) areas. DMM notes that the rating of Path 26 is often less than this during stressed conditions. Therefore, considering the full 4,000 MW rated path limit may be a shortcoming for a stress test in the LOLE study. DMM recommends the CPUC consider in further stress tests that reduce the Path 26 capacity to assess the reliability of the system with additional limitations on the path.

VI. Conclusion

DMM appreciates the opportunity to provide reply comments on Track 1 proposals.

Respectfully submitted,

By: /s/ Adam Swadley

Eric Hildebrandt, Ph.D.
Executive Director, Market Monitoring
Adam Swadley
Manager, Market Monitoring
Ben Dawson, Ph.D.
Market Monitoring Economist

Department of Market Monitoring
California Independent System
Operator Corporation
250 Outcropping Way
Folsom, CA 95630
Tel: 916- 608-7150
aswadley@caiso.com

Independent Market Monitor for the California
Independent System Operator

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CERTIFICATE OF SERVICE

I certify that on March 8, 2024, I served on the parties listed on the service list of Docket Number R.23-10-011 by electronic mail a copy of the *Reply Comments on Track 1 Proposals by the Department of Market Monitoring of the California Independent System Operator Corporation.*

/s/ Aprille Girardot
Aprille Girardot
An employee of the California Independent System Operator Corporation

Executed on March 8, 2024, at
Folsom, California