

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to
Oversee the Resource Adequacy
Program, Consider Program
Refinements, and Establish Annual
Local and Flexible Procurement
Obligations for the 2019 and 2020
Compliance Years.

Rulemaking 17-09-020

**COMMENTS ON PROPOSED DECISION
CLARIFYING RESOURCE ADEQUACY IMPORT RULES OF
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 on the Commission’s *Proposed Decision Clarifying Resource Adequacy Import Rules* (“Proposed Decision”), filed September 6, 2019.

I. OVERVIEW

In the Assigned Commissioner’s Proposed Decision, the Commission “affirms the requirements for RA import contracts established in D.04-10-053 and D.05-10-042 with the clarification that “firm” energy must flow, at a minimum, during the AAH window.”¹

In opening comments on the Commission’s initial Ruling², many parties including DMM expressed concerns about requiring resource adequacy import contracts to include delivery of firm energy. DMM urged the Commission to “avoid RA import

¹ *Proposed Decision*, p.9.

² *Assigned Commissioner’s Ruling Seeking Comment on Clarification to Resource Adequacy Import Rules*, Rulemaking 17-09-020, CPUC, July 3, 2019 (“Ruling”).

requirements that could increase the amount of self-scheduled imports, especially during the hours of peak solar production.”³ Other parties expressed concerns that an energy delivery requirement could reduce the flexibility of the system fleet⁴ and exacerbate oversupply conditions.⁵ Some parties expressed that a delivery requirement could expose suppliers to losses associated with delivering energy at prices lower than marginal cost or at prices lower than what a supplier could earn outside of the CAISO.⁶

To address these concerns, the Commission’s Proposed Decision clarifies that the energy delivery requirement applies only to the RA Availability Assessment Hours (“AAH”) from 4:00 to 9:00 p.m. As explained in the Proposed Decision:

We recognize that market inefficiencies may result from this type of firm energy requirement. For example, this may result in a potential self-scheduling of energy into the market at times of negative prices. However, requiring energy delivery during the AAH window, as opposed to a 24 x 7 bidding obligation, minimizes this concern in part because negative prices are unlikely to occur between 4:00 and 9:00 p.m. Further, LSEs rely on imports to a lesser degree in off-peak months, when negative prices are more likely to occur.⁷

The Proposed Decision would address DMM’s longstanding concern that RA import capacity can simply bid at or near the \$1,000/MWh bid cap in the day-ahead market and have no further obligation to be available in real-time if not scheduled in the day-ahead market or residual unit commitment (“RUC”) process. The Proposed Decision would also address concerns that import RA capacity can receive capacity payments while providing no real benefits in terms of either system reliability or market competitiveness.

³ *DMM comments on Ruling*, p.7.

⁴ *CAISO comments on Ruling* p.4, *Powerex comments on Ruling* p.10.

⁵ *Public Generation Pool comments on Ruling*, p.3.

⁶ *Powerex comments on Ruling*, p.10, *AReM comments on Ruling*, p.6.

⁷ *Proposed Decision*, p. 9.

The Commission's clarification that delivery of RA imports would only be required during Availability Assessment Hours effectively addresses concerns raised by DMM and other parties in response to the initial Ruling. The AAH window represents the peak evening ramping hours when net demand and prices are highest. As described in these comments, DMM has performed analysis of the potential impacts of the Commission's Proposed Decision based on day-ahead market data for 2018 and 2019. This analysis shows that requiring delivery of all RA imports only during Availability Assessment Hours would primarily result in reduced scheduling of virtual supply, natural gas generation and non-RA imports in the day-ahead market. Any impacts on the scheduling of wind and solar resources would be extremely low and limited to wind and solar resources with positively priced energy bids.

DMM's analysis also shows that limiting energy delivery requirement to the Availability Assessment Hours would avoid additional self-scheduling during periods of very low and negative prices. While some parties have noted that requiring import RA contracts to include energy delivery would increase the cost of import RA contracts, energy delivery provisions may also lead to lower spot market prices during the CAISO's highest priced hours (weekdays 4 to 9 pm).

Based on this analysis, DMM supports the Commission's clarification of import RA rules as a temporary measure that can be enforced under existing Commission decisions. However, because low system prices sometimes coincide with assessment hours in spring months (March to April), the Commission could consider further limiting the energy delivery requirements in the spring months as highlighted in these comments.

DMM recognizes that market efficiency and system flexibility could be improved by avoiding large volumes of self-schedules in the CAISO market. Therefore, while DMM is supportive of the Commission's proposed clarification as an interim measure, DMM supports consideration of alternative solutions that would allow import RA to participate more flexibly in the market.

II. ANALYSIS AND COMMENTS

A. Energy delivery requirements for RA imports

DMM has longstanding concerns that existing resource adequacy rules could allow a significant portion of RA requirements to be met by imports that may have limited availability and value during critical system and market conditions.⁸ If RA import capacity is not scheduled in the day-ahead market or residual unit commitment ("RUC") process, these resources have no further obligation to bid into the real-time market. Thus, by simply bidding at or near the \$1,000/MWh bid cap in the day-ahead market, RA imports can receive RA capacity payments while providing no real benefits in terms of either system reliability or market competitiveness.

Recent analyses by the Energy Division and the CAISO also show that the state's LSEs will likely increase reliance on imports to meet RA requirements in coming years due to projected retirements of gas and nuclear capacity.⁹ Imports are expected

⁸ *2018 Annual Report on Market Issues and Performance*, Department of Market Monitoring, May 2019, p. 269:

<http://www.caiso.com/Documents/2018AnnualReportonMarketIssuesandPerformance.pdf>

Import Resource Adequacy, Department of Market Monitoring, September 10, 2018:

<http://www.caiso.com/Documents/ImportResourceAdequacySpecialReport-Sept102018.pdf>

⁹ *Assigned Commissioner and Administrative Law Judge's Ruling Initiating Procurement Track and Seeking Comment on Potential Reliability Issues*, Rulemaking 16-02-007, CPUC, p. 12.

to be relied on more to meet both capacity *and* energy needs in peak load months. The magnitude of the potential increase in reliance on RA imports in the near future amplifies the potential impacts of *capacity-only* or very *energy limited* RA imports (i.e. which submit very high prices in the day-ahead market) on both system reliability and CAISO market competitiveness.

DMM supports the Commission's clarification of RA import rules as a temporary measure that can be enforced under existing Commission decisions. Limiting the energy delivery requirement to Availability Assessment Hours would limit self-scheduling to hours when CAISO expects to need energy the most on the system. However, as illustrated in these comments, the Commission could consider further limitations to the energy delivery requirement to avoid increased self-schedules in hours that coincide with low load and high renewable generation during spring months.

B. Analysis of the Proposed Decision

The Proposed Decision would enhance the reliability of import RA capacity by deterring very high priced RA imports that do not clear the day-ahead market.

Figure 1 shows the average amount of RA imports offered and cleared each hour during the month of July 2019. As shown in Figure 1, during this month about 930 MW, or about 21% of total import RA capacity, did not clear the day-ahead market during the Availability Assessment Hours (non-holiday weekdays between 4:00 and 9:00 p.m).

Also see: *CAISO reply comments on Assigned Commissioner and Administrative Law Judge's Ruling Initiating Procurement Track and Seeking Comment on Potential Reliability Issues*, Rulemaking 16-02-007, August 12, 2019, pp. 8-11.

Figure 1. Average hourly resource adequacy imports offered (July 2019)

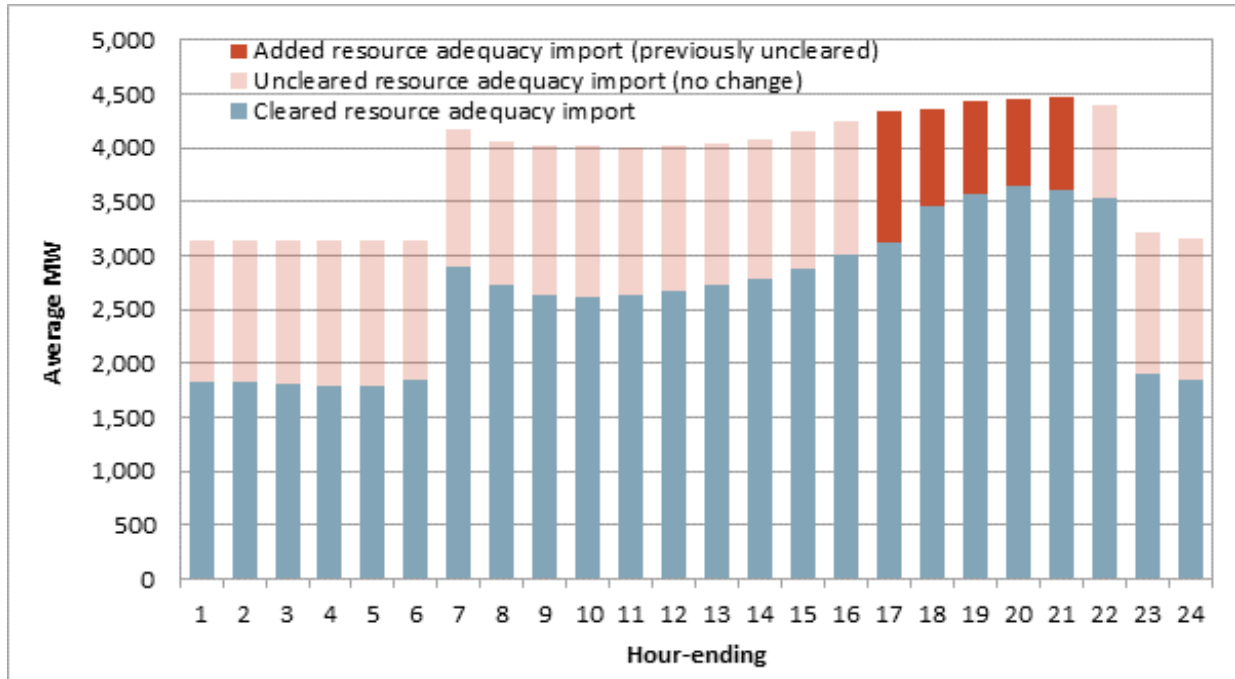


Figure 2. Average hourly resource adequacy imports offered by month (Availability Assessment Hours only)

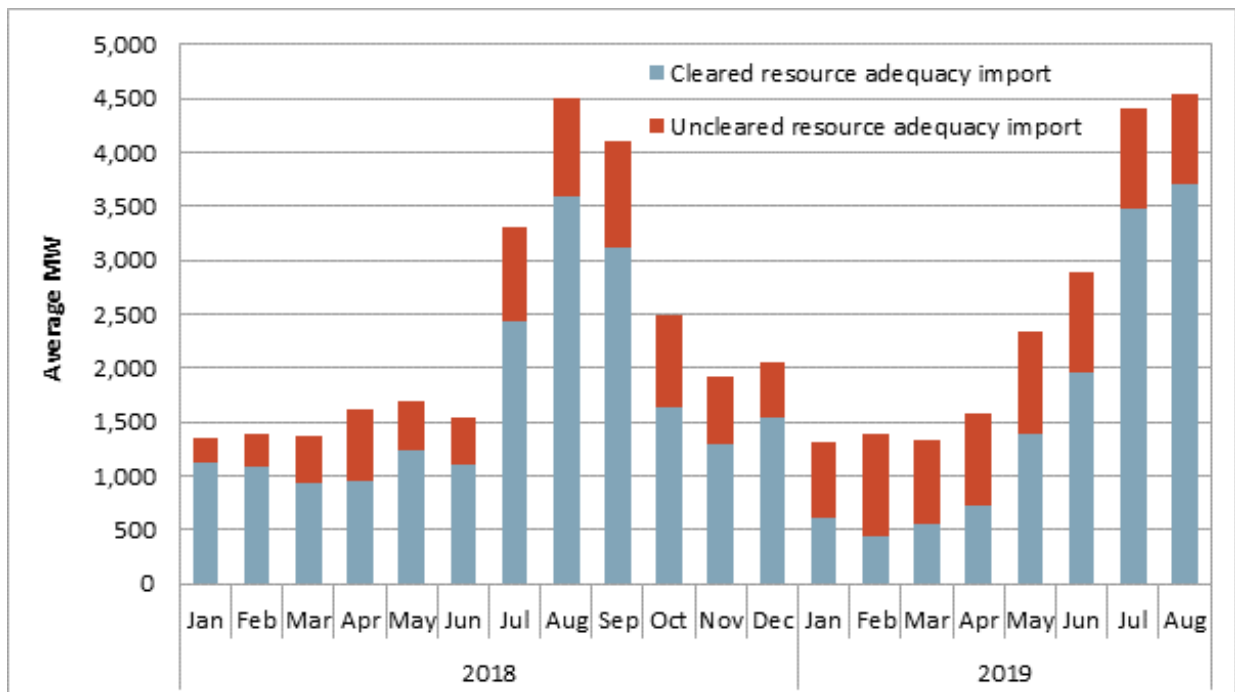


Figure 2 shows the average amount of RA imports offered and cleared each month since January 2018 in the Availability Assessment Hours. In summer months (June to September) about 840 MW, or nearly a quarter of total import RA capacity, did not clear the day-ahead market.

The majority of import RA capacity that does not clear the day-ahead market has been bid at prices that far exceed typical day-ahead clearing prices. For example, of the capacity not cleared in summer month assessment hours shown in Figure 2, about 73% (or about 660 MW), was bid at prices greater than \$500/MWh in the day-ahead market.

Figure 3 shows average day-ahead import RA bids by price bin during weekday hours in August 2018. As shown in Figure 3, a significant and consistent amount of import RA capacity is bid at high prices across the day and does not clear the day-ahead market, even in peak load hours in summer months. This has been a consistent trend since at least 2017.

Figure 4 further illustrates this trend by comparing the price at which RA imports have been offered in the day-ahead market relative to the Default Energy Bid (DEB) for hydro resources recently filed by the CAISO at FERC.¹⁰ The formula for this new DEB for hydro units is designed to be an upper estimate of the potential opportunity costs of a very energy limited hydro unit.¹¹

¹⁰ *California Independent System Operator Corporation CAISO Tariff Amendments to Enhance Local Market Power Mitigation and Reflect Hydroelectric Resource Opportunity Costs in Default Energy Bids*, CAISO, FERC Docket No. ER19-2347, July 2, 2019, pp. 31-47. <http://www.caiso.com/Documents/Jul2-2019-TariffAmendment-LocalMarketPowerMitigationEnhancements2018-ER19-2347.pdf>

¹¹ For this analysis, DMM used the maximum of two potential hydro DEBs, based on either Palo Verde or Mid-C as the local area hub, assuming 12 months of storage. Additional details of the hydro DEB are provided in the DMM's comments on the CAISO's recent proposal filed at FERC. <http://www.caiso.com/Documents/MotiontoInterveneandCommentsoftheDepartmentofMarketMonitoring-LMPME-ER19-2347-000-Jul232019.pdf>

Figure 3. Average hourly RA imports offered by price bin (weekday hours) August 2018

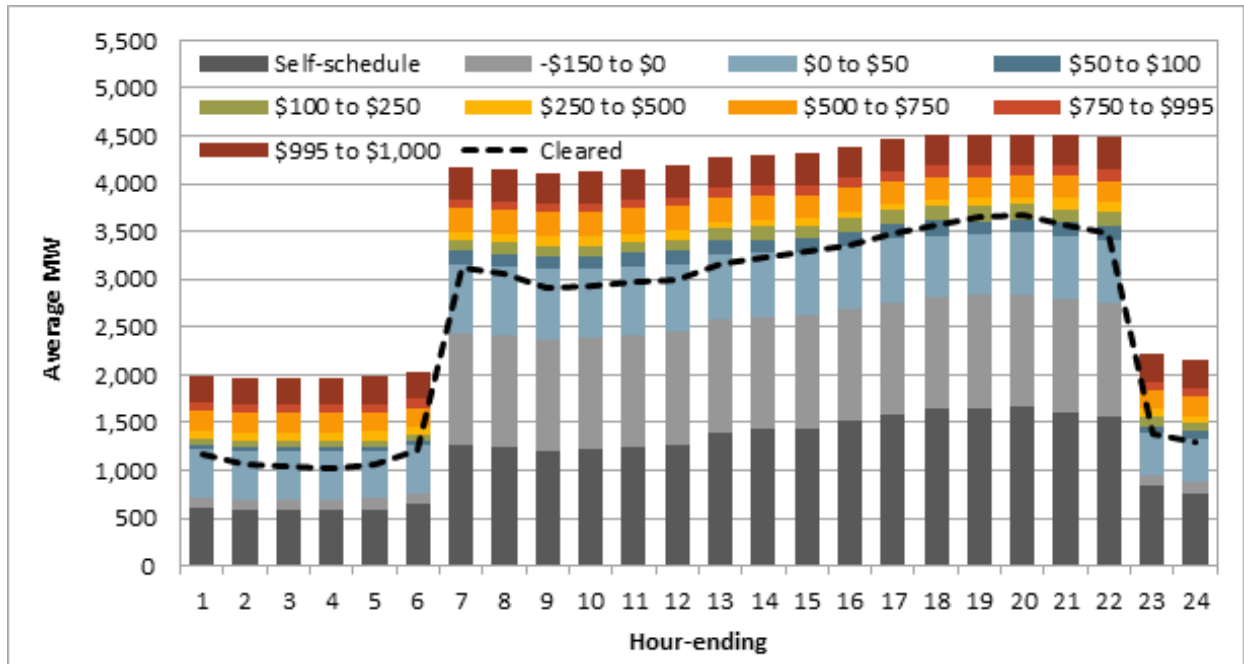
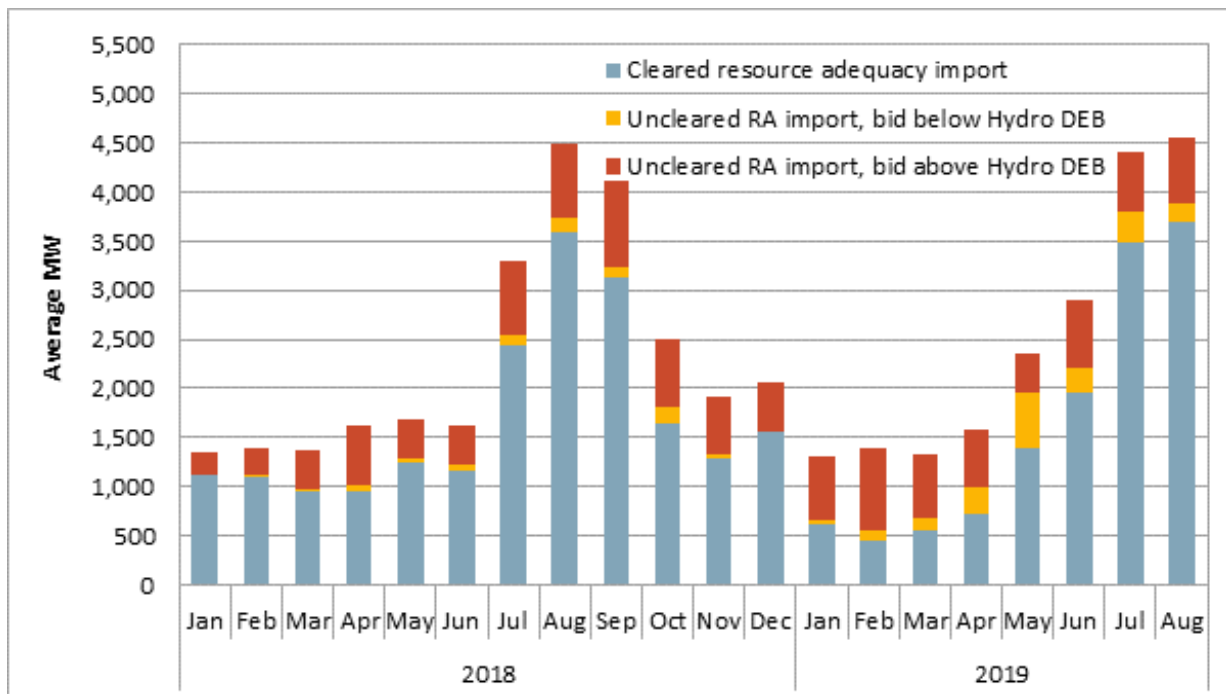


Figure 4. Average hourly RA imports offered by prices greater than hydro DEB (Availability Assessment Hours only)



As shown in Figure 4, most of the RA imports which do not clear the day-ahead market are bid at prices in excess of the recently-filed DEB for hydro units. In the summer

months shown in Figure 4, about 81% percent of the RA imports which did not clear the day-ahead market were bid at prices in excess of the DEB being proposed for hydro units.

The Commission's proposed clarification would require RA import capacity that may not otherwise clear the day-ahead market to be delivered in Availability Assessment Hours. In the absence of other enhancements to import RA rules that continue to be discussed at the CPUC and the CAISO, the Commission's proposed clarification would help enhance the reliability of import RA capacity by ensuring suppliers cannot intentionally avoid clearing the market through high-priced bids.

Limiting energy delivery to peak evening ramping hours avoids reduced scheduling of renewable generation due to increased RA imports.

To analyze the potential impacts of the Proposed Decision, DMM also used actual day-ahead supply and demand bids between January and August 2019 to identify what sources of supply would not have cleared the day-ahead market (or would be *displaced*), if all import RA was required to flow in the Availability Assessment Hours. This analysis is based on hourly day-ahead supply and demand curves constructed from market bids and comparisons of the difference in supply that cleared in two different scenarios. The first scenario is based on actual schedules and bids, while the second scenario assumes all RA imports are self-scheduled.¹²

Figure 5 shows results of this analysis. Over the 20 month period covered in this analysis, almost all supply that would have been displaced by increased RA imports in

¹² This is the same basic methodology that is used by DMM to assess the impact of gas-fired generation which bids above estimated marginal costs. A more detailed description is provided in DMM's 2018 Annual Report, See *2018 Annual Report on Market Issues and Performance*, Department of Market Monitoring, May 2019, p. 154:
<http://www.caiso.com/Documents/2018AnnualReportonMarketIssuesandPerformance.pdf>

Availability Assessment Hours consisted of virtual supply (31%), non-RA imports (32%), and natural gas generation (28%).

A very small portion of supply that would not have cleared the day-ahead market due to increased RA imports came from hydro (7%), coal (2%), and wind and solar (< 1%). Figure 6 shows a more detailed summary of the volume and bid prices of wind and solar generation that would not have cleared the day-ahead market due to increased RA import self-schedules.

As shown in Figure 6, most of the wind and solar generation that would not have cleared the day-ahead market occurred in the spring months of March, April and May. All of the very low priced wind and solar generation (i.e. \$5/MWh or lower) that would not have cleared the day-ahead market occurred in these three spring months. Most of the remaining wind and solar that would not have cleared the day-ahead market was offered at relatively high positive prices for renewable resources. In practice, if this wind and solar generation was actually available in real-time, it would have generated unless curtailed by the CAISO based on its bid price or through reliability curtailments needed for local constraints.

Figure 5: Average hourly supply displaced by additional RA imports (Availability Assessment Hours only)

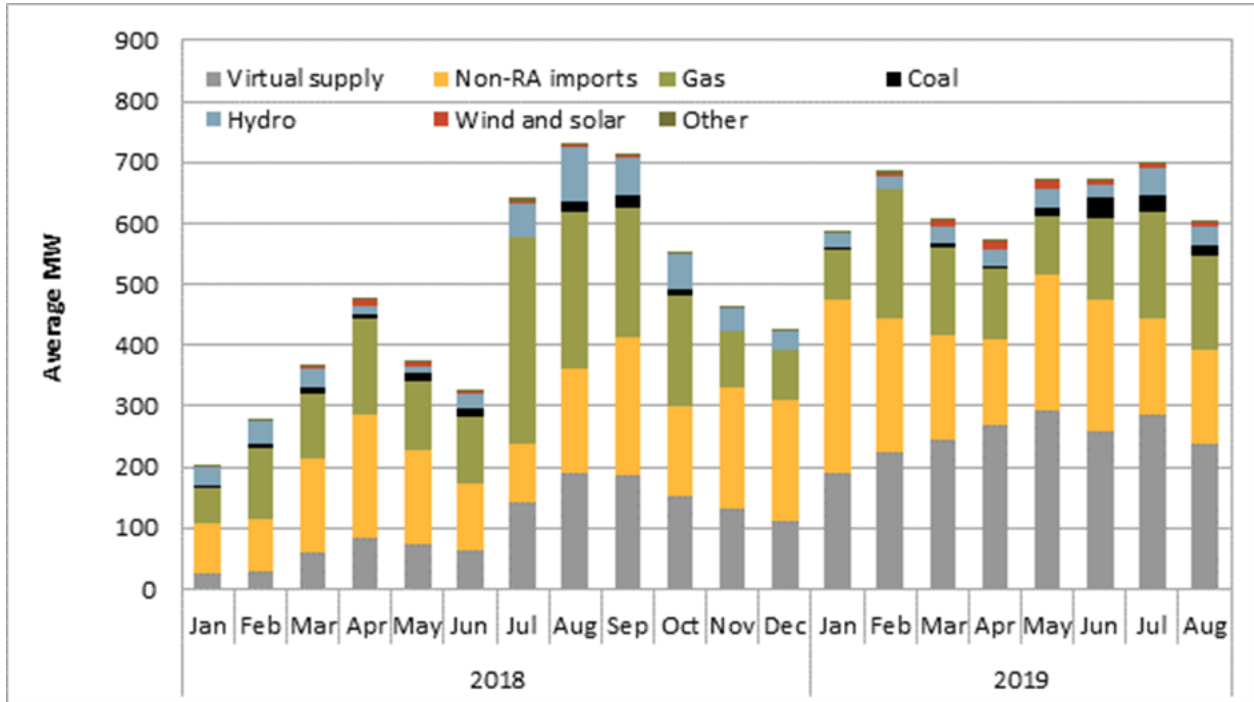
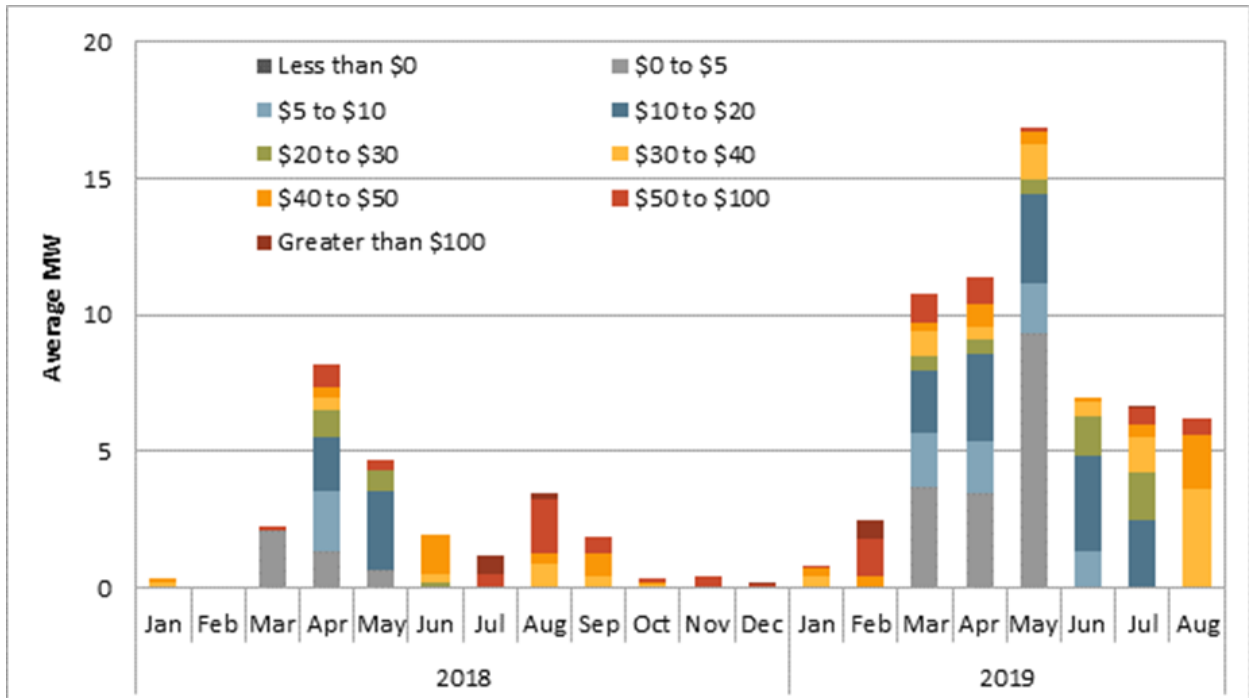


Figure 6. Bid prices of wind and solar generation displaced by additional RA imports (Availability Assessment Hours only)



Limiting energy delivery to peak evening ramping hours avoids increased self-scheduling of imports during negative and low priced intervals.

DMM has also examined the potential impact of the Proposed Decision in terms of any increases in negative or very low prices in the day-ahead market. Results of this analysis are summarized below.

First, DMM's analysis shows that Availability Assessment Hours do not coincide with periods in which very low or negative prices have occurred in 2018 and 2019. Specifically, day-ahead market system marginal energy cost never fell below \$10/MWh during any of the Availability Assessment Hours in 2018 or 2019, except for a very limited number of Availability Assessment Hours in the spring months of March to May.

Figure 7 shows the frequency of low system marginal energy costs during these three spring months (March to May) in 2018 and 2019. Data in Figure 7 are limited to only include these three spring months because, as noted above, these are the only months in which day-ahead market system marginal energy cost ever fell below \$10/MWh during any of the Availability Assessment Hours during 2018 or 2019. The red dotted lines highlight the Availability Assessment Hours from 4 to 9 pm. As shown in Figure 7, the frequency of very low day-ahead prices was still relatively limited in the Availability Assessment Hours even in these spring months.

DMM also assessed the potential for increased RA imports to increase the frequency of very low or negative prices in the Availability Assessment Hours. DMM assessed this potential price impact as part of the same analysis used to assess the types of supply that would not have been scheduled in the day-ahead market if all RA import capacity was scheduled in the day-ahead market, as summarized in the prior section of

these comments. Table 1 summarizes results of this analysis for January 2018 to August 2019.

Figure 7. Frequency of low system marginal energy prices during spring months by hour of day (March to May, 2018 and 2019)

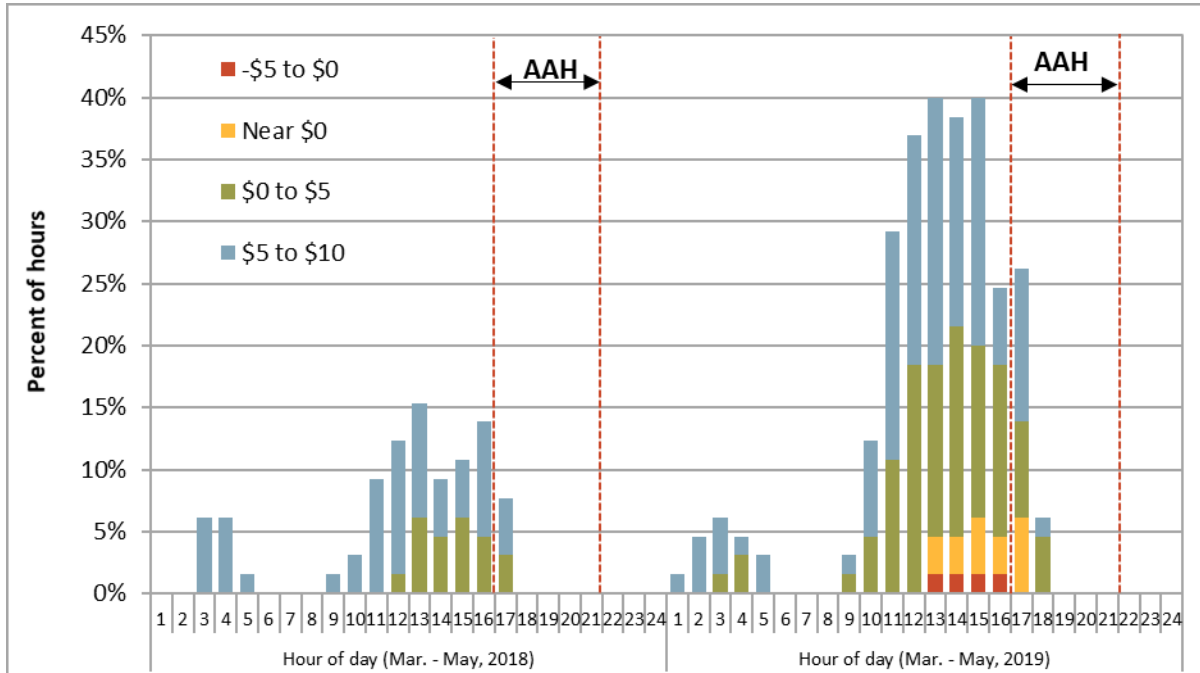


Table 1. Potential impact of increased RA imports on frequency of low day-ahead prices (Availability Assessment Hours only, January 2018 to August 2019)

System marginal energy price	Actual day-ahead prices (hours)	Estimated prices with increased RA imports (hours)
Less than \$0	0	0
Near \$0	4	11
\$0 to \$5	10	11
\$5 to \$10	12	33
\$10 to \$15	25	41
\$15 to \$20	44	60
\$20 to \$25	63	72
Greater than \$25	1,972	1,902
Total hours	2,130	2,130

As shown in Table 1, this analysis indicates that if all RA import had been scheduled in the day-ahead market during the Availability Assessment Hours, the number of hours with very low prices would have increased, but would have still been relatively minimal. For example, the total number of hours with day ahead prices between \$0 to \$10/MWh would have increased from about 1.2% of hours to about 2.6% of the hours in the Availability Assessment Hours between January 2018 and August 2019. As shown in Table 1, there were no hours with negative prices during the Availability Assessment Hours and DMM's analysis indicated that no negative prices would have resulted from scheduling all RA imports in the day-ahead market.

C. Bilateral purchases could continue to support energy delivery to the CAISO under the Proposed Decision

In opening and reply comments on the initial Ruling some Parties expressed concern that requiring firm energy delivery of RA imports may force sellers to schedule energy into the CAISO at a loss where marginal costs may exceed LMPs.¹³ However, under its Proposed Decision, the Commission will not also require suppliers to associate delivery of import RA with a specific resource. Thus, it appears that under the Proposed Decision suppliers could continue to have discretion over what supply ultimately backs an import into the CAISO in any given hour.

DMM expects that given a consistent energy delivery obligation, it is likely that many or most suppliers would back import RA with dedicated supply to minimize exposure to CAISO non-delivery charges and to ensure compliance with CPUC requirements and other CAISO market rules. However, if the marginal cost of a resource

¹³ *Powerex comments on Ruling*, p.10, *SDG&E reply comments on Ruling*, pp. 1-2.

dedicated to backing a firm RA import obligation is expected to exceed CAISO prices, it would be rational for the supplier to purchase cheaper energy from the bilateral spot market to support an import versus operating a resource uneconomically. DMM expects that suppliers would continue to support energy delivery using least cost supply, whether the supply is sourced from a dedicated resource or energy purchased in bilateral spot markets.¹⁴

D. Delivery requirements could increase the cost of import capacity, but would ensure capacity is committed to the CAISO when conditions are tight across the West.

In opening and reply comments on the initial Ruling, some parties have also expressed concerns that requiring import RA to deliver energy would force RA imports to incur economic losses when prices outside of the CAISO are higher.¹⁵ These parties expressed concern that suppliers would embed lost opportunity costs in import RA contracts, increasing the cost of import RA.

DMM expects that import RA contracts with delivery requirements would sell at a premium to contracts with no delivery obligation. However, DMM continues to support the Proposed Decision as an interim measure to enhance the reliability of import RA until more viable solutions are developed. Although some import RA contracts may become more expensive up front, a delivery obligation would ensure power is dedicated to the

¹⁴ DMM recognizes that suppliers may face other delivery obligations that require delivery from a specific source such as those tied to meet RPS or carbon-free requirements. However, these obligations likely result in resources being considered must-take today and would not face new constraints under the Commission's clarification.

¹⁵ *AReM comments on Ruling*, p.6, *Powerex comments on Ruling*, pp. 10-11, *SDG&E reply comments on Ruling*, pp. 3-4.

CAISO and not directed elsewhere when conditions are tight across the West and CAISO must rely on the entire RA fleet to serve load.

III. **CONCLUSION**

DMM supports the Commission's clarification of import RA rules as a temporary measure that may be enforced under existing Commission decisions. Limiting the energy delivery requirement to the Availability Assessment Hours would limit self-scheduling of additional RA imports to hours when this energy is needed most for the CAISO system.

Based on analysis summarized in these comments, it appears that the Commission's proposed rule clarification is not likely to result in significant displacement of renewable generation or cause a significant increase in low negative prices, even if applied throughout the year. However, most of these potential impacts could be avoided by not applying the delivery requirement in the spring months of March through May. Thus, the Commission could consider further limitations to the energy delivery requirement to avoid increased self-scheduling in these periods.

DMM recognizes that market efficiency and system flexibility could be improved by avoiding large volumes of self-schedules in the CAISO market. Therefore, while DMM is supportive of the Commission's proposed clarification as an interim measure, DMM supports consideration of alternative solutions that would allow import RA to participate more flexibly in the market. Other solutions that have been discussed in this proceeding and at the CAISO (such as real-time must offer provisions, negotiated bid caps and fixed-for-float contract options) are potentially more viable long terms solutions to improve the reliability of import RA and address system market power concerns.

Respectfully submitted,

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Dated September 26, 2019