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California ISO

California Independent System Operator Corporation

California ISO

Import resource adequacy

September 10, 2018

Department of Market Monitoring

Summary

This report provides an update of analysis and trends concerning imports used to meet resource adequacy requirements which DMM has highlighted in prior annual reports.¹ DMM's *2017 Annual Report* noted that both the overall volume of imports used to meet resource adequacy requirements and the prices at which many of these imports were offered into the ISO's day-ahead market increased in 2017. As shown in this report, these trends continued in the summer of 2018.

System-level resource adequacy requirements met by imports during peak summer hours increased from an average of around 3,600 MW in 2017 to around 4,000 MW in 2018. The volume of resource adequacy import capacity bid in the day-ahead market at very high prices has also increased in the summer of 2018. During peak hours in July and August of 2018, an average of about 484 MWh of imports used to meet resource adequacy requirements was bid in the day-ahead market at prices greater than \$750/MWh, compared to an average of around 145 MWh in the summer of 2017.

Background

The ISO works with the California Public Utilities Commission (CPUC) and other local regulatory authorities to set system-level resource adequacy requirements. Requirements are set for each specific load-serving entity based on their forecasted peak load in each month (based on a 1-in-2 year peak forecast) plus a planning reserve margin, which is typically 15 percent of peak load.²

Load-serving entities are allowed to use imports to meet system resource adequacy requirements. Imports were used to meet an average of around 3,600 MW (or around 7 percent) of system resource adequacy requirements during the peak summer hours of 2017. In the summer of 2018, this has increased to an average of around 4,000 MW (or around 8 percent) of system resource adequacy requirements.

Resource adequacy imports are not required to be resource specific or to represent supply from a specific balancing area, but only that they be on a specific intertie into the ISO system. Further, scheduling coordinators are only required to submit energy bids for resource adequacy imports in the day-ahead market.³ Imports can be bid at any price and do not have any further obligation to bid into the real-time market if not scheduled in the day-ahead energy or residual unit commitment process.

DMM has expressed concern that these rules could allow a significant portion of resource adequacy requirements to be met by imports that may have limited availability and value during critical system and market conditions. For example, resource adequacy imports could be routinely bid significantly above projected prices in the day-ahead market to ensure they do not clear and would then have no

¹ *2017 Annual Report on Market Issues and Performance*, Department of Market Monitoring, June 2018, pp. 229-231. <http://www.caiso.com/Documents/2017AnnualReportonMarketIssuesandPerformance.pdf>

² The planning reserve margin is designed to include additional operating reserve needed above peak load as well as an allowance for outages and other resource limitations. The requirement is then adjusted for several factors including a credit for demand response programs.

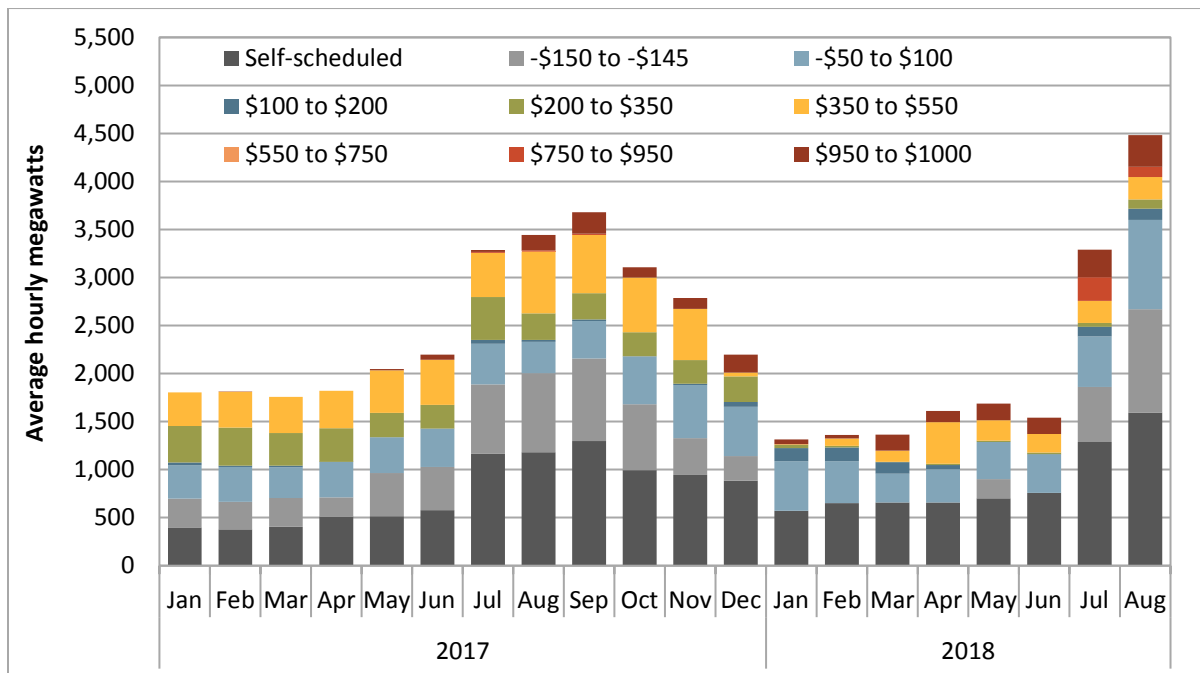
³ Day-ahead availability requirements are not applicable to resource adequacy capacity (including imports) for load-following metered subsystems. For more information, see section 40.6 of ISO's tariff: http://www.caiso.com/Documents/Section40_ResourceAdequacyDemonstration_SCs_CAISOBAA_asof_May1_2018.pdf

further obligation to be available in the real-time market. Consequently, DMM has recommended the ISO re-consider rules concerning resource adequacy requirements met by imports.⁴

Analysis

Figure 1 shows the average hourly volume of self-scheduled and economic bids for resource adequacy import resources in the day-ahead market, during peak hours.⁵ The dark and light gray bars show the amount of import capacity that was self-scheduled or bid near the price floor. The remaining bars show the amount of resource adequacy import capacity bid into the day-ahead market at different price levels.

Figure 1 Average hourly resource adequacy imports by price bin (peak hours)



As shown in Figure 1, during peak hours in July and August of 2018, an average of about 484 MWh of imports used to meet resource adequacy requirements was bid in the day-ahead market at prices greater than \$750/MWh, compared to an average of around 145 MWh in the summer of 2017. None of the resource adequacy imports bid over \$750/MWh ever cleared in the day-ahead market.

Prior to June 2017, system marginal energy prices in the day-ahead market had not reached above \$200/MWh since 2009. On June 21, 2017, the day-ahead market experienced record high system marginal energy prices that peaked around \$609/MWh for hour-ending 20 when load net of wind and solar was highest. Since that time, day-ahead market system marginal prices greater than \$200/MWh have become more common, occurring in over 80 hours between July 2017 and August 2018.

⁴ 2017 Annual Report, p. 259.

⁵ Peak hours in this report reflect non-weekend and non-holiday periods between hours ending 16 and 22.

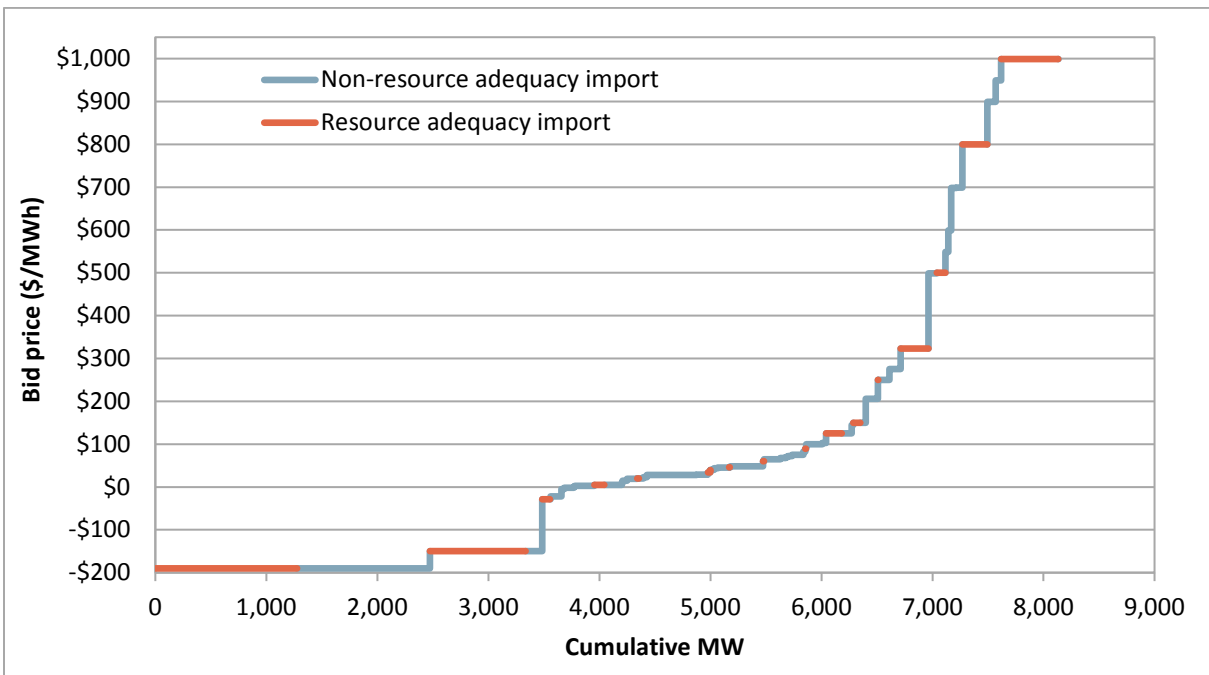
During July and August of 2018, less than 1 percent of resource adequacy imports, bid above \$200/MWh, cleared in the day-ahead market. In the hour-ahead scheduling process, about 67 percent of this import volume was self-scheduled, while about 6 percent was re-bid and cleared the market. A very high portion of these imports were delivered in the real-time market (about 96 percent). The remaining 27 percent of import bids above \$200/MWh that cleared the day-ahead market were re-bid and did not clear the hour-ahead scheduling process.

Illustrative import bid curves

Figure 2 and Figure 3 show the cumulative import supply stack in the day-ahead market on two sample days (September 1, 2017 and July 24, 2018) for the peak net-load hour.⁶ During this hour on these days, the day-ahead market experienced very tight supply conditions and reached record high system marginal energy prices. The red lines in these figures show the proportion of bid-in import capacity that have a resource adequacy designation.

As shown in the figures, over 500 MW of resource adequacy import capacity was bid-in near or at the bid cap of \$1,000/MWh on these days. On September 1, 2017, only 71 percent of resource adequacy import capacity offered in the day-ahead market cleared with the system marginal price reaching around \$773/MWh in hour-ending 19. On July 24, 2018, only 84 percent was accepted in the day-ahead market in hour-ending 20 with a system marginal energy price of \$979/MWh.

Figure 2 Import bids by resource adequacy designation (September 1, 2017)



⁶ Self-scheduled imports are depicted on the figure at -\$190 for illustrative purposes.

Figure 3 Import bids by resource adequacy designation (July 24, 2018)

