

Memorandum

To: ISO Board of Governors
From: Eric Hildebrandt, Executive Director, Market Monitoring
Date: May 10, 2019
Re: Department of Market Monitoring update

This memorandum does not require Board action.

EXECUTIVE SUMMARY

This memo highlights key findings and recommendations of the Department of Market Monitoring's forthcoming 2018 annual report. Additional findings were provided in DMM's March memo to the Board.¹

OVERALL MARKET PERFORMANCE

- The total estimated wholesale cost of serving load in 2018 was about \$10.8 billion or about \$50/MWh. This represents a 24 percent increase that was driven primarily by a 25 percent increase in natural gas prices. After adjusting for higher natural gas costs and changes in greenhouse gas prices, wholesale electric costs increased by about 4 percent.
- Day-ahead prices were often driven up by high gas prices in the next-day market for SoCal Citygate. The high gas prices at SoCal Citygate resulted from supply limitations and the potential for high noncompliance charges associated with operational flow orders (OFOs).
- Real-time prices were systematically lower than day-ahead market prices in part due to additional supply from renewables and other balancing areas available in real time. Real-time prices were driven lower by adjustments made to the hour-ahead load forecast by grid operators and additional unit commitments and out-of-market energy dispatches made after the day-ahead market.
- Prices in the ISO's energy markets were generally competitive in 2018. However, analysis indicates that prices were significantly in excess of competitive levels in some hours when net loads that must be met by gas-fired units are highest.

¹ <http://www.caiso.com/Documents/Department-MarketMonitoringUpdate-Mar2019.pdf>

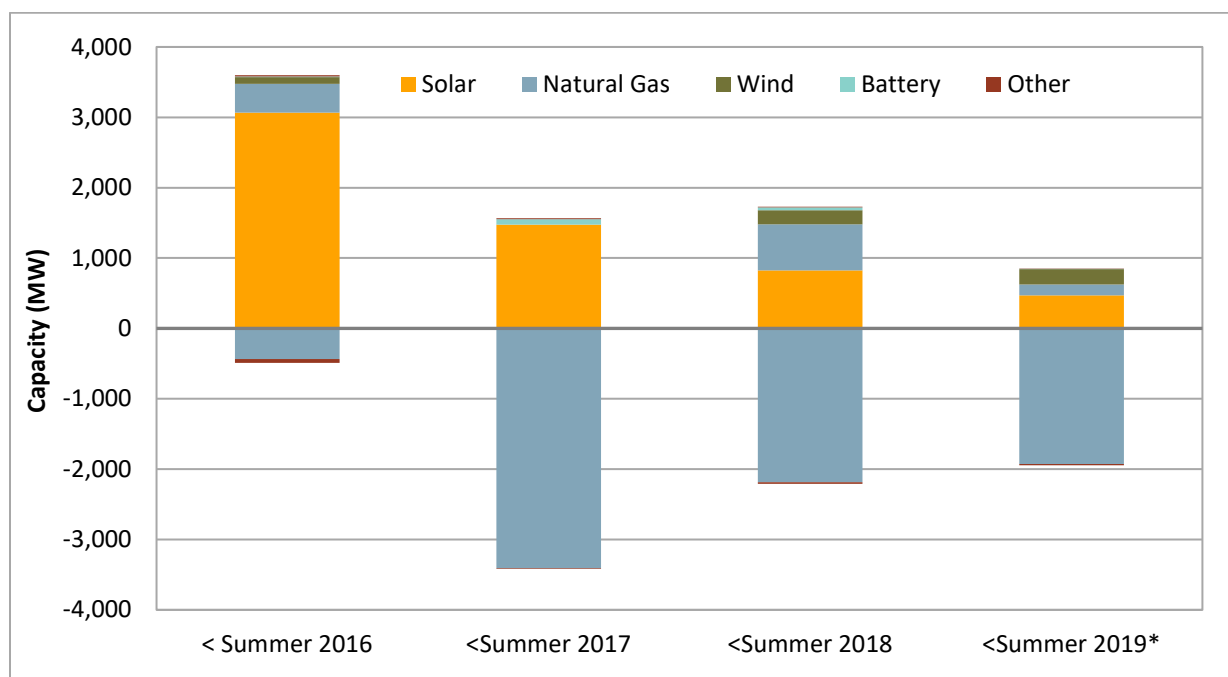
GENERATION ADDITIONS AND REDUCTIONS

Over the last four years, most new capacity being added has been from solar and wind resources, while a significant amount of gas fired capacity has been retired or temporarily withdrawn from the market. Figure 1 shows DMM’s estimate of capacity additions and reductions from 2015 to 2018 based on maximum nameplate capacity.

From June 2015 to June 2018, DMM estimates about 6,000 MW of generation has been withdrawn from the market.² Almost all of this capacity was from natural gas resources, most of which was located in local capacity areas. About 4,000 MW of gas-fired capacity that was retired was subject to once-through cooling limitations. Over the same time period, about 1,000 MW of gas, 5,300 MW of solar, 300 MW of wind and 130 MW of battery capacity was added or returned to the market.

Since June 2018, an additional 2,000 MW of gas has withdrawn from market participation, while an additional 470 MW of solar, 220 MW of wind, and 150 MW of gas generation was added or returned. For the entire time period from June 2015 to present, DMM estimates a net reduction in maximum nameplate capacity of about 320 MW.

Figure 1. Generation additions and reductions (maximum capacity)



² In addition to decommissioned units, capacity reductions include (1) resources that withdraw for a short period of time before returning (or *mothballing*), (2) resources that withdraw to upgrade the unit and then repower, and (3) resources whose Participating Generator Agreements (PGAs) have expired.

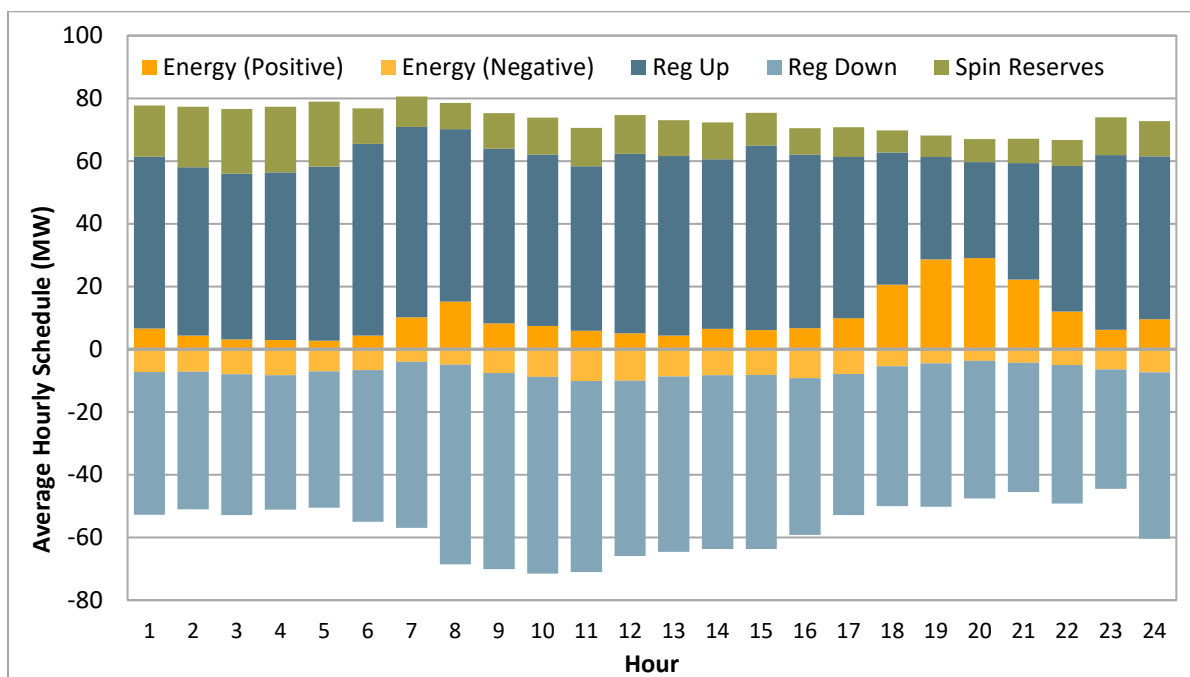
In 2018, the qualified capacity ratings used to calculate the amount of solar that can provide resource adequacy reduced from about 80 percent (in 2017) to 41 percent of nameplate capacity for solar resources in the month of August. For wind resources, the qualified capacity rating for August increased from about 17 percent (in 2017) to 26 percent in 2018.

Based on these new resource adequacy availability ratings for the month of August, about 2,400 MW of solar and 135 MW of wind have been added since summer 2015. In 2018, solar resources were used to meet almost 4,000 MW of resource adequacy requirements in the peak summer months, while wind units provided over 1,500 MW of resource adequacy capacity. Together, solar and wind accounted about 5,500 MW of resource adequacy capacity in the peak summer months, or about 11.6 percent of total system resource adequacy capacity.

Battery Resources

The amount of battery resources operating in the ISO is growing but is still very limited with installed capacity reaching about 130 MW in 2018. Figure 2 shows the average amount of battery capacity scheduled in the day-ahead market to provide energy and ancillary services each hour in 2018. As shown in Figure 2, batteries were primarily scheduled to provide ancillary services, including regulation up, regulation down, and spin reserves.

Figure 1. Average hourly battery schedules (2018)



Upward energy provided by battery resources is highest during the morning and evening ramping hours. However, as shown in Figure 2, even during these ramping hours most battery capacity is scheduled to provide ancillary services rather than ramping energy. Batteries often recharged overnight and during mid-day hours when renewable energy production is highest.

The ISO currently does not mitigate the energy bids of battery resources. However, many battery resources are located in transmission constrained areas that are frequently downstream of congested non-competitive constraints. Therefore, it is very likely that these resources will need to be subject to energy bid mitigation within the next few years. DMM is recommending that the ISO and stakeholders begin to develop default energy bids for batteries as part of the ISO's ongoing energy storage and distributed energy resources (ESDER 4) initiative.

RECOMMENDATIONS

DMM provides written comments and recommendations on an ongoing basis in the ISO's stakeholder process and in quarterly, annual and other special reports. DMM's current recommendations on key market design initiatives and issues include the following.

Consider options for avoiding or mitigating potential system market power

In our 2017 annual report, DMM recommended that the ISO begin to consider various actions that might be taken to reduce the likelihood of conditions in which system market power may exist and to mitigate the impacts of system market power. DMM continues to make this same general recommendation.

DMM believes the potential for system market power may increase in the coming years due to a combination of recent trends that are likely to continue.

- The amount of gas fired-capacity operating in the market has been decreasing and reductions in net gas fired capacity are likely in the coming years due to limitations on use of once-through cooling.
- Regional supply and demand conditions appear to have tightened, so that the supply of imports at competitive prices appears to be dropping when ISO system conditions are tight.
- The amount of gas fired capacity under energy tolling contracts or longer term power purchase agreements (PPAs) has decreased in recent years, while gas fired units providing resource adequacy capacity under capacity only contracts has increased. This trend could continue as the portion of load served by Community Choice Aggregators (CCAs) increases. Tolling agreements and PPAs help to mitigate system market power in the energy market, while capacity only contracts only require resource adequacy units to offer into the market.

- During many evening ramping hours, the actual supply of solar and wind resources may be significantly lower than the amount of capacity from these resources shown in resource adequacy supply plans.

DMM recognizes that this recommendation involves a combination of market design and policy issues, many of which are related to CPUC procurement and resource adequacy policies and processes. In 2018, the ISO initiated a process to analyze the structural competitiveness of the ISO system, and, depending on results of this analysis, will consider options for mitigating system market power.

Require cost justification for imports over \$1,000/MW bid cap

One of DMM's specific recommendations for helping to protect against system market power is to make a filing at FERC so that when the ISO implements Order 831, imports in excess of the current \$1,000/MW bid cap would be subject to *ex ante* cost verification in order to set market clearing prices. Without such a filing by the ISO, imports up to \$2,000/MW would not be subject to cost verification and could set market clearing prices under Order 831.

Consider changes to resource adequacy imports

Imports used to meet resource adequacy requirements are not required to originate from specific generating units or to be backed by specific portfolios of generating resources. These imports can be bid at any price up to the \$1,000/MWh bid cap and do not have any further obligation if not scheduled in the day-ahead market or residual unit commitment process. DMM has expressed concern in prior annual reports that under current rules and implementation processes, imports may have very limited availability and value during critical system and market conditions.

As part of the ISO's resource adequacy enhancements initiative, the ISO is assessing the requirements and rules for the resources or supply behind imports that are used to meet resource adequacy requirements. As part of this initiative, DMM is recommending that the ISO continue to work with stakeholders to come to an explicit policy decision on whether or not resource adequacy capacity must be backed by specific generation resources and how any such requirements should be enforced in practice.

Reliability must-run and capacity procurement mechanism

The ISO initiated a stakeholder process in 2018 to consider changes to the reliability must-run (RMR) and capacity procurement mechanism (CPM) policies. DMM supports changes included in the ISO's 2018 proposal, but recommends that other concerns with the ISO's CPM/RMR procurement be addressed as part of a comprehensive reform.

In 2019, the ISO has committed to continue to consider changes to the \$76/kw-year soft cap used in procuring capacity under the ISO's CPM provisions. DMM believes the scope of this initiative should be expanded to include reconsidering the need for a 20 percent adder above going forward fixed costs. DMM also recommends that the ISO consider options for applying a market power test to CPM offers and then linking limits on CPM compensation to the competitiveness of CPM solicitations.

DMM also recommends that the ISO consider merging CPM and RMR into a single backstop procurement mechanism to prevent self-selection between CPM and RMR designations based on maximization of compensation. Voluntary CPM designations can be declined by suppliers with market power that prefer RMR compensation. Newer pivotal resources with undepreciated capital costs may have an incentive to self-select RMR compensation while older pivotal resources may prefer to self-select CPM compensation. It is not clear what efficiencies this self-selection provides.