# Memorandum

**To:** ISO Board of Governors

**From:** Eric Hildebrandt, Director, Market Monitoring

**Date:** February 9, 2012

**Re:** **Market Monitoring Report**

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***This memorandum does not require Board action.***

## EXECUTIVE SUMMARY

This memo provides comments by the Department of Market Monitoring (DMM) on Management's proposed changes to further refine rules relating to bid cost recovery payments. The memo also includes a summary of DMM's assessment of market performance in the final quarter of 2011 and in January 2012.

- **Bid cost recovery rule changes.** DMM is supportive of the two changes being proposed to further refine rules to prevent the potential for excessive bid cost recovery payments. The first of these changes ensures that units are eligible for recovery of minimum load costs through bid cost recovery payments only if they are on-line. This change is being made to address a market design flaw identified by DMM through monitoring of bid cost recovery payments that wasthen referred to the ISO. This market design flaw was detected by DMM before it had a significant impact on bid cost recovery payments. The second change would require that most gas-fired capacity ultimately be modeled as multi-stage generating resources. DMM is supportive of this requirement. However, as noted in our October 2011 Board memo, DMM continues to recommend that the ISO develop an improved approach for limiting bids submitted by multi-stage generating unit owners to represent the cost for these units to transition from one configuration to another.[1] DMM is recommending that this issue be addressed as part of the ISO's initiative on commitment costs that began in February.

- **Recent market performance.** Wholesale prices have remained highly stable and competitive. Prices in the day-ahead, hour-ahead and real-time energy markets

[1] See Department of Market Monitoring Report, October 20, 2011, p. 1 and p. 4, http://www.caiso.com/Documents/111027Department_MarketMonitoringReport-Memo.pdf

have also tracked much more closely in the fourth quarter of 2011 and January 2012 compared to the same months last year. Much of the improved price convergence is due to fewer instances of price spikes in the 5-minute real-time market. DMM's review indicates this drop in real-time price spikes is largely the result of improved use of manual load adjustments by ISO operators and implementation of the new flexible ramping constraint on December 13, 2011. This constraint is designed to ensure that additional fast ramping capacity is available when needed to improve grid reliability and market outcomes when relatively sudden fluctuations in load and supply occur.

## BID COST RECOVERY RULE CHANGES

In the first half of 2011, the ISO made two emergency filings with FERC to mitigate manipulative market behavior that was significantly increasing bid cost recovery payments. As discussed in DMM's October Board memo, these rule changes were highly effective and resulted in a dramatic drop in bid cost recovery payments.[2] An update on bid cost recovery payments is provided later in this memo.

In the first of these emergency filings, the ISO committed to conduct a stakeholder process to review the effectiveness of these rule changes and identify any further refinements to bid cost recovery rules. Several additional refinements to bid cost recovery rules have been identified through this process.

As noted by Management at the December Board meeting, some of these changes involve modifications necessary to prevent the ability to inflate bid cost recovery payments by deviating from ISO dispatch instructions.[3] However, given the complexity of these new measures, additional development time is necessary to ensure that the new measures work as intended and to provide stakeholders with additional time to consider the impacts of the new measures. Prior to filing the elements of this proposal with the Federal Energy Regulatory Commission, the ISO will bring these bid cost recovery mitigation measures to the Board for approval later in 2012.

At the February Board meeting, Management is asking for approval of two other measures identified in this review of bid cost recovery rules. As explained below, DMM is supportive of both these measures.

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[2] See Department of Market Monitoring Report, October 20, 2011, pp. 4-5, http://www.caiso.com/Documents/111027Department_MarketMonitoringReport-Memo.pdf.

[3] Memo to ISO Board of Governors, Re: Decision on Renewable Integration – Market & Product Review Phase 1, December 8, 2011, http://www.caiso.com/Documents/Decision-RenewableIntegration-MemoDec2011.pdf.

## Minimum load cost tolerance band

The first of these changes ensures that units are eligible for recovery of minimum load costs through bid cost recovery payments, only if they are on-line. This change is being made to address a market design flaw identified by DMM through monitoring of bid cost recovery payments that was then referred to the ISO. This market design flaw was detected by DMM before it had a significant impact on bid cost recovery payments (i.e. less than $300,000 in excess bid cost recovery payments). DMM's review also indicated that this market design flaw did not appear to have been intentionally exploited to increase bid cost recovery payments.

## Multi-stage generating unit modeling

The second change would require that most gas-fired capacity be modeled as multi-stage generating resources by 2013. As discussed in Management's memo on this issue, the way multi-stage generation units are modeled reduces the potential ways in which bid cost recovery payments might be intentionally inflated by generators, by submitting high-priced energy bids and deviating from ISO dispatch instructions. Thus, DMM is supportive of this requirement as part of the overall effort to minimize potential gaming of bid cost recovery payments.

One of the potential strengths of multi-stage generating unit modeling is that it accounts for the costs and operational constraints associated with transitioning between operating configurations. Currently, participants are afforded significant flexibility in the value of transition costs they submit to represent the costs incurred by a resource when transitioning from one configuration to another. These transition costs used by the market software are based on costs submitted by participant to the ISO bounded by rules developed by the ISO.

As noted in our October 2011 Board memo, DMM has previously expressed several concerns about current rules for limiting these transition costs. Specifically, DMM is concerned that transition cost bids submitted by participants can significantly exceed actual costs and the basis for limiting these costs is not clearly defined or verifiable.[4] DMM has recommended an approach for more accurately accounting for transition costs based directly on fuel usage rates and any other verifiable costs. DMM continues to recommend that the ISO seek to develop an approach for limiting transition cost bids based on some percentage of verifiable costs. DMM recommends that this issue can be addressed as part of the ISO's initiative on commitment costs that began in February.

[4] See Department of Market Monitoring Report, October 20, 2011, p. 1 and p. 4, http://www.caiso.com/Documents/111027Department_MarketMonitoringReport-Memo.pdf.

## MARKET PERFORMANCE UPDATE

### Price convergence

Wholesale prices have remained highly stable and competitive. As shown in Figure 1, prices in the day-ahead, hour-ahead and real-time energy markets have also tracked much more closely in the fourth quarter of 2011 and January 2012 compared to the same months last year. Real-time prices were particularly more consistent with hour-ahead prices, continuing a trend that began in August 2011.

The trend toward improved price convergence is largely a result of the decreased incidence of price spikes in the real-time market. As seen in Figure 2, the number of price spikes in the fourth quarter of 2011 was down substantially from the prior year, particularly in December and January. A number of factors contributed to the decrease in real-time price spikes and improved convergence of prices between markets:

- **Manual load adjustments**. During the fourth quarter, manual load adjustments have appeared to be more consistent and reduced price spikes in the 5-minute market. During ramping hours, operators have typically increased the load forecast in the hour-ahead and 15-minute pre-dispatch markets to compensate for differences between these markets and actual conditions in the 5-minute real-time market. These adjustments are aimed at improving reliability and market outcomes by making more capacity available to meet energy and ramping needs in the 5-minute market.

- **Convergence bidding trends.** Changes in convergence bidding patterns also contributed to price trends in December and January. Because of the tendency for hour-ahead prices to be predictably lower than day-ahead prices, convergence bids at the inter-ties consistently added significant volumes of virtual supply to the day-ahead market. Meanwhile, convergence bidding at internal points tended to consistently result in additional virtual demand in the day-ahead market. The suspension of convergence bidding at the inter-ties at the end of November caused the net amount of virtual supply and demand bids clearing the day-ahead market to switch from being net virtual supply to net virtual demand. This had the effect of increasing day-ahead prices and potentially lowering real-time prices in December – contrary to the price trends in these markets. By late December, however, participants adjusted to new price trends and the net amount of virtual bids within the ISO clearing the day-ahead market have been more consistent with hourly price trends in the day-ahead and real-time market in January. As shown in Figure 1, price convergence in these markets improved significantly in January.

**Figure 1. Average monthly on-peak prices - PG&E Area (all hours)**

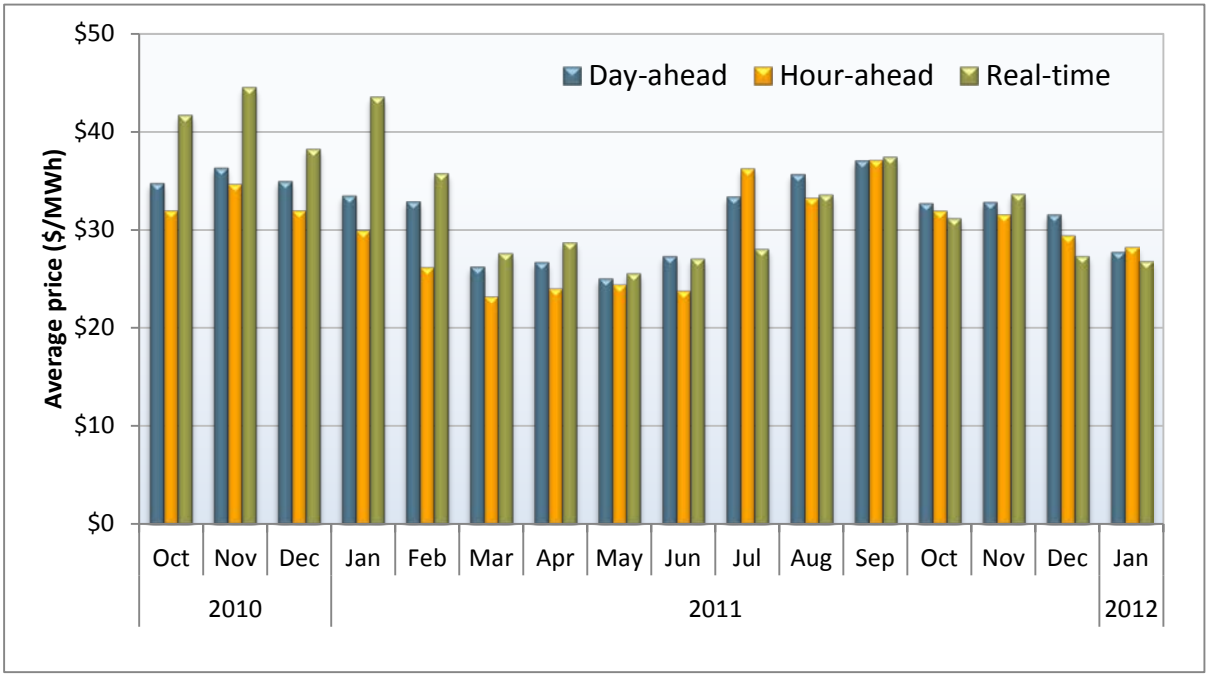
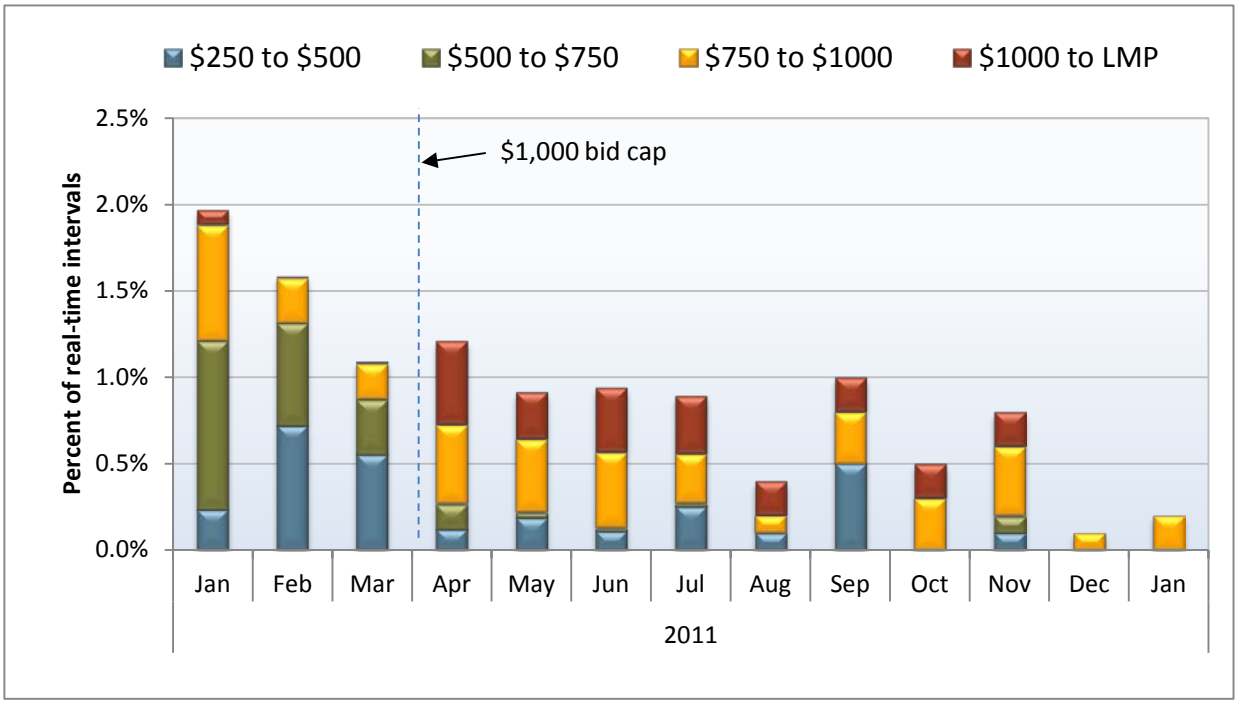


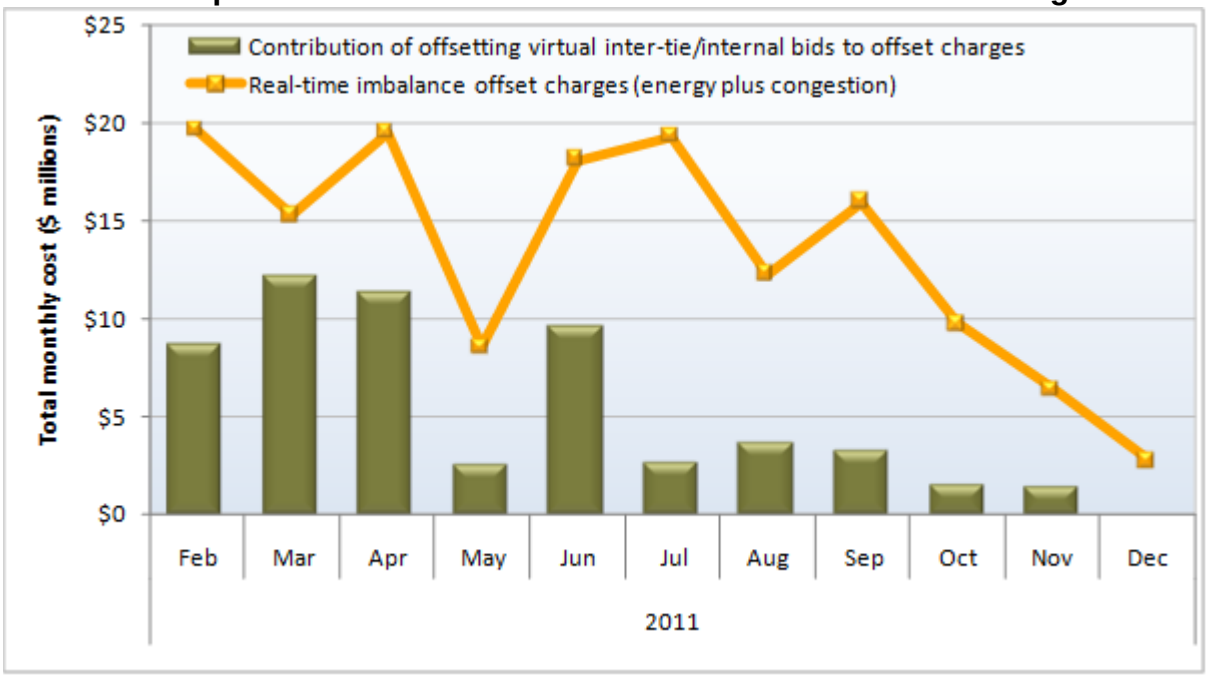

**Figure 2. Frequency of price spikes (ISO system)**



- **Flexible ramping constraint.** On December 13, the ISO implemented a new flexible ramping constraint in the real-time market. This constraint adds additional ramping capacity in the 5-minute real-time market to mitigate load and supply fluctuations in the real-time market. This constraint has helped to improve grid reliability and reduce price spikes due to violations of the system energy balance constraint in the 5-minute real-time market. In December, the very low frequency of real-time price spikes drove average real-time prices well below average day-ahead and hour-ahead prices. Price convergence between the hour-ahead and real-time markets continued to improve in January as the ISO gained more experience setting the levels of this new constraint. A more detailed discussion of this new constraint is provided in the following section of this memo.

As price convergence improved, real-time imbalance offset costs also decreased. Real-time imbalance costs (for energy and congestion) totaled around $19 million in the fourth quarter. This is the second lowest quarterly value since the nodal market began in April 2009 and is down from $40 million in the fourth quarter of 2010. Moreover, imbalance costs associated with virtual bids at inter-ties offset by virtual bids within the ISO also declined to an average of about $1.5 million per month in October and November (see Figure 3). There were no imbalance costs for offsetting virtual positions in December as convergence bidding at the inter-ties was suspended in late November.

**Figure 3. Estimated contribution of off-setting convergence bids at the inter-ties and points within the ISO to real-time imbalance offset charges**



## Flexible ramping constraint

On December 13, the ISO implemented a new flexible ramping constraint in the real-time market. This constraint was added to ensure that additional fast ramping capacity is available when needed due to relatively short by sudden fluctuations in load and supply. The constraint procures upward ramping capacity in the 15-minute real-time pre-dispatch process market that is subsequently made available in the 5-minute dispatch.

Implementation of the constraint appears to have helped improve grid reliability and reduce price spikes due to violations of the system energy balance constraint in the 5-minute real-time market. As a result, price convergence between the hour-ahead and real-time markets continued to improve in January as the ISO gained more experience setting the levels of this new constraint. ISO operators appear to have gradually reduced the use of manual load adjustments after this new constraint was introduced.

As seen in Figure 4, the total weekly cost of the flexible ramping constraint was highest in the first couple of weeks after implementation and came down afterwards as the frequency of the constraint also decreased. During this time, the ISO gradually reduced the flexible ramping requirement in the 15-minute real-time pre-dispatch commitment from 700 MW to 450 MW. Also, operators began to vary the requirement based on hourly ramping expectations. The total cost of the flexible ramping constraint in January has been around $2.5 million.[5] The total cost of spinning reserves in January 2012 was around $1.2 million.

A longer term goal of flexible ramping constraint is to develop a flexible ramping product that will provide additional sources of revenue of fast ramping resources that provide additional ramping capacity when needed by the ISO. Figure 5, shows total flexible ramping costs by operating hour in January. As shown in Figure 5, most payments resulting from this constraint have been for ramping capacity during the morning and, to a further extent, the evening ramping hours. Natural gas fired units have received about 70 percent of these payments, with hydro units receiving most of the remaining 30 percent.

## Bid cost recovery payments

Bid cost recovery payments are designed to ensure that generators receive enough market revenues to cover the cost of all their bids dispatched by the ISO. As noted in DMM's October Board memo, overall bid costs fell significantly in the third quarter of 2011 as a

[5] Although the FERC has approved the implementation of the flexible ramping constraint in the 5-minute real-time market, the methodology to allocate the associated cost has not yet been approved. While the ISO's proposal would allocate all of these cost based on metered load serving entities, FERC has indicated that it may be appropriate to allocate these costs to load and supply based on cost causation.

**Figure 4. Weekly cost and frequency that flexible ramping constraint was binding**

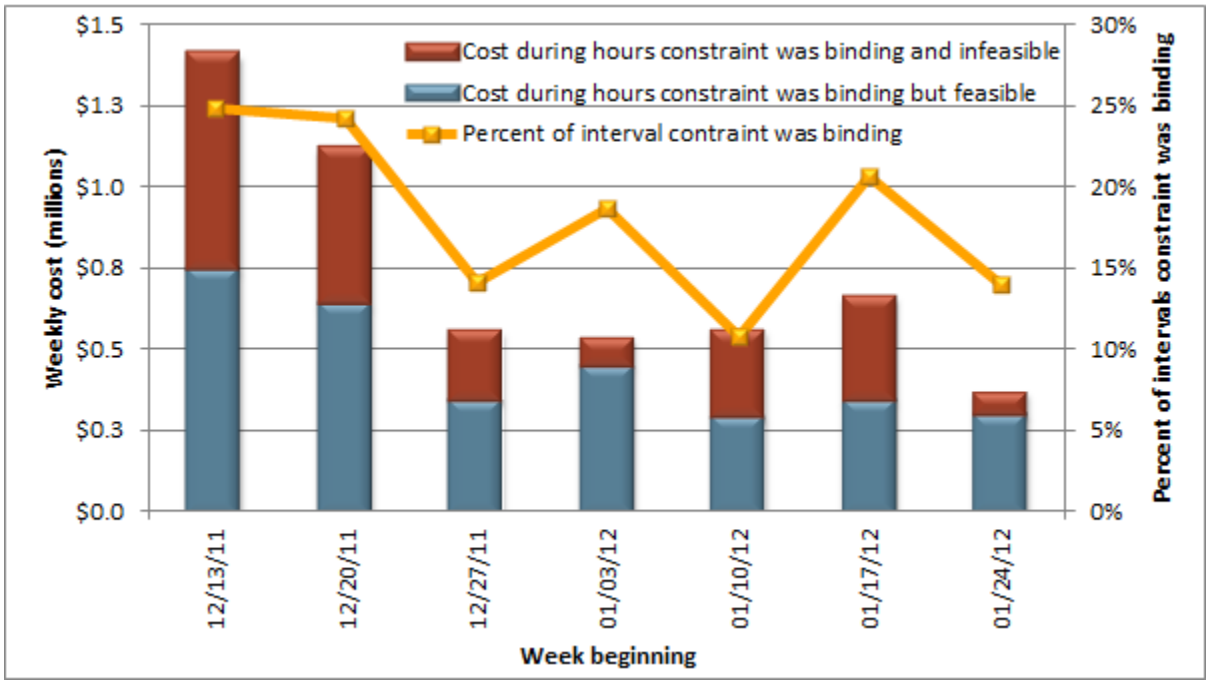
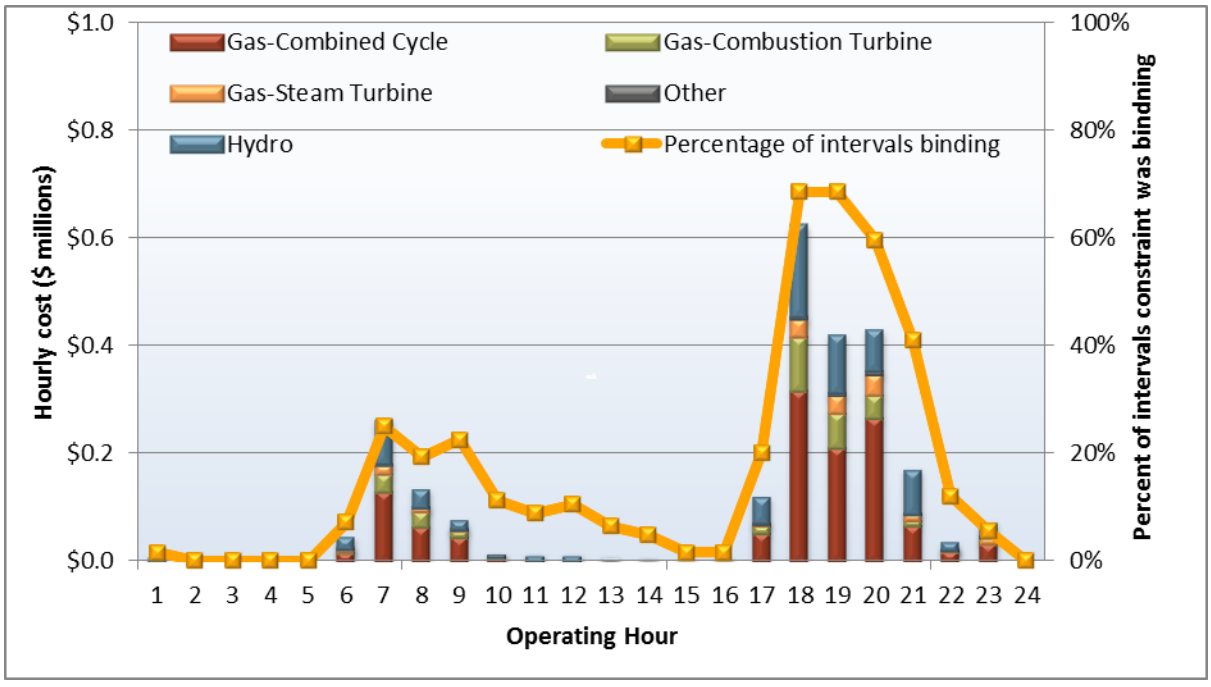



**Figure 5. Direct cost of flexible ramping constraint by operating hour (January)**



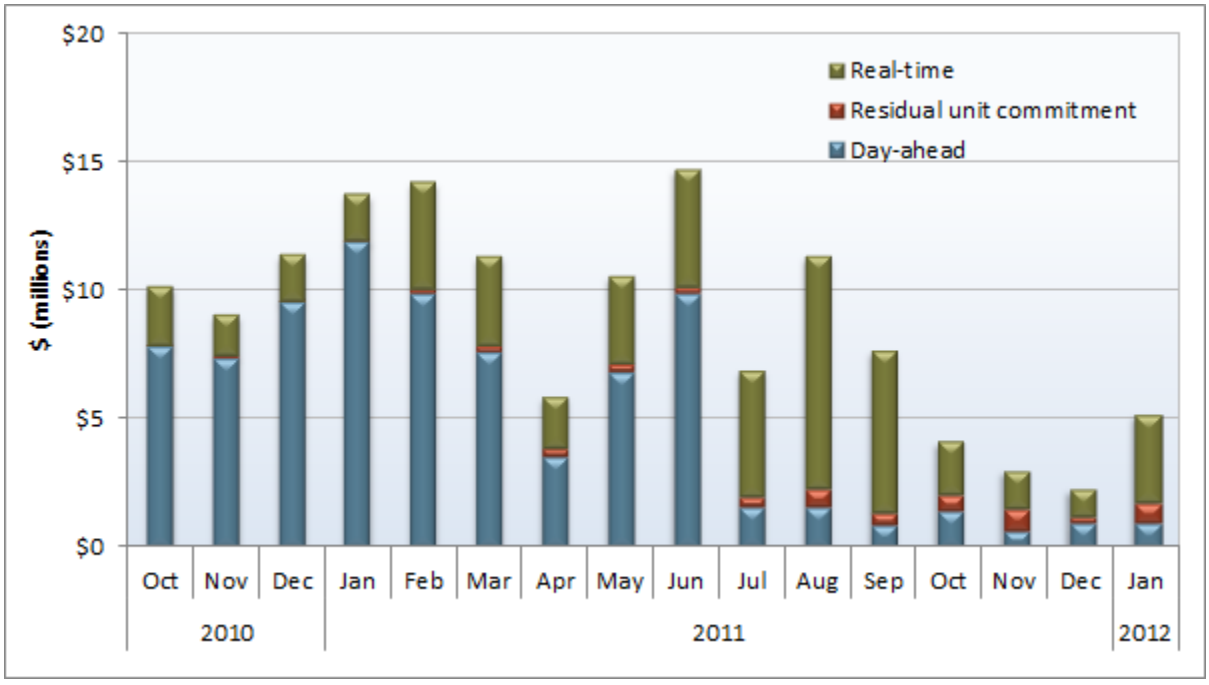
result of decreases in day-ahead uplifts. This drop was a result of changes to bid cost recovery rules to mitigate manipulative bidding behavior.

However, bid cost recovery payments associated with real-time market dispatches increased by almost 50 percent in the third quarter of 2011. This increase was a result of the ISO exceptionally dispatching units for system and south of Path 26 capacity needs, typically on high load days.[6]

In the fourth quarter, real-time bid cost recovery payments declined around 75 percent and overall bid cost recovery payments declined by 65 percent (see Figure 6). Day-ahead bid cost recovery payments remained fairly constant. The decline in bid cost recovery payments in the fourth quarter was a result of fewer exceptional dispatches made after the day-ahead market run to meet system and south of Path 26 capacity needs. As noted earlier, capacity exceptional dispatches are often related to peak load conditions. Loads fell in the fourth quarter consistent with seasonal conditions.

The increase in real-time bid cost recovery in January appears to be primarily related to a software defect that was corrected in late January.

**Figure 6. Bid cost recovery payments**




[6] See discussion of exceptional dispatches in DMM's *2010 Annual Report on Issues and Performance*, pp. 70-74: http://www.caiso.com/Documents/2010AnnualReportonMarketIssuesandPerformance.