

Memorandum

To: ISO Board of Governors
From: Eric Hildebrandt, Director, Department of Market Monitoring
Date: July 3, 2013
Re: **Market Monitoring Report**

This memorandum does not require Board action.

EXECUTIVE SUMMARY

This memo provides an update on market performance in the second quarter of 2013 by the Department of Market Monitoring (DMM). Two key trends in recent market performance include the following:

- **Low real-time prices.** Average prices in the real-time market were significantly lower than day-ahead prices over the last few months. This trend has been driven in part by an increase in negative real-time prices. Much of the negative real-time prices were the result of low loads, combined with seasonal increases in hydro-electric generation and renewable generation (particularly wind), and new solar generation capacity coming on-line. Day-ahead prices are rarely negative and were not negative in any hour in the second quarter. This systematic divergence of day-ahead and real-time prices has created opportunities for virtual bidders to profit from virtual supply bids accepted in the day-ahead market.
- **Real-time congestion uplifts increased.** Congestion related uplifts increased from \$5 million in the first quarter to \$41 million in the second quarter. As much as half of these costs occurred on a half dozen days when real-time congestion was due to forced outages related to wildfires and other special system conditions. In contrast, much of the congestion related uplift costs in the summer and fall of 2012 were related to more systematic and predictable congestion patterns stemming from unscheduled flows and market modeling issues. The ISO has undertaken a number of steps since last summer to reduce these charges, including making constraints and congestion more consistent between the day-ahead and real-time markets. However, to the extent that unexpected and unavoidable conditions occur, this can still create substantial uplifts.

Low real-time prices

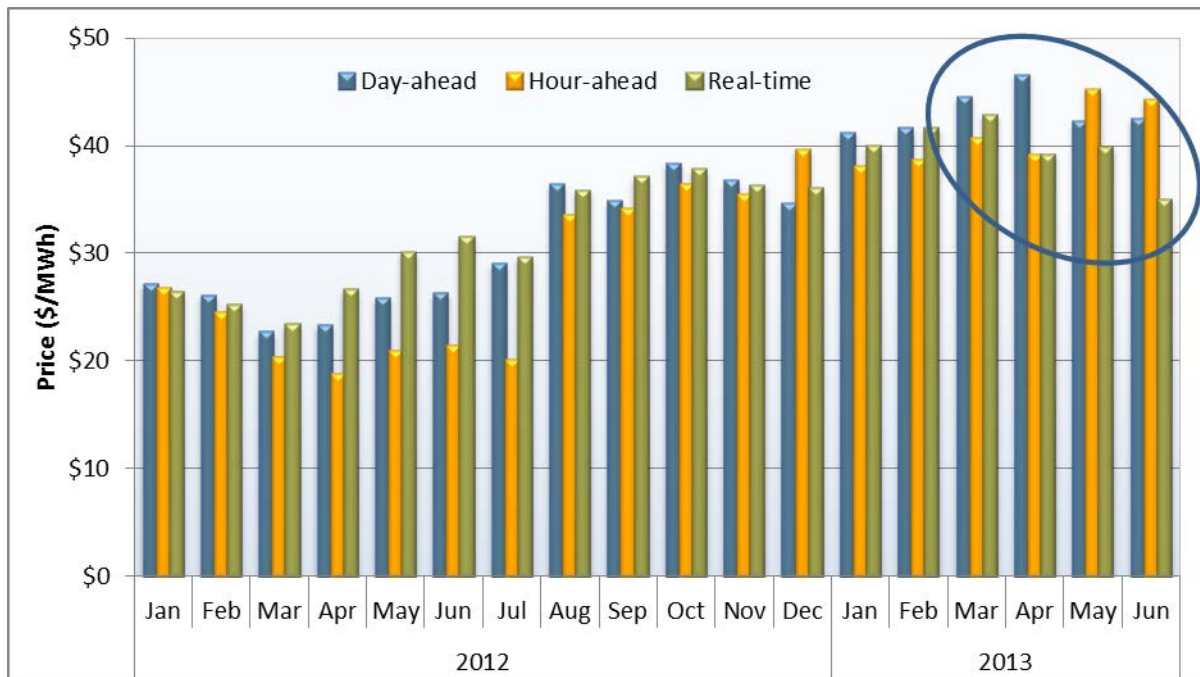
For much of 2012, average day-ahead and real-time system energy prices showed increased convergence compared to previous years. However, since March, average real-time system energy prices have been systematically lower than average day-ahead

prices, as shown in Figure 1. In the second quarter, average real-time prices were almost \$6/MWh or 13 percent lower than day-ahead prices.

The low average real-time prices in recent months have been driven largely by an increase in negative real-time prices. For example, in May about 6 percent of all real-time prices were negative, with the majority of the prices the result of insufficient downward ramping capacity. Much of the negative prices were driven by low seasonal loads, combined with seasonal increases in hydro-electric generation and renewable generation (particularly wind), and new solar generation capacity coming on-line. Day-ahead system prices are historically rarely negative and were not negative in any hour in the second quarter.

There are inherent differences between the day-ahead and real-time markets that can lead to such price divergence. For instance, a significant portion of renewable resources (including both wind and solar) are frequently not scheduled in the day-ahead market. At times this has led to a several thousand megawatts of additional renewable generation in the real-time market. When load serving entities schedule most of all of their physical load in the day-ahead market, this extra generation can cause very low or even negative real-time prices.

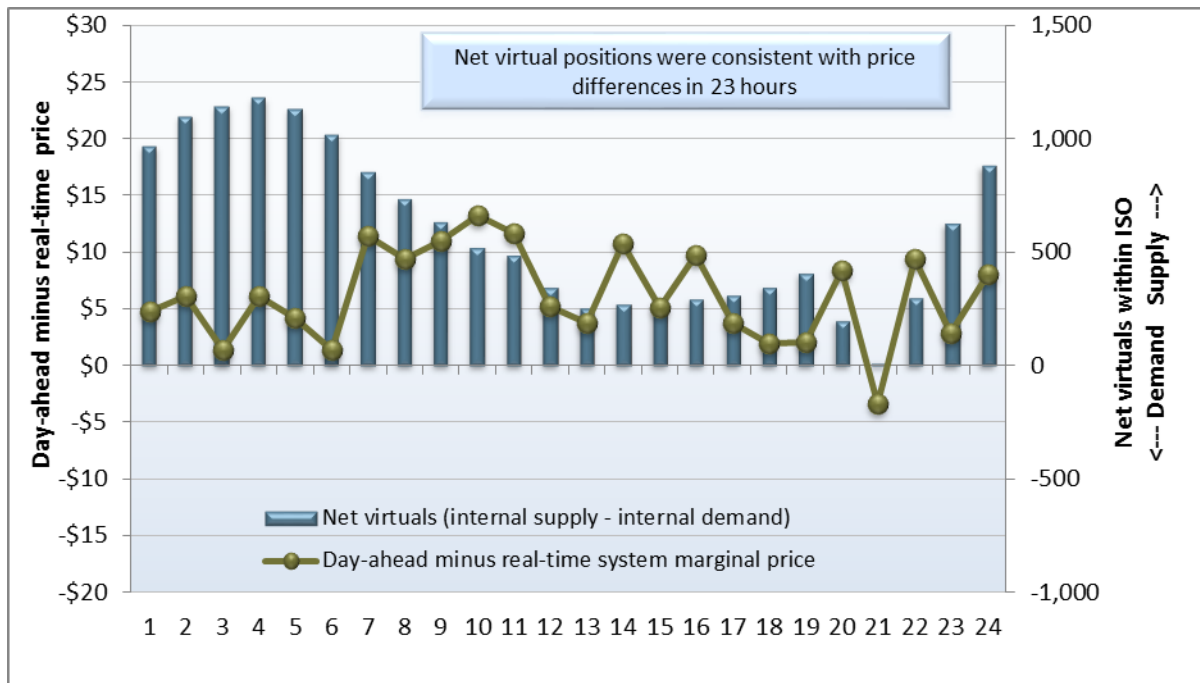
Figure 1 Average monthly prices - system marginal energy price (all hours)



This systematic divergence of day-ahead and real-time prices has created opportunities for convergence bidders to profit from virtual supply bids. DMM estimates that convergence bidders made approximately \$14 million in the second quarter, up from a loss of about \$3 million in the first quarter. Most of the gains from convergence bidding were a result of virtual supply positions designed to take advantage of lower prices in the real-time market compared to the day-ahead market.

As shown in Figure 2, the net supply from convergence bidding positions (blue bars) were highest in the early morning and late evening hours, but also continued to a lesser extent throughout the rest of the day. Figure 2 also shows that day-ahead prices were higher than real-time prices (when the green bar is greater than zero) in nearly all hours. This shows that divergence in average day-ahead and real-time prices highlighted in Figure 1 was consistent throughout the day.

Figure 2 Net hourly convergence bidding volumes and price differences (April – June 2013)



Under these conditions, virtual supply can help improve convergence of day-ahead and real-time prices by decreasing day-ahead prices. The virtual supply may also help increase real-time prices by causing fewer resources to be committed in the day-ahead energy market. However, after the day-ahead energy market is run, additional resources may be committed for reliability purposes through the residual unit commitment process or by exceptional dispatches.

Real-time uplifts increased

Uplifts recovered from load-serving entities through real-time imbalance offset charges increased from \$21 million in the first quarter to \$58 million in the second quarter (see Figure 3). However, this uplift level is just slightly higher than levels during the first quarter of 2012 and is much lower than uplifts during the second half of 2012.

Most of the increase in these uplift costs in the second quarter was related to uplifts due to real-time congestion. Almost half of these costs occurred on a half dozen days when real-time congestion was primarily due to forced outages related to wildfires and other special short-term system disruptions. In contrast, much of the congestion related uplift costs in the summer and fall of 2012 were related to more systematic and predictable congestion patterns stemming from unscheduled flows and market modeling issues.

The ISO has undertaken a number of steps since last summer to reduce these charges including making constraints and congestion more consistent between the day-ahead and real-time markets. However, to the extent that unexpected and unavoidable conditions occur, this can still create substantial uplifts.

Figure 3 Real-time energy and congestion imbalance uplifts

