Memorandum

To: ISO Board of Governors

From: Eric Hildebrandt, Director, Market Monitoring

Date: May 8**,** 2013

Re: **Market Monitoring Report**

This memorandum does not require Board action.

EXECUTIVE SUMMARY

Each year the Department of Market Monitoring (DMM) publishes an annual report on the performance of the market administered by the ISO. A copy of the report is attached. In this year's report, DMM determines that the ISO market continued to perform efficiently and competitively in 2012. Total costs per MWh of load served by the ISO dropped about 2 percent, primarily as the result of a 30 percent drop in gas prices. Electric prices were prevented from dropping further by a combination of factors, including higher loads, lower hydro-electric supply, over 2,000 MW of nuclear generation outages, and increased congestion. Wholesale energy prices over the course of 2012 were about equal to what DMM estimates would result under highly competitive conditions, taking into account these actual system conditions.

The report also highlights key aspects of market performance and issues relating to longer term resource investment, planning and market design. The report notes that it has become increasingly apparent that the state's current one-year ahead resource adequacy process is not sufficient to ensure that sufficient flexible generation will be kept online over the next few years to reliably integrate the increased amount of intermittent renewable energy coming online. The ISO and CPUC continued to address these resource adequacy issues through several initiatives in 2012 which would establish specific requirements for procurement of flexible generation multiple years in advance. However, those efforts have not resulted in firm procurement strategies for either flexibility or maintaining generation that is not procured under yearly resource adequacy contracts but may be needed in future years over the mid-term planning horizon. DMM is highly supportive of these initiatives and urges continued collaboration to reach a firm solution to these gaps before more urgency is required to obtain the needed flexibility to support renewables and maintain system reliability.

MARKET PERFORMANCE

DMM finds that the ISO market continued to perform efficiently and competitively overall in 2012. Other highlights of market performance noted in DMM's 2012 annual report include the following:

- Total wholesale electric costs fell by 2 percent. However, natural gas prices dropped almost 30 percent, so that ISO prices were higher after accounting for lower gas prices. This increase was driven by a combination of higher loads, lower hydro-electric supply, over 2,000 MW of nuclear generation outages and increased congestion.
- Overall prices in the ISO energy market over the course of 2012 were about equal to what DMM estimates would result under highly competitive conditions. About 97 percent of system load was scheduled in the day-ahead energy market, which continued to be highly efficient and competitive.
- Average real-time prices were driven higher than day-ahead market prices during some periods by relatively infrequent but high price spikes. Real-time prices spiked over $250/MWh in about 1 percent of 5-minute intervals, with many of these spikes being driven by congestion.

Other aspects of the market performed well and helped keep overall wholesale costs low.

- The ISO implemented new automated local market power mitigation procedures in the day-ahead and real-time software that mitigated local market power very effectively and accurately. This helped keep prices at competitive levels during most peak summer load periods.
- Ancillary service costs totaled $84 million, or about 1 percent of total energy costs compared to about 2 percent in 2011. This decrease was partly driven by the decrease in natural gas prices and increased use of limited hydro supplies to provide spinning reserves rather than energy.
- Bid cost recovery payments totaled $104 million, or about 1.3 percent of total energy costs in 2012, compared to 1.5 percent in 2011. About half of these payments resulted from units committed to operate to meet special capacity related reliability requirements.
- Exceptional dispatches, or *out-of-market* unit commitments and energy dispatches issued by ISO grid operators to meet constraints not incorporated in the market software, increased from 2011 but remained relatively low. Energy from exceptional dispatches totaled about 0.53 percent of total system energy in 2012 compared to 0.40 percent in 2011.

- Although the volume of energy from exceptional dispatches increased, the above-market costs resulting from these dispatches decreased from $43 million in 2011 to $34 million in 2012. These costs decreased because more exceptional dispatches were made to manage congestion on uncompetitive constraints and were therefore subject to local market power provisions in the tariff.

Congestion increased significantly in 2012, largely as the result of new reliability constraints incorporated in the market models and outages of the San Onofre Nuclear Generating Station (SONGS) units. This congestion impacted market performance in numerous ways:

- Congestion within the ISO system resulted in an increase in price divergence between overall locational market prices in the day-ahead, hour-ahead and real-time markets. Real-time congestion was typically higher than in the day-ahead market as a result of reductions in transmission constraint limits made in response to power flows observed in real-time.

- Congestion also increased real-time market revenue imbalance charges allocated to load-serving entities. These charges increased from $28 million in 2011 to $186 million in 2012, or about 2 percent of total wholesale costs.

- Convergence (or virtual) bidding inflated these real-time congestion imbalances by increasing the volume of transactions settled at higher real-time congestion prices.

- Almost all of the $56 million in net profits received by virtual bidders resulted from divergences of day-ahead and real-time congestion associated with changes in reductions in transmission flow limits after the day-ahead market. In 2011, most profits received by virtual bidders resulted from divergence in system energy prices between the day-ahead, hour-ahead and real-time markets.

The report also highlights key aspects of market performance and issues relating to longer term resource investment, planning and market design.

- About 700 MW of peak generating capacity from renewable generation was added in 2012. Energy from wind and solar resources directly connected to the ISO grid provided slightly more than 5 percent of system energy, compared to 3.9 percent in 2011.

- Energy from new wind and solar resources is expected to increase at a much higher rate in the next few years as a result of projects under construction to meet the state's renewable portfolio standards. This will increase the need for flexible and fast ramping capacity that can be dispatched by the ISO to integrate increased amounts of intermittent energy efficiently and reliably.

- Over 1,300 MW of new gas-fired generation was added in 2012. However, the estimated net operating revenues for typical new gas-fired generation – excluding revenues from resource adequacy contracts or other bilateral contracts – remained substantially below the annualized fixed cost of new generation.

Net operating revenues for many – if not most – older existing gas-fired generation are likely to be lower than the going-forward costs of these units. A substantial portion of this existing capacity is located in transmission constrained areas and is needed to meet local reliability requirements and to ensure enough flexible capacity exists to integrate the influx of new intermittent resources. Most of this capacity will also need to be replaced or repowered to comply with the state's restrictions on use of once-through cooling. This investment is likely to require some form of longer term capacity payment or contracting.

The state's resource adequacy program continued to work well as a short-term capacity procurement mechanism. However, it has become increasingly apparent that the state's current one-year ahead resource adequacy process is not sufficient to ensure that sufficient flexible generation will be kept online over the next few years to reliably integrate the increased amount of intermittent renewable energy coming online.

The ISO and the California Public Utilities Commission continued to address these resource adequacy issues through several initiatives in 2012. One initiative involves development of specific requirements for flexible generating capacity needed to integrate increasing amounts of intermittent renewable generation into the ISO system. The ISO and CPUC are also collaborating on a process and discussions that could lead to incorporation of these flexibility requirements into a multi-year ahead resource adequacy process or centralized capacity market. DMM urges parties to reach a solution to that problem before more urgency is required to obtain the needed flexibility to support renewables.

DMM is highly supportive of these initiatives as ways of increasing the efficiency of the state's capacity procurement process and addressing these key gaps in the state's current market design. Three key recommendations provided by DMM on these capacity procurement initiatives are highlighted below.

- Flexible capacity requirements incorporated in the longer term procurement process should ensure that sufficient flexible capacity is procured to meet the ISO's different market and operational needs. This includes needs being addressed though the 5-minute flexible ramping product and 30-minute contingency response constraint being developed by the ISO. Flexible capacity requirements used in long-term procurement should be directly based on the ISO's projected market requirements for these different dimensions of resource flexibility.

- ISO rules should include must-offer and market power mitigation provisions ensuring that flexible capacity procured several years in advance is available and can be

effectively utilized to meet the ISO's day-to-day market or operational requirements. These tariff provisions should explicitly include future market requirements for the flexible ramping product and 30-minute contingency response constraint being developed by the ISO.

- A well-designed centralized capacity market may offer several advantages compared to continued reliance on the state's resource adequacy program. A capacity market may provide a more reliable and efficient mechanism for procuring portfolios of resources that cover the different attributes of flexibility needed to meet the ISO's market and operational needs, and may be more efficient and easier to coordinate in a centralized market. A capacity market may also provide a more efficient mechanism to encourage demand response and other options for meeting local reliability requirements in transmission constrained areas, in which a large portion of existing gas-fired capacity must be replaced or retrofitted to meet the state's restrictions on once-through cooling.