

Memorandum

To: ISO Board of Governors

From: Keith Casey, Vice President, Market & Infrastructure Development

Date: October 20, 2011

Re: Briefing on Renewable Integration - Market Vision and Roadmap

This memorandum does not require Board action.

EXECUTIVE SUMMARY

The purpose of this memorandum and the accompanying market vision and roadmap is to provide the Board a status report and a roadmap of planned activities related to market design enhancements to facilitate the state's renewable energy goals. In April 2011, the ISO began the initiative to define a market design vision and lay out a roadmap for getting there. The objective of the initiative was to focus staff resources and elicit broad stakeholder involvement in developing market enhancements that will facilitate the state's renewable energy goals while maintaining reliable grid operation and stable, efficient spot markets. Central to this effort has been the recognition that large amounts of variable wind and solar generation will be entering the supply fleet at the same time that approximately 12,000 MW of the existing once-through cooling resources will be retiring. These impending changes will challenge grid operations and could impact market performance; thus, it is imperative that the challenges these changes present be identified, assessed, and addressed through timely and well-designed enhancements to our markets and rules.

The ISO's integration studies, which have been presented to the Board, reveal that the integration of intermittent renewable resources will require resources that can flexibly and accurately respond to dispatch signals and can quickly ramp to new operating levels. Studies have also shown that production of large amounts of low-marginal-cost renewable energy will depress market energy prices and potentially undermine the commercial viability of needed flexible resources. Under this initiative, the ISO and stakeholders addressed both aspects of renewable integration, specifically the short-term market signals to align market participant behavior with operational needs, thereby assisting grid operators in maintaining system energy balance with the increased volatility and unpredictability of variable resources, and the need to keep flexible resources financially viable and available as their need increases while their energy revenue decreases.

When the ISO began the market vision and roadmap initiative in April 2011, the initial objective was to develop a comprehensive end-state vision of the market design enhancements needed to address renewable integration impacts and a roadmap that translates the vision into implementable proposals. Management sought a vision which would be flexible enough to accommodate less predictable developments such as the impacts of new technologies at both grid level and closer to the consumer side of the industry.¹ However, stakeholders expressed discomfort that this comprehensive approach was too much, too fast, and as a result, Management revised its straw proposal setting forth a more incremental and evolutionary approach. The revised approach is based on three time periods for developing and implementing incremental market enhancements – the short-term (now to 2013), mid-term (2013 to 2015) and long-term (2015 to 2020).² Stakeholder response to the revised straw proposal and its emphasis on mid-term enhancements was generally positive and supportive. This incremental approach will allow the ISO and stakeholders to consider the experience gained from the implementation of the short and mid-term enhancements as well western regional market developments prior to making any final decisions on the long-term market design.

The short-term enhancements include enhancements that are already under development and will be implemented within the next two years. This includes several operational enhancements as well as market design enhancements that have been or will be presented to the Board before the end of the year. The mid-term enhancements will be developed in focused stakeholder initiatives that are scheduled to take place over the next several months. This includes initiating focused stakeholder initiatives to expedite the design process for two of the most critical mid-term enhancements as directed by the Board at its August meeting. These two enhancements are extending the flexible ramping constraint through development of a ramping capacity product, and revising the pricing and settlement regime for hourly imports and exports scheduled in the hour-ahead scheduling process to mitigate the impacts of real-time price discrepancies between internal locations and the inter-ties.

OVERVIEW – MARKET VISION AND ROADMAP

The purpose of the market vision and roadmap initiative is to review the ISO market, identify market enhancements required to integrate large amounts of intermittent renewable into the ISO grid, and provide a roadmap for how the ISO will develop these enhancements. This

¹ For example, although there are innovative activities in progress to increase the viability and adoption of local small-scale solar generation, electric vehicles, storage devices and programmable optimization of household energy consumption, the speed and magnitude of their adoption is currently highly speculative, and yet their impacts on the ISO market and grid operation could be substantial once they reach a yet to be determined threshold.

² These time periods overlap because they are not intended to be strictly demarcated by the calendar, but are instead defined by their focus, objectives and ease of implementation, and as a result some later elements of an earlier period may be implemented around the same time as the first elements of a later period, as discussed in the accompanying market vision and roadmap.

roadmap leverages the existing market and infrastructure to address the transformative energy and environmental policies changes and the emergence of new technologies. The goal of this initiative is to identify market enhancements and their staging for development that will:

- Enable ISO operators to efficiently and reliably operate the grid with a more diverse and variable supply portfolio;
- Be flexible to accommodate future changes to energy policy goals and new resource types without requiring further substantial market changes; and
- Resolve known market and performance issues and minimize the need for manual operator interventions.

The market vision and roadmap provides a conceptual outline of market enhancements that have been broken down into three time periods:

- Short-term: Now to 2013
- Mid-term: 2013 to 2015
- Long-term: 2015 to 2020

The ISO purposely overlapped the three phases to convey the idea of market evolution rather than a market transformation, i.e. the periods conveyed do not represent explicit hard “cut over” design phases. Details of the design enhancements can be found in the accompanying market vision and roadmap.

Short-term enhancements

The short-term, now through 2013, includes enhancements that are directly responsive to identified issues in the ISO operations or market. These enhancements are already under development, and many have already been approved by the Board or will soon be brought to the Board for approval.

Mid-term enhancements

The mid-term period, 2013 through 2015, is currently the primary focus of the initiative, as the detailed planning and development of proposed market enhancements must begin promptly for the design and approval of enhancements to occur in 2012, subject to implementation impact assessments. The proposed market enhancements for this period build on the short-term enhancements, with the intent of making refinements commensurate with the size and scope of the renewable integration challenges anticipated in the 2013 to 2015 timeframe. Additionally, in the mid-term, Management will begin considering with stakeholders the development of forward flexibility products designed to ensure sufficient flexible resources are available to meet the increasing future need for flexible resources.

Long-term enhancements

The ISO will continue to work with stakeholders to consider more comprehensive, long-term market design enhancements. Under the phased approach, the ISO will first take the time to understand the short and mid-term market design enhancement impacts on market efficiency and grid reliability. The ISO will use this experience to determine whether more changes are necessary to effectively meet the challenges of integrating large amounts of variable output renewable resources. This approach will also allow the ISO to consider potential changes to the western regional markets that could also have a significant impact on the ultimate market design.

STAKEHOLDER PROCESS

The market vision and roadmap initiative commenced on April 5, 2011 with the publication of a discussion and scoping paper. In total, the ISO published four papers, hosted three stakeholder meetings, received three sets of formal, written stakeholder comments, and reviewed the proposed market enhancements with the market surveillance committee.

POSITIONS OF THE PARTIES

Phased approach and schedule

Stakeholders largely support the phased, incremental market design approach, i.e. market evolution over market transformation. A common theme was stakeholders desire to move certain enhancements forward in priority. For example, Beacon Power Corporation and the California Energy Storage Alliance want a pay-for-performance regulation product developed in the short-term versus mid-term and in advance of further guidance from FERC, which has an outstanding NOPR on frequency regulation. Others, like NRG, implore the ISO to begin the process of developing the forward procurement of flexible capacity immediately given the time necessary to develop and implement such a policy and product.

Other stakeholders petition the ISO to coordinate market enhancements with the CPUC, especially related to the forward procurement of flexible capacity.

Cost allocation

Most all stakeholders support the principle of cost causation; however, stakeholders hold differing views about how it should be implemented. For example, load-serving entities generally desire costs to be allocated to those causing the need for flexibility or ramping capacity. On the other hand, some renewable developers believe these costs should be allocated to load similar to how ancillary services are allocated today.

Increase flexibility versus decrease variability

Certain stakeholders are concerned about the ISO taking an approach to develop products and incentives that increase the flexibility of the fleet versus focusing on methods to decrease resource variability. For example, certain renewable resource stakeholders

advocate the ISO to provide scheduling opportunities that are much closer to real-time so that their forecasts and schedules are more accurate, creating less need for fleet flexibility.

Forward procurement

Generally there was strong stakeholder support for the ISO moving forward with developing the policies and framework for the forward procurement of flexible capacity. Many stakeholders desire the ISO to begin work on this sooner rather than later. However, certain stakeholders have raised concerns about how such a market would be structured.

Stakeholder comments were fully considered and used to shape the final market vision and roadmap.

NEXT STEPS

The ISO will be commencing several new stakeholder initiatives to develop detailed design proposals for the mid-term market design enhancements. The ISO will also continue to work with stakeholders to refine the market vision and roadmap as new information becomes available. Such revisions are likely to include the identification of new design enhancements as well as a reprioritization of previously identified enhancements. Management anticipates providing periodic status reports to the Board in an effort to keep the Board apprised of the planned evolution of the market design to facilitate the state's renewable energy goals while maintaining reliable grid operation and a stable, efficient spot market.