

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Consider Smart Grid Technologies Pursuant to Federal Legislation and on the Commission's own Motion to Actively Guide Policy in California's Development of a Smart Grid System.

Rulemaking 08-12-009  
Filed December 18, 2008

**Reply Comments of the California Independent System Operator Corporation**

The California Independent System Operator Corporation ("ISO") submits these reply comments to provide further input to the Commission as it considers how it can help California deploy a smart grid. The ISO limits the scope of its reply comments to the following matters: (1) comments that discuss the specific role the ISO should play in the development and implementation of a smart grid; (2) the difficulty in evaluating the costs and benefits of smart grid projects; and (3) the need for a coordinated and integrated smart grid approach.

**I. Responding to Specific Comments about the ISO**

**A. The ISO Should Publish Locational Prices and Respond to Locational Demand**

In its comments, Pacific Gas & Electric Company ("PG&E") recommends that after the ISO launches its Market Redesign and Technology Upgrade ("MRTU"),<sup>1</sup> the ISO should make real-time locational pricing available to all market participants for all products.<sup>2</sup>

The ISO agrees that providing timely information to market participants is important. The ISO already posts real-time market information on its FERC-approved

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<sup>1</sup> The ISO plans to launch MRTU on March 31, 2009.

<sup>2</sup> PG&E comments at 32.

Open Access Same-time Information System (“OASIS”) website.<sup>3</sup> From the OASIS site, market participants and the general public can access market data and can download search queries in a variety of formats to upload data to their own computer systems. Once MRTU launches, the ISO will post a variety of locational prices in a timely manner. If PG&E believes that there is specific real-time information that is not published on the ISO’s OASIS website that should be, then the ISO will consider that issue either through this rulemaking’s workshop process or through an appropriate ISO stakeholder process.

**B. The ISO’s Markets Should Support Demand Response**

Several parties, including the Center for Energy Efficiency and Renewable Technologies (“CEERT”), NRG Energy, Inc./Padoma Wind Power LLC (“NRG”), and PG&E argue that the ISO should place more of a value on demand response. CEERT comments that the ISO should adapt its tariff to take advantage of the demand response created by the smart grid.<sup>4</sup> NRG states that the ISO’s ancillary services markets should include demand response.<sup>5</sup> PG&E notes that the ISO should receive real-time demand response information at the distribution and customer level and utilize that information to operate the grid more efficiently.<sup>6</sup>

The ISO embraces the role demand response can play in making the grid function more efficiently. In line with these parties’ comments, the ISO’s vision is for increased participation from demand resources in the ISO markets in order to enhance the reliable operation of the grid over all hours of the year. Although the ISO values the more traditional capability of demand resources to reduce peak demand, the ISO envisions a

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<sup>3</sup> The ISO’s OASIS website is found at: <http://oasis.caiso.com/>.

<sup>4</sup> CEERT comments at 22.

<sup>5</sup> NRG comments at 6-7.

<sup>6</sup> PG&E comments at 32.

more comprehensive role for demand response as a resource that can operate throughout the year providing ancillary services, balancing energy, and helping to smooth the dynamic nature of intermittent renewable resources. From the ISO's perspective, this approach is more aligned with the preliminary concepts of the smart grid and how distributed energy resources, like demand response, will be integrated assets in the overall energy and information supply chain. The ISO encourages the Commission to continue to pursue a more comprehensive vision for demand response resources as it considers policies to deploy smart grid technologies in California.

With respect to NRG's comment that the ISO's ancillary services markets should accommodate demand response, for many years the ISO has permitted demand resources to provide non-spinning reserves and imbalance energy to the ISO. Loads that can offer ancillary services and imbalance energy into the ISO's wholesale markets are termed "Participating Loads" by the ISO. The ISO is working diligently with stakeholders to expand the functionality and capability of its market design under MRTU to lower barriers and increase participation from Participating Loads.<sup>7</sup> Additionally, with the support of the Commission, the ISO is working with the IOUs on Participating Load pilot projects that are intended to offer non-spinning reserves into the ISO's ancillary services market under MRTU by summer 2009. As a direct result of these pilot projects, the IOUs and the ISO are learning what infrastructure, system modifications, and business processes are needed to offer ancillary services from Participating Loads that are sourced through various end-use customer types, including residential, commercial, and industrial

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<sup>7</sup> Information concerning the ISO's demand response efforts can be found at: <http://www.caiso.com/1893/1893e350393b0.html>.

customers. The lessons learned from these projects may serve as a foundation for smart grid investments in California.

**C. The ISO Should Make Grid Operating Requirements More Transparent**

The Western Power Trading Forum (“WPTF”) observed that the increasing number of renewable and intermittent resources will require new categories of specialized ancillary services. WPTF suggests that by making grid operating requirements more transparent, the ISO can provide a better opportunity for third-party vendors to develop products to meet the new ancillary services requirements.<sup>8</sup>

The ISO agrees with WPTF that renewable integration will create certain additional ancillary service requirements and may drive revisions to the market design for ancillary services. For example, in its November 2007 report on renewable integration associated with a 20% renewable portfolio standard in California, the ISO identified the need to procure additional Regulation Up and Regulation Down capacity, depending on the season and hour of day.<sup>9</sup> The ISO has begun evaluating the operational and product changes necessary in order to procure this capacity. The ISO has also begun a process to review the need for an additional 30 minute operating reserve product, both in response to market stakeholder interest and to a FERC requirement under a recent order on Exceptional Dispatch.<sup>10</sup>

As a backdrop to these considerations, the ISO notes that its MRTU market design will change the approach to procuring and pricing the existing ancillary services in

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<sup>8</sup> Western Power Trading Forum comments at 9-10.

<sup>9</sup> CAL. INDEP. SYS. OPERATOR CORP., INTEGRATION OF RENEWABLE RESOURCES: TRANSMISSION AND OPERATING ISSUES AND RECOMMENDATIONS FOR INTEGRATING RENEWABLE RESOURCES ON THE CALIFORNIA ISO-CONTROLLED GRID (2007), available at <http://www.caiso.com/1ca5/1ca5a7a026270.pdf>.

<sup>10</sup> *Cal. Indep. Sys. Operator Corp.*, 126 F.E.R.C. ¶ 61,150 (2009). The ISO’s most recent documents on 30 Minute Reserves are available at: <http://www.caiso.com/2078/2078be2d3790.html>.

California. Most notably, MRTU will establish a simultaneous co-optimization among Energy, Regulation, and Operating Reserves, in which the market clearing prices in each product will reflect the opportunity cost of not providing alternative substitute products. For example, the clearing price for 10 Minute Spinning Reserves will reflect the opportunity cost, if any, of not providing Energy with the reserve capacity. FERC has also required the ISO to implement “scarcity pricing” of ancillary services within one year of MRTU implementation. Under scarcity pricing, prices for these products and Energy will be increased administratively when the system runs into shortage.<sup>11</sup> Other features of these new markets will also affect ancillary service procurement and other requirements of renewable integration. The new day-ahead market under MRTU is expected to result in a more optimal commitment and dispatch of generation resources and any non-generation resources, such as demand response and storage, which enter the markets. The ISO also intends to rely on improved wind forecasts to improve dispatch and to reduce procurement of Regulation when possible.

In order to develop a rational and transparent design approach to these and other developments in ancillary services, the ISO has proposed a process over 2009-2010 for operational assessments and market design decisions.<sup>12</sup> This includes: (a) evaluating the effect of the MRTU market design and planned enhancements, such as scarcity pricing, on factors influencing renewable integration; (b) evaluating whether new market products and/or pricing rules are needed to stimulate needed capabilities; and (c) pilot projects for non-generation resources to demonstrate operational capabilities and market value in

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<sup>11</sup> The ISO’s most recent documents on scarcity pricing are available at: <http://www.caiso.com/1bef/1bef12b9b420b0.html>.

<sup>12</sup> Materials describing the ISO’s process on integrating renewable resources are available at: <http://www.caiso.com/1c51/1c51c7946a480.html>.

ancillary services. In short, the ISO feels that it is actively considering the issues raised by WPTF and has a reasonable time-frame in place for making ancillary service market design decisions. Once these market design revisions are made, the ISO will endeavor to make the requirements for market participation transparent so that all current and potential market participants are given a fair opportunity to provide these new ancillary services.

#### **D. The Impact of Smart Grid on the Planning Reserve Margin**

Question 31 of the Order Instituting Rulemaking posed the question of how the smart grid might impact the Commission's Planning Reserve Margin ("PRM"). In its comments, Southern California Edison Company ("SCE") suggests that with certain tools, the ISO may be able to operate under a reduced PRM.<sup>13</sup> The ISO believes that, in theory, with additional tools such as more refined demand response resources, the amount of load for which a PRM is necessary may be reduced. However, the PRM itself, which is set as a certain percentage of reserves above projected load, would remain the same. The ISO concurs with SCE that it is necessary to work collaboratively with regulatory agencies and market participants to understand both the benefits and the risks of modifying the PRM.

#### **II. Difficult Cost Effectiveness Issues**

Many parties argue that the smart grid will create broad societal benefits that will be difficult to quantify in a traditional cost-benefit analysis.<sup>14</sup> One of the issues the ISO raised in its initial comments presents this problem. The ISO is utilizing data from synchro-phasor technology, also referred to as phasor management units ("PMUs"), to

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<sup>13</sup> Southern California Edison Company comments at 72.

<sup>14</sup> *E.g.*, PG&E comments at 28; San Diego Gas & Electric Company comments at 23.

measure operational conditions on the grid in near real time.<sup>15</sup> PMUs measure the voltage and phase angle of electricity at a particular bus every 33 milliseconds. That data is transmitted to the ISO which can then incorporate the data into its state estimator model. The state estimator model is used to assess the status and condition of the electric grid throughout the Western Electricity Coordinating Council. By providing new and more current information than is provided through the current SCADA technology,<sup>16</sup> PMUs allow for a more robust model. A more robust model in turn can provide reliability benefits. These benefits, though, are currently limited, as PMUs exist as a demonstration project and have been deployed in limited numbers. Increased deployment of PMUs would benefit the ISO by creating a more reliable smart grid. However, a full-scale rollout of PMUs would be very costly. The reliability benefits of PMUs, although significant, may be difficult to quantify and balance against the significant costs. Further complicating such analysis is the fact that the costs of emerging technologies often fall significantly as the technologies proliferate. This is but one example from the ISO's experience of how measuring cost effectiveness with smart grid technology will be a challenge. Determining the categories of technologies that could make up the backbone of the smart grid, as well as the relative costs and benefits of those technology investments, is thus an issue that the Commission and the parties should continue to explore in this proceeding.

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<sup>15</sup> ISO comments at 8.

<sup>16</sup> SCADA stands for *Supervisory Control And Data Acquisition* and is an information control and monitoring system. Current SCADA technology provides voltage and phase angle information approximately every four seconds.

### **III. The Need for an Integrated and Coordinated Smart Grid Approach**

Many of the comments focused on the need for coordination in crafting a smart grid approach.<sup>17</sup> The ISO largely agrees with this sentiment and stresses that many aspects of the smart grid should fit together. It is not meaningful to consider the smart grid as consisting of distinct transmission and distribution components. Instead, the smart grid must fit together as an integrated, end-to-end system in the same way that the existing grid is an integrated electrical system. As such, cross-communication and coordination between devices across the transmission system is necessary. In this regard, it is important to coordinate utility investments in smart grid technologies to meet grid-wide operation needs. The Commission should also strive to integrate smart grid technologies between the transmission and distribution systems. This will be essential to deploy effective demand response, as will supervision and monitoring over “autonomous” control devices.

A specific example of the need for such coordination can be seen with reliability. As discussed above, better visibility over the transmission system is important to the ISO because of its related reliability benefits. However, without integrating that visibility with the distribution system and without a distribution system that can both provide distribution-level consumption information to the ISO and react to conditions on the transmission system, the utility of providing the ISO with better visibility over the transmission system will not be maximized.

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<sup>17</sup> *E.g.*, Wal-Mart Stores, Inc. and Sam’s West, Inc. comments at 1-2; Technology Network comments at 12-13; California Energy Storage Alliance comments at 5.



Another example of the need for coordination is the ISO transmission planning process, which was referenced in the ISO's initial comments.<sup>18</sup> As part of this process, the ISO has the opportunity to flag projects identified as smart grid projects and tries to give that due consideration. As identified in the ISO Transmission Planning Business Practice Manual,<sup>19</sup> potential project sponsors may submit their projects for the ISO's consideration through the Request Window. The Request Window is open each year from August 15 through November 30. Each project that has been submitted through the Request Window will be evaluated by the ISO during its approval process. In addition, participants in the ISO planning process may submit comments or additional information for the ISO's consideration. This includes both the proponents of the project, as well as other parties.

To maximize the effectiveness of projects that are adopted through this process, it would be helpful to ensure that the Commission considers distribution-level smart grid projects that compliment transmission-level smart grid projects. Part of this rulemaking should thus be devoted to creating a vision of the smart grid that will ensure the ISO and the Commission are approving complementary projects.

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<sup>18</sup> ISO comments at 15.

<sup>19</sup> The ISO's Transmission Planning Business Practice Manual is available at: <http://www.caiso.com/205b/205b824839a80.html>.

#### **IV. Conclusion**

The ISO appreciates the opportunity to continue its participation in this rulemaking and looks forward to participating actively in the coming workshops.

Respectfully submitted,

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Dated: March 9, 2009

**CERTIFICATE OF SERVICE**

I hereby certify that on March 9, 2009, I served, on the Service List for  
Proceeding No. R.08-12-009 by electronic and U.S. Mail, a copy of the foregoing.

**REPLY COMMENTS OF THE CALIFORNIA INDEPENDENT SYSTEM  
OPERATOR CORPORATION**

Dated at Folsom, California this 9th day of March, 2009.

*/s/ Jane Ostapovich*  
Jane Ostapovich