

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

Order Instituting Rulemaking Pursuant to)
Assembly Bill 2514 to Consider the Adoption)
of Procurement Targets for Viable and) R.10-12-007
Cost-Effective Energy Storage Systems)
_____)

**COMMENTS OF THE CALIFORNIA INDEPENDENT SYSTEM
OPERATOR CORPORATION ON THE ENERGY STORAGE
PHASE 2 INTERIM STAFF REPORT**

On January 10, 2013, ALJ Yip-Kikugawa entered the Energy Division Staff's Phase 2 Interim Report into the record of this proceeding and invited interested parties to submit comments and reply comments on the draft Phase 2 Interim Staff Report. In accordance with the schedule established by the ALJ, the ISO hereby submits its comments.

I. Introduction

As noted in comments on the Phase 1 Staff Report, the ISO supports the Commission's efforts in this docket to explore whether steps should be taken to reduce barriers to the development of energy storage as a viable and cost-effective resource that can participate in procurement activities. The ISO has continued in its efforts to provide opportunities for storage projects to compete in its wholesale markets, and presented an update on those activities at the January 14, 2013, energy storage workshop. The purpose of these comments is to present that information on the record for Commission consideration.

II. ISO Update on Market Design Initiatives

At Section 7 of the Phase 2 Interim Staff Report, the Staff addresses activities being conducted by the ISO and the CEC, and notes that it is difficult to develop a comprehensive energy storage policy without coordination between regulatory agencies. Section 7.1 briefly describes some of the ISO market activities and stakeholder initiatives intended to remove barriers and incent flexible resource development, but some of this information is no longer accurate. The ISO addressed the following topics at the workshop.

A. Participation by Non-Generator Resources in Providing Ancillary Services

The ISO proposed tariff modifications to remove barriers and expand participation in providing ancillary services by non-generation resources such as storage and demand response which were previously excluded from providing these services. The ISO set certification requirements for ancillary services based upon the operational needs these services met. Previously, the certification requirement assumed that these services would be met by conventional thermal generation. By establishing the certification requirements based upon ISO operational needs, the updated requirements were technology agnostic. This allows the ISO to procure ancillary services in the most cost effective and efficient manner for all resource types participating in ISO markets.

These changes, which were approved by FERC in September 2010:

- removed resource type restrictions and reduced minimum rated capacity to 500 KW from 1 MW;

- reduced minimum continuous energy requirement from 2 hours to 60 minutes for Day-Ahead Regulation Up/Down; 30 minutes for Real-Time Regulation Up/Down and 30 minutes for Spin and Non-Spin;
- now measure minimum continuous energy from the period that the resource reaches the awarded energy output rather than the end of the 10 minute ramp requirement.

B. Regulation Energy Management

Regulation energy management implemented additional market functionality which enabled limited energy storage resources, such as flywheels and batteries, the ability to participate in the day-ahead and real-time regulation market based upon their ability to inject and withdraw energy from the grid. The market functionality observes the resource's state of charge so that the resource can continuously provide regulation although its storage capacity is less than one hour. In addition, the ISO implemented a new resource model which recognizes that storage devices can seamlessly move between charging and discharging. These changes were approved by FERC in November 2011 and implemented by the ISO in Fall 2012. The ISO has made similar market design enhancements to accurately model resource operating limits for other technologies. The ISO's stakeholder initiatives catalog process allows all market participants to identify additional market design changes or modeling enhancements. The proposed initiatives are prioritized through an open stakeholder process.

C. Lower Bid Floor to Encourage Decremental Dispatch

In order to incent additional decremental bidding, the ISO proposed lowering the bid floor from -\$30.00 to -\$150.00 then -\$300.00 the following year. As a result, in periods of over-generation marginal prices can decrease further to incent curtailment or,

in the case of storage, consumption. As a result, storage devices could be compensated up to -\$300.00 for being willing to charge their device. The lower bid floors will be implemented with bid cost recovery changes in Fall 2013 pending FERC approval.

D. Flexible Ramping Constraint and Product

The flexible ramping constraint ensures sufficient upward ramping capability is committed in the ISO's real-time market. Flexible resources are compensated for the opportunity costs when their ramping capability is used to meet future uncertainty of net load (Load less variable energy resources). The costs of the flexible ramping constraint are then allocated to measured demand and uninstructed deviations of supply. The flexible ramping constraint and FERC settlement to changes in compensation and cost allocation were approved by FERC and implemented in December 2013.

When the flexible ramping constraint was approved by the ISO Board of Governors, the Board directed the ISO to develop a more robust flexible ramping product. The ISO commenced a new stakeholder initiative which has proposed:

- Compensation based upon "real ramp" or the actual movement between 5 minute RTD dispatch;
- Procuring flexible ramping in both upward and downward direction in the day-ahead and real-time market;
- Allowing capacity bids in the day-ahead market;
- Combining IFM and RUC for day-ahead FRP procurement and improved market efficiency;
- Improving cost allocation consistent with guiding principles.

The ISO will finalize the flexible ramping product design upon completion of FERC Order 764 compliance. This will ensure that the flexible ramping product is aligned with the real-time market design changes.

E. Pay-for-Performance Regulation (FERC Order 755)

Pay-for-performance regulation introduces two-part compensation – capacity and accurate movement. Currently, faster resources may receive more regulation dispatches than slower resources, but are paid the same capacity price. FERC Order 755 requires a two-part payment for frequency regulation: (1) a payment for regulation capacity; and (2) a payment for performance of the resource in response to a regulation signal. Mileage is defined as a resource’s movement as measured by the absolute change in regulation signals between 4 second intervals. Accuracy is defined as the comparison of the regulation signal to actual telemetry. Pay-for-performance was advocated at FERC by many fast storage devices focused on the regulation market, such as flywheels and batteries. Pay-for-performance, in combination with regulation energy management, ensures that these fast limited storage resources can participate fully in the ISO regulation market and be compensated for being fast and accurate.

FERC approved the pay for performance design in September 2012. Market participants can participate in the current market simulations and the ISO will implement the functionality in Spring 2013.

F. 15 Minute Scheduling and Settlement (FERC Order 764)

FERC Order 764 provides an opportunity to address real-time market inefficiencies and facilitate renewable integration. FERC Order 764 has two main components that are important here. It: (1) allows 15-minute scheduling, and (2) requires that variable energy resources must provide meteorological data for production

forecasting. The ongoing stakeholder initiative is proposing a 15-minute market settlement for internal and intertie resources.

III. Conclusion

The ISO appreciates this opportunity to provide additional information as to activities that will help to eliminate barriers to participation in its markets. In Section 9.2 of the Interim Staff Report, under paragraph 5 “Related Proceedings,” the Staff asks whether there is more to be done in these proceedings to advance energy storage deployment, “aside from establishing procurement targets.” As a general principle, the ISO believes that removing barriers to participation for all technologies in resource procurement processes is a more cost-effective means to promote the development of non-generation resources than establishing procurement targets.

Respectfully submitted,

By:/s/ Judith B. Sanders

Nancy Saracino

General Counsel

Anthony Ivancovich

Deputy General Counsel

Anna McKenna

Assistant General Counsel

Judith B. Sanders

Senior Counsel

California Independent System

Operator Corporation

250 Outcropping Way

Folsom, CA 95630

Tel: 916-608-7143

Fax: 916-608-7222

jsanders@caiso.com

Attorneys for the California Independent
System Operator Corporation

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