California Independent
System Operator Corporation

Memorandum

To: ISO Board of Governors

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

Date: May 11, 2011

Re: **Decision on Dynamic Transfers**

This memorandum requires Board action.

EXECUTIVE SUMMARY

Historically, imported power from other regions throughout the west serves approximately 25% of California's electricity demand. Most of this imported energy is provided by fixed hourly schedules on the transmission interties between neighboring regions. This is the standard scheduling practice for the west. However, there are limited cases where certain intertie schedules between the ISO and other balancing authorities [1] are allowed to vary within the hour – a practice referred to as "dynamic transfers."

In this proposal, Management recommends various tariff clarifications and modifications that will provide greater opportunities for imports and exports to the ISO system to be scheduled dynamically within the hour. Importantly, these changes include extending dynamic transfers to renewable energy resources, which will provide greater opportunities for renewable resources outside of our system to be used to meet California's renewable portfolio standard. These changes, which have broad stakeholder support, will also better enable each region to manage and share the obligation of balancing the variable output from renewable energy resources.

The specific recommended tariff modifications cover the following twelve issues, each of which is described in the main body of this memo.

[1] A balancing authority is the responsible entity that integrates resource plans and maintains the load-resource balance within a balancing authority area. A balancing authority is the collection of generation, transmission, and loads within the metered boundaries of the balancing authority. The ISO is a balancing authority, as is Bonneville Power Administration, and other similar entities.

1. Transmission reservations
2. Scheduling update and forecasting
3. Dispatchability requirements and curtailment rules
4. Locational pricing
5. Pro rata allocation of deviations among balancing authorities
6. Aggregation of conventional and renewable resources
7. Generator-only balancing authorities
8. Dynamic exports
9. Layoffs from pseudo-ties
10. Multiple dynamic schedules
11. Non-firm transmission
12. Documentation for ancillary service certification

Management proposes the following motion to clarify the tariff regarding dynamic schedules and expand the allowable use of dynamic transfers:

Moved, that the ISO Board of Governors approves the proposal to implement the dynamic transfers proposal, as described in the memorandum dated May 11, 2011; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

BACKGROUND

The *California renewable portfolio standard* requires 20% of retail energy sales to be met by renewable energy by 2012 to 2013 and 33% by 2020. These standards have triggered a tremendous surge in renewable energy resource development throughout California and the rest of the west. In the process, this surge in development has raised practical concerns about the ability and responsibility of each balancing authority to balance the variable output from renewable resources – particularly if the output is being exported out of the balancing authority where the resource resides (host balancing authority).

California's renewable portfolio standard has also raised significant interest among renewable resource developers for enhanced opportunities to import renewable energy to the ISO balancing authority. Currently, the only option for a renewable resource to import to the ISO is to use a static hourly schedule. Management proposes to add another option that would allow dynamic transfers of renewable energy. Management also proposes to clarify tariff provisions for dynamic transfers for conventional resources to allow two mechanisms for dynamic transfers – a "pseudo-tie" and "dynamic schedule." A pseudo-tie effectively transfers the external generation resource into the ISO balancing authority. A dynamic schedule transfers the resource's energy schedule, but not the resource itself, into the ISO balancing authority.

The generation output from renewable resources such as wind and solar generation can be highly variable. For a variable renewable resource to import to the ISO balancing authority as a static schedule, its variability would need to be managed externally, at the expense of the entity scheduling the import. To overcome the physical and cost barriers of externally balancing this variability, renewable resource developers want to use dynamic transfers. With dynamic transfers, our balancing authority would manage the balancing of variability, where the renewable imports are serving load in the ISO balancing authority and contributing to meeting California's renewable portfolio standard. Historically, we have not permitted dynamic transfer of renewable resources because of concerns about the impact on reliability.

As a result of the interest in dynamic transfers by renewable resource developers in other balancing authorities, Management has given further consideration to the reliability and other issues associated with these types of dynamic transfers. Management now proposes rules necessary to reliably accommodate dynamic transfers of variable resources as well as conventional resources.

PROPOSAL

Management's specific proposed revisions are summarized below and stated in detail in the *Dynamic Transfers Final Proposal*, dated May 2, 2011.[2] This proposal addresses issues that affect dynamically transferred resources. In particular, dynamic transfers are scheduled over interties. This practice subjects them to requirements that resources internal to the ISO balancing authority do not face. With the few exceptions noted below, all recommendations apply to both types of dynamic transfers, dynamic schedules and pseudo-ties. This memo provides a summary of stakeholder views on the proposed recommendations, and a separate table provides further discussion of stakeholder comments.

1. *Transmission reservation*

Expanding dynamic transfers to include variable resources raises a concern of how to balance efficient transmission utilization with reserving sufficient transmission capacity for renewable resources' variable output. The existing ISO tariff establishes a transmission reservation for dynamic schedules that equals their energy schedules. Management proposes that, on an hourly basis, a dynamic transfer may bid to establish a transmission reservation greater than its energy schedule, to ensure that transmission is available for its maximum expected transfer for the hour. However, within the hour, a dynamic transfer may be dispatched above or below its transmission reservation based on available transmission. If a dynamic transfer delivers above its reservation and actual flows on the path exceed the flow limit, the dynamic transfer must comply with operating orders to reduce deliveries to the level of its transmission reservation. In addition, deliveries above its reservation will be subject to all applicable imbalance and congestion settlement consequences under the tariffs of the ISO and other transmission providers.

2 The Dynamic Transfers Final Proposal is posted at http://www.caiso.com/2b72/2b72e3f642fa0.pdf.

2. *Scheduling updates and forecasting*

To efficiently dispatch all ISO resources over the real-time operating horizon, Management proposes a scheduling option that will allow dynamic transfers of variable resources to update their expected available energy deliveries within the operating hour. This will allow us to manage variability within operating hours and maintain high transmission use by dispatching other resources. Alternatively, we would dispatch variable resources based on the expectation that what the resource is currently delivering will persist. In either case, dynamic transfers of variable resources may also offer bids that allow the ISO to dispatch the resources below their available delivery.

In addition, a dynamic transfer of a variable resource will be considered an *eligible intermittent resource* under the tariff, to promote consistency of treatment of both internal and external variable resources in other respects. Currently, owners of eligible intermittent resources are required to provide necessary meteorological and telemetry data to allow us to develop its own energy forecast for the resource, and this proposal would ensure that the ISO can obtain this same information from external variable resources dynamically transferred to our balancing authority as it does from internal resources.

3. Dispatchability requirements and curtailment rules

Dynamically transferred resources must be able to respond immediately to intertie schedule curtailments. Operating procedures will recognize the characteristics of new dynamic resources for this purpose. In addition, this proposal establishes new requirements for compliance with operating orders with consequences uniquely tailored to dynamic transfers. The new requirements, which will replace the existing requirements, will require that a dynamic transfer comply with an ISO operating order. Failure to comply with such an operating order three times will require that the resource install necessary automated equipment to ensure compliance with future operating orders. If no remedy for compliance is installed, the dynamic transfer agreement may be suspended until compliance measures are completed.

4. Locational pricing

Within its balancing authority area, the ISO models and prices generation and dispatchable load at their physical locations. This proposal applies the same principle to dynamic transfers that are associated with specific generation resources. Such resources will be modeled and priced at their actual locations.

5. *Pro rata allocation of deviations among balancing authority areas*

A resource located outside of the ISO balancing authority can schedule part of its output to the ISO as a dynamic schedule and the rest of its output to its host balancing authority (i.e., the balancing authority area in which it is located). To address the circumstance where the resource's total output deviates from its total schedule (ISO

dynamic schedule and schedule to its host balancing authority), Management proposes to revise the tariff to incorporate a pro rata sharing of such deviations between balancing authorities. This will limit the ISO's balancing responsibility to its fair share. This proposal applies specifically to dynamic schedules, because pseudo-ties essentially become part of the attaining balancing authority and thus all deviations are assigned to the attaining balancing authority.

6. *Aggregation of conventional or renewable resources*

By allowing dynamic transfers from an aggregation of resources (conventional and renewable), this proposal provides opportunities to offset variation in variable resources' delivery. Within its balancing authority, the ISO allows aggregation of resources only for connections to the same substation and voltage level. This measure is to ensure accurate modeling of flows within the ISO controlled grid. For resources outside the ISO balancing authority, Management proposes to allow aggregation within broader geographic areas where the resources have similar impacts on transmission constraints within the ISO balancing authority.

7. *Generator-only balancing authority areas*

Balancing authority areas are generally large regions that include both generation and load. However, in some cases a balancing authority area can consist of just generation resources. This proposal permits dynamic scheduling agreements with balancing authorities that only contain generation, subject to satisfaction of specific conditions. Approval will depend on the balancing authority demonstrating it can manage inadvertent energy and maintain sufficient contingency reserves.

8. *Dynamic exports*

Most of the ISO's existing dynamic transfers are for imports to the ISO balancing authority. However, the ISO has successfully operated under a pilot pseudo-tie agreement for a generating facility wherein the facility is connected to the ISO grid but is effectively part of another balancing authority. This proposal allows additional dynamic exports of supply (not load) resources located within the ISO balancing authority area. This proposal only applies to resource schedules that cross the interties between the ISO and other balancing authorities. Management does not recommend placing provisions in the tariff for dynamic exports of load until the ISO has operational experience through a pilot.

9. *Layoffs from pseudo-ties*

The existing pseudo-tie import pilot agreement for the Sutter combined cycle generating facility allows its owner to sell a portion of its output to its host balancing authority, which is referred to as a "layoff" schedule. This proposal supports exports to host balancing authorities from pseudo-tie generating facilities. This option is unique to a pseudo-tie and is not needed for dynamic schedules.

10. ***Multiple dynamic schedules***

In some instances, generators outside the ISO balancing authority would like to dynamically schedule into the ISO balancing authority but cannot obtain a contract for their full capacity on a single external transmission path. This proposal allows an external generator to be split into separate dynamically scheduled resources (not pseudo-ties), which would be scheduled on different interties.

11. ***Non-firm transmission***

Energy schedules within and across a balancing authority can have different types of transmission service, the most dependable of which is "firm" transmission service where the transmission service will be provided unless it is forced out of service. The ISO provides firm transmission service to all of its awarded market schedules within the ISO balancing authority. But some intertie schedules are not supported by firm transmission outside the ISO balancing authority area. The tariff currently requires dynamic schedules to obtain firm transmission for the operating hour, but not for longer durations.

Variable resources using dynamic schedules may not know their hour-to-hour deliveries until close to the operating hour. In addition, some external transmission providers do not offer firm transmission until after the close of the ISO day-ahead market. This proposal allows dynamic schedules of energy to use non-firm transmission through external balancing authorities, which is reserved or scheduled on an as-available basis and is subject to interruption. This arrangement will avoid unnecessarily buying firm transmission that later goes unused, and thus will promote more efficient use of transmission. This arrangement will not apply to pseudo-ties, dynamic scheduling of ancillary services, or dynamic scheduling of resource adequacy capacity, which will still require firm transmission service.

12. ***Documentation for ancillary service certification***

The tariff specifies the requirements for ancillary service certification, but there has been uncertainty regarding the documentation needed for dynamic schedule resources to demonstrate they meet these requirements. This proposal clarifies the documentation requirements for certification of dynamic imports of ancillary services.

The ISO plans to take a phased approach to implementing the modifications described above. To the extent that new dynamic transfers use the same functionality that supports the existing dynamic transfers, the ISO will be able to support the new dynamic transfers under the existing tariff or once tariff amendments are approved by the Federal Energy Regulatory Commission. In some instances, the ISO proposal requires modification to the existing market or operations systems.

Until functionality enhancements are implemented, the ISO market will establish transmission reservations equal to energy schedules as the tariff now provides. Implementation of functional changes to support the provisions associated with transmission reservations and scheduling updates are expected to be complete in spring 2013.

POSITIONS OF THE PARTIES

The ISO has worked with stakeholders for over a year to develop this proposal. One foundational issue concerning the policy for managing requests for dynamic transfers is whether the ISO must limit the amount of dynamic transfers of variable resources due to operating criteria. To answer this, Management contracted with General Electric for a study that was published in January 2011. General Electric examined reliability issues and concluded that the ISO does not need to apply limits on dynamic transfers to its balancing authority area at this time.

However, other balancing authorities may establish limits based on conditions within their balancing authority areas. The ISO will continue to coordinate with other balancing authorities on regional issues affecting dynamic transfer capability. To allow market participants who are developing or contracting for new dynamically transferred resources to self-manage risks about deliverability to the ISO market, Management proposes to provide data on the ISO website, the number of dynamic transfer agreements at specific interties.

Despite the General Electric study results, PG&E recommended establishing a limit on the amount of dynamic transfers, equal to the intertie import limit, to allow operational experience and evaluation before considering additional dynamic transfers. Management disagrees with PG&E that an explicit limit needs to be established, as that would create operational inefficiencies and complications for managing requests for dynamic transfers. However, Management proposes to address PG&E's concern by regularly performing an operational assessment of impacts of dynamic transfers. If such operational assessments reveal that limitations are needed in the future, Management will take appropriate action, which may include a moratorium on new dynamic transfers of variable resources.

Some parties were concerned that the proposed transmission reservation would result in transmission underutilization. Management performed additional analysis to demonstrate that transmission reservation would not materially impact transmission utilization. Additionally, Management made certain modifications to how transmission reservations can be used that will mitigate the potential for them to cause transmission underutilization. Some parties asked for clarification whether requiring a transmission reservation for dynamic transfers restricts flexibility in scheduling, while another questioned whether Western Electricity Coordinating Council criteria allow flexibility in scheduling. Management has explained the basis of its proposals through reference to the North American Electric Reliability Corporation and WECC standards and other documents. These efforts address most concerns with the proposed transmission reservation.

Some stakeholders wanted to address issues that extend beyond dynamically transferred resources policy. In this stakeholder process and this proposal, Management has focused on topics specific to dynamic transfers. More general issues that apply to both internal and external resources will be addressed through other stakeholder processes. Those issues are not included in this proposal.

NextEra, LS Power, and other stakeholders asked the ISO to clarify requirements for resources using dynamic transfers to qualify as resource adequacy capacity. Other California Public Utilities Commission and ISO processes have previously established these requirements. Eligibility as a resource adequacy resource is contingent upon a showing that an import has secured firm transmission through any intervening balancing authority for the applicable operating hours, and that the load serving entity has an allocation of import capacity at the import scheduling point. Variable resources within the ISO balancing authority area have an additional protocol for establishing qualifying capacity through the CPUC's "exceedance" methodology. Management proposes to apply the same exceedance methodology to dynamic transfers of variable resources.

Imperial Irrigation District, Sacramento Municipal Utility District, and other stakeholders encourage the ISO to continue its active coordination with other affected balancing authorities regarding similar market initiatives that they are developing. Management is actively participating in such regional coordination. The ISO briefed WECC's seams issue subcommittee and variable generation subcommittee regarding the dynamic transfers policy changes described in this memo, as well as meeting individually with neighboring balancing authorities and coordinating with other joint initiatives as opportunities occur to reduce seams between markets.

MANAGEMENT RECOMMENDATION

Management requests Board approval of this proposal for dynamic transfers as set forth in this memo. These revisions and clarifications to current ISO policies and tariff provisions will position the ISO to effectively manage all resources that participate in the ISO market using dynamic transfers, as well as facilitating the state's goals for renewable energy development.