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Discussion Draft

PROPOSAL TO RESOLVE REAL-TIME PRICE OVERLAP (TARGET-PRICE)

1. BACKGROUND

Since the CAISO has started operation, the ISO has had to develop ways to deal with a set of real-time imbalance energy bids that have a price overlap. In the ISO real-time market, dispatch of resources is performed from the stack of bids if there is a need to dispatch more or less energy to make up for real-time imbalances. The bids to produce more energy (incremental bids) and bids to reduce energy output consume more energy from the system (decremental bids) are submitted independently by Market Participants. As a result there are times in which there are decremental bids offering to buy energy for a price higher than incremental bids are willing produce energy. This condition is known as the price overlap.

To address the potential gaming problems, the ISO real-time market design included a feature that modifies the bids submitted by market participants if price overlap exists to eliminate the price overlap and create an aggregate merit order bid stack that is non-decreasing. The original target price method calculated a "target price" as the price at which the inc. and dec. bid stacks overlap. All incremental bids lower than the target price were set equal (i.e. increased) to the target price. All decremental bids higher than the target price were set equal (i.e. decreased) to the target price.
During the second year of market operation, the ISO observed gaming behavior that allowed market participants to manipulate the target price and benefit by receiving a higher price for incremental generation resources. As a result, in April 2000, the ISO modified the method used to determine the target price to eliminate the gaming opportunity.

The new target price methodology used since April 2000 establishes the target price as the lowest submitted inc. bid or zero (whichever is higher). While the new target price methodology eliminated the gaming incentive of inflating the target price to receive a higher price for incremental energy, it created a variety of new opportunities for market participants to control the target prices affecting the decremental pricing. Although at the time, the affect on the decremental price was understood, the ISO felt that on balance it was more important to eliminate the target inflation opportunity since in general the ISO is buying imbalance energy (inc'ing) more often then it is selling imbalance energy (dec'ing).

Since implementation of the current methodology for resolving the price overlap, staff has worked with market participants, as well as collaborated internally to develop a permanent resolution to the price overlap. Both short-term and long-term solutions have been proposed. However, while there is common agreement that the issue needs to be resolved, efforts to resolved the issue have been deferred in the effort to come to a solution that would resolve the issue once rather than resolving the issue with an interim measure while pursuing a longer-term permanent solution. In

addition there were serious concerns about any solution has been thoroughly thought out to avoid unintended consequences. Ultimately, the lack of action to resolve the issue has been further deferred by the crisis conditions recently experienced in the western energy markets since summer 2000.

2. IMPACT ANALYSIS

The proposed solutions to the price-overlap issue have been evaluated using the following criteria:

- **Operational Impact**: Criteria measure of impact to improving operational control.
- **Market impact**: Criteria measure of how well solution will reduce costs of energy to consumers.
- **Effectiveness**: Criteria measure of how well the solution will eliminate the price overlap problem and potential gaming behavior.
- **Unintended Consequences**: Evaluation of some potential unintended consequences.
- **Tariff Impact**: Measure of whether solution requires tariff change or not.
- **Future Market Design:** Criteria measure of how well solution either fits into longer term market redesign efforts or potentially derails redesign efforts.
- **Timeline:** How long will it take to implement the solution

3. SOLUTIONS

The following proposed steps are proposed to resolve the real-time price overlap issue:

A. Maintain target price but set target price based as the minimum of the two methods:

A1. Original target price with feasibility test: Utilize original method of determining target price prior to April 2000, but only let feasible bids set the target price. Feasible bids will be determined as any tie that is pre-dispatched; generation bid available in ten minutes, or load from a participating dispatchable load.

A2. Gas-Fired Proxy bid: Utilize gas-fired proxy bid to set target price. The lowest price available proxy bid will be the target price setter.

B. Continuous Clearing of Overlap: Continuously clear price overlap by utilizing real-time optimization. This method would also allow the ISO to enforce transmission constraints at the same time. Out of real-time optimization could be a single clearing price. If such were the case, there would be a need to put measures in place such as penalties for non-performance of a dispatch.

Table 1 provides a comparison of each approach to resolving the price overlap issue using the previously described evaluation criteria.

TABLE 1:
Impact Analysis of Proposed Solution Path to Resolve Price Overlap in Real-time Market

	Step A. **Set Target Based on the minimum of Old target w/ feasibility and lowest Gas-Fired Proxy**		**Step B. Continuous Clearing of Price Overlap**
Operational Impact	• Improved control provided by removal of $0 dec. price	• Improved control provided by removal of $0 dec. price.	• Provide best control • Can respond to transmission constraints. • Changes current dispatch practice.
Market Impact	• Improve cost of dec. energy. • May increase cost of incremental energy. • Target Price may remain high.	• Improved cost of dec. energy. • Target Price will be consistent with proxy cost of gas fired resource available.	• Optimal dispatch will result in most efficient dispatch. . • Modifies 10-mintue settlements with single clearing price.
Effectiveness	• Moderate.	• Completely de-couples bids and target price determination. • Relies on proxy bids.	• Overlap continuously resolved recognizing ramping constraints • Relies on penalties for deviating form instructions beyond a tolerance band.
Unintended Consequences	• Target price may be manipulated due to no obligation to deliver.	• Incentives gas-fired proxy falls outside of overlap price.	• Resources may be dispatched absent any imbalance energy requirements.
Tariff Impact	• None	• None	• Requires tariff change.
Future Market Design	• Modification temporary until CMR-like design	• Modification temporary until CMR-like design • Only good while proxy bid authority exists.	• Most consistent with other markets. • Similar to design of CMR.
Timeline	• 4 – 6 weeks		• Phase I (w/o-network model) 16-20 weeks NO • Phase II (w/ network model) 20-30 weeks NO

allows CAISO to make more on over-bought energy

What does uninstructed energy get paid?
Why no obligation to deliver?
$100 deviation penalty

4. RECOMMENDATION

The recommendation implement the proposal to continuously (every 10-minutes) clear any overlaps that exist in the imbalance energy stack. However because this effort will take time get necessary tariff approval as well as make necessary software modifications, the ISO proposes to continue to calculate the target price using a methodology that considers feasibility of bids as well as considers lowest available gas fired proxy bid.