

Medium-Term Solution to Clearing Intertie Bids in the Real-Time Energy Market

by

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June 24, 2005

1. Introduction

We have been asked to provide a recommendation for a medium term solution for settling intertie bids under the Real Time Market Application (RTMA) market design until the Market Redesign and Technology Upgrade (MRTU) is implemented in February of 2007. The Department of Market Analysis (DMA) has documented that the initial “bid-or-better” mechanism for settling bids into the ISO’s real-time energy market resulted in more than \$33 million in total uplift payments between the start of the RTMA market on October 1, 2004, and March 23, 2005, the date the bid-or-better mechanism was suspended by the Federal Energy Regulatory Commission (FERC) in response to the ISO’s Amendment 66 filing.¹ Of these total uplift payments, more than \$18 million was attributable to the clearing of DEC bids with bid prices above INC bid prices resulting in no net energy being delivered to or withdrawn from the California ISO control area.²

FERC set a sunset date of September 31, 2005, when it approved the current pay-as-bid mechanism on April 7, 2005. The ISO has implemented a stakeholder process to assess various “medium term” options to be implemented between September 31, 2005, and February 2007, when MRTU is expected to be in place. Long-term options for the settlement of interties under MRTU are part of ongoing discussions of the Hour Ahead Scheduling Process (HASP). On May 7, 2005, the ISO filed a request for clarification/rehearing on the Amendment 66 decision for settling interties. In this filing, the ISO informed FERC that a pre-dispatch market-clearing price solution—the ISO’s Option 1—could not be implemented until Spring of 2006, approximately one year before MRTU is expected to be implemented. The ISO also requested clarification on whether pay-as-bid could be considered as a medium term option until MRTU was implemented. On May 20, 2005, FERC ruled that pay-as-bid could be considered as an option. However, it also ruled that if the ISO did not propose an acceptable medium term solution, the current pay-as-bid mechanism would be replaced by the previous bid-or-better mechanism.

We have discussed the settlement of intertie bids at both the March and May Market Surveillance Committee (MSC) meetings and received stakeholder input at those times. In addition, several MSC members have had extensive individual discussions with staff of the DMA and various stakeholders. MSC members also participated in the stakeholder meetings dealing with these issues.

¹ Cover letter for Amendment 66 to the California ISO Tariff, Docket No. ER05-718-000, March 23, 2005, p. 5.

² *Ibid.* p.5.

We strongly support the current pay-as-bid mechanism as the preferred medium term solution until the MRTU is implemented in February 2007. However, we should immediately emphasize that this does not imply that we support a pay-as-bid mechanism for settling interties under MRTU. In fact, a major factor in our preference for maintaining the pay-as-bid mechanism until MRTU is implemented has to do with any medium term solution only being in place for a short period of time, which implies the need to balance the relative expense of any proposed solution against the relative benefits of that solution over the period of time the solution will be in place. The remainder of this opinion details our reasons for this recommendation.

2. Background

The incentive to create uplift payments under the original implementation of RTMA was caused by two aspects of how intertie bids are treated in the settlement process.

- 1) The ISO pre-dispatches intertie bids prior to the start of the settlement hour to meet their expected imbalance energy needs. Besides procuring or selling the net imports necessary to balance real-time supply and demand within the ISO control area, this process also clears all INC bids and DEC bids both within and across scheduling coordinators (SCs). This is necessary because there was often a significant quantity of DEC bids offered at prices higher than the prices offered for INC bids. This clearing process can therefore allow a substantial quantity of megawatt-hours (MWhs) to be bought and sold at an intertie with no change in the resulting net imports into or out of California.
- 2) The original settlement rules paid or charged INC or DEC bids from inter-ties pre-dispatched based on projected system conditions on a “bid-or-better” basis. Specifically, if the price in the ISO’s real time market is lower than the bid price for pre-dispatched incremental bids, in addition to being paid the real-time price, the suppliers are paid an uplift payment equal to the difference between their bid price and the real-time price. The net effect then is that the INC suppliers are paid their bid. A similar mechanism operates on the DEC side of the market. If the real-time price is higher than the bid price for DEC bids pre-dispatched by the ISO, these suppliers are refunded the difference between the real-time price and their bid. Thus, on net, they are only charged their bid price for an accepted DEC bid, rather than the real-time price.

As an example, if an import INC bid of \$50/MWh is cleared against an import DEC bid of \$60/MWh, but the real-time price is either over \$60/MWh or under \$50/MWh, an uplift is required. For instance, a real-time price of \$70/MWh means that the DEC bid is refunded \$10/MWh from the real-time price, while a real-time price of \$35/MWh would instead imply a \$15/MWh uplift payment to the INC bid. Both of those situations result in the CAISO paying out money without any change in net power flows into California.

Over the October 2005 to March 2005 period, average prices in the real-time market diverged from the average bid prices from the INC and DEC energy bids on interties that have been pre-dispatched by the ISO. These problems contributed to the high uplift payments mentioned above for the current “bid-or-better” settlement system. However,

even if average prices and average bid prices from the INC and DEC energy bids were equal, the bid-or-better mechanism would still create a “free option” for an intertie bidder to receive the higher of its bids or the market-clearing price on one side of any overlapping INC and DEC bids on the intertie. In short, the incentive to submit overlapping bids would still exist even if there were no expected difference between the average pre-dispatch price and the real-time price.

This problem has been created by the ISO’s attempt to reconcile two competing needs. One is the need for imports to transact in advance of real-time as firm energy purchases that remain constant over the hour. This need conflicts with the other need of operators to balance system conditions on a 5-minute basis.

The wholesale energy market operates under the principle that transactions are made between buyers and sellers. The ISO does not play a direct role in those transactions until real-time, when the need to continually balance the system makes it necessary for the ISO to play the role of proxy buyer and seller. These real-time transactions undertaken by the ISO are allocated to market participants ex post. Thus the general blueprint for electricity market operations is that participants make all forward transactions and all real-time transactions are instigated by the ISO.

The problem stems from the fact that importers that are unable to schedule dynamically cannot wait until the real-time market is run in order to participate in it. Intertie conventions for those unable to schedule dynamically necessitate an advance (45 minute) commitment of a constant energy import or export quantity over the hour. Thus if the ISO operators are to purchase these imports (or sell exports) they need to “pre-dispatch” these bids prior to real-time market operation. Even though these transactions are made before the real-time market is run, the portion of inter-tie bids that are pre-dispatched under RTMA is determined based on the projected market clearing price in the real-time market. However, if the real-time imbalance forecast is wrong, the actual real-time price could be lower than the pre-dispatch price used to determine the amount of intertie bids accepted. If imports were settled at the real-time price alone, they could have their \$50 offer accepted by the ISO, only to find that the real-time price ended up at \$20—thereby earning \$30/MWh less than they expected when their offer was accepted. The problem—which existed prior to RTMA—discourages market participation by importers that were unable to schedule dynamically to bid into the real time market. To avoid this problem, the ISO implemented a settlement rule under RTMA that guaranteed that imports receive their “bid-or-better” price. This is the higher of their bid price or the actual ISO spot price.

The fundamental problem is that the ISO is committing to a price at the interties for the entire hour when the real-time market sets prices every five minutes and settles on a ten-minute basis. There are three general ways for the ISO to address this problem in the medium-term. Each solution eliminates the linkage between the real-time price and the payments to importers who need to commit in advance:

- **Option 1:** Establish an alternative 45-minute-ahead market with its own market-clearing settlement price.
- **Option 2:** Continue the Amendment 66 pay-as-bid system for imports.

- **Option 3:** Accept only imports from firms willing to dynamically schedule their imports, thereby committing to respond to ISO real-time dispatch instructions or to paying imbalance penalties if they cannot respond to those instructions.

3. Medium Term Solutions Under Consideration

The ISO has formulated a number of proposed medium term solutions through the stakeholder process.³ The Bonneville Power Administration (BPA) has also submitted its own proposed solution. The two solutions receiving the most support from the ISO are: Option 1, which would set pre-dispatch market-clearing prices that all tie bids would be settled against, and Option 2, which would continue the current pre-dispatch pay-as-bid mechanism.

Options 1 and 2 share many important features. Both would continue to integrate the pre-dispatch purchases of imports roughly 45 minutes ahead of each operating hour with the available supply of resources within the ISO control area that are dispatchable on a 5-minute basis within the operating hour. Option 3 would treat imports symmetrically with resources within the ISO control area in the real-time market. Intertie bids could be dispatched at the start of the hour (or anytime within the hour) and supply a fixed amount of output during the hour. However, these resources would be subject to imbalance energy charges to the extent that they fail to respond to additional dispatch instructions during the hour. Both Options 1 and 2 would establish separate, pre-dispatch market prices that will generally differ from real-time prices. By setting prices in advance, the ISO avoids the problem of making a commitment to buy (or sell) power before it actually knows the price.

Unless more import capacity is willing and able to schedule dynamically, Option 3 could significantly shrink the supply of imports willing to sell to the California market. Although we find Option 3 very appealing and encourage the ISO consider it as a long-term solution under MRTU, the question of which of the two remaining options to favor boils down to the following issues, the theoretical efficiency benefits of uniform price markets versus the additional costs to implement such a system for a relatively short period of time.

Inefficiencies of Pay-As Bid Market

The main argument in favor of Option 1 over Option 2 is that it pays a single market-clearing price. The concern over pay-as-bid stems from the potential inefficiencies caused when different market participants hold different beliefs (or information) about the market. In a perfectly competitive uniform-price market, it is unilaterally profitable for firms to bid their incremental costs. In a pay-as-bid market, firms must try to guess the market clearing-price (the highest accepted bid) and bid as close to it as possible, as long as the price is above their costs, without being shut out of the market by bidding too high.

Inefficiencies can also arise when firms have different ideas about what the market-clearing price will be. Firm A, which has low cost generation units, could expect a high price

³ Summary of Proposed Solutions for Pre-dispatch and Settlement of Intertie Issues, posted on April 13, 2005, at <http://www.caiso.com/docs/2005/04/14/2005041412094722924.pdf>

and therefore would submit a relatively high bid. Firm B may have higher cost generation than firm A, but actually submits a lower offer bid than firm A, because it thinks the market clearing price will be lower. The end result of this could be that firm B supplies electricity instead of firm A, despite the fact that firm B is more expensive.

Several other potential problems with pay-as-bid markets have been previously noted.⁴ For example, in the long run the burden of forecasting energy prices can raise the cost of entering these markets, and lead to consolidation of suppliers, thereby reducing competition. In contrast, in a uniform pricing regime, small suppliers would not have to invest in price forecasting capabilities and can simply bid their marginal costs.

While we believe that these potential inefficiencies are real, we do not believe they are particularly significant in this instance for two reasons. First, the amount of net imports that are pre-dispatched before the start of the real-time market is a small fraction of total ISO load. The “physical” volume of this market (*i.e.* the portion of pre-dispatch volume purchased to meet actual California ISO needs as opposed to clear against other pre-dispatch bids) has averaged in the range of 363 MW since October 2005. It is this physical volume that would be impacted by any misallocation of production. This constitutes less than 1.5% of total ISO end-use consumption. Thus any productive inefficiency resulting from a pay-as-bid rule would constitute a fraction of total production costs on a small fraction of total supply. Second, the pay-as-bid settlement is very likely to be a temporary solution to be replaced when MRTU comes on line. Therefore, the long-term consequences of pay-as-bid markets are unlikely to be relevant. We find it implausible that firms would undertake major institutional or organizational changes in response to a temporary feature of a relatively modest-sized market.

It is important to remember that the entire system of pre-dispatching imports is necessitated by the willingness of the ISO to accommodate the timing of import practices within real-time system operation in a manner that encourages imports. To the extent that importers are able to dynamically schedule their imports to respond to ISO dispatch instructions, their supply will be unaffected by the pre-dispatch rule because these suppliers could settle just like any other internal resource, or be paid as-bid in the pre-dispatch process. Consequently, imports have the option to mitigate any negative impacts of pay-as-bid settlements by choosing to schedule dynamically. Therefore, Option 2 also encourages importers to schedule dynamically; something we believe will enhance the long-term efficiency of the California market.

Costs of Alternative Solutions

As noted earlier, the ISO has determined that implementing a market-clearing price mechanism for settling intertie bids cannot be implemented until at least Spring of 2006. In contrast, the ISO is currently settling interties as-bid with no evident negative reliability or economic consequences. The MWh amount of import and export bids that results in a net zero schedule (*i.e.*, the extent of purely financial settlement of imports and exports) into

⁴ See for example, Cramton, Peter, Kahn, Alfred, Porter, Robert, and Tabors, Richard (2000). Blue Ribbon Panel Report: "Pricing in the California Power Exchange Electricity Market: Should California Switch from Uniform Pricing to Pay-as-Bid Pricing?"

California declined dramatically on the day the pay-as-bid settlement mechanism was implemented.⁵ Implementing a market-clearing price mechanism would require software changes and significant testing, and as is the case with any new market rule, there is always the potential for unintended consequences.

According to the CAISO, implementation of an alternative pre-dispatch settlement, such as that encompassed in the California ISO's Option 1 or in the proposal by BPA, would entail a commitment of significant time and resources. The ISO estimates that Option 1 would take at least 6 to 8 months to implement at a cost of approximately \$600,000 in addition to the use of internal ISO resources.⁶ In addition to financial resources, the development of an alternative pre-dispatch settlement scheme would involve non-trivial amounts of stakeholder and CAISO staff time that would otherwise be focused on the more pressing problems of implementing MRTU and resource adequacy provisions. We believe that this time is better spent on the long-term design of the market, rather than transient issues that affect only a very small fraction of the energy transacted in California.

3. Conclusion

We recognize the finite resources available to the CAISO and market participants in California. These resources are best employed if they are focused on the timely implementation of long-term solutions to the most significant problems facing the California market. The implementation of an alternative settlement scheme for the pre-dispatch of inertie sales is neither a significant nor long-term problem in California. The inefficiencies associated with the current pay-as-bid system are theoretically plausible, but rough calculations and common sense argue that they cannot be large. Furthermore, any alternative solution would take nearly a year to develop and be in place for only about a year after that, and it is not guaranteed to perform any better than the current pay-as-bid solution. Given the out-of-pocket and opportunity costs involved in developing an alternative, we feel that the continuation of the current system is clearly the best choice among the available alternatives.

⁵ "Settlement for Pre-Dispatched Inertie Bids" Presentation by Eric Hildebrandt at the Market Surveillance Committee Meeting, May 24, 2005, p. 10.

⁶ "Memorandum to ISO Board on Modification of Settlement for Pre-Dispatched Bids from Inerties," by Mark Rothleder, Director of Market Operations, and Anjali Sheffrin, Director of Market Analysis, June 8, 2005, p. 4.