

Comments on Price Inconsistency Caused by Intertie Constraints

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Powerex is pleased to submit these comments on the issues raised in the Price Inconsistency Caused by Intertie Constraints Issue Paper and Straw Proposal.

The paper addresses an unforeseen outcome of the manner in which convergence bids (also called “virtual bids”) and physical bids are treated on the interties. Specifically, the paper identifies specific instances in which physical imports (exports) clear the market despite being priced higher (lower) than the calculated locational marginal price (“LMP”) at the intertie. In the numerical examples described, the outcome is that a physical export bid pays a price above its maximum bid, creating un-mitigatable price risk for physical participants in the market. By extension, circumstances can arise in which a physical seller receives a price below its bid, leading to under-payment. In both cases, the “winning” bidder regrets having cleared the market. This potential for regret can have significant liquidity consequences to physical imports and exports in the CAISO market.

Of greater concern than actual outcomes to date is the potential that, once these pricing anomalies are more broadly understood, participant behavior may exacerbate the problem. In the numerical example provided, for example, the physical export (with a bid of \$59) is actually charged \$60, based on the virtual export bid. One could easily construct an example, in which physical and virtual exports are at very different prices, and the unanticipated overcharge to the physical export is considerably greater; indeed Powerex has observed this to occur on numerous occasions over the past months. Powerex further believes that this problem is not limited simply to one of LMPs that are inconsistent with some of the cleared bids, but that the LMP is fundamentally distorted by the peculiar pricing algorithms employed.

Resolving this issue also suffers from the computational complexity of the CAISO’s algorithms. Attempts to intuit the calculation of shadow prices, for example, are often unreliable. More extensive discussions and explanations are necessary to ensure stakeholders fully understand the nature of problem and can offer suggested solutions that are realistic and implementable.

Powerex believes that two important objectives need to be satisfied by the solutions ultimately adopted.

First, the market participants should not be subject to confiscatory outcomes.

That is, sellers should not find themselves selling at a price below their bid, and buyers should not find themselves buying at a price above their bid. This principle applies equally to physical and virtual transactions. If bid consistency is not achieved, it is preferable that it take the form of sales that failed to clear the market despite being bid below the clearing price, or for purchases that failed to clear despite being bid above the clearing price. These are errors of foregone

opportunities, and are preferred since they do not entail an actual financial loss that could significantly discourage physical and/or virtual participation on the interties.

Second, convergence bids should actually facilitate price convergence.

This requires that settlement prices fully reflect the joint interaction of physical and virtual bids. After all, the primary objective of convergence bids is that they help eliminate inefficient price differences across the CAISO's Integrated Forward Market ("IFM") and Hour Ahead Scheduling Process ("HASP") markets that would exist if only physical bids and offers were permitted. If convergence bids on interties essentially boil down to clearing "crossing" virtual bids and virtual offers, with no impact on unit commitment and no ability to displace less economic physical bids or offers, then their ability to foster price convergence is greatly muted.

Based on the limited explanation and the numerical examples offered in the paper, Powerex provides the following comments on the specific proposed solutions:

Option A

This is the least satisfactory option, in Powerex's view. By creating separate prices for virtual and physical transactions, this proposal appears likely to undermine convergence between the IFM and HASP markets. Settling physical transactions at a different price than virtual transactions implies potentially different degrees of price convergence (since a price bifurcation between physical and virtual transactions seen in the IFM may be different than is seen in the HASP, or may not exist at all). Convergence bids would rationally attempt to eliminate inefficient *virtual* price differences, but this may nevertheless leave important *physical* price differences. Conceivably, efficient levels of virtual convergence could even imply exacerbated divergences in the physical market. These outcomes are patently contrary to the rationale behind implementing convergence bidding in the first place.

In the numerical example provided by CAISO, the physical transactions will settle at the exact same price as if there were no virtual bids at all. For example, if a participant believes that CAISO chronically understates import capacity in the IFM relative to the HASP, it is free to submit convergence export bids. The self-interest of the participant is to gain from the expected price differential, but the benefit to the market is that, all else equal, the LMP at the node should increase in the HASP. A bifurcated settlement undermines this important feedback.

Moreover, while this option may be mathematically correct (reflecting two related but different constraints), its results are wholly unintuitive. What is the price signal being communicated to participants when, as in the numerical example, the LMP for physical transactions is \$50/MWh whereas that for virtual transactions is \$60/MWh? What is the intuition that appears to make virtual energy "worth" more than physical energy?

Powerex believes Option A will send incorrect price signals to virtual bidding participants, may often result in profitable virtual bidding activity that lacks physical pricing convergence benefits, and may lead to significant unintended market outcomes and consequences.

Option B

This option appears to entail two changes. First, the LMP is calculated based on the shadow prices of both the physical and physical+virtual constraints (as opposed to only the latter, in the current approach). This is claimed by the CAISO to ensure that cleared physical bids are always

consistent with their bid prices, though virtual bids may be inconsistent. Second, virtual bids found to be inconsistent with the final LMPs are eliminated from the solution.

Again, the numerical examples are presently insufficient to draw general conclusions. However, it appears that this approach may produce the same LMP as if only physical bids existed, but permits a limited quantity of virtual bids to clear so long as they are in the opposite direction to the binding constraint.

This option appears to satisfy Powerex's first criterion – of avoiding “false positive” transactions at potentially confiscatory prices. Additional information is needed to determine whether it satisfies the second criterion of permitting convergence bids actually to drive prices toward convergence. It initially appears that this is not the case, but additional examination is necessary before a final conclusion can be drawn.

Additional options

Both of the proposed solutions have something in common: they have the potential to result in unforeseen undesirable or anomalous outcomes. It is Powerex's opinion that replacing the current system with a hastily-developed but also flawed alternative will simply create new problems down the road.

There are likely additional approaches that might be considered for adoption. Powerex believes that the CAISO should explore additional alternatives consistent with the two aforementioned objectives. Powerex urges the CAISO to take the time necessary to work with stakeholders, consult with other RTOs and experts, and develop the appropriate long-term solution.

To this end, Powerex believes it is highly appropriate for the CAISO to immediately suspend convergence bidding on the interties for a period of up to 6 months while the CAISO works out several of the complex issues that have become evident since the launch of convergence bidding. These issues have manifested themselves in large uplift payments for convergence awards that are not successfully facilitating price convergence; confiscatory outcomes to physical intertie participants; and economically irrational intertie LMPs which, at the very least, undermine confidence in the CAISO markets.