

Comments on
“Establishment and Use of Reference Prices for Mitigation
in Markets Operated by Regional Transmission Organizations,”
Federal Energy Regulatory Commission Docket No. PL05-6-000

by
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May 2, 2005

1. Introduction

These comments respond to the Federal Energy Regulatory Commission’s (FERC) “Notice Inviting Comments on the Establishment and Use of Reference Prices,” issued April 1, 2005. First we state the goals of market power mitigation. Next we discuss the ability of bid mitigation in general and the Automated Mitigation Procedure (AMP), in particular, to achieve these goals. We then compare the properties of typical approaches used to set reference prices for mitigated generation units. We conclude with design recommendations for market power mitigation mechanisms that limit the market inefficiencies that result from their application. Specifically, we recommend that FERC consider alternative approaches to the current AMP mechanisms used in the eastern ISOs.

2. Goal of Market Power Mitigation Mechanisms

Market power mitigation is a form of regulatory intervention. Like all regulatory interventions, it is justified only when the expected benefits from intervention exceed the costs of intervention. Because all regulatory processes are necessarily imperfect, designing a market power mitigation mechanism requires balancing the costs and benefits of an imperfect market mechanism that reflects the exercise of unilateral market power by one or more suppliers against the costs and benefits of an imperfect regulatory mechanism. Viewed from this perspective, the goal of market power mitigation is to replicate as closely as possible the market outcome that would occur if all suppliers faced significant competition for their output. Unfortunately, the structure of the transmission network, the existence of scale economies in electricity production, and the fact that market participants typically own a number of generation units in fairly tight geographic clusters create system conditions when competition cannot be relied upon to discipline the actions of some market participants. Under these circumstances, consumers would be subject to the exercise of significant unilateral market power and the unjust and reasonable prices that result without an effective market power mitigation mechanism.

However, there is growing concern that over-mitigation of suppliers is not in the long-term interests of consumers. That is because the market power mitigation mechanisms typically focus on limiting the incidence of extremely high prices while doing little to prevent higher prices the vast majority of the hours of the year. Basing reference prices for mitigated units on

* These are draft comments that were prepared in consultation with the other members of the Market Surveillance Committee (MSC), Brad Barber, James Bushnell and Ben Hobbs, based on previously submitted MSC opinions.

functions of accepted bids by that generation unit or including *ad hoc* adders in these reference prices increases the likelihood that market prices will be higher than they would in the absence of the market power mitigation mechanism during the vast majority of hours of the year.

We believe there are two major shortcomings with the AMP-like mechanisms that currently exist in the eastern ISOs: (1) the use of reference prices based on accepted bids and (2) the use of *ad hoc* bid adders in setting mitigated bid levels. Both of these features of the AMP mechanisms that exist in eastern ISOs are inconsistent with the goal of market prices being as close as possible to those that would exist if all suppliers faced effective competition.

3. Shortcomings of Automatic Mitigation Procedures

The experience of the California market with its system-wide AMP mechanism has failed to convince us that it is effective for limiting anything but isolated, excessive exercises of unilateral market power. These are the same types of events that are mitigated by the bid cap in the energy market. However, with the system-wide AMP mechanism, this mitigation comes at the expense of sanctioning, and perhaps even promoting, more widespread and subtle forms of market power. For example, under the California ISO's existing system-wide AMP mechanism,¹ all suppliers are allowed to bid the lower of \$100/MWh higher than or 200% of their reference level and not be subject to mitigation by the system-wide AMP mechanism. These conduct thresholds provide suppliers with substantial discretion to raise market prices without triggering mitigation. Even though the California ISO's system-wide AMP mechanism has failed to mitigate any bids in the real-time market, significant amounts of unilateral market power could have been exercised while this AMP mechanism has been in place.

In our view, an AMP mechanism with the large conduct thresholds described above does not constitute adequate mitigation of the unilateral market power a supplier might possess, because this mechanism allows a supplier to move market prices above competitive levels enough to impose significant consumer harm without violating the conduct thresholds. Therefore, this AMP mechanism allows substantial system-wide market power to be exercised without triggering mitigation.

It is unclear to us what is accomplished by specifying conduct and impact thresholds, if one is willing to make the very reasonable assumption that suppliers exercise all available unilateral market power. For example, the interaction of two suppliers exercising all available unilateral market power subject to the conduct and impact thresholds in a system-wide AMP mechanism can cause each supplier to exercise significantly more unilateral market power than would be possible without conduct and impact thresholds. If both suppliers bid higher, even if both bids violate the conduct thresholds, neither will violate the impact threshold, because removing the bids of either supplier has little impact on the market-clearing price.

For this reason, we favor market power mitigation mechanisms that intervene only when a supplier is determined to possess sufficient market power to justify interfering with market mechanisms, rather requiring them to violate a conduct threshold and an impact threshold before

¹ Although the California ISO proposes to eliminate the present system-wide AMP procedure on Day 1 of the implementation of the Market Redesign and Technology Upgrade, the California ISO may implement it later in conjunction with a higher energy bid cap. See California ISO, "MRTU White Paper," www.caiso.com/docs/2005/02/23/200502231639176611.pdf.

being mitigated. We emphasize that this does not mean we believe that mitigation should take place more frequently than it would under an AMP-like mechanism. In fact, in our recent opinion on the California ISO's Market Redesign and Technology Upgrade (MRTU) Conceptual Filing, we recommended against implementing an AMP mechanism on a system-wide basis.² We do not believe that the system-wide AMP mechanism is worth the potential cost in terms of the market inefficiencies it introduces at the current level of the bid cap on the California ISO market. In that opinion, we emphasized that system-wide market power is best handled throughout forward contracting at various time horizons in advance of delivery for energy and ancillary services. Our opinion stated that market power mitigation mechanisms should be used only in those instances when the barriers to entry in certain locations in the transmission network are sufficiently large that the threat of new entry cannot be used to discipline the pricing behavior of suppliers of forward contracts for energy and ancillary services at those locations.

Our preferred local market power mitigation (LMPM) mechanism is one that requires that two conditions be satisfied in order for a supplier's bid to be mitigated. First, the supplier must be deemed able to exercise substantial local market power. Second, replacing the supplier's actual bid with a mitigated bid is expected to result in a market outcome that is closer to the outcome that would result if the mitigated units faced effective competition to supply electricity. This second criterion implies we do not advocate mitigation unless the use of a mitigated bid in place of the supplier's actual bid is expected to result in prices closer to competitive levels. We believe that an appropriate horizon for this expectation is an annual basis. By this we mean that averaging the market prices over all of the hours of the year that the supplier's bid is mitigated, yields prices at that location that are closer to the competitive benchmark average prices at that location than the average market prices that would result if the supplier's actual bid was used to set the price during these same hours.

4. Methods Used to Set Reference Prices

The MSC also has expressed substantial concern in a previous opinion about using functions of previously accepted bids to set AMP reference levels for mitigated bids.³ This imposes a cost on a supplier for submitting a low bid, because this bid is likely to reduce that supplier's reference level and therefore limit the extent to which the supplier can raise prices during other hours of the year. For example, if a supplier's AMP reference level is set at the mean of accepted bids over the past 90 days, one can imagine a circumstance where a very low accepted bid could significantly reduce that supplier's reference level. This lower reference level would limit the ability of the supplier to raise its bid and therefore the price it receives for selling electricity without exceeding the conduct threshold. For this reason, we believe that setting AMP reference levels based on accepted bids limits the incentives for suppliers to vigorously compete during competitive periods. Using this mechanism to set reference levels results in an AMP mechanism that is likely to raise average prices in the majority of periods and reduce prices only during those relatively rare periods when the supplier is pivotal.⁴ Therefore, an AMP

² "Opinion on California ISO's Market Redesign and Technology Upgrade (MRTU) Conceptual Filing," April 26, 2004 (available at <http://www.caiso.com/docs/2005/04/26/2005042611125729395.pdf>).

³ "Market Power Mitigation Under Locational Marginal Pricing", MSC Opinion, Nov. 23, 2004, (available at <http://www.caiso.com/docs/2004/11/23/2004112316123829554.pdf>).

⁴ The AMP mechanism is a unique tool in the portfolio of economic regulation whose potential to produce unintended consequences is not well understood. For example, the AMP mechanism provides incentives to make offer curves more 'flat' because firms benefit from raising the offer price of infra-marginal units that they are

mechanism that sets reference prices using functions of previously accepted bids or includes *ad hoc* adders in cost-based reference prices is likely produce higher annual average prices than would exist in its absence.

Specifically, suppose that in the absence of an AMP mechanism a supplier with a minimum variable cost of production of \$30/MWh is able to exercise unilateral market power and set a price at their location equal to \$100/MWh during 5 percent of the hours of the year. In the remaining 95 percent of hours, this supplier faces significant competition and its bid is usually equal to or close to the market-clearing price at its location, so that the unit sells its output at average price of \$35/MWh. Suppose that with an AMP-like system-wide market power mitigation mechanism this supplier is mitigated 20 percent of the hours of the year and is allowed to bid \$75/MWh, a \$45/MWh reference price plus a \$30/MWh bid adder (a level that is consistent with the bid adders currently used in the eastern US markets). Suppose that because of this bid adder and the existence of an AMP-like mechanism, whenever this supplier produces it sets the price at its location, so that it sells at price of \$75/MWh during all of the hours that it is mitigated. Because this supplier's reference prices are based on accepted bids from its unit, it is reluctant to bid below \$40/MWh during the other hours of the year and as a result it sells at, say, an average price of \$42/MWh in the remaining 80 percent of hours during the year. The annual average price without the local market power mitigation mechanism is \$38.25/MWh, versus \$48.60/MWh for the case of the local market power mitigation mechanism with a \$30/MWh bid adder. Although prices are more volatile without the market power mitigation mechanism in place, average prices over the year are lower. Because consumers purchase electricity for use throughout all hours of the year, they would clearly prefer the market without the system-wide AMP-like mechanism to the one with the \$30/MWh bid adder and reference prices set using accepted bids.

The Department of Market Analysis at the California ISO has documented examples of suppliers using this strategy to increase the incremental energy (INC) reference level and decrease their decremental energy (DEC) reference levels significantly in order to have the freedom to exercise additional local market power within the context of the California ISO's existing AMP mechanism.⁵ In both situations, this strategy is made attractive by the fact that previously accepted INC and DEC bids are used to set INC and DEC reference levels

An alternative approach to set reference bids is to allow a fixed adder on top of variable cost. A motivation for proposals of such adders is the maintenance of adequate revenues for generators. However, we believe that there are more effective mechanisms for ensuring revenue adequacy that do not have the disadvantage of distorting LMPs. We strongly urge the FERC to avoid setting locational marginal prices above competitive levels by including *ad hoc* bid adders in mitigated bid levels as a means for providing adequate revenues to owners of mitigated generation units.

confident will be accepted in the market. Thus, AMP provides incentives similar to pay-as-bid systems to raise bids to the level of market clearing prices. Without AMP, firms are largely indifferent to the offer price of a unit, conditional on the fact that it is accepted. With AMP, a higher offer price for an accepted unit raises its reference price and allows more flexibility for bidding that unit in other hours.

⁵ See Chapter 2 of the California ISO DMA's *2004 Annual Report of Market Issues and Performance*, April 2005 (available at <http://www.caiso.com/docs/2005/04/28/2005042814343415812.html>).

For the reasons discussed above, we do not believe that even 10% bid adders should be included in cost-based reference bids. A scheme that systematically biases the bids of mitigated generation units upward relative to the ISO's best estimate of the unit's minimum variable cost of supplying electricity does not achieve the goal of market power mitigation discussed above. Generation units that face sufficient competition will bid close to their minimum variable cost. Combining these bids with mitigated bids set significantly above their minimum variable cost of supplying energy will result in higher prices as well as overuse of units facing significant competition.

One might think that a 10 percent adder is relatively small, but it is important to emphasize that if 100 MW generation unit is operating 2000 hours per year with a 10 percent adder on top of a variable cost estimate of \$50/MWh, this implies annual payments in excess of these variable costs of \$1 million to that generation unit's owner. In addition, this mitigated bid level will set higher prices for units located near this generation unit, further increasing costs to consumers.

Including *ad hoc* bid adders or other adjustments in the computation of mitigated bid levels also increases the incentives for unmitigated suppliers to distort their bids above their minimum variable cost. These suppliers recognize that the mitigated bid must be dispatched so they face little risk of a reduced amount of energy sold but a substantial likelihood of achieving a higher price for their energy by bidding higher than their minimum variable cost of supplying energy. This bidding behavior risks greater distortion from an efficient dispatch of the units in the control area, all because of the use of this *ad hoc* bid adder.

The ISO should design a mechanism for setting the mitigated bid level for a supplier that balances the two competing goals common to all regulatory price-setting processes. First the mitigated bid should allow the generation unit owner the opportunity to recover the minimum variable cost of supplying energy. Second this mechanism should provide the strongest possible incentives for the supplier to provide the necessary energy at minimum cost.⁶

5. Recommended Methods for LMPM and Setting Reference Levels

Based on our analysis of the market power mitigation mechanisms in California, the eastern ISOs and those in other wholesale electricity market around the world, we have the following recommendations. First, we see limited long-term benefits to consumers from system-

⁶ One example of this approach is for the ISO to establish a benchmark variable cost estimation procedure based on validated heat rates and variable operating and maintenance costs for each gas-fired generation unit in California. This validated heat rate would be multiplied by a benchmark daily price of natural gas delivered to the generation unit. The Henry Hub price plus the regulated cost of transporting natural gas from Henry Hub to this generation unit, including the relevant intrastate gas transmission and distribution charges, could be used as this benchmark natural gas price. The mitigated bid level for this unit could then be set equal to the heat rate times this benchmark delivered price of natural gas plus a benchmark variable operating and maintenance charge for generation units of this technology and vintage. If the supplier believes that it can produce the necessary energy at a lower variable cost, then it should be able to keep the difference between this benchmark variable cost and its actual variable costs. This scheme for setting mitigated bids would provide strong incentives for the least-cost operation and procurement of natural gas by mitigated generation units. Because it uses the ISO's best estimate of the minimum variable cost of that generation unit, this mechanism also limits the distortions in the dispatch introduced as a result of mitigating generation units because they possess substantial local market power.

wide AMP mechanisms. System-wide short-term market power is best dealt with through long-term contracts for both energy and ancillary services between suppliers and load-serving entities. Market power mitigation mechanisms should focus on limiting the opportunities for suppliers to exercise local market power by exploiting the substantial barriers to entry at certain locations in the transmission network. These local market power mitigation mechanisms should focus on identifying system conditions which satisfy the two-tier test for mitigation given above, without a conduct or impact thresholds. Instead, a generation unit's bid should be mitigated if it is deemed to possess substantial market power and using that unit's reference price is expected to produce a market price closer to the competitive benchmark price than the unit's actual bid.

We strongly urge FERC to eliminate setting reference prices based on functions of previously accepted bids. FERC should not include any *ad hoc* adders in cost-based reference prices. Including sizable bid adders in the reference prices of units that possess local market power introduces significant distortions into the dispatch process, which impacts how these units are used and how other units in the system facing substantial competition for their output are used. In addition, the use of the bid adders will introduce even greater distortions into market outcomes as final demand becomes a more active wholesale market participant.

Our preferred approach for setting reference prices is to use the ISO's estimate of the minimum variable cost of supplying energy from the mitigated generation unit. This mechanism should provide strong incentives for the unit owner to produce the necessary output at the lowest possible cost. This can be accomplished using benchmark heat rates, input fuel prices and variable operating and maintenance costs to set the reference price level for that generation unit, rather than the incurred input fuel costs or variable operating and maintenance costs of the generation unit. These minimum cost-based reference prices should not include *ad hoc* bid adders. For hydroelectric generation units or other energy limited resources, reference prices should be set based on bilateral negotiations between the Department of Market Analysis at the California ISO and the market participant using principles of economic analysis for deriving efficient prices. For example, for energy limited resources, reference prices should be based on the opportunity cost of supplying energy from the mitigated energy limited unit.