

Opinion on the California ISO's Proposal for Interim Locational Market Power Mitigation ("Interim LMPM")

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Introduction

Currently, the California ISO is required by the Federal Energy Regulatory Commission (FERC) to pay non-Reliability-Must-Run (RMR) resources as-bid when it dispatches them out of merit-order in real time to meet locational energy needs. These real time energy dispatches can occur under abnormal system conditions (planned or unplanned facility outages or line de-rates) as well as under normal operating conditions due to the presence of intra-zonal congestion.

This payment mechanism provides generation unit owners with significant opportunities to exercise their locational market power. These opportunities arise because the geographic distribution of load within the ISO control area can result in generation units owned by one or two market participants being the only ones able to meet a real-time locational energy need. Generation unit outages or transmission line de-rates can increase the likelihood that real-time energy needs will be confined to specific locations in the ISO grid. The geographic concentration of ownership of generation units by the same market participant along with very limited demand-responsiveness further increases the likelihood that these conditions are met.

The requirement to satisfy a plant-level or unit-level locational energy need in real time is not unique to the California ISO zonal market design. This is a feature of all restructured electricity markets currently operating, including the PJM, New York, and New England ISOs. The combination of a bulk transmission grid designed for the vertically-integrated geographic monopoly regime, the concentration of demand within the bulk transmission grid, and the geographic distribution of ownership of generation resources causes this circumstance to occur in all of these regional markets. Each of these ISOs have FERC-approved mechanisms which mitigate the locational market power that certain market participants possess during system conditions when energy from units they own is essential to maintain system reliability. The purpose of the California ISO's proposal for Interim Locational Market Power Mitigation (Interim LMPM) is to put in place an analogous mechanism that will remain in force until the ISO's current comprehensive market re-design process has been implemented.

Necessity of Interim LMPM

The FERC pay-as-bid requirement, combined with a smaller number of generating resources under RMR contracts during the California ISO's second year of operation, has increased the frequency of instances when very high-priced or out-of-merit bids must be accepted to relieve a real-time locational energy need. There have even been instances when an RMR unit (which was given this status because of a predictable real-time locational energy need) is unavailable but the ISO is instead required to accept a very high-priced bid from a unit at that location owned by the RMR unit owner. The ISO's "Interim Proposal for Locational Market Power Mitigation" refers to an instance when the ISO paid \$1 million per day under this

pay-as-bid mechanism to receive the same level of service usually provided by an unavailable RMR unit.

Because of the ISO's transmission grid was designed for the vertically-integrated geographic monopoly regime, this locational market problem has the potential to occur in virtually all hours of the year. Generating unit owners tend to undertake planned maintenance during the off-peak months. Consequently, significant locational real-time energy needs may arise during these hours despite reduced system load conditions. Conversely, tight system conditions during the summer months can result in significant real-time locational energy needs. However, all generators plan to produce energy during these periods, which significantly reduces the likelihood that an out-of-merit bid must be accepted to satisfy a real-time locational energy need. This possibility of paying unit owners as-bid for out-of-merit calls for energy during virtually any hour of the year underscores the urgency of implementing an LMPM mechanism. Given the statewide growth in the demand for electricity in during the first six months of 2000 relative to those same months in 1999, California electricity consumers face an even greater prospect of many days when very large out-of-merit payments for real-time locational energy needs will be necessary.

Distinguishing Scarcity Rents from Locational Market Power

While it is understandable that generation unit owners would attempt to maximize the profits they earn from generation units they own within the constraints of the California ISO market rules, it is important to distinguish this exploitation of locational market power from the presence of scarcity rents. A generation unit owner exercises market power when it is unwilling make energy available from a unit at a price that is equal to that unit's variable cost of production, even though there is currently unloaded generation capacity. This capacity withholding strategy is profit-maximizing for a generation unit owner because it is able to increase significantly the price that it receives for the electricity that it supplies, either through a higher bid price or less capacity made available to the market. Because of the existence of additional generation capacity not currently supplying electricity (usually owned by this market participant), this high price for electricity cannot be attributed to a shortage of available generating capacity, or equivalently the presence of scarcity rents. This bidding strategy is profitable because the firm controls a significant amount of relatively low-priced generation capacity and the level of market demand is sufficiently high so that all of the capacity available from all other market participants is insufficient to satisfy the current market demand. Similar to other markets, the combination of the concentration of productive capacity (in this case generation unit ownership) and the level and inflexibility of the market demand are the two major factors which enable a market participant to exercise market power.

The same logic applies to the exercise of locational market power. A market participant must own a significant fraction of the capacity that can satisfy the locational energy need. This locational energy demand should also exceed the total amount of local generation capacity not owned by that market participant. The outcome of the generation unit divestiture process in California resulted in a geographic concentration of capacity ownership. The same market participant always owns all units at a given plant location. Often the same market participant owns multiple plants on the same side of an intra-zonal or inter-zonal transmission path. This geographic pattern of unit ownership increases the ability of unit owners to exercise locational market power. For example, if the locational energy requirement is 90 MW and there are four units, each with 100 MW in capacity, but all of them are owned by the same market participant, it is unlikely that any bid, besides one at the real-time energy price cap, will cause this market participant to willingly supply energy. However, if each of the 100 MW units is owned by a different market participant, the price at which any of them is willing to supply this locational energy need is significantly lower than the real-time energy price cap.

In contrast, scarcity rents would occur if the level of electricity demand is such that there is little, if any, unused capacity available throughout the system. In these instances, prices are set by the willingness of consumers to forgo purchases of electricity, rather than by the willingness of generators to supply additional electricity. Given the level of demand relative to available capacity, there is very little additional capacity necessary to serve demand. These market conditions indicate genuine scarcity of generating capacity, because little is available to serve any incremental increase in demand within the system.

The identification of locational scarcity rents follows in the same manner. If local generation needs are only slightly less than the amount of available local generation capacity, then one could argue that there is a scarcity of local generation, and therefore any high prices could be justified as being due to local generation scarcity. However, if the reason local generation is scarce is because the same market participant has declared other units at this location out-of-service, this calls into question the conclusion of the existence of scarcity rents because the market participant has a very strong incentive to make its local generation appear "scarce." Consequently, if there is unloaded local generation unwilling to supply energy at price above its variable cost of production, then the resulting elevation of prices reflects locational market power, not a scarcity rent.

Necessary Features of a LMPM

Any LMPM mechanism necessarily limits the revenues received by a market participant during system conditions when it would otherwise have the opportunity to earn extremely large revenues. Consequently, the system conditions which trigger mitigation of bids should be very straightforward for any market participant to understand and for the system operator to implement in real time. The experience of the past two years has shown that market participants will attempt to use all regulatory interventions to increase their ability to exercise market power in the ISO's energy and ancillary services markets. Consequently, the mechanism for compensating unit owners whose bids are mitigated under the LMPM, should operate outside of the ISO's price-setting mechanism to the greatest extent possible.

Transparency in both the system conditions that will trigger mitigation of a unit owner's bids and the revenues received for the energy supplied when bids are mitigated is necessary to allow unit owners to account for the LMPM mechanism when determining how to bid into the ISO's energy and ancillary service markets. Simplicity in implementation of the LMPM is necessary because real-time system operator decisions about which units to dispatch must be made extremely rapidly. Mitigation measures which require anything beyond a very rudimentary determination of the degree of competition in the market in real-time are not likely to be always implemented as formulated, given the time constraints facing system operators in real-time. The revenues paid to unit owners when their bids are mitigated should be sufficiently unattractive that they submit bids which are unlikely to be mitigated when the unit would be able to earn revenues in excess of short-run production costs from selling into the ISO's energy and ancillary services markets.