Comments on Locational Marginal Pricing and the California ISO's MD02 Proposals

Market Surveillance Committee of the California ISO
Frank A. Wolak, Chairman; Brad Barber, Member;
James Bushnell, Member; Benjamin F. Hobbs, Member

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Summary

We have been asked to comment on the relationship between Locational Marginal Pricing (LMP) and the ISO's Market Design 2002 (MD02). Concerns have been raised about the uncertain impact of MD02, in general, and LMP in particular on California consumers. It has been argued that extensive testing is needed before implementing MD02. We agree with these concerns. However, we also feel that the ISO's most recent plan for testing and implementing its MD02 design, for the most part, satisfies the concerns that have been raised. The application of LMP to retail loads has been indefinitely postponed, and participants will therefore have ample time to observe the actual prices resulting from market operations before any decisions about application of those prices to retail loads are taken. The current schedule for implementation of MD02 is by no means hasty and already calls for extensive *testing* during parallel operations with existing systems, as opposed to simulations using predictions about prospective market conditions. One lesson from the events of May 2000 to June 2001 is that suppliers will exploit market design flaws in ways that are difficult to predict in advance. Consequently, the ISO's approach of parallel operations is currently the most reliable form of testing the potential impact of LMP on California consumers. Market participants will have ample opportunity to analyze the impact of LMP during the parallel operation of the ISO's existing market with the MD02 market design.

The Big Picture: Why Redesign the Market?

Before discussing the implications of LMP in the context of the MD02 proposals, it is worthwhile to review the motivation behind the formation of these proposals in light of the market structure that now exists in California. These proposals have at times been characterized as imposing revolutionary changes on the electricity market to a degree comparable to the changes implemented in 1998. This is simply not true. For better or worse, the impact of any ISO market rule on the electricity costs of end-users in California will be much more limited relative to the impacts of the major structural changes undertaken in 1998. A significant share of the energy consumed in California is self supplied by the utilities and a large share of the remainder will be supplied under mid-term and long-term contracts signed during the winter and spring of 2001 whose costs will be largely unaffected by ISO market outcomes.

Long-term contracts and additional generation capacity have greatly reduced the impact of system-wide market power on the ISO's energy market. One of the largest

remaining threats to the market is the local market power of some suppliers that is created by limitations in the transmission system. This is a problem that could very well get worse with the addition of new generation capacity in transmission constrained regions. The ISO needs additional tools in order to deal effectively with the problem of local market power. Such tools are an important element of the MD02 proposals. Importantly, it appears to us that the Federal Energy Regulatory Commission will not provide the ISO with the most effective local market power mitigation tools without other elements of MD02, including LMP. The ISO has made several requests, starting in 1999, for "PJM style" local market power mitigation. FERC has rejected these requests, most recently stating that it may consider providing the ISO with more effective local market power mitigation if it adopts an LMP market such as the one proposed in MD02.

While the long-term commitments now present in the system largely hedge the electricity costs of end-use customers, they do not minimize the usefulness of a short-term electricity market run by the ISO. To the contrary, given the potential rigidities introduced by a system of longer-term bilateral contracts, the efficiency and reliability of the system depend even more on having a rational, transparent market that allows firms to adjust to market conditions very different from those that existed when contracts were signed. Firms sign contracts based upon what they think average prices may be over the next 5 or 10 years. We do not want the daily operation of our electric system to be based upon the same criterion, with expensive generation operating while more efficient generation is idled simply because they had different expectations about long-term trends in electricity prices. By the same token, units should not be operated simply because the owner has a long-term physical right to a transmission interface.

Daily spot markets allow for firms to adjust their actual production and consumption decisions based upon their true current opportunities and costs. Long-term commitments help to hedge the risks of such decisions, but should not drive daily decision-making. In the electricity industry, with its enormous size and with the volatility of many of its key inputs and even demand, the ability to make short-term adjustments can reap substantial benefits. Even a 1% cost reduction is consequential in a $250 Billion industry. The MD02 proposals are motivated by these goals.

The current ISO market design has a number of well-known flaws. Setting aside even the impacts of market power and the tremendous costs that have been borne by California consumers over the last several years, the electricity system has not operated nearly as efficiently as it could. Much of this is due to a market design whose greatest champions, such as Enron, benefited from the inefficiencies embedded in this current design, the most publicized one being the "dec game," where a supplier would over-schedule at a given location knowing that the unit would subsequently be paid not to provide this energy because of local transmission constraints. Some parties continue to benefit from these inefficiencies. While the costs of the Dec game to date pale in comparison to the costs of overall market power, it remains a concern that is likely to grow more serious in the future. The fact that market redesign cannot recoup the losses of the last few years does not mean it's not worth doing.

Next Steps

There seems to be little disagreement about the need for changes to the ISO's market design and operations. At issue currently is the extent to which LMP will be a component of that market design, as well as the timing of any implementation of LMP. Concerns have been raised about the uncertain impact of MD02, in general, and LMP in particular. It has been argued that extensive testing is needed before implementing MD02. We agree with these concerns. We believe that the ISO's most recent plan for testing and implementing its MD02 design for the most part satisfies them. In reaching this conclusion, we make the following observations.

1. The application of LMP is not a revolutionary or experimental concept.

Many variants of LMP have been adopted around the world. The overall performance of those markets has varied, but it is generally accepted that such differences are due to the overall market structure and relative competitiveness of these markets. The usage of LMP has not caused significant difficulties in these regions; no market that has adopted it is considering getting rid of it, and some markets that started with a zonal model have converted to LMP. Concerns have been raised that a stakeholder process in California could lead the ISO to adopt design changes that distort a reasonably reliable and tested approach into something much less predictable. If such concerns are significant, it may be advisable to adopt an existing LMP system, such as the one that exists in PJM, with as little alteration as is practical. This may also have the additional benefit of allowing the ISO to obtain a "PJM-style" local market power mitigation mechanism.

2. The application of LMP to retail load has been indefinitely postponed.

Customers will not even have the opportunity to voluntarily enroll in a LMP based rate. The only application of LMP on the demand side would be its application to dispatchable load that is explicitly bid into the ISO market and essentially paid the nodal price to reduce consumption. While we feel that there are potentially significant cost savings that could be reaped from an eventual application of retail pricing to a level finer than the currently proposed 3 pricing zones, we are sympathetic to concerns about the unpredictable impacts of LMP on California consumers at this time. The current ISO proposal would allow for the ISO and participants to observe the resulting implied prices for a considerable time before any decisions are made about whether or how to apply them to retail loads. At the same time, the ISO and others should continue to pursue methods that would hedge the monetary impacts of LMP on given regions while still providing the right incentives for the efficient production and consumption of power.

3. Testing and Simulation are not the same thing.

Substantial criticism has been levied at the ISO's first study of the potential impact of LMP as testing a "best-case" scenario. Even the ISO acknowledges this is

true and has always planned undertaking further studies to predict the impact of MD02 rules on local prices. However, it is important to understand that such studies are just *predictions*, and predictions in electricity markets are always based on simplifying assumptions and notoriously inaccurate. It is also important to recognize that the goal of testing should be to determine the *differential* impact of LMP, as opposed to the current system, on prices, not to predict the impact of the overall market structure on prices. We have the ability to model and understand with some accuracy the impact of market power on system-wide prices. To our knowledge, there is no model that can reliably predict the incremental impact of LMP vs. another pricing system on overall prices, for the simple reason that the impacts are incremental. In other words, overall price levels are mainly driven by underlying market structure, the extent of forward contracting, and market power mitigation provisions, rather than whether LMP is used for congestion management and spot markets. We could simulate what local retail prices would result given a set of assumptions about how suppliers would bid under that system. At a minimum such an exercise would be expensive and at worst futile. It would be much more informative to calculate what local prices would result from the *actual* bids of suppliers operating under the system. The current ISO proposal would do this. At several stages of implementation, the proposal calls for running the new system in parallel with the existing system for at least several months before "plugging in" the new system to the market. To us, this constitutes the most reliable approach to testing the system. We also urge that the implementation and testing process be as transparent as possible. This would include the publication of as much detailed data as is practicable.

4. LMP-based transmission management and MD02 cannot be separated easily.

As described above, it is relatively straightforward to eliminate the impact of LMP on retail load by averaging the prices charged to load serving entities (LSEs) over large regions. It is not, however, possible to ignore the physical reality of actual transmission constraints and their impact on system operations. Simply put, transmission constraints require the ISO to call upon more expensive generation sources, since operating the cheaper sources would threaten network reliability. This means that different generators at times have to be paid different prices.

Such is the case today, as it would be under MD02. Both systems pay individual generators potentially different local prices, and charge load much more aggregated regional prices. Thus a comparison of the current system and MD02 is not about *what* is done, but *how* to do it. The MD02 proposals would improve upon today's ad-hoc and mainly real-time approach to managing local congestion, thereby reducing overall costs and hopefully reaping savings for consumers. Now that LMP is not to be applied to retail load, it is difficult for us to see a further separation of LMP from MD02 as anything but a change in semantics.

5. Concerns about MD02 remain, but are not about adopting LMP.

Several other concerns have been recently raised in conjunction with the concerns over the introduction of LMP. These include the uncertainty about the design and allocation of CRRs and the prospects for generation and transmission investment. With LMP now to be applied to generation only, any *new* CRRs will not be needed by LSEs to hedge *intra-zonal* congestion. Firms also want to know what kinds of hedging instruments will be available for *inter-zonal* congestion, but such concerns apply whether LMP is adopted or not.

Concluding Comments

LMP is a small, but important, part of a well-functioning wholesale market for electricity. Demand-responsiveness to both locational and temporal price differences is another important source of benefits from a wholesale electricity market. LMP is a necessary step towards achieving this long-term goal. In the short-run, the phased implementation of LMP (as proposed by CAISO) carries little potential costs and provides several short-term benefits. These benefits include: (1) the ability to secure effective local market power mitigation tools from FERC, (2) reduction in undesirable trading strategies (e.g., the "dec game"), (3) greater transparency, efficiency, and reliability in system operation, (4) improved demand responsiveness (given the ability of dispatchable loads to bid and respond as generation and receive the LMP), and (5) greater granularity in the costs of transmission congestion to aid the transmission planning process.