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Berkeley Lab Study Is an Important Step to Improving the Monitoring of Western Electricity Markets

Econometric methods show promise for market monitoring screening in the absence of organized ISO markets

Denver, CO and Berkeley, CA— A new study by the Department of Energy’s Berkeley National Laboratory (Berkeley Lab) has evaluated methods for monitoring power markets that should allow market monitors and regulators to more quickly identify efforts to manipulate the price of power in the Western Interconnection.

“This study is another important step to ensure that the failures in monitoring power markets that contributed to the 2000-2001 Western electricity crisis are not repeated,” said Joanna Prukop, Chair of the Western Interstate Energy Board (WIEB). “Implementation of the study findings by an effective independent market monitoring system would also serve as a deterrent to such behavior in the first place. Western states appreciate the Department of Energy’s support of efforts to improve Western power markets.”

WIEB is the energy arm of the Western Governors’ Association. One of WIEB’s committees, the Committee on Regional Electric Power Cooperation, is comprised of the state and provincial regulatory commissions and energy agencies in the Western Interconnection.

Berkeley Lab’s researchers, who worked with the Analysis Group, found econometric price prediction methods can provide a benchmark screen for identifying possible instances of uncompetitive pricing in Western power markets. The study surveyed analytical methods that could be applied to market monitoring in the West, where there are few organized wholesale markets and individual wholesale transactions are often opaque.

Charles Goldman, a co-author of the report, explains that “in the electric industry, market monitoring involves the systematic analysis of prices and behavior in power markets to determine when and whether potentially anti-competitive behavior is occurring. Our study was designed to explore different methods of doing this, using readily available data.”

Ed Kahn, another of the reports co-authors, adds that “the basic goal is to develop a benchmark for wholesale prices in a well-functioning competitive market. Once you’ve done that, you can compare actual prices to the benchmark and identify ‘outliers’—instances where suppliers may have manipulated prices and further investigation and screening is warranted.”

The study was co-funded by the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability and the Western Interstate Energy Board, with the assistance of members of the former Market Monitoring Work Group of the industry's Seams Steering Group-Western Interconnection (SSG-WI). WIEB's Committee on Regional Electric Power Cooperation (CREPC), supported the study because of its desire to foster the expansion of an independent capability to monitor wholesale electricity markets in the West. "DOE is pleased to provide technical assistance to States and regions on electricity issues. These issues are typically very complex and we do our best to add value through the development of tools such as this." said Kevin Kolevar, Director of DOE's Office of Electricity Delivery and Energy Reliability.

The researchers reviewed five potential analytic methods to test their feasibility for market monitoring. They selected the two most promising methods—econometric analyses and production cost modeling—and tested them using day-ahead market data from two electricity trading hubs in the West: Palo Verde in Arizona, and the Mid-Columbia hub in the Pacific Northwest.

Kahn explains that "production cost models are detailed simulations of the operation of power systems that are often used for resource planning." He adds that "when adapted for market monitoring purposes, their complexity is both a blessing and a curse. They provide a lot of detail that simpler models cannot handle, but their workings are somewhat of a 'black box' and they are time-consuming and data-intensive to implement." In the end, the researchers found that production cost simulations based on several discrete scenarios of future supply/demand conditions in the West did a relatively poor job of predicting seasonal variations in actual wholesale electricity prices at the Palo Verde or Mid-Columbia hubs.

"The results for the econometric analyses were much more promising," notes Goldman. Econometric analyses are well-established statistical methods that can be applied to model the relationship between a set of fundamental price drivers (such as weather and fuel prices) and wholesale power prices.

"For the Palo Verde hub data, we developed a model that predicts over 90% of the observed price variations", says Goldman. He adds, "we were able to link all the outliers we found in the Palo Verde data to well-defined events—such as outages of major coal generation plants—that were not captured by variables in our model."

However, the report's authors caution that econometric methods do have some pitfalls. For the mid-Columbia hub, the results were not as compelling. Kahn says, "we suspect that the problem lies in to capturing the effects of spring runoff on the hydroelectric system. If this type of model was actually used for market monitoring screening, it would require more attention to the unique dynamics of hydroelectricity in the Pacific Northwest."

Overall, the researchers are optimistic that econometric analyses could provide a promising market monitoring screening tool for the West, but they caution that it must be “implemented and interpreted with care”.

The report is titled “A Regional Approach to Market Monitoring in the West” (LBNL-61313), and is authored by Matthew Barmack, Edward Kahn and Susan Tierney of Analysis Group, and Charles Goldman of Lawrence Berkeley National Laboratory. Download it at: <http://eetd.lbl.gov/ea/EMS/rplan-pubs.html>

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