

*Demand Side Bidding Will Reduce the Level and Volatility of Electricity Prices**

by

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With the move to deregulate wholesale electric utility prices in the United States, each state or region needed to develop a plan for restructuring their industry and defining the auction market rules that would determine the hourly wholesale price of energy. Universally, these new markets employed supply side bidding mechanisms in which generator firms submitted bids to supply whatever quantity of energy would be demanded by wholesale buyers who must provide power to end-users at regulated prices. This meant that any end-user, regardless of the individual circumstances of that consumer's need for an uninterrupted flow of energy, would be guaranteed that his demand would be satisfied. This policy of meeting all "must serve" demand was inherited from a rigid regulatory system that politicized the reliability of service to all consumers without regard to cost, to differing consumer priorities for service, or to differences in the willingness-to-pay for the reliability of those services. Consequently, retail consumers were shielded from exposure to the great natural variability in energy cost from nighttime lows to daytime highs and across seasons by averaging these cost variations into flat rate prices.

The driving force behind deregulation was to improve performance by exposing the industry and its customers to cost based price signals, a policy that has worked well in the transportation (air, truck, rail) and gas industries. Unfortunately, in electricity, deregulation in wholesale markets has not been accompanied by concurrent attention to the deregulation of retail markets, and this has exposed the industry to unusual stresses.

* For a more detailed discussion, see our papers entitled, "Controlling Market Power and Price Spikes in Electricity Networks: Demand-side Bidding" and "Demand Side Bidding Will Control Market Power, and Decrease the Level and Volatility of Prices." These papers can be downloaded at <http://www.econlab.arizona.edu/power/>.

Beginning three years ago in the Midwest and Southern wholesale markets summer peak prices reached levels of 10 and occasionally 100 or more times the normal price of \$20-\$30 per megawatt hour. This was the predictable direct consequence of completely unresponsive retail demand impinging on a discretionary responsive supply. Recently, California has been plagued by similar increases in spot prices because of supply shortages, together with insufficient investment in switching technologies that allow selective interruption of low priority uses of power at high cost peaks in demand. (See Figure 1.)

The high general level of these prices and the tendency for upward price spikes to occur when electricity supplies are tight has been shown to be avoidable in markets where no more than 16% of the peak demand can be interrupted through discretionary bids submitted by wholesale buyers. This new study is based on laboratory experiments using profit motivated buyers and sellers of energy in a network with three major centers of consumption and generation where demand cycles through transitional shoulder, peak and off-peak levels. Figure 2 compares average prices and the volatility of prices, with and without demand-side bidding for each of the three demand levels.

California and the rest of the country can avoid these price shocks by redesigning their markets to provide incentives for bulk buyers to introduce technologies allowing energy flows to be voluntarily reduced to customers willing to consume less in return for a discount on their electricity bills. This policy of decentralizing the demand side of the market to allow free choice is both more flexible and much less costly than allowing the utilities to recover their energy purchasing costs by a regulated new levy on all consumers. The latter policy provides all the wrong incentives for conservation as a competitive alternative to more investment in high cost peaking capacity. Empowering buyers will lower short run electricity prices, while reducing the need for emergency reserves when there are line or generator outages, save investment in new generation and transmission lines, and reduce their impact on the environment.

**California PX Prices
(Unconstrained Day-Of/Hour-Ahead Market)**

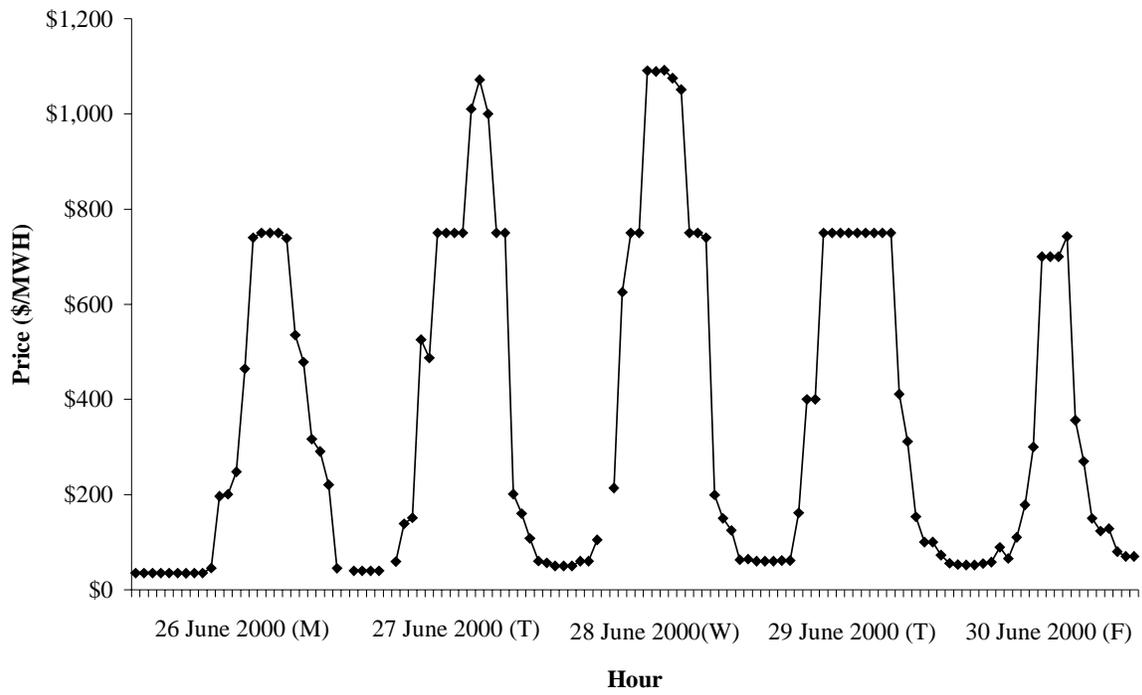
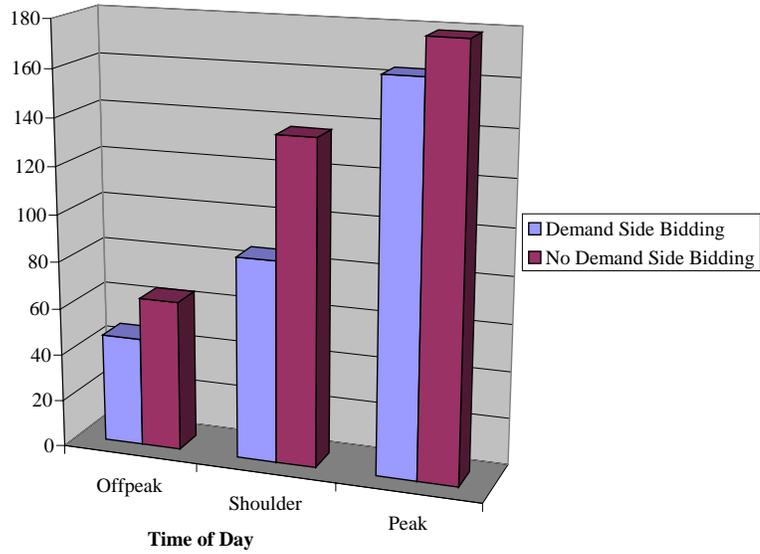


Figure 1

Average Electricity Prices



Variance of Changes in Electricity Prices from Day to Day

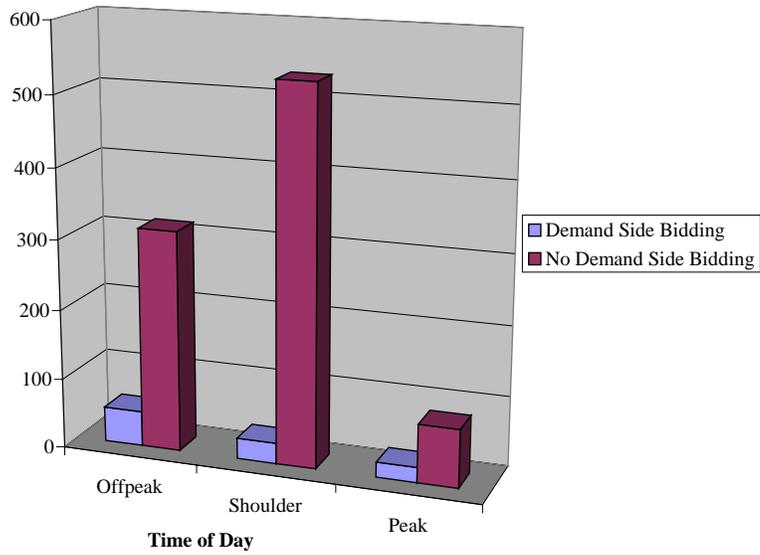


Figure 2