Impact of Electricity Deregulation in the State of California

OVERVIEW

The first investor owned utility was established by Edison Illuminating Company in 1882 on Pearl Street in New York and served around 60 customers in lower Manhattan. The electricity industry started as a natural monopoly, and was then regulated to protect customers from high and unreasonable prices. In 1978, the Public Utilities Regulatory Policies Act (PURPA) provided the first step towards a competitive market. Electricity deregulation was expected to reduce prices. In this study, the effectiveness of deregulation in the state of California was assessed by examining historical retail prices, and second by developing a model to estimate the grid marginal costs using historical data.

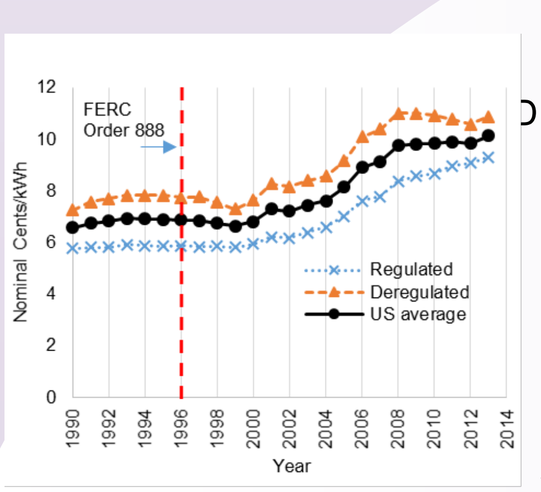
GOALS

- Collect dispatch and historical market data
- Determine marginal prices using actual dispatch schedules and fuel prices
- Determine if deregulation has resulted in lower prices

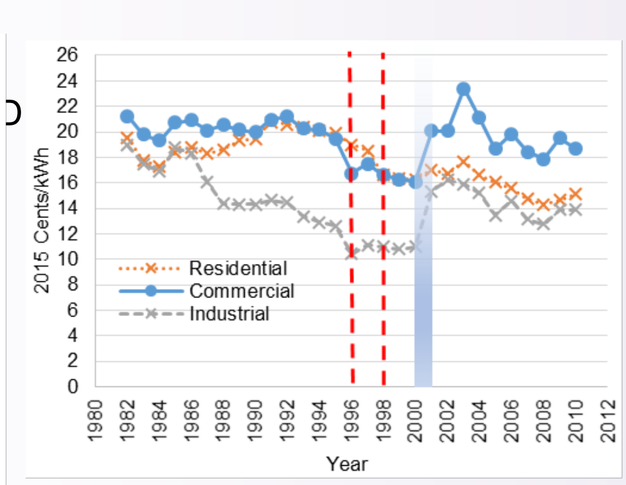
RESULTS

Every country or state implementing deregulation has gone through a unique experience. In the state of California, electricity market started operation in April 1998. And in 2000-2001 the state experienced an energy crisis during which the electricity wholesale prices increased 800% and one of the state's investor owned utilities went bankrupt and another came close to bankruptcy. In 2001, CalPX went out of business as a result of the crisis and the state was left without a day-ahead energy market from 2001 to 2009.

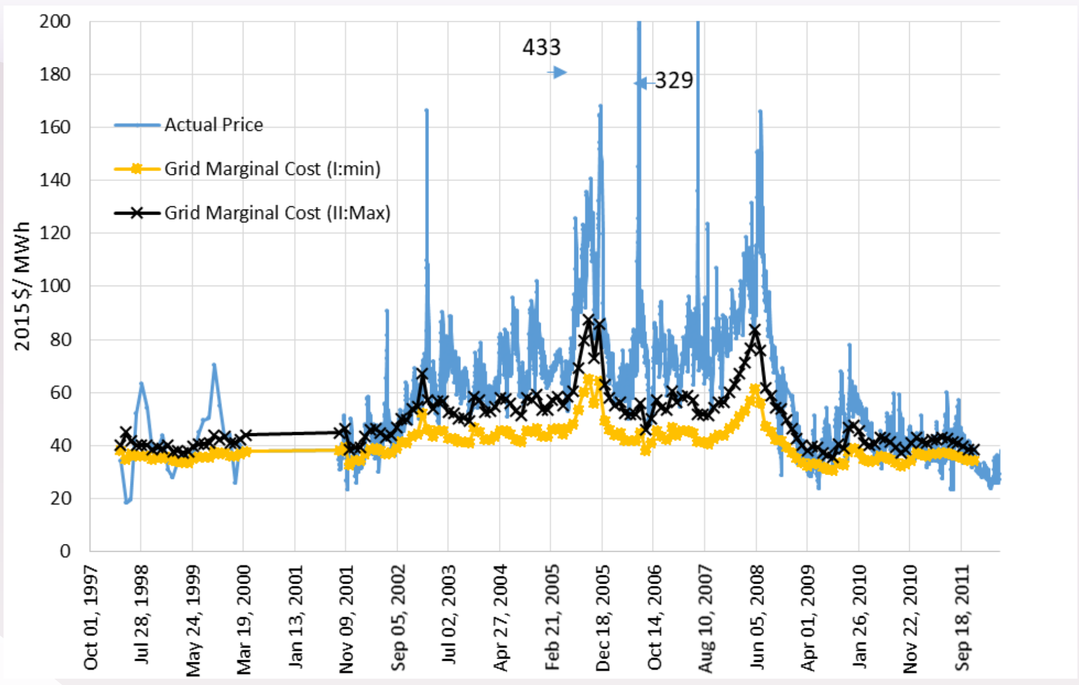
Average retail prices in regulated and unregulated states, follow the same trends. The rate of increase in the deregulated states are higher than that of regulated states in 1999-2001 and 2004-2008, and the prices in deregulated states decreased from 2008-2012 on average. The higher rate of increase in prices and reduction in prices both coincide with the natural gas prices reduction from 2008 on.



Retail prices in regulated and unregulated states



Average retail prices by sector

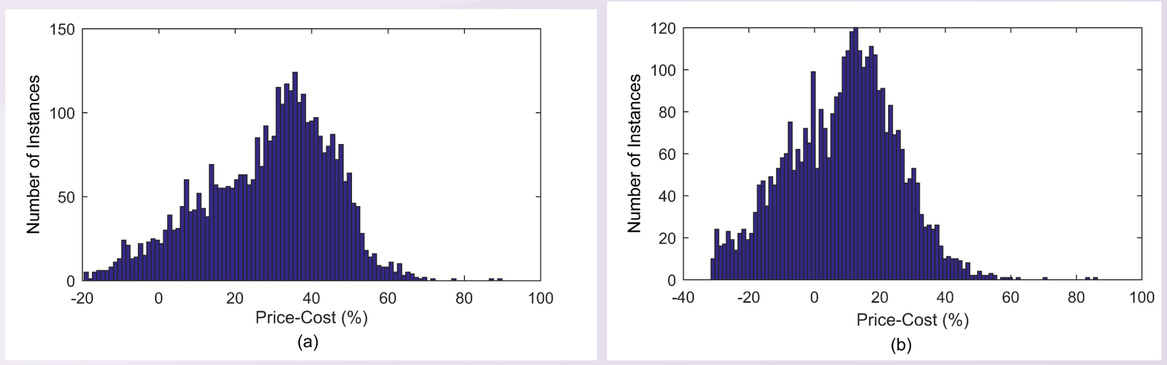


Estimated grid marginal cost vs. actual market prices

RESULTS (continued)

Using the methodology and model developed, grid marginal costs are determined. The results indicate that electricity wholesale prices are higher than the grid marginal cost in the majority of instances. Starting in 2009 and going forward, however, prices occurred that were lower than the grid marginal cost modeled. This might be due to the fact that, after implementation of the MRTU (April 2009), the CAISO became capable of running a more efficient and optimized market since they switched to nodal modeling and included a full network model in the market clearing process.

Overall, during the 1998-2013 timeframe studied, in the majority of the instances, the modeled grid marginal costs are lower than the actual historical price after deregulation (Figure 13), and the price reductions that occurred were mostly due to reductions in natural gas prices as well as reduction in cost of renewable resources and improvements in the efficiency and heat rates of generating units



Histogram for marginal cost-price difference in percent for (a) min, and (b) Max results

RECENT PUBLICATIONS

G. Razeghi, B. Shaffer, S. Samuelsen(2017). Impact of electricity deregulation in the state of California. Energy Policy, Vol. 103, pp. 105-115.

PERSONNEL

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