

California Electricity Market Crisis: Causes, Remedies, and Prevention

The competitive electric power market of the state of California began operation on 31 March 1998 with the California Independent System Operator (California ISO) and the now bankrupt Power Exchange (PX) as the main operationally independent market facilitators. The market took off smoothly, and the prices were seemingly just and reasonable until May 2000, when the first signs of market crisis emerged. This marked the beginning of the California power crisis that continued until about May 2001. During that period, California was confronted with an unprecedented electricity crisis that threatened to undermine the reliability of its electricity system, weaken its economy, and impact energy markets throughout the western part of the United States.

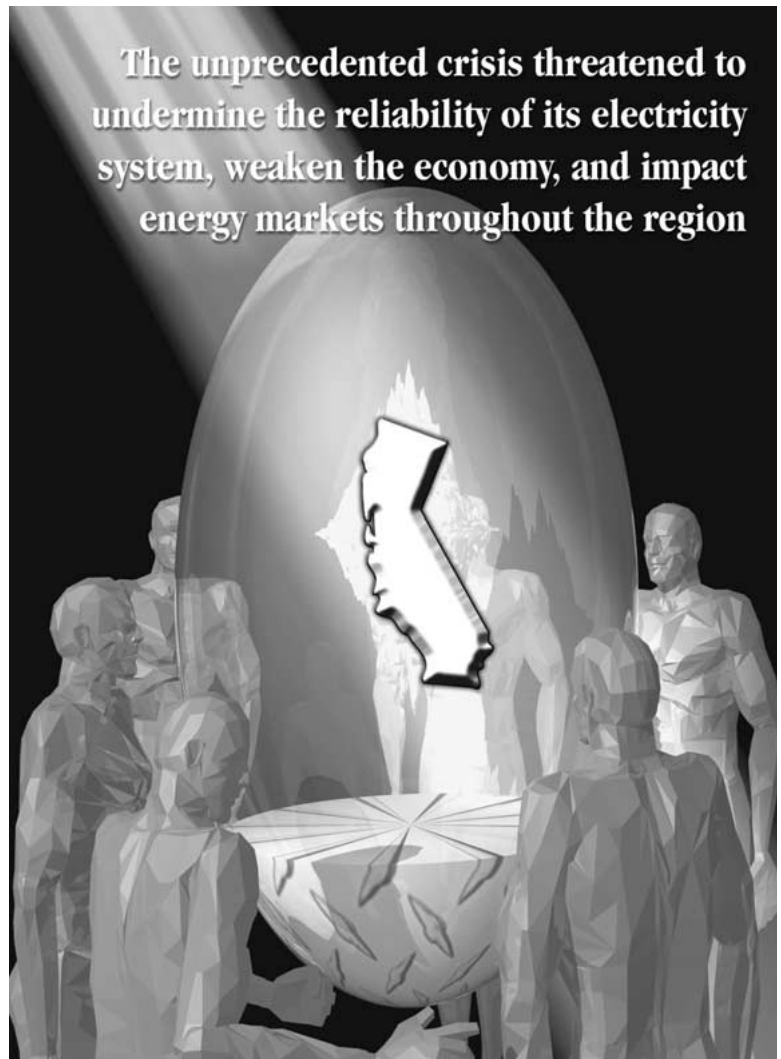
Root Causes of the Crisis

The initial causes of the high wholesale market prices reflect a complex mixture of:

- Drought conditions that reduced hydroelectric power production (particularly in the northwest region) and corresponding low power-import levels
- Growing economy that fueled demand for power
- Dramatically higher and volatile natural gas prices
- Lack of sufficient generating capacity in California and throughout the U.S. western region
- Inadequate transmission infrastructure
- Inadequate demand responsiveness or lack of demand elasticity
- Lack of forward contracting
- Forward scheduling that resulted in the huge reliance on the spot market
- Federal Energy Regulatory Commission's (FERC) hands-off approach in regulating wholesale markets.

These anomalies, among others, culminated into a "perfect storm" and consequently led to the significant market power abuses in California. The problems were further compounded by the potential financial insolvency of the investor-owned utilities (IOU). The increasing deterioration of the financial solvency of California's three IOUs further shattered all vestiges of a "normal" deregulated electricity market. Effectively, the California ISO, IOUs, and state government overseers had to resort to desperate measures in keeping the lights on in California with the limited available resources.

C. Mensah-Bonsu is with the California ISO, Folsom, California, USA. S. Oren is with the University of California, Berkeley, California, USA.



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The crisis had its origins in the unintentional mistakes and miscalculations adopted at the time the electricity sector was restructured in California through the Assembly Bill 1890 (AB 1890) in 1996. Two mistakes stand out as critical.

- California required utilities to make nearly all their electricity purchases on a volatile spot basis, divest a substantial portion of their generation without allowing them to enter into long-term contracts to ensure stable and "reasonable" prices during the transition period following deregulation. The lack of demand responsiveness to hourly prices

were partly due to technical capability limitation for real time price responsiveness, ambiguous accountability for the acquisition of reasonably-priced power for retail consumers, and lack of adequate forward contracting for energy. Transition contracts are found in every successful electricity market, as well as in other unregulated commodity markets, and are particularly important where the utilities divest generation but have obligations to serve remaining customers.

- California froze retail rates at low levels and banked on low wholesale prices to support a profit margin high enough to enable the utilities to pay off historical, uneconomic investments, including stranded costs. Although frozen at 10% below 1996 levels, the rates were supposedly high at the time compared to what a competitive

market would presumably have produced. The fixed retail level price discouraged end-users from undertaking normal market responses: to conserve and/or to take advantage of the allowed customer choice and opt for an alternative retail supplier. Those responses would have helped restrain prices.

In May 2000, wholesale market prices soared due to rising demand, and dramatically fixed retail prices blocked conservation efforts by insulating consumers from market realities and reduced consumer incentives to turn to competitive retailers. The heavy reliance on spot market purchases, combined with demand that was unresponsive to prices, helped drive prices higher.

Impact of Stakeholders and Credit-Worthiness

The energy prices were low to moderate in the first 2 years. However, the IOUs managed to sell a good portion of their generation assets at attractive prices, expediting the recovery of stranded costs, presumably due to the reliability must-run (RMR) contracts that most of the divested units had, which enabled them to sell above book value. Unfortunately, the utilities had already divested most of their generation plants without being allowed by the California Public Utility Commission (CPUC) to secure contracts that would have ensured their right to buy back the power at some fixed back-stop price. The CPUC felt that such contracts would add unnecessary costs to consumers' electricity bills and were concerned about "self-dealing" by the utilities. The divestitures of generation assets by the utilities that were encouraged and sanctioned by the CPUC exposed the utilities to the financial costs associated with high wholesale (purchase) prices and low fixed-retail (sale) prices. Meanwhile, the IOUs were losing money on the electricity they were buying for resale to their customers. The inversion of the typical wholesale-retail price relationship brought these utilities to the brink of bankruptcy. The perceived risk of nonpayment in turn caused generators to be reluctant suppliers, even at dramatically elevated wholesale prices. The natural reluctance of suppliers to supply voluntarily when they did not expect to get paid was a substantial contributor to the rising prices and rolling blackouts that were seen in California in the early months of 2001.

California Crisis and Its Impact on Worldwide Energy Markets

This article is part of a series on the California energy crisis of 2001 and its impact on other energy markets and their deregulatory/reregulatory actions. These articles are based on presentations given at two separate technical sessions held during the 2001 IEEE PES Summer Meeting in Vancouver, British Columbia, Canada: *California Electricity Market Crisis: Causes, Remedies and Prevention* was chaired by Chris Mensah-Bonsu of the California ISO; *Is Deregulation at a Dive after California? A View from the Rest of the World*, was chaired by T.J. Hammons of the University of Glasgow. Both sessions provided learned opinions of the causes of the crisis and tried to assess possible aftereffects on the regulatory processes occurring worldwide.

I took the liberty of selecting the articles that I considered most relevant. I hope you enjoy them and gain some new insight into the complexity of the overall process.

Bill Schwartz,
editor in chief

The destruction of the utilities' credit-worthiness and the resulting responses by suppliers shattered all vestiges of a normal market. Consequently, California had to deal with both a financial crisis and an electricity supply crisis. With the utilities' credit quality destroyed, suppliers fearful of not being paid for their supplies became reluctant to sell into the California market. In effect, the utilities and their state government overseers had to resort to desperate measures to keep the lights on with the available limited resources, with only limited success. CA ISO energy control center employees worked diligently to keep the lights on, a task that was on-going until FERC ordered a market mitigation framework in collaboration with the California ISO in December 2001 to ensure stability, and "just and reasonable" prices in the California ISO electricity markets. However, this framework, which was ordered by FERC to stop the "bleeding," expires on 30 September 2002.

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A section of the California ISO control room, with (left to right): Anjali Sheffrin, director of the department of Market Analysis; Chris Mensah-Bonsu, market design engineer, Market Operations; Mark Rothleder, manager of Market Integration