# Drawing Lessons from the California Power Crisis

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Opening statewide electricity markets, a topic usually interesting to only a few policy aficionados, has become a major story because of the California power crisis. High prices, rolling blackouts, bankrupt utilities, bailouts, and allegations of anticompetitive conduct should provide lessons that other states can use. The danger in focusing on California's mistakes, however, would be to overlook the inherent difficulties of even a well-implemented open competition plan.

In the last 25 years, the economy has reaped great benefit from weaning industries from having the government determine who gets to sell what for how much. Not only has this led to lower prices in the short run, but also to innovations in technology and marketing plans with more substantial benefits.

In theory, opening electricity markets could also generate these benefits to that industry. As new entrants with the latest technology challenge incumbent utilities, competitive pressure among power suppliers should lead to lower prices overall for electricity. Opening markets may allow power retailers to obtain for ordinary consumers the low prices that politically powerful industrial purchasers have typically received under regulation. It should also allow innovative options in providing energy services, so customers can better reap the rewards from using more energy-efficient equipment. Additional benefits can come from product differentiation. For example, some environmentalists backed deregulation because it would allow consumers to purchase electricity from suppliers using "green" technologies, such as wind or solar power.

Making electricity markets more competitive, however, is complicated by an inability to deregulate "all the way." Local distribution of electricity is a monopoly because it would be wasteful for a second provider to install its own lines, poles, and conduits over the existing grid. The long-distance transmission grid also is, functionally, a single interconnected economic unit. Because electricity flowing between any two points takes all available paths, maintenance of and congestion along some lines significantly affects the operating characteristics of other lines. Until customers can economically produce electricity on their own premises using "distributed-generation" technologies, local distribution and long-distance transmission will remain regulated monopolies. Policymakers continue to contemplate how much corporate separation between the regulated "wires" and the generation and marketing sectors in the industry is necessary to preserve competition while maintaining system reliability—a topic that will be addressed in further detail.

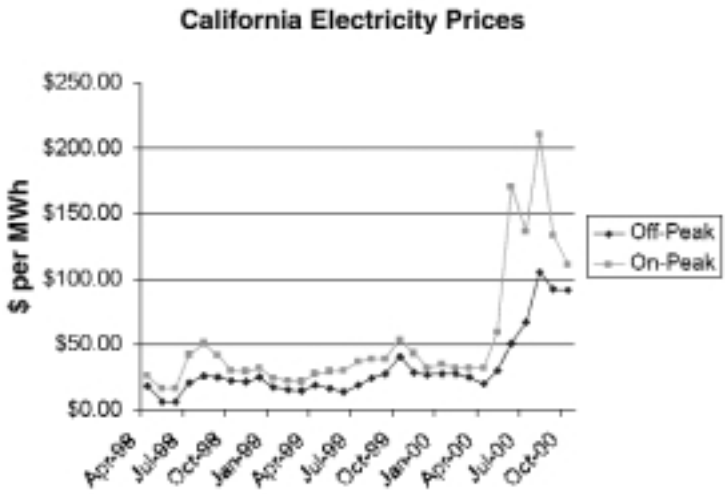


*Figure 1: California wholesale electricity prices, 4/98–10/00 (California ISO)*

## The California Experience

Following a series of feasibility studies, the California legislature unanimously passed Assembly Bill (AB) 1890 in 1996, which began the process of opening the state's electricity markets to competition. The bill set up an independent system operator (ISO) to manage the California transmission system and procure power to keep loads balanced—that is, to keep power supplies equal to demand. The legislation also mandated a power exchange in which most power would be traded. To ensure that utilities would recover potentially "stranded" costs of older investments in power plants and long-term contracts, AB 1890 included a "competitive transition charge" to be paid by all consumers, whether or not they continued to buy power from the state's original regulated utilities.

AB 1890 specified that retail markets would be fully open by January 1, 1998. For the first four years, the state's three investor-owned utilities (IOUs) were required to buy power from the independent power exchange, rather than through independently negotiated contracts. Each IOU's retail rates were reduced by 10% until it recovered its stranded costs. The only IOU to qualify was that serving San Diego, where retail rates were deregulated in June 2000. To improve prospects for competition, the IOUs were required to divest their oil- and natural-gas-fired power plants. By 1999, they had reduced their share of California's generation capacity from 81% to 46%.

Restructuring the California energy industry seemed to work well for more than two years. The system was generally reliable and, as Figure 1 indicates, until June 2000, electricity in California remained inexpensive.

The turn for the worse began around that time. Wholesale prices started to skyrocket, and reserves hit precariously low levels with greater frequency. The retail price ceilings prevented the IOUs from covering their expenses. As they teetered at the edge of bankruptcy, generators became less willing to sell them electricity, fearing they would not be paid. Prices in the winter of 2001 jumped to levels exceeding those of the previous summer and fall. Trying to ward off the impending financial disaster, California regulators raised retail power prices by 40%, and a reluctant legislature approved other steps, including authorizing the state to purchase power. The state also began negotiating deals to purchase the utilities' transmission systems at prices greater than book value. Nevertheless, the investor-owned Pacific Gas & Electric filed for Chapter 11 bankruptcy protection on April 6.

In assessing the California experience, three insufficiently recognized facts should be remembered:

- California's restructuring plan was designed to satisfy virtually every interested stakeholder, as reflected in the unanimous vote for AB 1890 following extensive public debate and political negotiation.
- The character of the "crisis" has changed over time. It began with higher consumer prices in San Diego in the summer of

2000, following the rise in wholesale rates. Then came a threat of blackouts throughout the state. As summer passed into fall, the crisis became financial as the accumulated difference between wholesale costs and retail prices led to an over $14 billion deficit that no one—utility stockholders, electricity consumers, taxpayers, or generators (through government-ordered rebates—wanted to pay. We then saw regular emergencies and rolling blackouts throughout the winter of 2000–2001.

- As Figure 1 shows, for more than two years, the system worked, holding prices at or below the rate reductions mandated by AB 1890. So far, restructuring has performed reasonably well in other parts of the country, most notably Pennsylvania. Any explanation for the crisis needs to keep in mind that restructuring does not automatically spell disaster.

## Reasons for the Crisis

The severity of the power crisis has inspired an ample supply of potential explanations. Were it possible to convert explanations into electricity, California's dilemma would disappear. Here is a "top 10" list of potential culprits, with comments on their likely significance:

**1. Supply and demand.** At the head of the list is the fact that California hit a very hard wall when steadily growing demand, fueled by increased population and a strong economy, strained production capacity to the limit. During the 1990s, demand for electricity in California grew by over 11% while capacity fell slightly. Population and economic growth in other western states reduced electricity supplies that California might otherwise have imported. Exhausting the capacity to produce electricity would have led to higher prices, rolling blackouts, or perhaps both, even if California had not adopted restructuring. Other factors described below may have made a bad situation worse, but had capacity remained plentiful relative to demand, electricity policy would have remained an obscure pursuit.

**2. Higher fuel costs**. The price for power rose in part because the fuels used to produce it, particularly natural gas, became far more expensive. Among the portfolio of generation technologies used to supply electricity in California, natural gas-fired generators are the ones called upon to meet peak demands. As supplies get tight relative to demand, the generators called upon to meet power needs are increasingly less efficient. Consequently, when the price of natural gas rose, the cost of meeting peak demand increased, raising the price required to attract enough electricity to meet demand.

**3. Environmental regulations.** Somewhat more controversial are claims that NIMBY ("not in my back yard") attitudes made it more difficult to build generators in the state, and that regulations limiting emissions of particular pollutants reduced electricity supplies and raised generation costs. Even if environmental regulations increase such costs, damages from pollution or losses in residential land values caused by nearby plant construction are inherently no different than other costs, and electricity prices should include them. If not, we will ignore environmental costs and treat power too cheaply, using too much of it.

**4. Wholesale price regulation, actual or threatened.** Calls to cap wholesale power prices have been made since the crisis began and are becoming more prominent in academic and political arenas. They may alleviate a politically undesirable redistribution of wealth from consumers to generators. They may also discourage suppliers from withholding supplies to drive up prices. However, threatening to cap prices could have discouraged supply.

**5. Retail price controls.** If hitting the capacity wall was the primary cause of the crisis, holding down retail prices made matters worse. Low retail rates would keep demand high and discourage conservation that might have eased the stress on the power system. Utilities lost billions of dollars when they had to purchase wholesale power at prices up to five times the retail level to meet their legal obligations to serve the public. The potential for bankruptcy called into question their ability to pay, leading to a vicious circle in which wholesalers would raise prices to cover the risk of nonpayment.

**6. Wealth redistribution in markets.** One important difference between competition and regulation is that under the former, as prices rose to cover the cost of marginal generators, all suppliers got to charge the higher prices. In San Diego, where retail rates had been deregulated, this led to a reported doubling or tripling of electricity bills and reregulation of rates by September 2000. Higher prices are efficient, in that they send the right message about the value of conservation, but they also lead to a politically undesirable transfer of money from consumers to producers. Retail rates in San Diego were, in fact, quickly reregulated. The long-term solution is for more generators to come on-line, but that may be a politically difficult wait.

**7. No real-time metering.** Because electricity cannot be stored, the cost of producing it and the value of conserving it

are highly sensitive to when it is used. Electricity may cost 10 times as much to produce on a hot summer afternoon than later that same evening. But standard meters, which tell only how much electricity one uses during a particular month, do not allow prices to be charged based on when the power was used. Real-time meters would allow such charges, encouraging consumers to conserve and reschedule use for off-peak times. While a generator and its customers have an incentive to enable more efficient power billing, greater real-time metering may be a worthy policy goal if the alternative is a series of blackouts.

**8. Lack of long-term contracts.** A long-term contract is essentially insurance against price volatility. Long-term contracts here would have helped the IOUs avoid bankruptcy, just as fire insurance protects against financial ruin when a house burns down. But the benefits of contracting in hindsight could exaggerate its benefits going forward. Contracts alone do not reduce the expected price of electricity. If higher prices are likely, a long-term contract will reflect them. In addition, like other forms of insurance, long-term contracts can lead to "moral hazard," namely, being less careful after reducing exposure to risk. In electricity, long-term contracting could encourage greater consumption at a lower contract price and discourage conservation.

**9. Auction design.** The California power exchange ran an auction in which each generator could specify up to 16 prices and amounts of electricity it would sell at those prices. Generators might have been able to "game the system" by offering only a small amount of power at a very high price. If that small amount of power went unsold, little would be lost, but if the power were purchased, the generator would get that high price on all of its sales.

**10. Market power.** The most hotly debated allegation in the California crisis is whether generators exercised market power, that is, intentionally withheld electricity to drive up its price. The number of competitors in the California wholesale market would seem to make illegal collusion unlikely. But each seller may have found it unilaterally worthwhile to reduce output, especially when retail regulation and the absence of real-time metering would have made demand largely insensitive to price. Whether outages were designed to raise prices remains under regulatory scrutiny. Some studies find that electricity prices were above the average variable cost of generating power, but these need to be interpreted with care. Peak-period prices would normally cover not only variable costs but capital costs as well. Moreover, the prices charged may have been inflated to compensate for the possibility that bankrupt utilities might not have been able to pay their bills.

## Lessons for Other States

The causes of the California disaster are so varied that forecasting its likelihood elsewhere is risky. But the experience offers lessons for those charged with implementing retail competition. An ideal first lesson would be to lift retail price controls along with getting the local distribution monopolies out of the competitive retail business. If this is impractical and utilities will continue to dominate the market, any continued retail regulation should allow a pass-through of wholesale prices to deter utility bankruptcy. Whether or not retail regulation is continued, policymakers should consider ways to encourage real-time pricing if the prospect of blackouts is significant.

Market mechanics may be improved by eliminating impediments to long-term contracting between generators and customers or electricity retailers. One might rethink having publicly maintained or chartered central auctions to buy and sell power beyond purchases needed to maintain the technical integrity of the power grid and to alleviate emergencies. If central auctions are to be maintained, their rules should be modified to reduce the incentive for gaming by offering small amounts of power at very high prices.

As noted above, the flow of wealth from California electricity customers and, increasingly, taxpayers to generators charging very high prices makes wholesale price controls tempting. But price caps are unlikely to produce more power unless suppliers are acting strategically. To the extent that wholesale price caps translate to lower retail prices, they will discourage production and encourage consumption, putting the system at greater risk.

## Would These Fixes Suffice?

Paradoxically, the severity of the California crisis may give a false sense of security about opening retail markets in other states to competition. That is, focusing on California-specific issues could lead us to think that electricity markets can work just fine, if only obvious mistakes were avoided.

One potentially generic problem California has brought to light is the potential incentive for generators to exercise market power by withholding electricity when supplies are tight. Theoretical models suggest that usual indicators of competitiveness may not apply in electricity, with firms having as little as 10%