

# Aftershocks—And Essential Lessons—From the California Electricity Debacle<sup>1</sup>

*Without question, the crisis exacted enormous financial costs. But the longer-term impact may well be how it affects both the pace and direction of the broader electricity deregulation movement. That's why it is essential to distill the important lessons from the experience.*

*Peter Navarro and Michael Shames*

**T**he California electricity crisis hit the state's rate-payers, taxpayers, and utilities with all the force of a 7.0 earthquake. The state's electricity bill rose by more than \$40 billion, the state budget was stripped of another \$6 billion, and the state's two major utilities—Pacific Gas & Electric and Southern California Edison—wound up seeking another \$13 billion in relief from the courts.

In addition, the state remains saddled with almost \$40 billion of long-term contracts that are roughly twice the actual market value of the electricity and that

will institutionalize high electricity rates in the state for years to come.<sup>2</sup> Moreover, \$13 billion in bonds have been issued to pay back the state's general revenue fund—effectively amortizing a significant part of the costs of the crisis over the next decade.

Despite these enormous costs, *the longer-term impact of the electricity crisis may well be how it affects both the pace and direction of the broader electricity deregulation movement.* Without question, the California crisis has significantly slowed the pace of deregulation in a number of states in the U.S. Nor has the crisis gone unnoticed in

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**Table 1:** Preliminary Lessons from the California Electricity Crisis

1. Don't deregulate into a power plant shortage.
2. Employ a suite of mechanisms to address supply–demand imbalances.
3. Don't deregulate into a congested transmission grid.
4. Market monitoring and enforcement matter! Don't balkanize the market.
5. Rent-seeking special interests will attempt to “capture” the design, implementation, monitoring, and enforcement processes.
6. A deregulated market paradoxically will require the application of greater regulatory resources.
7. A fully deregulated market will undersupply demand-side management (DSM).
8. A fully deregulated market will lead to an overreliance on natural gas.
9. The central regulatory authority (e.g., the Federal Energy Regulatory Commission, or FERC, in the U.S.) must be both a competent and fair broker.
10. Establish swift and sure punishments for rule violations—Consider *both* compensatory and punitive damages as well as criminal penalties.

many countries considering deregulation around the world.

**T**he question this article poses then is this: What can we really learn from the California crisis that will be of use to those regulators who may now well be sitting on the deregulation fence? The answers, which this article examines, are summarized in [Table 1](#).

## **I. Lesson 1: Don't Deregulate into a Supply Shortage**

Most obviously, in a perfectly competitive, deregulated wholesale electricity generating market, a shortage of capacity will lead to both significantly higher prices and the possibility of supply disruptions, including rolling blackouts. More subtly, in an *imperfectly* competitive electricity generating market, the presence of real, physical shortages of capacity may increase incentives for market participants to *artificially* withhold capacity so as to exacerbate the shortage condition

and thereby sustain higher prices over a longer period of time than might otherwise exist in a perfectly competitive market.

In California, *both* of these scenarios played out. At the beginning of the crisis in the summer of 2000, California was experiencing its summer peak demand. At this time, numerous power plants were under construction but because of forecasting errors both by state bureaucracies and the utilities themselves, California was caught in a *real* shortage situation where these plants were not yet operational, and prices skyrocketed.

However, as the crisis moved into the winter non-peak months where peak demand fell from roughly 50,000 MW down to 35,000 MW, a second, *artificial* shortage scenario began to play out as participants began to withhold capacity from the market to drive up price. As the California Public Utilities Commission (CPUC) has noted in its study of the gaming activity of just five key producers—Dynergy, Duke, Mirant, Reliant, and AES/

Williams—if these producers had provided available capacity on a timely basis, the state could have avoided “14 out of 16 blackout hours (88 percent of the total) in Southern California . . . 10 out of 23 blackout hours (43 percent of the total) in Northern California . . . 161 out of 219 hours of service interruptions (74 percent of the total) in the South . . . [and] 116 out of 257 hours of service interruptions (45 percent of the total) in the North.”<sup>3</sup>

**T**he broader lesson point: To deregulate into a shortage of electricity generating capacity is to invite strategic market gaming, soaring prices, and supply disruptions, including blackouts.

## **II. Lesson 2: Employ a Suite of Mechanisms to Address Supply–Demand Imbalances**

Even if a system of deregulation is introduced during a period of adequate power plant capacity, over time the market may periodically suffer from

supply–demand imbalances—with all of the attendant problems of price volatility, supply disruptions, and the exercise of market power outlined in Lesson 1.

The most likely reason supply–demand imbalances may occur is that, as we witnessed in California, market participants individually and/or the regulatory authorities may collectively underforecast demand or overforecast available supplies. The result may be a failure to build adequate power plant capacity on a timely basis.

**P**rior to the deregulation of electricity generating system, the traditional solution to preventing such supply–demand imbalances was to impose strict reserve margin requirements on the regulated utilities. However, in a deregulated market, it is useful to look at the problem not as a “reserve margin problem” but rather more globally as a problem of supply–demand imbalances. Viewed from such a global perspective, the solution is not one but a suite of mechanisms.

To address new plant construction quite literally at the reserve “margin,” this suite of mechanisms may involve some public agency, as California has formed, with the responsibility of building new plants. Alternatively, it may involve some type of “reserve margin” requirement that may be imposed upon market participants.

As another market-oriented supply-side reform more in tune with the broader philosophy of

deregulation, the regulatory authorities may also want to remove many of the overly onerous restrictions on *self-generation* by consumers. At present, large commercial and industrial customers that want to partially or fully remove themselves from the central grid and generate their own power face considerable obstacles, including substantial exit fees. At the residential level, consumers who want to install

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technologies such as solar panels face similar restrictions.

Finally, on the demand side, one important way to handle supply–demand imbalances is to make demand much more responsive. The most direct way to do so is to ensure that real-time meters are installed in most or all of the customer base.

### **III. Lesson 3: Don't Deregulate into a Congested Transmission Grid**

A number of the supply disruptions during the California

electricity crisis occurred not because there wasn't adequate power in the state but rather because the transmission grid was not physically able to deliver it. For example, a key bottleneck was Path I-15 linking northern and southern California. During the crisis, there were a number of times in which there was sufficient power in the south to prevent supply disruptions in the northern California *if* there had been enough transmission capacity.

In part because of a lack of transmission capacity and in part because of poor market design, a number of participants were also able to strategically game the congested grid. The most infamous of these games was dubbed “Death Star” by Enron traders. This practice, which was hardly limited to Enron, involved artificially congesting the transmission grid and then getting paid fees for removing the false congestion.

The broader point: An uncongested transmission grid is just as important to insure the integrity of the system as adequate reserve margins.

### **IV. Lesson 4: Market Monitoring and Enforcement Matter! Don't Balkanize the Market**

In California, the state legislation enabling the electricity market restructuring<sup>4</sup> set up a balkanized or “separated, sequential” market that featured

two non-profit entities: a Power Exchange (PX) and an Independent System Operator (ISO). The ISO's primary job was to act as a "traffic cop" for the transmission grid. The purpose of the PX was to provide auction markets to set wholesale prices. Unfortunately, the auction markets were set up in such a way as to doom the markets to failure. The problem lay in a set of auction rules that could be easily manipulated in times of electricity shortages.

Because of this, many observers have criticized the auction itself for being the "villain" in the resultant market-gaming piece. However, the real problem was not the auction rules *per se*, which are widely used to set prices of commodities. Rather it was the fact that neither the PX or the ISO—nor any other state agency—had the authority to monitor the various suppliers into the market. Nor did any state authority have the power to order any of the generators to supply power into the market during conditions of shortage. Moreover, this problem was exacerbated by the balkanized nature of the market: The PX and ISO were separate, and unlike in other power markets around the country, the ISO was nothing more than a "price taker" when it came to accepting prices set by the PX.

Because of this lack of any market monitoring or enforcement power, once electricity supplies began to tighten, it was exceedingly easy for market participants to exacerbate the problem by artificially withholding

power from the market. The points: Provide the market authorities with monitoring and enforcement powers and do not balkanize the market.

## V. Lesson 5: Special Interests Will Try to "Capture" the Process

It is an interesting question as to why California policymakers

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designed a market that was doomed to failure. The reason may be found in Nobel Laureate George Stigler's famous "capture" theory of regulation.<sup>5</sup> In Stigler's view, "rent seeking" special interests will typically try to use the government for their own ends.

In this particular case, the primary "rent seekers" were the merchant generators and energy traders. The vehicles these rent-seeking interests used to co-opt the process were the two "stakeholder boards" set up in the original restructuring legislation (AB 1890) to design and oversee the market. One such board governed

the PX, which set prices in the market. The other board governed the ISO, which was ostensibly the transmission "traffic cop."

In theory, such the stakeholder boards were supposed to represent interests of all those concerned, from the public and private utilities, the independent power producers, and both large and small business interests, to consumer and environmental interests. In practice, effective coalition-building on the board allowed the merchant generators, in league with the large industrial customers, to exert an influence completely disproportionate to their actual numbers. The result was precisely the set of rules described above that were easy to game, together with the lack of any effective enforcement mechanisms once the gaming began.

It follows that in any deregulation effort policymakers must be vigilant to ensure that the special interest "foxes" don't wind up in charge of designing, implementing, and monitoring the deregulated market "henhouse." From the California case, we may glean that it is unlikely that stakeholder boards can objectively govern key matters such as market structure, because profitability is simply too strong an incentive.

## VI. Lesson 6: Increase Regulatory Resources, Don't Cut Them!

A clear temptation on the eve of deregulation is cut back on

regulatory resources. In fact, it is precisely in the transition from the old regime to the new that the greatest demands may be made on such resources. Both the California Public Utilities Commission and California Energy Commission learned this lesson in the harshest possible manner. At the height of the crisis and even now in its aftermath, these bureaucracies were stretched to the analytical breaking point, overwhelmed by complaints and the need to expedite the construction of new plants.

It wasn't just the state agencies that were caught with the quantity—and *quality!*—of their staff down. As a sharp critique of FERC by the General Accounting Office noted: "FERC does not currently have enough staff with the skills and knowledge of competitive energy markets to effectively regulate and oversee" the deregulated markets.<sup>6</sup>

The simple point here is that if you want to get any deregulation effort off on the right foot, it is best that you have a set of referees ready, willing, and able to judge the contest. This suggests it is far better to "gear up" rather than "stand down."

## **VII. Lesson 7: The Central Regulatory Authority (e.g., FERC) Must Be Competent and Fair**

Whether an electricity generating market is deregulated in Tanzania or Texas, the market

will never be able to achieve the desired model of economic efficiency unless the central regulatory authority is competent, fair, and swift in its directions and enforcement. In the California case, FERC clearly did not meet this test through all phases of the process—from market design and implementation to monitoring and enforcement.

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had the role of essentially ratifying the proposals by the stakeholder boards. As the market design emerged from the deliberative process, FERC was repeatedly warned by various groups—from consumers to the utilities themselves—that both the PX and the ISO would be highly vulnerable to strategic gaming.<sup>7</sup>

Not only did FERC fail to adequately monitor such gaming once it began, but it refused to provide state regulators with the data necessary for the state to fulfill the monitoring function. Nor did it provide appropriate mitigation and protections once the crisis was in full

swing. A glaring case in point is the set of price caps and other rules that FERC finally imposed on the market in June 2001. By this time, the crisis, which spanned May 2000 to April 2001, had largely dissipated and the market manipulation horse had long since left the barn.

In this regard, as Professor Frank Wolak of the ISO's Market Surveillance Committee has pointed out, "Had the FERC adopted the ISO's proposed market power mitigation plan in October of 2000, I am confident that there would not have been a market meltdown in California during the winter and spring of 2001."<sup>8</sup>

FERC's arguable malfeasance hardly ended with issues of market design and implementation. The agency likewise failed to use its full legal authority to enforce the rules. This was glaringly apparent in FERC's abject refusal to appropriately sanction the more than two dozen merchant generators that were found to have gamed the market. It was equally apparent in FERC's similar refusal to provide adequate refunds to the state for the undue exercise of market power by these generators, which could not have sent market participants a stronger signal that it was okay to push the envelope of the law—or speed right past it.

The lesson FERC has taught us should be crystal clear. Any deregulation effort is doomed to failure if the central regulatory authority is not an honest and competent broker.

## VIII. Lesson 8: A Fully Deregulated Market Will Undersupply DSM

The central paradox of deregulation is that it will likely never *fully* serve the public interest unless it takes place *beneath the regulatory umbrella*. This and the next lesson will address this point within the context of two “negative externalities” that will likely be produced by a fully deregulated generating market. These negative externalities include lack of adequate demand-side management investment and an overdependence on a single fuel source, specifically, natural gas.

**T**he underinvestment in DSM may be traced to a classic case of market failure. While the costs of DSM are easy to measure, the benefits are both difficult to measure and hard for the investor to capture. In the California case, an aggressive DSM program, including metering and real-time pricing, could have mitigated much of the damage spawned by the market manipulation.

For example, as William Borders has noted, “. . . if [real-time pricing] meters had been installed before the summer of 2000, California would have seen estimated load reductions of 1,000 to 2,000 MW, price reductions during peak periods of 6 to 19 percent, and overall cost savings ranging from \$300 million to \$1.2 billion.”<sup>9</sup>

This may well be true. But how do you get an entity like a utility

or third-party provider to make such an investment when the “returns” to such an investment can’t be reaped precisely because the investment helps prevent a costly crisis?

Therein lies the nub of the DSM problem. It may well be solved at some point by some type of market mechanism operating underneath a regulatory



umbrella—but never by the free market alone.

## IX. Lesson 9: A Fully Deregulated Market Will Lead to an Overreliance on Natural Gas

Just as a deregulated generating market is likely to under-supply DSM, it is also likely to lead to an overreliance on natural gas. The reason again can be traced to a negative externality problem.

In particular, while a diversified energy mix provides the overall system some protection against fuel price and fuel shortage risks, such benefits cannot be captured by the individual generators.

Thus, the tendency among market participants is to always build the type of plants that deliver electricity at the cheapest costs. At least in the past era of cheap gas, this has been natural gas-fired, combined-cycle combustion turbines.

**F**or this reason, a deregulated market is unlikely to yield any substantial investments in higher-cost “renewable” energy sources like wind and solar which, in addition to providing power, convey an external environmental benefit to the broader system and its users.

In the California case, and despite at least some subsidies to alternative energy, the system was overly dependent on natural gas-fired generation. This made the system exceedingly vulnerable to price shocks in the natural gas market. It also made the system equally vulnerable to the exercise of market power in the natural gas pipeline system.

In California, from December 1999 to December 2000, the price of gas nearly tripled nationwide, but the price increased by a factor of six in California. This significantly raised the both cost of producing power and wholesale prices. At the root of this problem was not just tightness in natural gas supplies. One company, El Paso Natural Gas, was able to exert considerable market power during the period.

It follows that any deregulation policy must not only address the issue of diversification of supply, but must view the gas and electricity markets as an integrated system. If the integrity of the gas

market is compromised by market power-wielding pipeline operators or other actors in the system, this will compromise the integrity of the electricity generating market.

## X. Lesson 10: Break the Rules and Pay Hefty Fines on Your Way to Jail

America has a long and checkered history of corporate malfeasance. Yet it always seems to come as a shock and a surprise to the general public when high-ranking executives are found to so blatantly break the law.

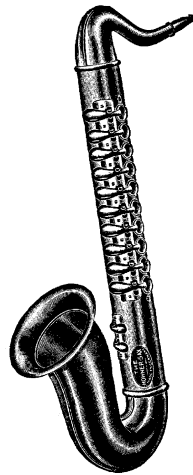
In this particular case, the public-interested view of the process assumed that not only would the market participants stay well within the letter and envelope of the laws and regulations governing the system, but that none would even push the envelope.

The reality is that numerous bad actors—with the bad seeds at Enron being only a small part of the problem—willfully exploited numerous loopholes in the law and, in some cases, blatantly broke the law. Cases of such bad acting not only abound. The bad actors gave them very colorful names.

For example, “Fat Boy” was slang for over-scheduling load. This was done by scheduling more load in the day-ahead market than was actually needed. The company would then supply enough power to cover the inflated schedule. The ISO would have to pay the company for the excess power. Similarly, “Ricochet” describes

the practice of “megawatt laundering.” This refers to the export of California power across state lines and its reimportation to evade state price caps.

The broader point: It must be clear to all market participants not only what the rules are but also what the punishments are for breaking those rules. As we shall see at least in the case of California,



the willingness of so many market participants to not only push the envelope of the law but run right past it offers stark testimony to the fact that when billions of dollars are at stake, no collar is white enough to prevent the executive wearing it from dirtying his hands. Accordingly, it may not be enough for participants to face civil penalties and the payment of compensatory damages. Given the high stakes involved, it may be prudent to add criminal penalties and punitive damages to the mix. ■

### Endnotes:

1. This article is distilled from the much more extensive analysis presented in the authors' *The Future of Electricity Deregulation: Lessons Learned*

from the *California Crisis*, ENERGY LAW J., Spring 2003. For a complete legal and regulatory history of the crisis, see also *A Legal and Regulatory Anatomy of the California Electricity Crisis*, Discussion Paper, March 2003, University of California-Irvine (available at <http://www.peternavarro.com>).

2. CPUC Press release, Feb. 24, 2002, at [http://www.cpuc.ca.gov/PUBLISHED/NEWS\\_RELEASE/13481.htm](http://www.cpuc.ca.gov/PUBLISHED/NEWS_RELEASE/13481.htm). See also Timothy P. Duane, *Regulation's Rationale: Learning from the California Energy Crisis*, YALE J. REGULATION, Summer 2002, 19 (2), at 522. The excess long-term costs represents about six times the revenue earned when the utilities sold many of the generating plants from which the state is now buying power.

3. California Public Utilities Commission, “Supplement to the California Public Utilities Commission Staff's Wholesale Generator Investigation Report dated Sept. 17, 2002,” Jan. 30, 2003, at 5.

4. AB 1890 was passed unanimously by the California legislature in 1996.

5. George Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI., 1971, 3.

6. *Energy Markets: Concerted Actions Needed by FERC to Confront Challenges that Impede Effective Oversight*, Report to Congressional Requesters, U.S. General Accounting Office, June 2002, at 8. Available at <http://www.gao.gov/new.items/d02656.pdf>.

7. See for example, UCAN comments on WEPEX Filings, Before the Federal Energy Regulatory Commission, April 8, 1996, at 2 and 8. See also Protest of TURN and UCAN Regarding Phase II Filings of the California ISO and PX, in Federal Energy Regulatory Commission Docket Nos. EC96-19-003 and ER96-1663-003, June 5, 1997.

8. Letter from Frank Wolak to Senate Select Committee, June 13, 2002, posted at <http://www.caiso.com/docs/2002/06/13/2002061311404524853.pdf>.

9. William A. Borders, *Learning from the Storm: Lessons for Illinois Following California's Experience with Electricity Restructuring*, 77 CHI.-KENT L. REV., 2001, 333, 354, at 354.