

California's Electricity Crisis: How It Came To Be

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Environmental Economics
May 15, 2001

I. Introduction

In early summer of 2000, the California electricity crisis began to take center stage. As media attention and coverage spread nationwide, the California electricity crisis began to be followed and scrutinized by the entire nation. Economists, such as Paul Krugman of Princeton University, Public Policy Institutes such as The Cato Institute, and well renown academic centers such as the University of California at Berkeley's Haas School of Business have all published comprehensive reports and recommendations regarding the crisis. This extensive nationwide concern stems from the alarming situation that Californians face today and the impact that it may have on the entire nation in the future. As the shortage of electricity in the largest micro-economy of the United States has created massive problems on the West Coast, there is little doubt that if left unchecked and unresolved, the ramifications may extend much farther, costing billions upon billions in forgone GDP, taxpayer monies, as well as consumer and producer welfare. This report aims to analyze the causes of the California electricity crisis with policy recommendations for resolution, as set forth in various literature on the matter.

Section I is the introduction. Section II is a discussion on the California legislative bill AB 1890. It will highlight the major components of the bill that are thought to have given rise to the electricity crisis. The rationales and intended effect of the covered mandates by the proponents of the bill will also be explained. Section III will closely examine the actual role that legislation played in California. The effects on the supply and demand for electricity, as well as the exacerbation of the crisis, will be analyzed. Accordingly, Section IV attempts to provide recommendations for a sensible resolution of the crisis. A caveat follows in that Section IV is opinionated and no longer follows the analytical mold of the previous sections. As the attempt to restructure the electricity industry has been a failure and has resulted in greater regulation than deregulation, the section will provide possible solutions to ease the crisis. Section V will summarize the paper.

II. AB 1890: California Restructures

The then Governor of California, Pete Wilson, signed the bill AB 1890 in September of 1996. The bill was the culmination of California's attempt to restructure its electricity market¹. The new bill was intended to promote competition in the electricity supplier and provider market, thereby increasing social welfare. Through enhanced competition, those proponents of the bill theorized that a more efficient, cost-effective, and welfare maximizing electricity industry would arise. The result would be lower retail and wholesale rates, increased ancillary services, increased consumer options, efficiency gains from competition, as well as the elimination of the unwanted consequences of

¹ Stanton, Sam. "How Californians got burned." *Sacramento Bee News Special Report*. www.sacbee.com/news/special/power/050601california.html.

monopoly power. In short, excess producer surplus would be redistributed to consumer surplus. The designs of the bill to meet these objectives are outlined below.

California Power Exchange

First off, the California Power Exchange (CalPX), a competitive spot market², was created with the mandate that all investor-owned utilities be participants in the exchange. The exchange functioned to serve as a supervised competitive market where utilities and electricity suppliers had to meet to buy and sell electricity. It is important to note that the mandatory nature of the exchange as well as it being a spot market effectively eliminated the possibility of long-term contracts³. Long-term contracts set in the 1970s plagued the utilities in the 1980s, as the wholesale spot market prices for electricity fell. As a result, the utilities paid higher rates and the suppliers reaped extraordinary profits. In hopes of avoiding the fiasco of 1980s, and as the future market price of energy was expected to fall, CalPX was instituted to head off repeats of previous mistakes⁴. The Public Utilities Commission (PUC) supported the measure as it disallowed long term contract proposals on the part of the utilities.⁵

This system operated by sellers asking, buyers bidding, and CalPX determining the market-clearing price. To illustrate, the individual suppliers would submit sell offers to the CalPX. Suppose that the offers, in increasing order of price, were quantity q_1 at price p_1 , q_2 at p_2 , q_3 at p_3 , ... , q_n at p_n . CalPX would then sum the individual quantities offered by the utilities until the total quantity demanded by the utilities (Q) was reached

² Day-Ahead and Day-Of-Markets for the competitive trading of electricity contracts

³ Kiesling, Lynne and Moore, Adrian, February 2001. "Powering Up California." Reason Public Policy Institute Policy Study No. 280.

⁴ Taylor, Jerry and VanDoren, Peter, February 2001. "California's Electricity Plan Falls Short." Cato Institute. www.cato.org/dailys/tvd-020701.html.

⁵ Vogel, Nancy and Reiterman, Tim, February 2001. "Inaction by Utilities, PUC Cost Chance to Avoid Crisis." LA Times Website. latimes.com/business/reports/power/lat_puc010205.htm

so that $q_1 + q_2 + q_3 + \dots + q_x = Q$. Next, the clearing market price would be established at p_x . All of the suppliers/buyers would receive/pay p_x for each unit. At this price, total demand would be met. If the price were set below p_x , then the supplier with the offer q_x at p_x would not sell, and thus, we would have excess demand. Furthermore, the suppliers who submitted offers above price p_x would not sell. The system forces suppliers to submit competitive bids so that they may be accepted, making the market competitive and driving down the wholesale price of electricity.⁶

Revamp of the Industry Structure

Secondly, the bill dismantled the existing industry structure to support the successful operation of the CalPX market and to foster fair competition. Before AB 1890, investor-owned utilities operated distribution networks, transmission lines, and electricity generation facilities, making them vertically integrated. The utilities would distribute electricity to consumers at a certain retail rate through the distribution network. This electricity would be obtained from their personal electricity generation assets or through contracted purchases from independent electricity suppliers, all transported to the distribution network via the transmission line. After AB 1890, these utilities were required to sell off their electricity generation facilities, forcing the firms to buy a majority of their electricity through CalPX. The utilities were also required to relinquish control of transmission lines to the Independent System Operator (ISO), allowing the ISO to govern all transmission to the distribution network. The purpose of the ISO is to “safeguard the reliable delivery of electricity, facilitate markets and ensure equal access to a 12,500 circuit mile ‘electron highway’.”⁷ As a result, the utilities now distributed

⁶ Kiesling, Lynne and Moore, Adrian...Policy Study No. 280

⁷ California Independent System Operator, www.calso.com/PowerCentral/

electricity to consumers at a certain retail rate through the distribution network, but the electricity supplied was bought at the Day-Of or Day-Ahead market clearing spot rates given at CalPX. The utilities could no longer give an unfair advantage to their own power generators or possess an unfair generating capacity over market entrants, allowing for a competitive environment⁸. The energy was then carried over the ISO governed transmission system.

[Figure of effective changes to be inserted]

Price Controls

In addition to these directives, the new legislation placed price controls. It cut retail rates charged by the utilities 10 percent. These rates were then frozen as the retail rate price cap. Also, a Competitive Transition Charge was added so that the utilities could recover stranded costs. Stranded costs are the carrying accumulated debt of the utilities that resulted from previous government retail rate control policies. Government policy forced utilities to buy at higher prices than what they were allowed to charge. These imposed price caps were only to be relaxed in the year 2002 or until the stranded costs were fully recovered—whichever came first⁹. The rationale behind the rate cut and cap, economically, was to shield the public from price volatility, and it served to protect consumers from market power abuse until new electricity generators and utilities entered the market. The political rationale included immediate voter gratification in order to gain public support for the re-election of the politicians passing the bill.

⁸ Kiesling, Lynne and Moore, Adrian....Policy Study No. 280

Government Owned Utilities

Lastly, the government owned utilities were exempt from many of the restructuring regulations. They were not required to sell their electricity generation assets, nor were they forced to participate in CalPX. The government owned utilities were allowed the freedom to participate by buying or selling in the competitive market or remain absent.¹⁰

Unfortunately, the new legislation fell short of its intentions. It proved to be more regulatory and crippling to the electricity industry rather than deregulatory and helpful in the transition to a competitive market. Because it placated legislators who demanded regulatory controls (CalPX, ISO), consumer groups who harbored suspicions of powerful businesses (rate caps), and environmentalists who opposed new market entrants (strict restrictions for building power plants), the bill lacked focus and cohesiveness. As a result, the combined components of the legislation have led to and exacerbated the current California electricity crisis.

III. The Trouble With California's Restructuring Plan

For roughly two years, the noticeable results of the restructuring plan were only minor disappointments. New utility and electricity generator firm entrants were few, and in turn, retail rates did not fall. These disappointments did not create concern, but all the while, two major forces were building momentum. Demand grew larger; supply growth staggered. Economic forces alone would create a price increase in an unregulated market, and if left unregulated, the California economy would settle at higher prices. With the distortion effects of governmental intervention in the markets, implemented in

⁹ Kiesling, Lynne and Moore, Adrian, April 2001. "Electricity Price Caps: A Recipe for Blackouts &

the form of AB 1890, the California economy came to be situated below natural market prices, translating into an electricity supply shortage.

[D & S figure to be inserted later]

High Demand Growth

California's demand for electricity grew extensively in the latter part of the 1990s. Fueled in part by rising temperatures and by a booming national economy, all facets of economic activity in California increased. Noticeably led by the e-business economy in Silicon Valley, the energy intensive economy took hold. Followed by population growth, and adoption of all things digital by consumers and businesses alike, demand for electricity has grown 25%¹¹ since 1996.

The growth in demand failed to be curtailed by prices. As prices signal to the economy the scarcity of resources and function to allocate the resources efficiently, rising prices provide incentive for consumers who *can* conserve *to* conserve. Rising prices also work to remedy demand and supply shocks, quickly and efficiently. Regrettably, the price cap severed the information line between final consumers and producers. Consumers, lacking a price incentive to reduce demand did not reduce demand. As a result, the growth in demand for electricity by a robust economy failed to be constrained by the price mechanism.

Nominal Supply Growth

Higher Long-Run Costs.” Reason Public Policy. www.rppi.org/041901.html.

¹⁰ Kiesling, Lynne and Moore, Adrian....Policy Study No. 280

¹¹ Priory, Rick, January 2001. “Duke Energy CEO, Rick Priory’s Letter to California CEOs.” Duke Energy Website. dena.duke-energy.com/california/crisis/cr012601.asp

On the flip side, supply growth staggered behind the high demand growth for a variety of reasons. Figures¹² indicate the supply growth to have been 6%¹³ since 1996. At the time of restructuring, California's electricity generation capacity exceeded the market's demand for electricity, but new electricity generation plants were not being built. The looming uncertainty of restructuring discouraged investment. With the passing of the bill in 1996, the opportunity for profit and competition sparked renewed interest by electricity suppliers. Why then did demand outpace supply?

The Cato Institute and the Reason Institute argue that California maintains the strictest environmental and community standards. Existing environmental regulations slow the approval process and construction of power plants. Add to that environmental activists arguing for subsidized energy conservation instead of energy generation and the approval process slows even more. People with a NIMBY (Not In My Back Yard) attitude augment the situation by effectively blocking the building of the power plants in their neighborhoods. As Jerry Taylor and Peter Van Doren phrase it, these forces created a "unified BANANA army ("Build-Absolutely-Nothing-Anywhere-Near-Anybody"),"¹⁴ preventing increases to the state's electricity generation capacity. "In California, plants often take three to five years from concept to operation, while in other Western states the process can be as short as one year."¹⁵ The bill failed to account for such barriers to promote speedy electricity generation and competition in the industry, making an electricity shortage inevitable. It is important to note that others such as Krugman consider the environmental regulations a minor secondary factor to the rise of the crisis.

¹² Exact figures for demand and supply growth vary by source, but the disparity is certain.

¹³ Priory, Rick

¹⁴ Taylor, Jerry and VanDoren, Peter, January 2001. "California's Troubles Not Caused by Deregulation." Cato Institute. www.cato.org/dailys/01-17-01.html.

Regardless of the cause, the electricity supply outstripped demand, as no new major power plants were built in California for 10 years.¹⁶

Exacerbating the Impending Crisis

In addition to unchecked demand increases and staggering supply growth, the wholesale rates increased in the spring of 2000. Increased natural gas prices, an input to generating electricity, raised the cost to produce electricity. Low water levels decreased electricity generation from hydropower facilities. The increased cost to produce, coupled with the decreased production raised the wholesale rates offered by the suppliers¹⁷.

Interestingly enough, the bill magnified the problem of rising wholesale rates. As mentioned earlier, the utilities were forced to buy electricity through the CalPX. After the utilities were stripped of personal electricity generation assets and the right to contract outside the exchange (but for a miniscule 5% of their total load), no other supply alternative for electricity existed. They therefore had to accept CalPX determined rates. These wholesale rates the utilities received were to be competitive, but the bidding system was inherently flawed.

Revisiting our example, the market-clearing price was set at p_x . Every supplier who sells received this market price, regardless of the lower offer they submitted. Recall that the firm who offered q_1 at p_1 offered a lower price than p_x , as did the other firms who offered q_2 at p_2 , q_3 at p_3 , on through q_{x-1} at p_{x-1} , but all still received p_x . Consequently, the system aggregated prices upwards. More importantly, since demand growth (economic boom, digital products, population growth, weather) exceeded supply growth (BANANA

¹⁵ Kiesling, Lynne and Moore, Adrian...Policy Study No. 280

¹⁶ Safire, William, January 2001. "California Power Failure." New York Times, 01/11/01.

¹⁷ Taylor, Jerry and VanDoren, Peter, February 2001. "Market More Effective at Regulating Prices than Politicians." Cato Institute. www.cato.org/dailys/tvd-020801.html

armies, environmental regulations), bids above the original p_x were accepted. Otherwise, total quantity demanded would not be met. With the increase in Q to say Q^{new} , the suppliers' offers of q_{x+1} at p_{x+1} and q_{x+2} at p_{x+2} were accepted until $q_1 + q_2 + \dots + q_{x+y}$ equaled Q^{new} . The prices were aggregated even higher to meet the increased quantity demanded. If in the case that $q_1 + q_2 + \dots + q_{x+y}$ exceeded Q^{new} , then all bids would be accepted at the highest bid price offered. The CalPX system could not compensate for demand exceeding supply, making it inherently flawed. The competitive incentive of the system dissipated, as suppliers were able to submit any bid price, knowing that all bids must be accepted. The utilities were forced to accept this price, since there was no other alternative. In spite of everything, the rising wholesale prices ratcheted up the already high bid prices. The ending outcome was sky-high wholesale prices. The electricity suppliers, knowing that all bids would be accepted due to the excess demand and with their own costs having risen, began to bid higher prices.

The California government, reacting to the rise in wholesale prices, placed a wholesale price cap on the CalPX. Causing even further harm, the suppliers reacted by selling elsewhere. As the suppliers were not restricted to selling at the CalPX, they sought more lucrative options where price caps were not in place. Acting as rational economic agents, the supply to California further decreased. On the other hand, the utilities were handcuffed. With decreased supply in the CalPX, and all-the-while without electricity generating facilities or long-term contracts, the utilities could not compensate for the dwindling supply. Hence, the rolling blackouts began, marking the start of the crisis.¹⁸

¹⁸ Kiesling, Lynne and Moore, Adrian....Policy Study No. 280

Start of a Financial Crisis

Immediately, the wholesale caps were lifted. As expected, wholesale rates remained high. In contrast, the retail rate caps were not lifted, fueling the high demand. In the legislation's efforts to protect consumers from market power abuses and price volatility, it insulated consumers from market reality. While consumers were protected, the utilities became the victims of price volatility and market power fostered by the CalPX. On a side note, the rate caps had the added effect of being a barrier to entry for new utilities, as the high wholesale price of electricity and the low retail rates eliminated the possibility for profit. Utilities were constantly buying at higher rates and selling at capped rates, forcing billions of dollars in losses. The only alternative to amassing incredible debt is to not buy, thereby causing blackouts. According to CNN, Pacific Gas & Electric (PG&E) and Southern California Edison (SCE) racked up \$12.7 billion in debt, as of February 2001¹⁹, eventually forcing PG&E to file for Chapter 11 Bankruptcy and placing SCE on the brink of bankruptcy. The electricity crisis grew into a financial crisis.

The unhealthy financial position of the utilities further reduced supply, even after The Federal Energy Regulatory Commission (FERC) relaxed CalPX participation mandates. The PUC also recently raised retail rates for business customers, but to no avail.²⁰ First off, the credit risk was too great for supply to increase. Fearing that utilities would be unable to repay the already high price for electricity, the prices rose higher as suppliers demanded higher prices to compensate for the risk that they would never be

¹⁹ "California governor signs bill to buy power for utilities."
www.cnn.com/2001/US/02/01/power.woes.03/index.html.

²⁰ "The Leaky Bucket." The Economist Website. 04/12/01
www.economist.com/displayStory.cfm?Story_ID=574161&CFID=2278729&CFTOKEN=20341158

repaid. Meanwhile, other suppliers were unable or unwilling to sell to California utilities due in part to low supply²¹ and to high risk, all leading to lower supply. Secondly, the opportunity for profit by electricity generators diminished, as collection on debts grew increasingly uncertain. Coupled with the uncertainty of future governmental measures such as the seizure of power plants, new barriers to entry were erected²².

Opportunism

In the meantime, government-owned utilities did nothing to alleviate the crisis at hand, but instead, choose to profit from it. The government-owned utilities were placed in a unique situation. Unlike the investor-owned utilities, AB 1890 did not restructure their organizations or mandate their participation in CalPX. With personal electricity generation assets and supply contracts in place, the government-owned utilities were shielded from the unfolding events. That is, their long-term contracts insulated them from rising wholesale rates; voluntary participation in CalPX allowed them to shop for better prices; ownership of electricity generating facilities allowed them additional supply sources. Faced with the supply shortage and high demand, the utilities sold any excess power at CalPX, charging the market clearing price. Oddly enough, the government-owned utilities gained unexpected profits, while the investor-owned utilities gained debt—which brings us to present day.

IV. Easing the Electricity Crisis

As of May 15, 2001, California's electricity crisis remains far from resolution. Governor Gray Davis has spearheaded movements for long-term solutions such as streamlining the approval process for the building of new power plants, in addition to

²¹ Electricity suppliers such as Duke Energy already contracted 90% of their load.

short-term solutions such as buying power for the utilities and working to maintain the solvency of PG&E and SCE. These initiatives are critical to overcoming the crisis. In conjunction to the Governor's policies, I propose that they must include the movement towards deregulation, increasing supply for the state, and limiting the government's participation, as outlined below. Please note that these policy recommendations, in contrast to previous sections, are simply personal ideas influenced by available literature.

Movement Towards Deregulation

Often, the market has infinite wisdom. But, with regulation and the shackling mandates of AB 1890, the market has been unable to express and correct itself. Thus, a movement towards a competitive marketplace in the electric industry must be allowed. A major obstacle is the mandatory CalPX. The bidding rules combined with forced participation provide market power to the electricity generator firms, leading to disastrous results. Such restrictions do not allow markets to work. Rather, a voluntary exchange with revised bidding rules that allows utilities to buy at individual bid prices would be a better alternative. The spot bid prices would be also be lower, since the utilities would be able to contract outside the exchange for supply. Whether it be through their own electricity generation assets or through set long-term contracts, the market power of the suppliers would be much less. Long-term contracts also have the added effect of providing price stability. For instance, while the spot price of natural gas rose by an astounding 340 percent, long-term contracts would have limited the effect of that increase²³. This is not to say that the suppliers would not have gone bankrupt instead of

²² Haas School of Business, January 2001. "Manifesto on the California Electricity Crisis." haas.berkeley.edu/news/california_electricity_crisis.html.

²³ Taylor, Jerry and VanDoren, Peter.... "Market More Effective at Regulating Prices than Politicians"

the utilities, but nonetheless, prices would be less volatile²⁴. Another major barrier to markets are the price caps. Consumers, lacking the price incentive to conserve electricity must be reconnected to the markets. Gradual increases in price would serve three goals. First, the financial health of the utilities would improve. Second, the price hikes would limit demand. Third, the opportunity for profit would grow, translating into new market entrants. In addition to reforming the CalPX and gradually lifting price caps, government owned utilities must be integrated. Allowing more competitors would effectively increase consumer choices and redistribute the unfair gains from opportunism. Not only would that be fair since tax-payers fund the government, but government and government-owned utilities should not be insulated from the public. Applying these recommendations, a more competitive and healthy marketplace would arise.

Increase Supply

On the matter of supply, it must be increased. Governor Gray Davis' action to streamline the approval process for the operation of power plants is the key initiative²⁵. Current plans to create a regulatory board that works with the construction process to meet regulations is crucial. Consequently, a cooperative effort may lead to meeting power plant construction objectives while maintaining environmental regulations. Such a power plant friendly environment would not only speed up construction but also eliminate barriers to entry. In other words, firms can drastically shorten the 5-year concept-to-operation time span, and this provides incentives to enter. In conjunction, the movement to deregulation would reinstate the market forces needed to increase supply. The price signaling mechanism would function to increase supply, and the real or

²⁴ Taylor, Jerry and VanDoren, Peter, February 2001. "Paul Krugman Short Circuits." Cato Institute. www.cato.org/dailys/taylor-022101.html.

perceived increased financial well being of the utilities would support buy/sell transactions. All in all, supply should increase.

Hands Off Approach

Finally, the government should take a hands off approach. Only in such a manner would markets function efficiently. Had not the government dictated the investor owned utility structure or planned the market but only allowed markets to take form, supply equilibrium would have been met. This is not to imply that prices would remain low. Markets do not guarantee low prices. Instead, markets guarantee the efficient allocation of scarce resources. In addition, government planned markets do not hold respectable reputations. In the case of AT&T at the turn of the 20th Century, government price caps on rates crippled the Independent Service providers²⁶. In the 1970s, energy supply shocks, price caps and forced contracts resulted in large monetary losses by the utilities. The lesson to be learned is that markets are complex and unpredictable. In general, imposing inflexible specifications and mandates usually backfires. Ironically, a wiser government would choose to not govern the markets.

V. In Sum

The California electricity crisis has been the end result of many forces. Most notably, the passage of AB 1890 was the main driving force. The institution of CalPX legally provided uncontrollable market power to the electricity suppliers. With the breakdown of the investor owned-utility structure, the firms were crippled. Mixing in unreasonable retail price caps, the utilities became handcuffed and chained to debt. In the meantime, demand grew without regard to supply, as the rudimentary market mechanism

²⁵ Kiesling, Lynne and Moore, Adrian...Policy Study No. 280

of price failed to relay important information to both demanders and suppliers. In the end, we have the recipe for an electricity crisis.

As of now, pricey wholesale rates are divergent from capped retail rates. Raising price caps are a solution, but unpopular to legislators. Deregulating the markets is another solution, and again, unpopular to legislators. A popular 'resolution' is to promote good-willed conservation. Another popular 'resolution' is to price cap all wholesalers. Unfortunately, those popular solutions will not work. I propose that the long-run resolution to the crisis can arise only from a deregulated market with higher electricity generation capacity. Time is of the essence to reach a resolution; otherwise, the entire economy will suffer.

In the long run, the crisis will pass and the economy will heal—whether society will learn is a different question altogether. Of greater concern is the impact on perceptions regarding the science of economics. That is, will California's pitiful attempt to deregulate the industry be attributed to government failure or economic failure in the history books and perceptions of the people? While we understand that the markets did not deregulate themselves and economic forces were not allowed to function, the public perception is quite contrary. Believing that electricity is still plentiful and the utilities are gouging customers, they outcry, "PG&E! Stop pimping off of me!"²⁷ If in the case of the former, public faith in the principles of economics will be restored. If in the case of the latter, more government intervention and its consequences are in store.

²⁶ Gabel, David. "Competition in a Network Industry: The Telephone Industry, 1894-1910." *Journal of Economic History* 54:3; September 1994.

²⁷ During a city council hearing on rate hikes, a woman sang these words.