

THE RESTRUCTURING OF THE ELECTRIC POWER INDUSTRY IN CALIFORNIA  
AND TEXAS: AN EXAMINATION AND COMPARISON  
OF DEREGULATION AS LEGISLATED

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California legislated the restructuring of its electric power industry in 1996. Deregulation was successful until 2000 when crisis, caused by a number of outside forces and flawed legislation, sent wholesale electric prices skyrocketing.

Restructuring of the electricity sector in Texas occurred in two phases. The first phase began in 1995, when wholesale markets were opened to competition; the second phase began June 18, 1997, when the 1999 Texas Electric Choice Act, was signed into law. Deregulation has largely been successful in Texas.

This analysis examines the legislation of these states and how they differed, setting the stage for one unsuccessful and one successful move to retail competition in the electricity industry.

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## CHAPTER 1

### ELECTRIC DEREGULATION

#### Introduction

Power markets are a whole lot more complicated than other kinds of markets and they require that you do a dozen things to get them to work right, and what we discovered is that if you get only 11 of the 12 things right, the whole thing crashes. – Daniel Yergin, President of Cambridge Energy Research Associates (Pearlstein, 2002, p. A14)

2001 was an ugly year for electricity deregulation in California. Rolling blackouts and the potential bankruptcies of two of the three state Investor-Owned Utilities were just two of the major crises that made restructuring seem like the worst thing going. Illegal trades, exorbitant prices, service interruptions – was this what the country had to look forward to as it moved towards a free market for electricity generation? Clearly, California found itself in a flawed situation; is it possible that it was a problem of the state's own (actually, the California Legislature's) making? It may take decades for the lawsuits and filings to move through the courts and the Federal Energy Regulatory Commission (FERC) to finally "place the blame" for the crisis in California and settle the issue. Meanwhile, numerous other states have put their plans for restructuring on hold as a result of California's woes. Things should not have been this way.

2001 was a pretty good year for electricity deregulation in the state of Texas. Texas has always been a unique case in the electric industry, though, with its own self-contained power grid and absolutely no dependence on other states for electricity.

Deregulation in Texas proved to be a less complicated undertaking than in other states with its two well-timed phases of implementation. The success stories keep coming, with entrepreneurs finding a burgeoning market for their power and the Legislature willing to constantly reassess the structure it has put in place for ways to make improvement. This is the way things should be with restructuring.

As the two most populous states in the nation, California and Texas are two exceptional cases, for sure, but the rest of the country typically looks to them as an example and often, a warning of what could and will happen, making their experiences even more important. Arizona, Nevada, New Mexico, Oklahoma and West Virginia have repealed their restructuring legislation while Montana, New Hampshire, and Oregon have scaled back their deregulation (Slocum, 2001). (The Arkansas Legislature voted in February 2003 to repeal deregulation, as well.) Before we examine the restructuring experiences and outcomes of California and of Texas, it makes sense to examine the increasingly vital role electricity has played in American life and the regulations that have accompanied that increase in importance.

Typically Americans do not stop to think about electricity and yet it is hard to imagine the world without it; we tend to take it for granted. “We do not ask what constitutes this product, what range of electric services are provided in the electric package, from where electricity is moved to our doorstep, how it is produced, and who and how determines the price” (Czamanski, 1999, p. 2). Forecasts from the U.S. Department of Energy predict the consumption of electricity will grow more than 30 percent over the next twenty years (Brown, 2001b). This is a far cry from 1980, when the

Union of Concerned Scientists concluded that only ‘minor increases in electricity consumption’ would occur in the future. Their failure to anticipate computers and other types of technology made their estimates embarrassingly wrong as electricity consumption rose more than 60 percent in the two decades following their pronouncement (Huber & Mills, 2000).

Even more surprising than the gigantic increase in electric usage in the last twenty years is the realization that a hundred years ago it was nearly impossible to get electricity in a residence during daylight hours. Electricity was dedicated almost entirely to lighting and so its peak usage occurred at night. As the practical uses for electricity grew and multiplied, so did the demand for its production. “Today, a typical large home may consume well over 4,000 watts of energy at a peak time – such as a summer afternoon. Since 1949, Americans have increased their annual use of household electricity seventeen-fold – from 67 billion Kwh to 1.1 trillion” (Crossen, 2001). Electricity has fundamentally transformed the way we live:

We take it for granted that all buildings in which we live, work, and spend our leisure hours are connected by wires to some distant source of electric energy. . . . Our expectations go further than that. We expect the cost of consuming electricity to be bearable, even for those who happen to be at the lower end of the income scale. In the modern world, electricity is not considered a luxury good. It is a necessity. (Czamanski, 1999, p. 1)

The early electric power industry began with transmission carried by direct current (DC) via large copper conductors. With DC, voltages were relatively low and

could travel only short distances. For all practical purposes, customers needed to be no further than one mile from a generating plant to receive power. As a result, numerous power plants were constructed within small, densely populated areas and consumers were able to choose their service provider. Competition prevailed as firms sought franchises from municipal governments to build power stations. In 1892, Chicago had more than thirty electric companies in the city at a time when only five thousand of the city's one million residents and businesses used electric lights (Anderson, 1981). Cities often found themselves served by several power companies and plants, each selling to customers within a small radius; the large capital investment required to construct a plant generally precluded one company from owning all of the plants within the city. It was not until Nikola Tesla discovered the rotating magnetic field in 1883, the theoretical basis for the principle of alternating current, that efficient electric transmission over long distances became a real possibility and the nature of the electric industry was changed completely.

“In the electric power industry, the heads of many – though not all – of the leading utility systems supported the movement for commissions because they believed commissions would protect them from political bosses, from competition, and most of all from municipal ownership.” (Anderson, 1981, p. 56) So within just a few years, the nascent electric power industry had begun its movement from a competitive enterprise with a large number of suppliers to a heavily regulated and monitored industry dominated by a few large players and governmental intervention.

## The Early 20<sup>th</sup> Century

In essence, all of the supporters of electric utility regulation shared a common desire – the desire to be protected. Consumers sought protection from high rates; progressives sought protection from political machines and monopoly power; electric utilities sought protection from municipal ownership and from the effects of competition. From its inception, utility regulation has reflected this defensive posture. Its functions have been largely negative – aimed at preventing the worst abuses rather than at promoting the optimal use of economic resources.

(Anderson, 1981, p. 61)

Three factors laid the foundation for strong federal involvement in the electricity industry in the early twentieth century: first, the electric power industry sought to and was recognized as a natural monopoly participating in interstate commerce subject to federal regulation; second, the federal government owned almost all of the nation's hydroelectric resources; and third, federal economic development programs accelerated (Energy Information Administration [EIA], 2002c). The Federal Water Power Act of 1920 codified federal powers and established the Federal Power Commission (FPC) to issue hydroelectric development licenses revocable after fifty years. The Federal Power Act gave the FPC a mandate to ensure electricity rates that are “reasonable, nondiscriminatory and just to the consumer” (Chandler, 2001). Until the 1930s, “the dominant pattern in the electric power industry was the expansion and consolidation of private firms under the supervision of state regulatory commissions” (Gordon, 1992,

§27). The industry began a period of intense change as the federal government increased its involvement heavily during the 1930s.

The Federal Power Act of 1935 is the primary legislation governing the electric energy industry; it established the guidelines for federal regulation of interstate energy transactions and supplemented state public utility regulation of electricity with oversight of wholesale trade by the FPC; the FERC replaced the FPC in 1977. The Federal Power Act was a legislative response to the 1927 Supreme Court ruling which held a state could not constitutionally regulate the price of power generated in one state and sold in another (Andrews, 1995). The Attleboro ruling denied the Rhode Island Public Utilities Commission the right to set the rates for power generated by a utility in Rhode Island and sold to a distributor in Massachusetts. Because Massachusetts could not constitutionally regulate the Rhode Island generator, and no federal power regulator existed at the time, the ruling was said to create a “regulatory gap,” which Congress had to fill. In 1935, Congress authorized the FPC to regulate interstate electricity commerce, but with the caveat that “such federal regulation, however, [is] to extend only to those matters which are not subject to regulation by the states” (Andrews, 1995, p. 135).

Title I of the Federal Power Act is the Public Utility Holding Company Act (PUHCA). At the time PUHCA was enacted in 1935, a handful of energy companies had spent the 1920s building large holding companies to use the profits they were making by selling electricity to buy new assets, most of which were unrelated to their core energy businesses and often were speculative in nature. A holding company is a company that controls a partial or complete interest in another company; it can be a useful tool in

consolidating the operations of several smaller companies (Chandler, 2001). From 1900 through 1920 the number of privately held electric systems had grown from around 2,800 to over 6,500. Beginning in 1920, the number of private electric systems had begun to decline dramatically as utilities began to consolidate through holding companies. Often a subsidiary of an operating company would own a holding company that in turn owned another holding company, and so on, in a complex corporate structure (pyramiding), and in at least one instance a holding company was ten times removed from the operating company (Public Citizen, 1998). Each new holding company would buy a controlling interest in the holding company below it and the additional costs and fees for the operating companies were passed along in a higher rate base for the consumer. Often the holding companies would instruct, and sometimes force, their electric subsidiaries to purchase financial, managerial, fuel, construction, and engineering services from the holding company at inflated prices. These unscrupulous practices, including the bilking of subsidiaries through service contracts, inappropriate depreciation techniques, and the use of inflated property values all contributed to the ultimate collapse of the holding companies while building their reputation for excessively high consumer rates, high debt-to-equity ratios, self-dealing, and increasingly unreliable service. While operating companies were subject to state regulation, holding companies were not, allowing individual holding companies to issue stocks and bonds without regulatory oversight (Public Citizen, 2002).

The PUHCA was enacted to eliminate unfair practices and other abuses by electricity and gas holding companies by requiring federal control and regulation of interstate public utility holding companies:

[Under PUHCA], holding companies could remain, but they could only have two levels--one holding company on top and one or more operating subsidiaries below. Meanwhile, the law dissolved holding companies that did not contain contiguous operating utilities; earlier companies held operating companies that were scattered about the country and could not take advantage of consolidated or interconnected operation. Moreover, all interstate holding companies and practically all businesses that produced a substantial amount of electricity would be forced to register with the newly created (in 1935) Securities and Exchange Commission. Furthermore, they were required to follow its strict rules about submitting financial reports, and they needed to obtain approval to issue stock and bond securities. (Hirsh, 2002, §31)

#### Federal Regulation After World War II

Following the Great Depression and the end of World War II, the electric power industry enjoyed a period of steady growth, driven by both technological advances and increase in efficiency. Between the years of 1947 and 1973, the growth rate for the industry held steady at about 8% per year and there was little change in the industry structure (Chandler, 2001). Promotional campaigns were begun to promote increased electricity usage; General Electric began its “Live Better Electrically” advertising campaign in 1956.

The declining block rate structure that utilities used to price electricity stimulated growth in demand. The more consumers used, the less per unit they paid.

Everyone – utility executives, investors, state regulators, and consumers seemed satisfied with promotional pricing because the growth in demand meant that larger generating plants could be constructed and greater economies of scale realized. Investors like the larger plants because they promised increased profits. Utility managers were attracted to the opportunities for growth in sales.

Regulators had the happy task of watching the industry become more efficient and, on occasion, of negotiating rate reductions. (Anderson, 1981, p. 68)

As the industry grew and prices continued to decline, there was little need for state and federal regulatory intervention. Decisions about new plants - how many, what type, when and where, and who should pay for them - were left to electric industry executives with little governmental oversight. As the chairman of one of New England's commissions made the point: "Regulation during the 1960s," he said, "was non-existent." (Anderson, 1981, p. 69) About the only people who paid attention to the actions and decisions of the state utility commissions were utility executives – until the OPEC oil embargo began in October 1973.

As a result of the embargo, fuel costs skyrocketed to nearly four times their 1972 levels. These costs were soon reflected in increased electricity rates; nationwide, rates rose 90% in the five years after 1970. The Arab oil embargo changed the electric power industry forever. It marks the turning point when the federal government began its active involvement in the day-to-day affairs of the electric utilities, as state commissions

appeared increasingly unable and unwilling to carry out their regulatory responsibilities. At the same time, and for different reasons, other groups including consumers, environmentalists, and experts from the Federal Energy Administration (FEA), began to make important contributions to the changing regulatory environment through their appearances before state regulatory commissions and their participation in utility rate proceedings (Anderson, 1981). “Decision-making no longer was the sole province of the industry with the mild supervision of the regulators. . . . Politicians, the press, and the environmental and consumer groups all clamored for a role” (Anderson, 1981, p. 74). This was the beginning of a new phase of interest in the electric industry that has continued without abatement. Although the different groups shared their newly discovered interest in regulation, their desired outcomes were not typically shared; for example, environmentalists typically made stopping pollution their highest priority, while consumer groups mostly wanted to stop rate increases. “At about the same time environmentalists discovered they could not stop all new power plant construction, consumers found themselves unable to prevent all rate increases” (Anderson, 1981 p. 75).

Aware of the increased attention being paid to electricity issues, Jimmy Carter made energy concerns one of his top priorities when elected President in 1976:

In attacking the demand side of the problem, he waged a public campaign focused on conservation to reduce the American public’s high rates of energy consumption. To combat the supply side, he sought to cultivate the growth of new sources of energy, including nuclear power and renewable resources such as solar and wind power. (Chandler, 2001)

The electric utility industry faced increasingly stringent state regulation, the rise of nuclear regulation, and a maze of programs other initiatives under the various federal energy laws passed in the 1970s.

October 1, 1977, Carter signed the Department of Energy Organization Act, creating the Department of Energy through consolidation of organizational entities from a dozen department and agencies. It was as part of this legislation that the FPC was replaced by the FERC as the federal agency that establishes and enforces wholesale electricity rates. FERC inherited most of the FPC's responsibilities and also gained some new powers and responsibilities.

The FERC operates as an independent regulatory agency within the Department of Energy; it:

- Regulates the transmission and sale of natural gas for resale in interstate commerce; regulates the transmission of oil by pipeline in interstate commerce; regulates the transmission and wholesale sales of electricity in interstate commerce;
- Licenses and inspects private, municipal and state hydroelectric projects;
- Oversees environmental matters related to natural gas, oil, electricity and hydroelectric projects;
- Administers accounting and financial reporting regulations and conduct of jurisdictional companies, and;
- Approves site choices as well as abandonment of interstate pipeline facilities.

(FERC, 2003)

The Commission recovers all of its costs from regulated industries through fees and annual charges.

In 1978, Congress passed the National Energy Act, signed into law by President Carter; it included the Public Utility Regulatory Policies Act of 1978 (PURPA). PURPA was intended to increase the efficient usage of fossil fuels by allowing non-utility generators (known as Qualifying Facilities or QFs) to enter the wholesale power market. Under PURPA, utilities are required to purchase power from QFs at the utility's avoided cost of producing power. QFs consist of small power producers (SPPs) using renewable resources and co-generators. PURPA designated two main categories of QFs: co-generators, which used a single fuel source to either sequentially or simultaneously produce electric energy as well as another form of energy, such as heat or steam, and independent power producers (IPPs), which use renewable resources including solar, wind, biomass, geothermal and hydroelectric power as their primary energy source. Partially as a result of PURPA, non-utility generation, increased by 275% during the period 1978-1992. The non-utility sector now accounts for 8% of total U.S. generating capacity (Chandler, 2001).

PURPA was the legislative outcome of Carter's outspoken desire for many aspects of his energy agenda, including "alternative" energy, to be adopted throughout the country (Gordon, 1992). Critics of PURPA call it "a legacy of the energy policy of the late 1970s, which attempted to substitute the government's fuel-choice and energy conservation judgments for those of the marketplace" (Block & Lenard, 1997, Sect. 7, §1).

PURPA is an excellent example of a regulatory program that, while sounding reasonable on its face, has led to serious adverse consequences. In an unregulated market, a cost-minimizing utility would purchase outside power when doing so is cheaper than its own generation. There would, therefore, be no need for PURPA-style regulation. In a regulated market, utilities may have strategic reasons not to purchase outside power (even if it is less expensive), since doing so may constitute a threat to their monopoly position. Therefore, requiring a utility to purchase power from QFs at the utility's avoided cost sounds like a policy that would simply simulate an efficient market and would lower prices to consumers. This has not, however, been how the statute has been implemented (Block & Lenard, 1997).

As with almost all controversial pieces of legislation, there are groups seeking to repeal PURPA. The PURPA Reform Group quotes a 1998 study by Resource Data Institute (RDI) on its web site that estimates the present value of above-market PURPA costs will amount to \$42 billion over the life of the PURPA contracts. While PURPA contracts account for a mere 7% of all electricity sold into power grids nationwide, the contracts for that power represent nearly 30% of the total costs for investor-owned utilities, publicly owned utilities and co-ops, according to the RDI study. Interestingly, over 60% of PURPA contracts do not expire until after the year 2010 (PURPA Reform Group, 1998). Even though it was intended to be an environmental statute addressing concerns about fossil fuel usage, “a primary effect of PURPA was to introduce competition into the generation sector of the electricity marketplace, thus challenging the utilities’ claim that the electricity market encouraged a ‘natural monopoly’” (Chandler,

2001). PURPA marked the beginning of the end for the theory of natural monopoly and the first steps toward the restructuring of electricity markets by the states with the assistance and leadership of the federal government.

### The Theory of Natural Monopoly

From the beginning, electric companies were primarily local businesses serving local needs. At the same time that the movement for regulation was growing so was the idea that geographic concentration and other economic factors made electric power service “a natural monopoly, characterized by economies of scale and scope and the need for large capital investments” (Prete, 2002, Appendix §1). It was assumed that large investments in equipment and duplication of facilities would be a waste of financial and material resources, and would lead to overall higher costs for companies and therefore higher prices to customers. Monopoly was thought to be the “natural” outcome of such a situation, with one company minimizing the waste of resources to serve customers. Samuel Insull’s behemoth Commonwealth Edison and its consolidation tactics contributed mightily to the notion that electric power was a natural monopoly and should be regulated. Progressive reformers believed that natural monopoly could benefit society, as long as it was controlled. “As electric utilities began to touch the lives of more and more people, there was nearly universal recognition that their development must be subject to some public influence” (Anderson, 1981, p. 33). In the early 20<sup>th</sup> century, the investor-owned power companies won the official designation as natural monopolies that they sought, thus gaining the right to sell electricity in a non-competitive market. In return for this privilege, they agreed to “pass along the benefits of monopoly to

consumers in the form of reasonably priced electricity and good service” (Hirsh, 1999, p. 1). The idea of natural monopoly was at the core of the state and municipal regulation enacted at the beginning of the 20<sup>th</sup> century. In a 1910 convention speech, Samuel Insull said, “[O]ur business is a natural monopoly and that we must accept, with that advantage, the obligation which naturally follows, namely, regulation” (Anderson, 1981, p. 43). Insull felt that with the “certain privileges” of monopoly, companies could not fight against the governmental and public push for regulation of the electric power industry.

A natural monopoly is said to occur when production technology causes long-run average total costs to decline as output expands. In such industries, the theory goes, a single producer will eventually be able to produce at a lower cost than any two other producers, thereby creating a “natural” monopoly, as higher prices will result if more than one producer supplies the market (DiLorenzo, 1996).

A number of reasons have been put forward as justification for natural monopoly, and one of the most popular is the idea that electricity is a “necessary” good (Primeaux, 1986).

The very term ‘public utility’ . . . is an absurd one. Every good is useful ‘to the public,’ and almost every good . . . may be considered ‘necessary.’ Any designation of a few industries as ‘public utilities’ is completely arbitrary and unjustified” (DiLorenzo, 1996, p. 43).

British economists T.H. Farrer and Sir Robert Giffin concluded in 1902 that the condition of necessity is an attribute of natural monopoly, but “they admit, however, that this condition alone is not sufficient to create a natural monopoly because many products and

services are vital”(Primeaux, 1986, p. 13). Not only are there other goods and services that would require monopoly power because they also are necessary to the public, technological changes have provided adequate substitutes for electric utility services, increasing significantly the cross-elasticity of demand. This is important as a true monopoly would typically tend to produce a product that has a very low cross-elasticity with other industries (Primeaux, 1986).

As there were only ten men employed as full-time professional economists in the late 1880s, there was no formal statistical analysis or study of data when the legislation was passed creating electric monopolies, and so the theory of natural monopoly appears to have been more of an after the fact rationalization of the governmental actions than a legitimate economic idea. According to Thomas DiLorenzo, “[a]t the time the first government franchise monopolies were being granted, [it was] understood that large-scale, capital intensive production did not lead to monopoly, but was an absolutely desirable aspect of the competitive process” (1996, p. 43). If competition is understood as an on-going process, it was clear that market dominance would necessarily be temporary in the absence of government regulation that created monopoly (DiLorenzo, 1996)

By ignoring the dynamic nature of the competitive process, [economists mistakenly believe] that “excessive” competition can be “destructive” if low-cost producers drive their less-efficient rivals from the market. Such competition may be “destructive” to high-cost competitors, but it is beneficial to consumers.

(DiLorenzo, 1996, p. 48)

In fact, “public utility monopolists may be even more inclined to be inefficient than monopolists in other fields since they are in a sense ‘guaranteed’ a certain price and return on investments” (Primeaux, 1986, p. 21).

The generation of electricity is not a natural monopoly. Generation is inherently competitive, and should be recognized as such by market rules governing the industry. Any sizeable electricity market can support dozens of individual power plants of efficient scale. Entry can also be facilitated with rules that encourage new investments while protecting consumer and environmental interests. The operation of these power plants can be coordinated over the electricity grid by an independent system operator without requiring the control of a single owner. . . .

History has shown that the economic regulation of potentially competitive industries often raises costs and distorts the industry to the detriment of consumers and the economy. Government has no unique expertise in building and operating power plants to outweigh the inefficiencies associated with government ownership and operation. (Smith, Sweeney, et al., 2002, §17)

While the theory of natural monopoly has been widely discredited over time, it is important to understand the rationale behind the theory as it was prevalent at the time that most electric utility regulations were enacted and provided the unsound economic basis for most of the actions taken; its examination provides a much need context for later regulatory actions, including deregulation.

## Federal Regulation in the Late 20<sup>th</sup> Century

The free-market craze of the 1980s and 1990s further discredited the notion of electric power as a natural monopoly. Regulation had outlived its usefulness, according to many economists and some politicians, too, and the market should be allowed to determine prices. Advocates for deregulation of the electricity industry argued that the success in the implementation of PURPA had proven that non-utility generators could produce power as inexpensively and effectively as the regulated utilities. Federal regulators began to seriously consider deregulation (Chandler, 2001). Large industrial corporations, such as steel mills, car makers, and oil refineries had begun calling for deregulation as early as the 1970s, but really started clamoring in the late 1980s. These corporations could see first-hand the huge discrepancies in the rates charged by different utilities in different areas; one factory could pay rates more than twice as high as a similar factory served by a different utility.

Always looking to cut costs, many large industrial corporations, which use tremendous amounts of electricity, began complaining about the differences in rates, as well as having to buy electricity from their local monopoly utility.

Instead, these large customers wanted to shop for the cheapest power available.

They also argued that new companies should be allowed to generate and sell electricity, which would put competitive pressure on the utilities to reduce their rates. (Higley, 2000, §8)

These industrial power consumers held great sway over their serving utilities which recognized the industrials had several options including “exporting production and jobs

to other states or countries, self- or co-generating electricity, and circumventing the serving utility by legal action” (Houston, 1998, p. 232).

The immediate impact of this trend toward negotiating prices with industrials was slight; however, the longer term implications were greater. As industrial consumers mounted de facto deregulation, fewer retail customers remained to pay for historical costs incurred by the utilities and to bear the risks related to future capital spending and operating decisions of the utilities. As a result, non-industrial customers also had a greater incentive to search for marketplace alternatives to utility regulation. By the early 1990s, commercial consumers and residential groups, especially those represented by municipalities, began to apply tactics similar to the industrials, including increased political involvement. (Houston, 1998, p. 232)

In 1992, the Energy Policy Act (EPACT) was passed by the U.S. Congress. EPACT opened access to transmission networks to non-utility generators and further facilitated the development of a competitive marketplace by creating another category of qualifying facilities known as exempt wholesale generators (EWGs). The EWGs were exempted from regulations faced by the traditional utilities; this would later play a crucial role in California’s restructuring. The EPACT amended the Federal Power Act (FPA) such that any electric utility could then apply to the FERC for an order requiring another electric utility to provide transmission service (wheeling); this was a significant change in policy as prior to EPACT, the FERC could not mandate the provision of wheeling services. The change in the law means that owners of electric generating equipment are

now free to sell wholesale power (sales for resale) to noncontiguous utilities. (EIA, 2002a).

Continuing deregulation at both Federal and State levels is transforming the historically monopolistic electric power industry into an industry that will eventually increase competition in the generation and service components of the electric power industry, and change the nature of the way electricity is priced, traded, and marketed in the United States. . . . Future electric rates are likely to be dynamic, reflecting the current cost of providing service. In a competitive environment, unbundling of electric power services and pricing that reflects time-of-day and seasonal variations will become more common. (EIA, 2002a)

Restructuring in California and in Texas is closely linked to the movement by the federal government away from regulation of the electric utilities towards open markets within the states.

#### What is Restructuring?

It is convenient to think of the electricity industry as made up of four functions:

- Electricity generation – The simple production of electricity
- Transmission – The movement of electricity over high-voltage lines from the generators to power substations in cities, towns and rural areas throughout the country
- Distribution – The movement of electricity over lower-voltage lines from power substations to customers
- Marketing – The sale of electricity to customers (Brown, 2001c, §5)

Most regions of the country are served by integrated electric utilities, each of which performs all four functions, from generating electric power to selling it. These utilities established monopolies in transmission and distribution, which were extended into generation and marketing. Restructuring means that one or more segments of the current system will be open to competition, typically generation and marketing. Restructuring typically encompasses five fundamental elements (with some regulation retained, at least in the initial stages):

- Electricity generation is opened to competition with free entry of new power plants and private contracts
- Transmission and distribution remain in the hands of the utilities and under regulatory control because they are viewed as natural monopolies
- Marketing to consumers is opened to competition
- Electricity prices are free to move
- A range of market instruments, including long-term contracts, spot sales and market-making activities, is allowed and encouraged (Brown, 2001c, §8)

Other key elements may include ensuring sufficient generation capacity (and fuel supplies) and also the encouragement of private market-making activity to hedge the risks from price volatility.

A mixture of market instruments for conducting electricity sales is important in creating well-functioning markets. Long-term contracts distribute the risks between buyers and sellers and enable planning. Spot sales allow a response to changing market conditions. Market-making is an activity of firms such as Enron

Corp. in Houston that act as intermediaries in the electricity market. They buy electricity under contracts of a given duration and sell it under contracts of another duration. This intermediation helps make electricity markets more efficient and restructuring more successful. (Brown, 2001c, §9)

### Conclusion

Without EPACT (1992) and to a lesser extent, PURPA (1978), which began the movement, California and Texas would not have been able to restructure their electric power markets:

The PURPA of 1978 opened up competition in the generation market with the creation of qualifying facilities [and] the EPACT of 1992 removed some constraints on ownership of electric generation facilities and encouraged increased competition in the wholesale electric power business. (EIA, 2002a)

The passage of EPACT in the early 1990s, coupled with the movement towards deregulation and restructuring already underway in Great Britain, led states with historically high electricity prices to investigate restructuring. Both California and Rhode Island passed deregulation legislation in 1996, giving the consumer the right to choose their electricity supplier, and taking the first steps towards a deregulated electricity generation market.

## CHAPTER 2

### A REVIEW OF THE LITERATURE

At the time this paper was being researched and written, there were almost no academic articles specifically examining the deregulation and restructuring of the electricity sector within the states. A more recent perusal of the literature finds three new articles in the Review of Policy Research Summer 2003 issue. *The political economy of electricity deregulation: Appointed vs. elected utility commissioners*, chooses a singular aspect of policy and scrutinizes it in great detail; in this case, the selection of utility regulators (Cavazos, 2003). Similarly, *Low-income issues in electricity restructuring*, takes aim at one particular aspect of deregulation, protections for low-income electric utility customers (Oppenheimer & Macgregor, 2003). The third article, however, takes a tack similar to this paper in tracing historical aspects of deregulation including the theory of natural monopoly. Author Steven Isser goes beyond a study of policy to make recommendations he believes will allow for a better implementation of competition into the electricity sector, including so-called “smart” meters that gauge individual consumption and alter price accordingly (2003).

As previously stated, the trend in most academic articles has been to trace a specific aspect of the restructuring process in particular detail. An excellent example is the work of Larry Parker and John Blodgett which examines the effect that deregulation has had on air quality in the United States. The authors conclude its impact has been

considerable and largely negative, as it has led to increased use of coal-fired generating facilities (Parker & Blodgett, 2001). *Vesting contracts: a tool for electricity market transition* is similar in its emphasis on the use of contracts to hedge risk and achieve the objectives of deregulation in electric markets (Kee, 2001). Ironically, Kee's article came out in July 2001, right as the crisis in California was reaching its peak; unfortunately it was too late to have any impact on the crisis. An article with a highly specific and technical focus fits into the same category as Parker and Blodgett and also with Kee.

Andreas Poullikkas proposes an optimization algorithm for the calculation of unit costs of electricity for various types of power generation technologies in his July 2001 article in *Electricity Journal*. At the same time, Poullikkas examines the impact of restructuring on the commoditization of electric energy. In an optimistic (pre-California debacle) article, Geoffrey Rothwell begins "During the next decade, most states in the USA will deregulate electricity generation" (2000, 61). As with the other articles reviewed, this one does not focus exclusively on deregulation, but in this case takes the early retirement of nuclear power plants as its focus.

Going back in time to earlier articles on deregulation, there is a tendency to approach the process with optimistic caution. In his 1998 article, Paul Joskow predicted the change in direction in regulatory policy toward competition in the supply of generation services. He concluded that reform of the industry would face many challenges:

Because of the critical role that economical and reliable supplies of electricity play in the economy, there is a profound public interest in ensuring that these

reforms improve rather than degrade the performance of the electricity sectors that are being affected by these changes (Joskow, 1998, p. 2).

In their 1996 article, *Short run pricing in competitive electricity markets*, Ring and Read state that short run pricing, similar to the spot market seen in California, is “an important requirement for efficient market operation in a competitive environment” (S316). Given that they go on to say that short run pricing must be used in conjunction with long-term contracts and capacity rights, it seems as if California’s legislators read only the first part of the article, or maybe a synopsis, while those in Texas read to the end. In the same vein is the 1993 work of William Hogan in which he concludes that markets in electricity networks require reactive prices. The current thinking in deregulation, as we see in the example of Isser’s article in 2003, ten years later, still runs the same way. It is easy to look back at Hogan’s work and think, if only California had listened.

Most of the articles written on deregulation for the newspapers focus on specific events related to deregulation, particularly events as they unfolded in California. Even two years after the end of the crisis, California, Enron, the California Public Utility Commission, Governor Gray Davis, and the three Investor-Owned Utilities are still newsworthy and appear in articles almost daily. Whether they are the focus of the articles, or just a passing comparison, the issues raised in California are still debated quite regularly in *The New York Times*, *Washington Post*, and *The Wall Street Journal*.

Op-Ed pieces in newspapers relating to electricity restructuring are of particular interest. In early 2001 as Texas was preparing for deregulation, a number of articles were

published emphasizing for readers in Texas that they were not in the same predicament as the Californians and that they possessed a number of advantages over their western neighbors in their pursuit of competitive electric markets. The Dallas Morning News featured two editorials in February 2001, *Texas should watch California closely* by William McKenzie and *Don't fear electricity deregulation* by Bernard Weinstein, each offering a unique perspective on policy differences between the two states, particularly in the electricity sector. "California's problems should help us do a better job, not prevent us from getting on with it," Weinstein wisely admonishes his fellow Texans (2001, §5).

## CHAPTER 3

### CALIFORNIA

In 1996, the California Legislature enacted Assembly Bill 1890 (AB 1890), to restructure the state's electricity industry and make California one of the first states to include components of a competitive market design in its heavily regulated electric sector. The legislation was heavy on compromise and short on deregulation. "The privately-owned utilities (IOUs) were directed to help create two new non-profit transmission network and wholesale market institutions, and to work with all 'stakeholders' to design the operating rules for the associated wholesale markets" (Joskow, 2002, p. 35-36). The California Independent System Operator (CAISO) was created to operate the transmission networks owned by the three major utilities and the California Power Exchange (PX) was created to run hour-ahead and day-ahead wholesale markets for electricity. With two new regulatory structures created as part of the restructuring legislation intended to open the market, many economists and policy analysts speculated early on that the plan was ultimately doomed to failure. "In short, California did not create a transition to a free electricity market, and its restructuring should not be considered deregulation" (Brown, 2001b, §3).

California has the largest population of any state, nearly 34 million residents in 2000. Since 1990, the state's population has increased 13.8% (Bowen & Davis, 2003). Over 10.2 million electric customers are served by 33,347 miles of transmission lines, in

addition to 162,768 miles of distribution lines, combining for a total economic value of over \$17.8 billion for the state (California Public Utility Commission [CPUC], 2003). Restructuring of the investor-owned public utilities was a significant policy decision with important ramifications for the state's residents and businesses. Legislators and policy analysts in other states were closely watching events in California, hoping to learn if the electricity sector could be successfully restructured. When deregulation officially began in April 1998, only those few eyes were focused on California, but by the end of 2000, the whole world was watching as events in California rapidly devolved into a debacle that would shake the power industry to its very core, with blackouts, bankruptcies, and allegations of fraud making the headlines daily. What went wrong? Was deregulation in California doomed from the beginning? Were there aspects of the legislation that precluded success from the outset? With few exceptions, people from all viewpoints now agree that the system as it was originally legislated was undeniably flawed; they disagree on what ultimately caused the crisis and how best to prevent a similar crisis in the future.

### Restructuring Begins

The California Public Utility Commission (CPUC) began a comprehensive review of the state's electricity industry in 1993. As throughout the rest of the country, industrial customers had begun to complain to their utility providers that they were paying much more for power than their competitors in neighboring states, and their complaints were forwarded to the CPUC for review. In fact, by the early 1990s, California's electric rates were averaging 50% higher than neighboring states (Chandler, 2001). California has traditionally had higher power rates than other states, primarily because it lacks sufficient

generation facilities to meet demand and is forced to import its electricity from other states, in addition to other factors. So, in April 1994, the CPUC issued the “blue book,” a study of electric power industry restructuring in California. “Everything from the high costs of nuclear power to expensive long-term contracts with independent power suppliers to excess generating capacity was attributed to California’s dependence on regulated, vertically integrated monopolies” (Joskow, 2002, p. 34). The report specifically identified the factors causing problems within the power sector at the same time it advised sweeping changes to the structure of the electricity market in California. A competitive wholesale market where power would be sold with transmission, distribution, and related operating functions remaining regulated monopolies was recommended. At that time, such a competitive market structure was unprecedented in the United States.

The dramatic proposals of the CPUC in the early 1990s changed the tone of the debate on deregulation within the states. It appeared that their plan would ultimately allow all customers to choose their own power supplier, an approach similar to the reforms carried out by England and Wales in the early 1990s (Joskow, 2002).

No longer was deregulation simply about encouraging “managed” competition among utilities and wholesales in which rate-based regulation and exclusive franchise were off-limits. Discussion moved to the radical: to permitting all consumers to choose suppliers; to restructuring of the industry by disintegration of the vertically integrated utilities; to eliminating exclusive franchise privilege; and to curtailing rate of return regulation. (Houston, 1998, p. 232)

In December 1995, the CPUC issued its final order calling for a massive restructuring of the electric power industry in California, allowing consumers direct access to competitive suppliers of electric power. Originally, the CPUC plan was to phase in consumer direct access, but later the plan was amended to allow retail access for all consumers simultaneously, beginning January 1, 1998 (EIA, 2003).

There was broad agreement that the system needed to be significantly restructured, but there was little consensus about what changes were most urgently needed or how the new modifications should be implemented. The CPUC's final plan embodied numerous compromises and sought to accommodate all of the various interest groups and political viewpoints.

Both the California Legislature and Pete Wilson, the governor at the time, embraced the initiative. California, the thinking went, would be at the vanguard of a movement to transform a tired old industry composed of imperfectly regulated monopolies into one that tapped the innovation and discipline of the free market. (Joskow, 2002, p. 33)

So in August 1996, the California Legislature passed a restructuring law that largely followed the plan put forth by the CPUC, compromises and all. Governor Wilson signed the bill into law on September 24, 1996.

#### Assembly Bill 1890

Assembly Bill 1890 (AB 1890) was enacted to restructure the California electric utility industry and implement retail direct access. The stated purpose of AB 1890, *The*

*Electric Utility Industry Restructuring Act*, was to make the generation of electricity competitive in California.

SECTION 1. (a) The Legislature finds and declares that the restructuring of the California electricity industry has been driven by changes in federal law intended to increase competition in the provision of electricity. It is the intent of the Legislature to ensure that California's transition to a more competitive electricity market structure allows its citizens and businesses to achieve the economic benefits of industry restructuring at the earliest possible date, creates a new market structure that provides competitive, low cost and reliable electric service, provides assurances that electricity customers in the new market will have sufficient information and protection, and preserves California's commitment to developing diverse, environmentally sensitive electricity resources. (Assembly Bill 1890 [AB 1890], 1996)

Arguably the two most crucial aspects of the restructuring legislation were the creation of the Power Exchange (PX) and of an independent, statewide transmission system operator, known as the Independent System Operator (CAISO).

SECTION 1. (c) It is the intent of the Legislature to direct the creation of a proposed new market structure featuring two state chartered, nonprofit market institutions: a Power Exchange charged with providing an efficient, competitive auction to meet electricity loads of exchange customers, open on a nondiscriminatory basis to all electricity providers; and an Independent System Operator with centralized control of the statewide transmission grid, charged with

ensuring the efficient use and reliable operation of the transmission system. A five-member Oversight Board comprised of three gubernatorial appointees, an appointee of the Senate Committee on Rules and an appointee of the Speaker of the Assembly will oversee the two new institutions and appoint governing boards that are broadly representative of California electricity users and providers. (AB 1890, 1996)

The California Power Exchange (CAL PX) was created by AB 1890 to operate as a commodities market where power producers would compete to sell their electricity generation in response to bids submitted by buyers in a “pool” or “spot market” where price information is publicly available. “Article 4. 355. The Power Exchange shall provide an efficient competitive auction, open on a nondiscriminatory basis to all suppliers, that meets the loads of all exchange customers at efficient prices.” (AB 1890, 1996)

Participation in the Power Exchange was voluntary for all buyers and sellers – unless they were one of California’s three Investor-Owned Utilities (IOUs). Under the provisions of AB 1890, the IOUs were forced to divest almost half of their own generation capacity and buy and sell power exclusively through the spot markets of the PX, effectively preventing hedging of their risk through the development of a portfolio of short-term and long-term energy products (Hebert, 2001). Bids from electricity buyers and generators were continuously solicited until the PX had enough electricity supply to meet requests for power; PX prices would change on an hourly basis.

While it operated, the California Power Exchange (CAL PX) operated as a spot market for electric power. Table 1 shows a simplified example of how such a bidding process operates:

Table 1

*Simplified Example of Bidding Process for Electric Power*

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Let's say that the spot market administrator determines that 1,200 MW of electricity is needed in the next hour. Generators send in their bids, as follows:

<b>Generator:</b>	<b>Offers to Produce:</b>	<b>At this price per MW for this hour:</b>
Company A	500 MW	\$38
Company B	600 MW	\$25
Company C	800 MW	\$50
Company D	250 MW	\$40

The market administrator (in this case, the PX) “stacks” the bids from lowest to highest cost:

<b>Generator:</b>	<b>Offers to Produce:</b>	<b>At this Price:</b>
Company C	800 MW	\$50
Company D	250 MW	\$40
Company A	500 MW	\$38
Company B	600 MW	\$25

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*(table continues)*

Table 1 (continued)

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The spot market can most economically meet its needs for 1200 MW by using the electricity from companies B, A, and D. The price from the highest bid in that group sets the market price. In other words, regardless of their individual bids, companies A, B, and D will all be paid \$40 for each MW of electricity provided despite the fact that companies A and B were willing to sell their power for a lower price

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*Note.* From Cape Wind Associates LLC, 2002.

The only option for the three California Investor-Owned Utilities to meet their service obligations was to purchase enough energy to meet the requirements for power of their customers in the day-ahead and real-time spot wholesale markets of the PX. Under the system created by the legislation, the utilities were essentially forced to sell the power they had generated into the PX market and buy back enough of that power to meet their demand at whatever price the PX was charging at that time. All of their previous contracts and cost-cutting measures were rendered irrelevant by the very nature of the exchange in which they were forced to participate. Also under AB 1890, the IOUs were no longer given the option to generate from their most efficient plants first during periods of peak demand, a cost-saving measure they had successfully utilized in the past:

Utilities received power from power plants they owned, from other utilities, or under long-term contracts with independent generators. Typically, these plants and the power bought under contract were dispatched to meet the demand for electricity on an economic basis. This means that in general, the utilities preferentially generated power from the most efficient plants first, and only

generated power from their least efficient plants during peak hours when demand was highest. (CPUC, 2002, p. 29)

Through the PX and the ISO structure created by AB 1890, the utilities were not afforded the same ability – they were at the mercy of a third-party that lacked sufficient knowledge to make the most efficient decision. AB 1890 created an artificial market structure that was doomed to fail from its inception; the government of California banned the use of long-term market instruments while forcing all power sales to be transacted through a potentially volatile spot market operated by a public agency. The only reason that it did not fail prior to 2000 was apparently exceptionally good luck, or so it seems in hindsight.

As part of AB 1890, the local utilities continued to distribute electricity as they had done under the monopoly system while the new independent, statewide transmission system operator, known as the California Independent System Operator, or CAISO, was given the responsibility to assure the reliability of the high voltage transmission system and to provide equal opportunity for new power producers to deliver their supplies.

Article 3. 345. The Independent System Operator shall ensure efficient use and reliable operation of the transmission grid consistent with achievement of planning and operating reserve criteria no less stringent than those established by the Western Systems Coordinating Council and the North American Electric Reliability Council. (AB 1890, 1996)

The IOUs retained ownership of their transmission facilities but were required to transfer operational control of their facilities to the Independent System Operator to

ensure that owners could not favor their own generation facilities over competing generators:

CHAPTER 2.3. ELECTRICAL RESTRUCTURING. Article 1. 330. (m) It is the intention of the Legislature that California's publicly owned electric utilities and investor-owned electric utilities should commit control of their transmission facilities to the Independent System Operator. These utilities should jointly advocate to the Federal Energy Regulatory Commission a pricing methodology for the Independent System Operator that results in an equitable return on capital investment in transmission facilities for all Independent System Operator participants. (AB 1890, 1996)

AB 1890 imposed no obligation on the generators to bid all of their available generation into the market:

Proponents of this new market system expected that wholesale generators would compete against each other, and thereby provide the power to the utilities at the lowest price possible. In particular, generators were expected to bid available power into the new markets to maximize sales and profits. Unfortunately, the ISO markets were not designed to avoid the possibility that by withholding some of their power, generators could drive prices up and make abnormally high profits on the power they did generate. . . . From December 14, 2000 to February 9, 2001, DOE required generators and energy traders to provide all available power in response to nightly ISO requests, but as is shown below, this requirement did not result in the five generators' bidding all their available power into the ISO

markets. This fatal flaw in the system was rectified, at least temporarily and in part, only after the crisis, when the FERC imposed comprehensive market controls in June 2001, including a price cap, trading barriers to prevent some types of market manipulation and a “must-offer” obligation that required generators to bid all available power into the market. . . . If a generator neither bid power into markets nor supplied that power “out-of-market” to the ISO, the ISO could not dispatch that power to meet electricity demand within its control area. (CPUC, 2002, p. 29-30)

AB 1890 legislated the recovery of stranded costs via a Competition Transition Charge (CTC) on customer bills until 2002 for the Investor Owned Utilities. The legislation provided for an accelerated recovery of utility investments through this CTC, the rate of which varied by utility. The recovery of stranded costs was already built into the existing regulatory structure and included in the rates already charged to all customers. Had there been no transition to a competitive market, customers would have continued to repay these costs to utilities through their electricity bills as they had before – the CTC did not necessarily result in an increase in electricity rates from previous levels.

The Competitive Transition Charge (CTC) was the compromise answer to the opposition expressed by the Investor-Owned Utilities prior to restructuring. They were concerned that retail competition would make it impossible for them to recover both their past investments in nuclear power plants and the costs of state-mandated contracts with co-generators and renewable energy suppliers. At the time AB 1890 was passed, the

utilities' cost of generating electricity under regulation was about \$65 per megawatt-hour, while wholesale market prices were anticipated to be in the range of \$25 to \$30/Mwh: "The difference between the 'regulatory value' of these generation sources and their expected market value was potential 'stranded cost,' and the utilities argued that they were owed a means of recovering these costs" (Joskow, 2002, p. 34) Those opposed to stranded cost recovery allege that utilities should not be rewarded for unwise investments and that forcing consumers to pay for stranded costs thwarted the objective of reducing electricity rates.

AB 1890 failed to address an important issue with regard to stranded costs: if stranded costs are to be recovered through surcharges on electricity purchases, methods must be devised that preserve competitive neutrality and do not introduce fees that would create an artificial cost advantage for either the IOUs or the new independent generators (Brennan, Palmer, & Martinez, 2002). Under the new structure there was no incentive for residential consumers to change their electricity provider as they were still paying surcharges for costs incurred under monopoly regulation.

Most states are moving toward retail competition, which will allow consumers to purchase electricity from competing generators. However, retail competition will not be effective if all consumers are required to pay arbitrary fees to reimburse utilities for their so-called stranded costs – utility investments that, while apparently justified under regulation, are uneconomical under competition. Nor is there much consumer choice if there are price controls on power transmission or

if local distributors are able to exercise monopoly power. (Smith & Rassenti, 1999, p. 3)

Other requirements of AB 1890 included a 10% rate reduction (financed by issuing bonds that will be repaid by a charge on customers' bills over a ten year period) and a rate freeze at 1996 levels for small and residential customers for a transition period of 4 years (through March 2002). This immediate rate reduction of less than 10% was legislated with no strings attached – consumers would receive the reduction whether they participated in the choice of their electricity provider or kept the same utility. The Legislature also decreed that the state would issue “rate reduction bonds” to pay for the rate decrease, which would create “no new financial obligations or liabilities for the State of California. Legislators anticipated that this pain-free and seemingly cost-free system would result in a cumulative rate reduction over time for residential and small commercial consumers of no less than 20% by April 1, 2002 (AB 1890, 1996).

Legislators were also careful to protect the interests of utility employees that might otherwise be ‘economically displaced’ in a restructured industry; they implemented numerous protections aimed to prevent any detrimental effects from the elements of the restructuring specifically aimed at small consumers and utility employees. Unlike in a corporate environment, where job security is based strictly upon performance and whether a job is crucial to the operations of the company, the state was quick to placate those who might argue that competition might induce the utilities to function on a less costly basis.

AB 1890 included the required divestiture of power plants (except hydro and nuclear) by the investor-owned utilities, but failed to take into account the profoundly altered market conditions created by divestiture. Ideally, divestiture will drive down costs and attract new entrants into either the “supply” side of power generation or the “wires” side of transmission and distribution (Smith & Rassenti, 1999). By forcing the utilities to divest generation and giving the wires side to a regulated public entity, California knocked the wind out of the possible smooth sailing of a deregulated market.

Energy efficiency and renewable energy programs and low-income customer programs were funded by a public purpose program charge on customer bills under AB 1890.

California opened its generation market to competition, but the state did not permit the free entry of new power plants. California entered deregulation with insufficient capacity. Nowhere in the legislation was there any mention of easing the restrictions on power plant siting as part of the restructuring. As a result, there was not enough new generation to meet demand, let alone replace the supply from plants that were retired (Brown, 2001c). At the same time that it was opening generation to competition, California shut the door to competition in the marketing and sales functions. By allowing electricity prices to move freely with market conditions, consumers would have been encouraged to conserve electricity (Brown, 2001c). Because California did not make any provision in AB 1890 to curb demand or offer incentives for customers to use less power at times of peak demand, there was no motivation for consumers to use less electricity even during the hottest days of the summer.

There has also been a lack of demand responsiveness to price. This is a standard means of moderating prices in well-functioning markets, but it is generally absent from electricity markets. When prices for other commodities get high, consumers can usually respond by buying less, thereby acting as a brake on price run-ups. If the price, say, for a head of cabbage spikes to \$50, I simply don't purchase it. Without the ability of end-use electricity consumers to respond to prices, there is virtually no limit on the price that suppliers can fetch in shortage conditions.

(Electricity Markets in California, 2001b)

By freezing retail electricity prices, AB 1890 guaranteed failure for the restructuring. An unwillingness to allow consumers to understand that their consumption directly affects the price of power undermined the entire market. As wholesale prices began to rise, it was the utilities that were stuck in the middle with no way out. Their customers continued to use power with no idea of the actual cost of their usage. That is not fault of the customers, though – that is a flaw in the legislation.

AB 1890 and California's restructuring plan is based largely on the Poolco model from Britain, one that has been rife with problems:

The Office of Electricity and Gas Markets found last year that collusion and price manipulation of Britain's power pool was the norm. This uncompetitive behavior has translated into British consumers paying, on average, 70% more for their electricity than their American counterparts. (Slocum, 2001, p. 11)

Was California's plan doomed to failure before it even began because of its considerable flaws and its considerable reliance on a less-than-ideal British model that had not been given time to work?

The state of California has been widely questioned for its restructuring legislation enacted in 1996. While mistakes were made, California is to be commended for realizing that consumers are better off if supply and pricing decisions are based on market mechanisms, not bureaucratic fiat. The premise of this legislation is that consumers will enjoy lower rates and increased service options, without compromising reliability of service, if electricity providers are motivated to serve by market forces and competitive opportunities. (Electricity markets in California, 2001a)

Unfortunately, the restructuring of California's electricity markets did not provide much deregulation.

Ideology and rhetoric played a bigger role in the debate than serious analysis. In the end, the design represented a series of compromises that drew on bits and pieces of alternative models for market design, congestion management, transmission pricing and new-generator interconnection rules. (Joskow, 2001, p. 36)

### The Economics of California's Deregulation

Thinking about supply and demand is a good way to examine the economic problems associated with restructuring in California. Through AB 1890, California attempted to create a free market almost entirely through manipulation of the supply side

of the market. In another situation, such a plan might have worked, but what California failed to consider while creating its system is that it had already created “a number of constraints on the supply side, including production capacity constraints, new plant siting constraints, pollution emission constraints, and constraints on the quantity of natural gas that can be shipped into the state in any given time period.” (Hutchinson, 2001, §15)

Any good introductory economics textbook shows that equilibrium price and quantity occur where the supply curve and the demand curve intersect. At that price, consumers are willing to buy the same amount that businesses are willing to offer. If the price goes above the equilibrium, a surplus of goods occurs; if the price is below the equilibrium, a shortage. Electricity consumers in California experienced a severe shortage in power during the crisis of 2000 and 2001. Those who suggest market power caused the crisis report that the generators in the state had additional capacity to generate power that they chose not to bid into the state’s deregulated Power Exchange (PX), leading to a shortage of electric power for transmission and sale and the subsequent blackouts during the crisis. But why would producers choose not to make their product, in this case, electricity, available for sale to consumers?

Basic economic theory provides the answer: a business will only fail to supply additional output if it is not cost-effective for it to do so, or if it lacks the physical capabilities in labor or equipment or means of production to do so:

Precisely these are the reasons the power companies did not supply more power than they did on the days that brownouts or blackouts occurred in California. To an important extent, they were physically unable to supply more power. At any

given time, a more or less considerable part of the overall generating capacity a power company possesses may be down for necessary maintenance and repairs. Perhaps such equipment could be brought back on line without performing the necessary maintenance or repairs. But doing so would impair power production, and thus the ability to earn revenue and profit in the future. Stepping up power production in this way is therefore extremely costly and therefore usually does not pay. (Consumers of power should be glad that producers behave in this way for it serves to assure their supply of power in the future.) (Reisman, 2002, p. 4)

Given the unusual circumstances of electric generation, transmission, and distribution, as well as the particular maintenance requirements, the claims against the producers are even more surprising.

What we are being told is that the power producers were in a position to do extra business – but simply refused to do it. We are being told a story which, if applied to restaurants or coffee shops, say, would claim that additional normal-type, well-behaved customers were coming through their doors, ready to order from their menus, and that even though these food-service establishments had all of the necessary means of filling the additional customers' orders, they simply refused to do so – indeed, they refused to do so out of reasons of greed! It should be obvious to everyone that this is the most utter nonsense. It is never profitable – and, therefore, never reasonable – for a business to refuse to do business that it is profitable for it to do. To pretend that businessmen and their greed are nonetheless responsible for people not being supplied, and for people therefore suffering

deprivation and even death, is to display an ignorance of ordinary economic law.

(Reisman, 2002, p. 3)

Even a conspiracy among producers to raise prices could not explain an intentional withholding of supply.

The shortage exists and endures only because the price is not allowed to go high enough to eliminate it by reducing the quantity demanded to the level of the limited supply available. When it becomes clear that the price will not be allowed to rise any further – and there could be no clearer evidence of this than the imminence of brownouts, not to mention blackouts – then no reasonable motive exists for a power company not to sell as much as it profitably can at the prevailing price. . . . If the power companies had had the power available to sell more to customers being asked to reduce their usage of power, if they had had the power available to sell to those about to be disconnected to they system, and if their cost of generating that additional power did not exceed the prevailing price of power, they would have had every reason to generate and sell that additional power, for doing so would have meant added profits in their pockets.” (Reisman, 2002, p. 4)

There is disagreement still about whether generating companies intentionally withheld supply leading to the crisis; an answer may never be known. Reisman makes a powerful argument that it was not the suppliers that caused the crisis, but rather the inability of the new market to adjust because of its inherent flaws. “Deregulating only the supply side of the market creates market imbalance, and when gas prices go up and

demand increases the market is blown out of existence, no matter what profit opportunities might have existed in it” (Hutchinson, 2001, §15). In this, as in so many other aspects of the deregulation, it appears that the planners failed to consider their state’s peculiarities or even any type of “worst case scenario” outcomes. Even with all of the things that went wrong in California in 2000 and 2001, the markets should have been able to adjust, but they weren’t designed properly and failed. This is an important lesson for the other states when they again reconsider deregulation: Ignore basic economic concepts in restructuring legislation at your own risk.

#### Timeline of the Restructuring and Subsequent Crisis

Electricity deregulation went into effect in California March 31, 1998, with the opening of the California Independent System Operator (CAISO) and the California Power Exchange (PX). Control of 70% of the state’s transmission lines was transferred to the California ISO. All consumers in investor-owned territories could choose alternative electricity suppliers and could expect that automatic 10% reduction in their residential rates regardless of their participation in the direct access program. Throughout the state there was excitement about the ambitious program to bring competition to the retail and wholesale sectors of the electricity industry in California.

Those pressing for the sweeping changes believed the program would lead to lower consumer prices, a host of innovative retail services, improved performance from existing generating plants and massive investment in clean new ones. Most of the rhetoric focused on lower prices and better service. (Joskow, 2002, p. 33)

There were great hopes for the future of deregulation in the state of California and for the most part, things went reasonably well in the beginning. But minor problems with the system emerged almost immediately after the new markets opened for business in April 1998 – the software to manage the wholesale markets still wasn't ready and operations were forced to begin without important functions in place.

[N]umerous compromises in market design led to poor coordination between the power exchange and the system operator, and the limitations placed on the system operator's ability to play an active role in energy markets led to numerous problems well before the highly visible meltdown that began in May 2000. In addition, episodic price explosions and instances of anticompetitive gaming by suppliers emerged in the markets operated by the system operator during periods of very high demand during the summer of 1998, requiring regulators to step in to impose price caps and to change market rules. (Joskow, 2002, p. 37)

Despite its considerable flaws, the system was able to operate fairly well during its first year or so. “[F]rom the standpoints of prices and reliability, restructuring in California was, initially, reasonably successful” and prices remained fairly low (Brennan, Palmer, & Martinez, 2002, p. 46). Yet, economists who were already concerned with the legislation began to foresee larger troubles ahead.

In 1999 concern began to grow when the system operator openly expressed concern about the extremely slow pace of completion of new power plants, rapid growth in demand and reductions in reserve margins; spot market price volatility raised concerns about California's reliance on real-time markets to meet retail demand and about

potential shortages and price spikes if new power plants were not rapidly authorized by the state and constructed (Joskow, 2002). Faced with the possibility of shortages, the ISO initiated a program in 1999 to bring new plants online and generating power by the summer of 2000, but the program was not successful. State regulators did nothing to speed the siting review process or to otherwise facilitate completion of new plants.

As of May 31, 1999, the CPUC reported that 135,493 California consumers, or only 1.3%, had switched electricity providers. 92,904 residential consumers made up 1.1% of those who utilized direct access (CPUC, 2003).

“Until 2000, California’s spot market prices were substantially lower than even California’s mandated freeze level. This allowed the California utilities to pay down billions of dollars in costs incurred during cost-of-service regulation” (Electricity markets in California, 2001a). As a result, the CPUC was able to end the mandatory 10% rate reduction for San Diego Gas & Electric (SDG&E) effective July 1, 1999 and state law no longer limited SDG&E customers’ electricity prices; their rate freeze was ended. It marked the end of the transition period for SDG&E and the recovery of all stranded costs as well as the end of the CTC for SDG&E customers; the rates in SDG&E territory were then unregulated and as SDG&E warned its customers, likely to be more volatile (Joskow, 2002). SDG&E’s retail prices initially fell in early 2000, but as SDG&E had warned, retail prices rose sharply along with wholesale prices during the summer of 2000. Rapidly increasing retail prices in San Diego:

infuriated consumers and ultimately led the California Legislature to cap the generation service component of SDG&E’s default service prices at \$65/Mwh

with a commitment that any difference between what SDG&E paid for power and what it could charge would ‘eventually’ be recoverable as a surcharge on retail distribution charges. (Joskow, 2002, p. 38-39)

Average wholesale market prices for power between April 1998 and April 2000 were actually reasonably close to pre-reform predictions.

Analysts expected that average hourly prices would start at about \$25/Mwh and rise to about \$30/Mwh as excess capacity was gradually dissipated. All things considered, wholesale prices before May 2000 were perhaps 15% higher than they would have been in a system without the design flaws noted above. (Joskow, 2002, p. 38)

As late as January 2000, officials in California acknowledged a variety of market design problems, but were in no rush to fix those flaws. The FERC, however, began to talk about changes in the wholesale market design. Any action would have proven fruitless, though, as all changes were required to go through a contentious approval process that was slow and typically led to unfortunate compromises – as had been the case with the restructuring legislation in 1996 (Joskow, 2002).

Instead of going down, as deregulation supporters had hoped, wholesale electricity rates in California began to rise – as much as 300% by June 2000. Wholesale electricity prices started their rise in May 2000. Prices increased significantly in June and stayed high for the rest of the summer; much higher than the fixed retail price that utilities were permitted to charge their customers for retail service. All three IOUs began to lose a lot of money at an alarming rate: “losses mount fast when you are buying power

for \$120, distributing it through a high-maintenance grid and collecting just \$60 from customers” (Joskow, 2002, p. 38).

June 14, 2000 was the first blackout of the 2000-2001 crisis and it occurred in the San Francisco Bay Area; it was the first in blackout in the state of California since World War II (CPUC, 2002). Late in June 2000, the CPUC reduced its buy-side price cap to \$500 per megawatt for the real-time, ancillary services, and congestion management markets. The CPUC further reduced its price cap to \$250 per megawatt on August 1, 2000 (EIA, 2002b, “Actions taken to contain the energy crisis,” §2).

Recognizing the electric power segment was heading into uncharted and unpopular territory, the CPUC began to take action in August 2000, when the president of the CPUC and the chairman of California’s Electricity Oversight Board (EOB) released a report that addressed the blackouts of June 2000 and the volatile wholesale market prices affecting retail rates. Somewhat surprisingly, the report acknowledged California’s high demand and limited generating capacity as the main reasons for the blackout. But in typical bureaucratic form, the only high-level action taken in response was a request by Governor Gray Davis for the Attorney General to form a task force (Joskow, 2002).

August 3, 2000, the CPUC ruled in favor of a petition by utilities Pacific Gas & Electric (PG&E) and Southern California Edison (SCE) to enter into bilateral agreements with generators at set prices that would serve to shield the utilities and consumers from volatile price spikes. (EIA, 2002b, “Actions taken to contain the energy crisis,” §3) The five-year agreements were intended to hedge against price spikes during periods of high demand and low reserves. Unfortunately, SCE and PG&E were only allowed to contact

third-party suppliers via the California Power Exchange (PX) to negotiate contracts keeping the middleman firmly in place and doing little to solve the growing problems facing the IOUs.

At an emergency meeting called by the governor, the CPUC approved a rate stabilization plan for SDG&E customers on August 21, 2000, while rejecting a price freeze, saying it was unclear who would have to pay the difference in wholesale energy costs. The plan was retroactive to June 1, 2000, and stated that consumers using 500 Kwh or less per month would pay no more than \$68 per month for electricity through the end of January 2001. The rates for those customers would then increase to \$75 per month through the end of December 2001. Any additional power consumed beyond 500 Kwh would be charged at market-based rates (EIA, 2003). On August 30, 2000, the California legislature passed a law (AB 265) that established rate caps of 6.5 cents per Kwh for SDG&E customers. The rate cap was also retroactive to June 2000, and it was planned to be effective through December 31, 2002 (EIA, 2002b). The legislation gave the CPUC power to extend the rate freeze through December 2003 if they found such a freeze in the best interest of the public.

By September 2000, utilities were paying nearly three times as much for wholesale power as they could charge at retail, and they began to confront serious cash-flow problems. SCE and PG&E pleaded with the CPUC to lift the retail rate freeze and to allow them to charge customers for the cost of purchasing wholesale power on their behalf. The CPUC refused; no retail price increases were permitted for the balance of 2000. (Joskow, 2002, p. 40)

The only bright spot of September 2000 was Governor Davis signing Assembly Bill 970, legislation to accelerate the power plant siting approval process. It reduced the California Energy Commission (CEC) licensing process from 12 months to 6 months for plants. Unfortunately, the law was obviously intended only as a stopgap measure and not a change in policy as its provisions will expire in January 2004 (EIA, 2003).

Government officials in California anticipated that wholesale prices would decline when power demand fell as usual after summer ended. “Wholesale prices did fall modestly in October 2000, but then soared to new heights in November and December. By mid-December, the utilities were paying almost \$400/Mwh for power and reselling it for \$65/Mwh!” (Joskow, 2002, p. 40). At this point, all three major Investor-Owned Utilities, SDG&E, SCE, and PG&E, had received the approval from the CPUC to negotiate long-term power contracts; it was assumed that these long-term agreements would be adequate to allow the utilities to hedge electricity prices and prevent volatile price spikes in the future like the ones that occurred over the summer. Despite the approval, the underlying issue remained that the utilities were losing about \$50 million a day and that their repeated requests for permission to increase retail prices were either rejected or deferred by the CPUC and the FERC. “With no retail price increases permitted by the CPUC, and wholesale prices soaring to levels eight times greater than they could charge retail consumers, PG&E and SCE were quickly approaching insolvency” (Joskow, 2002, p. 40).

The federal government became actively involved in the California electricity crisis in December 2000. U.S. Energy Secretary Bill Richardson issued a rare emergency

order December 13, 2000 requiring out-of-state power suppliers to sell electricity to California at “just and reasonable” rates. Some generators had been refusing to sell to California because they feared they wouldn’t be paid by the state’s cash-strapped utilities (Chandler, 2001). November 1, 2000, the FERC had issued an order proposing “specific remedies to address dysfunctions in California’s wholesale bulk markets and to ensure just and reasonable wholesale power rates by public utility sellers in California” (FERC, 2000c, §1). By December 15, the Commission decided that the state was not acting quickly enough to implement their proposals and acted under its authority as granted by the Federal Power Act and released an “Order Directing Remedies for California Wholesale Electricity Markets” (FERC, 2000c, §1). The FERC press release regarding the December 15 order begins,

The Federal Energy Regulatory Commission today adopted remedies for the seriously flawed electric power markets in California by providing strong directives to the markets to self correct and to stem the level of current price volatility in the state’s spot electricity markets” (Federal Energy Regulatory Commission [FERC], 2000b, §1).

The November FERC report had proposed a number of structural changes in California’s markets; most important of these structural changes, the order eliminated the mandatory requirement that the three IOUs sell and buy all of their power through the California PX. The FERC also ordered the system operator to lift the existing wholesale price caps, which the commissioners believed were contributing to shortages. “In the long run, the order will restore the benefits of a competitive and well-coordinated marketplace,

protect consumers, ensure creditworthiness of market participants and work to facilitate additions to generation and transmission capacity” (FERC, 2000b, §1). Or so they thought; despite their intentions to mitigate price issues, the FERC’s initiatives actually made things worse, as wholesale prices rose even higher following the order (Joskow, 2002). At the same time, power suppliers said that going forward they would not provide further power to the market unless payments were accelerated.

Under increasing pressure from all sides, the CPUC held hearings in late December and subsequently announced that it would relent and allow rate increases, ending the freeze that had been in place since March 1998 when restructuring began. The CPUC said it would take actions necessary to avoid the continuing conditions that may jeopardize utilities’ ability to procure power for their customers (EIA, 2003). But the California regulators would not raise retail prices sufficiently to restore the utilities’ credit. The order issued by the CPUC at its January 4, 2001 meeting to provide interim rate relief for Southern California Edison and PG&E increased retail rates by one cent per Kwh for all rate classes, equating to a 7% to 15% increase for a period of 90 days while the utilities had requested 26% and 30% increases. The CPUC further antagonized the utilities by requesting an independent audit of two utilities (SCE and PG&E) to determine the need for the rate increases and to determine if the increases represented just and reasonable costs (EIA, 2003).

SCE and PG&E experienced increasing losses that totaled \$12 billion by January 2001, due to the escalating wholesale prices at the PX and the inability to collect adequate revenues to recover the costs of procuring power because of the low frozen

retail rates (EIA, 2003). As they had previously threatened, power suppliers began to refuse to sell electricity for fear of never getting paid. “In mid-January, PG&E and SCE ceased making payments for power, including payments owed for supplies delivered through the power exchange in November and December 2000” (Joskow, 2002, p. 40). They felt that the retail price caps tied their hands. Shortages and involuntary curtailments of power to individual consumers soon followed. The only thing that kept the lights on in California through early 2001 were emergency orders from the U.S. Department of Energy (and subsequently from the federal courts) requiring generators to stay online.

The Bush administration indicated that it would not continue the practice of forcing electric generators to supply electricity without reasonable assurances that they would ultimately be paid. New Secretary of Energy, Spencer Abraham extended for two additional weeks Bill Richardson’s emergency order directing power wholesalers to sell to California on January 23, 2001, but promised it would be the last extension to be granted (Chandler, 2001). The utilities themselves had no cash or credit left, so the State of California began to buy power to cover the utilities’ short positions during the second half of January 2001. The credit ratings of Southern California Edison and Pacific Gas & Electric were downgraded to “junk bond” status as their debts for purchased power increased and their ability to pay their power bills decreased; both utilities anticipated going into bankruptcy (EIA, 2003). The California Department of Water Resources (CDWR) was authorized to spend \$400 million to purchase electricity and sell it to consumers through the utilities in implementing the governor’s emergency order of Jan.

17, 2001. The CDWR was asked to negotiate contracts and arrangements for the sale and purchase of electricity and was chosen for its experience in making purchases as part of the State Water Project. The California Independent System Operator (ISO), retained the lead role in distributing energy and making the call on outages under the order, but had staff co-locate with the CDWR and the two agencies began working closely under the order (California Department of Water Resources [CDWR], 2001).

The state pursued long-term contracts in order to obtain better prices than were expected to be available in the spot market, to provide incentives to generators to sell electricity, to reduce suppliers' incentives to exercise market power in the spot market, and to encourage the completion of new generating plants. The CDWR contracts appear to involve commitments of about \$40 billion over the next ten years. (Joskow, 2002, p. 41)

January 2001 marked the beginning of the state's active participation in California's "deregulated" power industry.

Governor Gray Davis signed Assembly Bill X1 (AB X1) into law February 1, 2001. This emergency legislation officially authorized California's Department of Water Resources to continue to purchase power under long-term contracts for sale to PG&E and SCE. As with Governor Davis's emergency order in January, this law was passed because the two utilities were unable to obtain long-term power contracts with power generators based on their own creditworthiness. The Department of Water Resources was also authorized to sell \$10 billion in revenue bonds to fund its power purchases, which could not be funded through the state treasury. The bonds will be paid through electricity

rates over the next ten years. Rate increases were authorized after the 2002 election. Additionally, the law provided another \$500 million for the CDWR to continue purchasing power in the short-term in addition to the \$400 million it had already spent to prevent major blackouts in the State (EIA, 2003).

This bill would authorize the department to enter into contracts for the purchase of electric power. The bill would authorize the department to sell power to retail end use customers and, with specified exceptions, to local publicly owned electric utilities at not more than the department's acquisition costs, as specified. The bill would prohibit the department from contracting for the purchase of electric power on and after January 2, 2003. The bill would provide, with specified exceptions, that nothing in the bill authorizes the department to take ownership of transmission, generation, or distribution assets, as specified. The bill would also authorize the department to hire and appoint additional employees and contract for the services of public and private entities.

The bill would authorize the department to issue revenue bonds not to exceed a certain amount, containing specified terms and conditions, upon authorization by written determination of the department and with the approval of the Director of Finance and the Treasurer, as specified.

The bill would establish in the State Treasury the Department of Water Resources Electric Power Fund, to be continuously appropriated to the department, and available for the purposes described above. The bill would require all revenues payable to the department under the bill to be deposited in the

fund. The bill would require that payments from the fund be made only for certain purposes. The bill would transfer \$495,755,000 from the General Fund to the fund for the purposes described above and require repayment to the General Fund at the earliest possible time. The bill would appropriate \$4,245,000 to the department for the 2000-01 fiscal year for administrative cost incurred by the department for purposes of the bill. The bill would permit the Department of Finance to authorize the creation of deficiencies for this appropriation. (AB X1, 2001, §3, ¶2-4)

In addition to AB X1, Assembly Bill 5 (AB 5) and Assembly Bill 6 (AB 6) were also passed into law in early 2001. AB 5 meets the requirement of the FERC's December 15 Order that the stakeholder board of the ISO be replaced with non-stakeholders appointed by the governor. AB 5 also required the California Independent System Operator to publish a list daily on its web site of non-operational generating plants. AB 6 required that generating plants owned by utilities in California prior to June 1997 remain under CPUC jurisdiction; they cannot be sold before January 2006 (EIA, 2003).

Electricity customers in Northern California experienced three additional blackouts in January 2001 (CPUC, 2002). The California ISO had issued a Stage Three Electrical Emergency almost every day during the month of January (EIA, 2003, "Legislation," §6).<sup>1</sup> Also in January, Cal PX announced steps to downsize its operations by 15%. At the same time, Southern California Edison and PG&E were suspended from

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<sup>1</sup> Stage Three means that reserves have fallen to below 1.5%, and rolling blackouts could be required to maintain system integrity.

trading on the PX; it was said that they had defaulted under the agreed upon tariff and rate schedule. January 29, the FERC issued a compliance order to the Cal PX seeking to enforce the December 15 order provision that ensured sellers into the PX market who bid in excess of \$150/Mwh only receive their actual bids, rather than the highest bid price. In response, the Cal PX suspended its day-ahead and day-of market operations as of January 31, 2001. The Cal PX then filed an emergency motion with the court requesting a stay of the December 15th order (EIA, 2003).

Within two weeks of the suspension of operation by the PX, U.S. District Judge Frank Damrell in Sacramento issued an order forcing power generators to continue to sell power to California's troubled utilities, despite their "failure to maintain an 'approved credit rating.'" The court cited 'emergency dispatch' provisions in the ISO's rules and the severe harm if generators refused to provide power in California" (Brennan, Palmer, & Martinez, 2002, p. 47). This temporary restraining order was granted only hours before the emergency energy order the Bush administration had vowed not to renew was set to expire on February 6, 2001. Under Judge Damrell's order, Reliant Energy was required to continue selling power to California and two other wholesalers, AES Pacific and Dynegy Power announced that they would also continue to sell power to California (Chandler, 2001).

The state continued to increase its presence in the markets when Governor Davis proposed in mid-February 2001 to buy the transmission lines of the three IOUs. On February 23, Davis announced that he has reached an "agreement in principle" with Southern California Edison to buy its transmission lines for \$2.7 billion; at the same time,

SCE agreed to produce inexpensive power to sell to the state for 10 years. Davis did not, however, reach a deal with Pacific Gas & Electric or San Diego Gas & Electric (Chandler, 2001). A final agreement was not reached until April 9, 2001 and the agreement still required approval by the State Legislature to be completed (EIA, 2002b).

In March 2001, the CPUC announced an increase of retail prices of up 46%, a 3-cents-per-kilowatt-hour average rate increase, in an effort to help PG&E and SCE, and to begin to cover the cost of electricity. The new rates were structured to reward reductions in usage and to penalize consumer increases in electric power consumption. The increase in rates was intended to reimburse the CDWR for the costs it had incurred to purchase power; the portion of rates that the utilities retained was still effectively under the rate freeze. The increase was too late to restore the utilities' credit, however, as would be expected since they did not receive additional rate income under the increase! PG&E filed for Chapter 11 bankruptcy protection April 6, 2001.

“In response to the growing crisis, California officials intensified conservation efforts to speed the completion of new plants and continued to enter into long-term contracts with electricity suppliers” (Joskow, 2002, p. 42). Governor Davis had issued a series of executive orders intended to expedite the construction and permitting of generation capacity and boost the output from existing generation capacity. The orders provided incentives for renewable and distributed generation, bonuses for completing construction and bringing a plant online by July 2001, and a funding mechanism to help plants install emission control equipment and pay mitigation fees to compensate for increased operations. The governor hoped to increase generation capacity in California by

5000 Mw by the summer of 2001, another 5000 Mw by 2002, and a total of 20,000 Mw by 2004 (EIA, 2003). “The Southern California Air Quality District helped out by dropping power plants from the cap and trade program, and by replacing the NOx credit trading system with a modest penalty of \$7.50 per pound for exceeding emissions limits” (Joskow, 2002, p. 42). This was important because although \$7.50 was five times historical levels, it amounted to one-fifth the price to which they had risen during the crisis (Brennan, Palmer, & Martinez, 2002).

One-third of the generating capacity in the ISO’s areas remained out of service for most of the winter and spring of 2001, and imports remained low. As a result, supply emergencies were in effect for most of this period, despite the fact the peak winter demand was not unusually high and was far less than power typically supplied by in-state generators. Predictions made during early spring 2001 for the coming summer were bleak as well. Demand was projected to continue to grow, yet little new generating capacity was expected to come online. The system operator predicted there would be hundreds of hours of blackouts during the summer. During this period, forward prices for electricity for the summer months were as high as \$700/Mwh. (Joskow, 2002, p. 41-42)

Meanwhile, blackouts continued in Northern and Southern California during March 2001 (CPUC, 2002).

With blackouts looming and forward prices for electricity in the stratosphere, California and the other Western states also pressed Washington to restore caps on wholesale prices and force generators to make all the electricity they could

produce available to the market. FERC responded, albeit slowly, to the political pressure. (Joskow, 2002, p. 42)

On April 26, the FERC announced its plan for market monitoring and price mitigation designed to bring price relief to the California market and price certainty to buyers and sellers while promoting energy conservation and encouraging investment in generation and transmission. FERC required generators to bid all available supplies that had not already been scheduled into the auction market. (Joskow, 2002)

During periods when operating reserves fall below 7 percent, the market clearing price would be based on the highest bid of the highest cost gas-fired unit located in California that is needed to serve the California ISO load on any day in which a reserve deficiency is called. The gas-fired generators are required to submit their heat and emission rates to the FERC and the ISO, and the ISO will calculate the marginal cost for each generator, including operating and maintenance costs. Prices during the period of operating reserve deficiency will be limited to the marginal costs of the highest cost (as calculated by the ISO) generator brought online to meet demand (EIA, 2003, "Regulatory orders," §10)

The plan was widely criticized; the proposed price caps disappointed market advocates while state officials argued that the order only covered periods when power was highly scarce and did not go far enough (Chandler, 2001).

Among other things the plan gives the California Independent System Operator (CAISO) more control of power plant outages, establishes price mitigation measures based on market principals, and requires new reporting obligations that

will allow the FERC to better monitor the energy market in California. (EIA, 2002b, “Actions taken to contain the energy crisis,” §12)

Blackouts again occurred on May 7 and 8, 2001, affecting customers in both Northern and Southern California (CPUC, 2002). As a result of the continuing power outages, May 2001 was another busy month with multiple emergency bills passing through the California Legislature. May 16, Governor Davis signed Senate Bill 6X creating the California Consumer Power and Conservation Financing Authority. The California Power Authority was given broad powers to construct, own, and operate electric power facilities, and finance energy conservation projects (EIA, 2002b). Following the Power Authority’s first meeting, Chairman S. David Freeman issued a press release assuring California residents that “the Power Authority’s mission is straightforward: to provide the reserve power necessary to ensure that the market provides low-cost, available power sufficient to guarantee that Californians never again have to worry about rolling blackouts” (State of California Consumer Power and Conservation Financing Authority, 2001, §2). On May 22, 2001, Governor Davis signed another emergency bill, Senate Bill 28X, designed to shorten the times for reviewing an application for a new power plant, and re-powering, or upgrading, an existing power plant. The new law also allowed new owners to pay emission mitigation fees in lieu of obtaining actual emission offsets when the new owner could show that emission offsets were not available (EIA, 2002b).

Also in May, Energy Secretary Abraham ordered the Western Area Power Administration (WAPA), a 15-state power-marketing arm of the U.S. Department of Energy, to complete planning and to seek outside financing for increasing California’s

transmission capacity. This action aimed to reduce power transmission bottlenecks on Path 15, a high-voltage power line connecting northern and southern California (EIA, 2002b).

During the first week in June 2001, spot and forward wholesale prices finally began to fall. The decline continued for the rest of the summer, and by August prices returned to levels that had not been seen since mid-May 2000 and remained low for the rest of the year. Forward prices for 2002 also dropped dramatically.

(Joskow, 2002, p. 42)

June 19, 2001, the FERC extended and broadened its price mitigation and market-monitoring plan issued in April 2001, enlarging the plan to apply to all spot market sales at all hours, 24 hours a day, 7 days a week, in all 11 States in the Western Systems Coordinating Council. Their price mitigation efforts now applied to all spot market prices. When operating reserves went above 7%, prices could not exceed 85% of the highest hourly price that was in effect during the most recent Stage 1 reserve deficiency period called by the ISO (EIA, 2002b). “The ISO’s rules did not require generators to bid their available capacity until the FERC’s ‘must offer’ requirement was imposed on June 19, 2001” (CPUC, 2002, p. 56). Following FERC’s order that generators to bid all available power at a price of no more than \$92 per Mw; prices fell and power outages virtually ended (CPUC, 2002). At the same time, the FERC “instituted a proceeding to resolve claims that California had been overcharged for power in 2000 and 2001 and held out the possibility of substantial refunds” (Joskow, 2002, p. 42).

September 20, 2001 the California Public Utilities Commission (CPUC) Commission Decision (D.) 01-09-060 suspended Direct Access and ended retail electric choice in California. At the time, the CPUC estimated that about 5% of the state's peak load of 46,000 Mw was under direct access contracts, primarily with large industrial customers. Contracts in place were allowed to continue until their expiration (EIA, 2002b). The dream of deregulation of the electric power industry in California was dead.

The experiment now lies in ruins. Rather than becoming an example of how to transform the industry, it has become an international symbol of the dangers inherent in deregulation. The state's two largest utilities became insolvent in early 2001 and stopped paying for power. Supply interruptions soon followed, and the state had to intervene to purchase power to keep the lights on, spending \$12 billion in just a few months and committing Sacramento to another \$40 billion of long-term contract with unregulated electricity suppliers. Retail consumers now pay about 40 percent more for electricity than they did before the program began. (Joskow, 2002, p. 33)

#### Factors That Contributed to the Crisis

California's situation does not demonstrate the failure of electricity competition. To the contrary, it demonstrated the need to embrace competition fully, instead of tentatively. - Curt Hebert, Jr., FERC Commissioner, Congressional Testimony (Electricity markets in California, 2001a)

Some have attributed the state's energy woes to the "perfect storm" theory: California fell victim to a number of different problems that, taken individually,

wouldn't have equaled a crisis, but through a combination of a flawed deregulation scheme, the effect of the drought, and several other extenuating circumstances, California was caught in the eye of a storm. (Chandler, 2001)

According to Senator Dianne Feinstein, the lack of federal regulation of California's **deregulated** electricity markets is to blame for the crisis! "It was FERC's inability and unwillingness to regulate the California energy market in the first place that led to the severe energy crisis," she said in a statement released by her office (Stout, 2002, p. C1)

Putting aside Senator Feinstein's astounding theory, it makes sense to examine more closely each of the factors that pushed wholesale prices drastically above projected levels during the California electricity crisis of 2000-2001. Without a doubt, the largest factor in the California energy crisis was the flawed restructuring legislation (AB 1890) enacted by the state and discussed in an earlier section. Each of these additional factors is important on its own, and yet not surprisingly, they are each directly or indirectly tied to AB 1890 and the inadequate market structure it created in California. Table 2 enumerates the additional factors that contributed to California's electricity crisis.

Table 2

*Additional Factors Contributing to California's Electricity Crisis*

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Inadequate Infrastructure (due to Environmental Regulations)

Abnormally Hot Weather in May and June 2000 (which led to reduced imports from other Western states)

Large Increase in Demand

Caps on Retail Prices

Rising Natural Gas Prices

High Voltage Transmission Line Congestion

*Maintenance Problems and Outages at Electric Generating Facilities*

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Inadequate Infrastructure

In his testimony before the Senate in March of 2001, William Massey, an FERC commissioner, stated

First and foremost among the causes is inadequate infrastructure. Whether it be due to regulatory uncertainty, siting restrictions, process inertia, or simply poor judgment, not enough generation has been built in the last few years to keep pace with demand. (Electricity markets in California, 2001b)

There were many factors that contributed to the California energy crisis, but California's lack of new electric generation facilities was certainly one of the most significant.

Environmental and political concerns have traditionally outweighed other considerations when California is dealing with the electricity industry. The process of building a power plant in California is so long and arduous that many independent power

producers gave up during the 1990s and did not return, leaving California with a shortage of generation.

The California Energy Commission, the state agency with the authority to approve the construction of energy-related facilities, cites among the ‘critical issues’ affecting siting ‘availability of emissions offsets, . . . local agency and public opposition, [and] land use constraints.’ Some environmental advocates deny that environmental regulations have had much of an effect on power plant construction. (Brennan, Palmer, & Martinez, 2002, p. 51)

Of those that filed an application from 1997-2000, none were generating power as of 2001, 14,000 Mw of potential energy that could have been used during the crisis (Abraham, 2001). The state was able to rely for a while on imports from other states, but during 2000 and 2001, record high temperatures, drought-like conditions, and increased demand left California in the dark, literally.

According to the Department of Energy, “California’s generation capability decreased 2% from 1990 through 1999, while retail sales increased by 11%. Further, no new generation capacity has been constructed in California for over a decade” (EIA, 2002b, “Actions taken to contain the energy crisis,” §2). Those numbers are disputed by activist political groups like Public Citizen, however, which claim “California Energy Commission data clearly shows that 11 new power plants, with the capability to generate 1,200 Mw of electricity came online during the 1990s” (Slocum, 2001, p. 8). Even if Public Citizen’s claims were accurate, the 1,200 Mw they mention would hardly put a dent in the increase in electricity demand from 1996-2001 of 6,300 Mw and would only

make the state 'break even' on the 1,200 Mw lost due to plant retirement (Abraham, 2001). Not only has California failed to build new power plants, the state has lost generating capacity due to plant retirements as well. Secretary of Energy Spencer Abraham testified before Congress that "Over the past five years, electricity demand in California grew by 6,300 Mw while generating capacity decreased 1,200 Mw due to plant retirements" (Western energy problems, 2001).

Public policy analysts use terms such as NIMBY-ism and BANANA to describe attitudes towards development - Not In My Back Yard and Build Absolutely Nothing Anywhere Near Anything. While these terms are jocular on the surface, as with all jokes, there is an element of truth to the joke that must be considered. California has long had draconian policies that prevented electric utilities from building power plants in the state and for many years, the state of California has slowed the development of new electricity generation facilities within its borders for environmental reasons. Those responsible for the policy clearly believed that they were acting in the best interests of the citizens of the state and their natural environment and that their decisions were correct. Unfortunately, the ramifications of their actions seem to have been lost until the crisis hit.

Electric utilities, fearing they would be unable to recover their costs as the state moved away from rate-based regulation, stopped trying to build new generation facilities. The imposition of price caps on retail electricity prices under the state's restructuring plan has further deterred the development of new generation facilities. Consequently, the growing demand for electric power in the state has

been met through increased imports of electricity delivered through a national grid. (Brown, 2001a, §2)

“As the California economy grew, its energy demand also grew, but the ability to produce electricity in less expensive baseload plants did not expand. . . . Californians did not want the pollution associated with the additional electric power plants” (Brown, 2001c, §17). Additional power plants, many of our contemporaries appear to believe, are not necessary for the production of additional electric power. That this is widely believed is clearly implied precisely in the acceptance of the claim that somehow the existing power plants are sufficient by themselves to provide a reliable, trouble-free supply of power – or would be if only the power companies did not maliciously withhold a major portion of their capacity from the market.

Economist George Reisman of Pepperdine University takes a pessimistic view of the actions of Californians in regard to the construction of power plants and their environmental tenets in his article “The Great Power Shortage Myth”:

On this view, the reason the power companies seek to build additional power plants, it would appear, is only to gain the malicious pleasure of polluting the environment. And, of course, in some mysterious way, to earn additional profits from investment in additional capacity that is allegedly not needed and will only be added to the unused capacity that allegedly already exists (something, of course, which also implies a contradiction in the logic concerning the alleged goal of pollution of the environment). (2002, p. 4)

In all seriousness, Californians did seem to want to have it all. Despite the fact that they were starting with a less than ideal amount of generating capacity, agencies like the South Coast Air Quality Management District (which covers Los Angeles and surrounding areas) “put into effect an innovative ‘cap and trade’ system to control emissions of nitrous oxide and some other air pollutants from power plants and other large sources like oil refineries” during the early 1990s (Joskow, 2002, p. 39-40). These nitrous oxide (NOx) emission credits limited the amount of power that could be generated per year. If a plant did not have enough credits, it could face stiff fines and penalties for illegal generation. “Under this system, a plant had to turn in enough permits or ‘credits’ to cover its emissions each year. Between April and September 2000, the price of pollution permits to cover NOx emissions from power plants increased nearly tenfold” (Joskow, 2002, p. 39-40). Thus, as the ISO and the PX demanded more power from generating facilities as the crisis worsened, operators were faced with the choice of generating more power and acing large fines or obeying the environmental rules and being accused of withholding generation capacity by the state.

Restricting the growth of energy consumption to pursue other goals – such as a cleaner environment – will reduce economic growth. This is not to say that we should not pursue a clean environment. Rather it is to acknowledge that a clean environment has a cost. Some analysts have promoted the notion that a clean environment can be had without cost. That view helped shape the policies that created California’s electricity crisis. (Brown, 2001c, §45)

Limiting energy consumption in the pursuit of other goals – such as a cleaner environment – has a cost and California needs to consider those costs when formulating policy rather than ignoring them and hoping that they will go away or take care of themselves. “California focused too much on illusive short-run gains from low-priced power available where there was excess capacity and focused too little on creating institutions to support investment in generation and transmission facilities” (Joskow, 2002, p. 44). During the crisis, Governor Davis began to loosen the regulations on power plant construction and siting, but only through 2004. A permanent change in policy going forward would guarantee increased generation to address increased demand.

#### Abnormally Hot Weather in May and June 2000

Summer demand in 2000 was driven by extreme weather conditions throughout the West. . . . It is clear that all areas were hot early in the summer, in May and June, when signs of high prices and price spikes first surfaced in California.

(FERC, 2000a, p. 2-9)

Demand throughout the West was increased by very hot weather in 2000. There were significant increases in power loads in California and the rest of the area; these were most pronounced in May and June. “Average summer loads were 11% higher in May and 13% higher in June from the previous year” (FERC, 2000a, p. 1-2).

May 29, 2000, the high temperature reached 122 degrees Fahrenheit in Death Valley, California. “This reading not only broke the May state record of 121 degrees set in Blythe, California in 1910 and earlier years, but also set a new national record

maximum temperature for the month of May” (National Oceanic and Atmospheric Administration, 2000a).

The month of June was marked by record heat over portions of Northern, Central, and Southern California (see Table 3). An upper level high-pressure system centered off the Northern California coast brought hot temperatures to the region on the 14th of June (see chart). June 14, 2000, the downtown San Francisco station (Duboce Park) tied its all-time record high temperature with a reading of 103 degrees Fahrenheit.

Table 3

*Temperatures at Various Locations in California in June, 2000*

Location	Record	Old Record/Year
Santa Rosa	108	103 in 1966
San Jose	109*	107 in 1961
Moffett NAS	106*	102 in 1961
Oakland	106	95 in 1976
San Francisco (downtown)	103**	101 in 1961
Paso Robles	115 (Tied All-Time)	112 in 1961
San Luis Obispo/Cal Poly	91 (Tied)	91 in 1983
Cuyama	106 (June Record)	98 in 1979
Lompoc	88	85 in 1981
Mt. Wilson	95	92 in 1961

Note. \*New all-time high temperatures. (San Jose-old record was 108 on 7/14/1972 and Moffett NAS -old records was 105 on 7/17/1988). Data compiled from National Oceanic and Atmospheric Administration, 2000b.

While May and June were extremely hot throughout the West, July and August show a mixed pattern, with moderate to below normal temperatures outside the Southwest in July and hotter than normal temperatures throughout the region in August, but falling short of the extreme hot weather of June. ... Regardless of the absolute rank of the summer of 2000, it is easily seen that the summer marked a departure from the mild summers since 1998 when California began to implement restructuring. (FERC, 2000a, p. 2-9)

The high temperatures coupled with the lack of rainfall in the Western United States reduced hydroelectric power supplies in the summer of 2000 by more than a quarter below production in 1999 (Brennan, Palmer, & Martinez, 2002). Unusually low water levels cost about 3,000 megawatts of capacity from the Northwest (see graph below) (Schnapp, 2001, slide 6). To meet its demand for power, California typically relies on 7 to 11 gigawatts of out-of-state generation capability, of which a significant portion is hydroelectric capacity from the Pacific Northwest region. Higher demand throughout the rest of the west, combined with low water behind the dams that feed hydroelectric facilities in the Northwest, reduced supplies available for export to California. “The wide geographic distribution of hot weather in June 2000 placed new stresses on the generation and transmission system throughout the West, taxing the ability of exporting areas to keep up with both internal and external demands” (FERC, 2000a, p. 2-9).

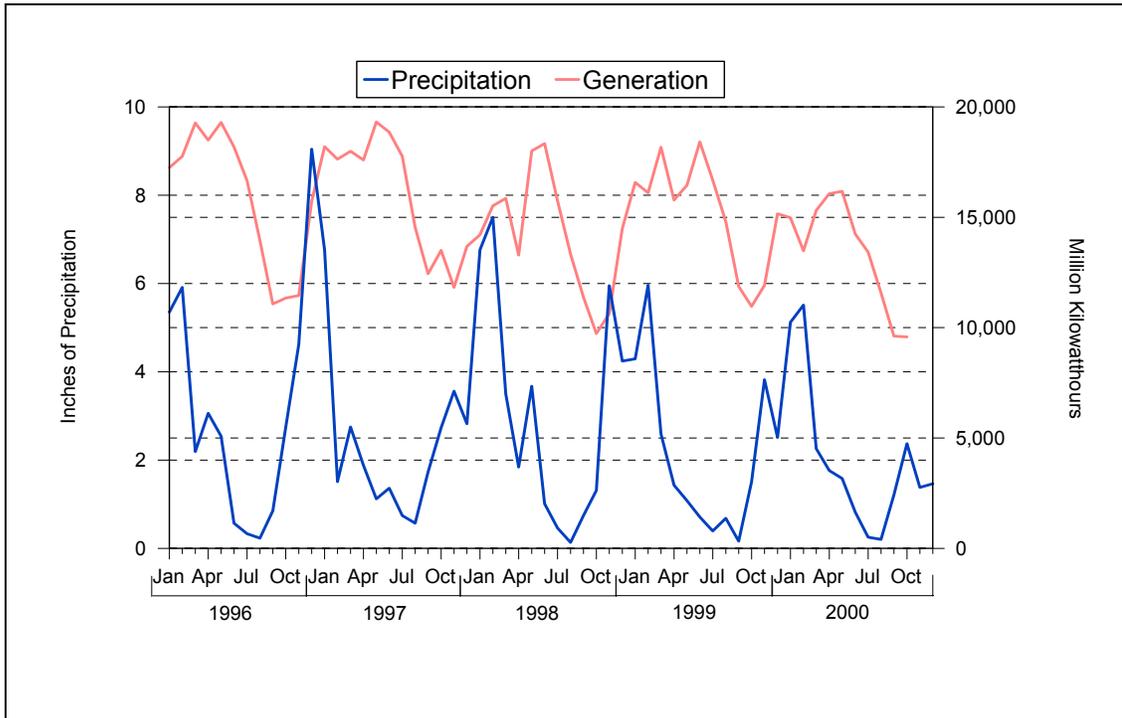


Figure 1. Pacific region precipitation and hydroelectric generation, 1996-2000

Seasonality is an important aspect of California’s energy woes. . . . the demand for electricity varies by season, with demand strongest in summer and second strongest in winter. When demand is weak in spring and fall, lower-cost baseload facilities can provide all or most of the electricity. As demand strengthens seasonally, electricity produced in higher-cost peaking facilities is drawn from other states. (Brown, 2001c, §15)

It was unfortunate that record high temperatures hit the West during a summer where California was already facing other stresses on its generation capacity. Under ordinary circumstances, it is likely that the warm weather and the decrease in imports would not have caused blackouts nor shortages, but coupled with the other factors in 2000, the weather was one more problem California was unprepared to address.

## Large Increase in Demand

Unprecedented economic growth associated with the dot-com economy and technology triggered vastly expanding electricity demand in California. Microchips and computers use a lot of energy, increasing demand at an accelerated rate throughout California and particularly Silicon Valley in the north. Electricity demand increased significantly throughout all of the Western United States during the summer of 2000 because of strong economic growth. During the 1990s, demand for electricity in California grew while capacity fell slightly. “Capability decreased 2 percent from 1990-1999, while retail sales increased by 11 percent” (Schnapp, 2001, slide 5). Because California’s legislation to restructure the electricity markets set retail prices caps and as a result retail prices did not respond to increase in wholesale prices, consumers of electricity had no incentive to reduce their usage. In the year 2000, California’s already growing electricity consumption surged 8%, virtually guaranteeing shortages. “Exhausting the capacity to produce electricity would have led to higher prices, rolling blackouts, or perhaps both – even had California not adopted restructuring” (Brennan, Palmer, & Martinez, 2002, p. 50)

Increases in population and economic growth in other Western states reduced electricity supplies that California might otherwise have imported (Brenna, Palmer, & Martinez, 2002). The growth of cities like Las Vegas and others in the West prevented California from importing the quantity of power that it once had from its neighbors, with or without increasing temperatures through summer 2000.

## Caps on Retail Prices

California suffered a double whammy during the crisis in relation to retail caps on prices. Not only did the state have caps in place as part of the original restructuring legislation, the CPUC was unwilling to respond to the request of the utilities during the crisis to raise the caps in tandem with the massive increase in wholesale electricity prices, dooming the IOUs to tremendous debts and no way to recover their outlays for power in the market.

The initial symptom of the California crisis was not blackouts or bankruptcy but the political turmoil associated with higher retail rates in San Diego in the summer of 2000, during the three month window in which its retail rates were not regulated. (Brennan, Palmer, & Martinez, 2002, p. 53)

“High wholesale prices resulted in a steep, but temporary increase in retail electricity prices in southern California in the summer of 2000” (EIA, 2002b, “Three major problems,” §3). In July 1999, San Diego Gas & Electric’s (SDG&E) retail price freeze had been eliminated as part of the deregulation plan and SDG&E customers were exposed to unregulated retail electricity prices. As a result of increased wholesale prices residential electricity rates had increased to approximately 16 cents per kilowatt-hour in July 2000, up from about 11 cents per kilowatt-hour in July 1999. Because the citizens of San Diego complained loudly about the increase, the California legislature established a ceiling of 6.5 cents per kilowatt-hour on the energy component of electric bills for residential, small commercial, and lighting customers of SDG&E (EIA, 2002b). While

wholesale prices remained relatively low, the retail caps did not have an adverse effect on the IOUs, but once prices began their climb, the utilities were doomed.

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 five or more 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. . . . The disastrous nature of keeping retail rates low when wholesale prices skyrocketed is obvious, but perhaps only in hindsight. Optimistic expectation when restructuring was enacted, supported by the first two years of the California electricity experience might have encouraged regulators to think that the retail controls were not going to be binding. Such controls may have been viewed as protection against market power in retailing, as long as the incumbent distribution utilities retained a near monopoly. The retail price may have been held down as part of a political bargain, to redistribute some of the expected gains from restructuring back to consumers in the form of lower power prices. Now, the political problem is to distribute the wholesale bill among distribution company stockholders (bankruptcy), electricity customers (rate increases), California taxpayers (state-funded bailouts), and the generation companies (FERC-ordered

refunds, court-mandated obligations to serve, and fractional debt repayment).

(Brennan, Palmer, & Martinez, 2002, p. 52)

In capping retail prices, the California Legislature and later, the Public Utility Commission discouraged conservation of electric power and kept demand artificially high through low prices. One key way to prevent a crisis in the future is to allow consumers to understand how much electricity actually costs and how they can change their usage to non-peak hours and pay less, most likely through the use of real-time meters. It is just another example of how the market was not really deregulated; you cannot have both a free market AND the safety net of retail price caps.

#### Rising Natural Gas Prices

One of the primary causes of the California electricity crisis in 2000 and 2001 was the rising price of natural gas. California's utilities rely heavily on natural gas-fired plants for generation and an increase in the price of gas had an immediate effect on spot market prices for electricity in California. When electricity demand increases and supplies get tight, it is the less efficient generators that are called upon to meet power needs and those are typically natural gas-fired generators (Brennan, Palmer, & Martinez, 2002; Electricity markets in California, 2001b). "[I]t is the entry and exit of small gas-fired plants that typically balance supply and demand in the wholesale market during peak use" (Joskow, 2002, p. 39). May 2000 saw natural gas prices begin their rise to unprecedented levels. The price of natural gas rose throughout the country during the second half of 2000, nearly tripling in the Western United States; in California, the spot prices for the gas were as much as five times higher than those in the rest of the United States during December

2000 (Brennan, Palmer, & Martinez, 2002). “[T]he natural gas prices in California alone would have increased the cost of electricity for California in December 2000 to more than \$1,000 per Mwh versus \$30 per Mwh in 1999” (California electricity market, 2002). As the price of gas rose, the cost of meeting peak demand also increased, leading to higher generation costs.

The increase in the price of natural gas was a contributing factor to rise in electricity prices in California, but what caused the increase in the price of natural gas? The gas industry was facing a crisis of its own in 2000. The FERC has found evidence that natural gas prices were manipulated during the same time period in 2000, although they were initially reluctant to correlate the two events.

The investigation by the energy commission has also found that the common method for reporting prices for natural gas and electricity trades – surveys published by industry publications – does not use statistically valid procedures and is subject to manipulation by traders who have an incentive to report false data to benefit their own trading positions. (Oppel, 2002, p. C1)

The fraudulent behavior of energy traders in artificially inflating prices was one of the major factors in the escalation of natural gas prices during the California crisis of 2000-2001.

A secondary cause of the natural gas crisis and an event that directly affected the supply of natural gas for California was the August 19, 2000 natural gas pipeline explosion that occurred about 20 miles south of Carlsbad, New Mexico (Schnapp, 2001). At 5:26 a.m. on August 19, an explosion occurred in one of three adjacent large natural

gas pipelines operated by El Paso Natural Gas Company. The interstate pipelines supplied both consumers and electric utilities in Arizona and in Southern California. The explosion involved one of El Paso's oldest pipelines, a section of 50-year-old pipeline 12 to 15 feet underground. A huge crater of mammoth proportions - 86 feet long, 46 feet wide, and 20 feet deep – is still visible (Hull, 2002). The Office of Pipeline Safety (OPS) of the US Department of Transportation's Research and Special Programs Administration issued an administrative order requiring the two pipelines adjacent to the failed line to be shut down completely immediately following the explosion. After it was determined that the cause of the explosion was an internal breach caused by corrosion, the OPS proposed a \$2.52 million civil penalty for El Paso Natural Gas Company (United States Department of Transportation, 2001). Undoubtedly, the closure of three pipelines directly supplying the state with natural gas heavily reduced the volume of gas flowing into California during the winter of 2000 and led to higher gas and electricity prices for many months.

California is still highly dependent upon natural gas-fired plants for the generation of its electricity. What is being done now to preclude another episode where natural gas prices spike out of control in the future? The fastest-growing energy source in the country, demand for natural gas is expected to grow 54% by 2025. In 1990, natural-gas-fired power plants were generating 1,220 megawatts of electricity. This year, natural gas will create 5,580 megawatts of power. While gas consumption has grown, the region's gas reserves have not kept pace and storing gas would give the West a hedge against high prices and unforeseen problems with supply. But utilities have made a decision to rely on

natural gas, without making the decision to increase storage (Ernst, 2003). Hopefully the utilities and generating facilities in California will begin to increase reserves of natural gas and enter into long-term contracts with gas providers that guarantee reasonable costs for the foreseeable future.

There is a looming shortage of natural gas even in 2003. Experts anticipate that by next fall or winter, rates for both electricity and natural gas could go up again. The most likely scenario factors in a low water year on the Columbia River, constraining hydroelectric production on the West Coast and forcing again a heavy reliance on natural-gas-fired power plants, squeezing an already tight supply and forcing natural gas prices to rise (Ernst, 2003).

Natural gas remains plentiful in North America. The problem is low gas prices over the past year haven't made exploration and production economical. Now, gas production is lagging and prices are climbing. Analysts are worried that gas prices could remain unusually high throughout the year. (Ernst, 2003, §8-9)

This could also spell trouble for California and the rest of the West if they again fail to plan ahead appropriately for their generating needs.

There is one bright spot on the natural gas horizon. Due to recent disclosures that during the 2000 crisis, trading data was falsified and prices were misrepresented to energy industry index publications, Dynegy, one of the most severe offender, has recently said the company's chief risk officer will verify all price information provided to industry publications. As one industry journalist said, it is a step in the right direction even though such verifications are not exactly an iron-clad pledge that all information will be accurate

(Perin, 2002). A heightened awareness of the possibility of a shortage of natural gas and a pledge from natural gas executives to provide verified price information should be successful in preventing another pricing crisis in the natural gas industry.

#### High Voltage Transmission Line Congestion

In addition to constraints on power generation, limits on transmission have hampered the delivery of electricity into and within California to areas most in need (Brennan, Palmer, & Martinez, 2002). “Transmission constraints, particularly along the notorious Path 15 in California, have played a role in local supply shortages and high prices. The critical transmission infrastructure has not kept pace with the needs of the electricity market” (Electricity markets in California, 2001b). Path 15 is an 84-mile stretch of electrical transmission lines in the Central Valley connecting Southern California with the northern part of the state. Capacity in this area is insufficient to carry the necessary electricity load, especially during peak hours (Western Area Power Administration [WAPA], 2003). “Path 15, the high voltage transmission line connecting southern California to northern California, became congested at times, reducing the flow of surplus electricity capacity in southern California to meet shortages in northern California” (EIA, 2002b, “Factors contributing to the energy crisis,” §5).

The CPUC has found that during the statewide blackouts of March and also May 2001, “the amount of excess capacity on Path 15 exceeded the amount of surplus ungenerated power in Southern California that was available to alleviate the blackouts in Northern California” (CPUC, 2002, p. 40). However,

[d]uring the three blackout days in January 2001 which only affected Northern California, ISO data shows that Path 15 had little if any excess capacity. Thus, even though substantial excess ungenerated power existed in Southern California on those days, this power could not easily be moved to Northern California without exacerbating heavy flows on Path 15. (CPUC, 2002, p. 41)

Upgrading Path 15 to remove transmission constraints is crucial to the reliability of power systems in California; it will create a more robust electrical market in the West by removing transmission constraints between southern and northern California (WAPA, 2003). Building a third transmission line and other upgrades will allow for about 1,500 Mw of additional electricity to be transmitted across the state. The path upgrade is planned to relieve constraints on the existing north-south transmission lines. Based on previous studies, this plan is estimated to increase the non-simultaneous path rating to 5,400 Mw from the existing 3,900 rating. The project's estimated cost is \$306 million (WAPA, 2003).

On September 25, 2001, the ISO filed testimony with the CPUC supporting the need for the Path 15 upgrade. The testimony stated it is

[E]conomically justified to reduce the risk of high prices associated primarily with the exercise of market power by strategically located generation and the existence of drought hydro conditions but also other factors such as the risk of a low level of new generation development in Northern California. (WAPA, 2003, p. 2)

An examination of historical congestion costs and studies undertaken by the ISO show that: 1. Between September 1, 1999 and December 31, 2000, congestion on Path 15 cost California electricity consumers up to \$221.7 million; and 2. Using reasonable assumptions, the \$300 million cost of upgrading Path 15 could potentially be recovered within one drought year, plus three normal years. Further, upgrading Path 15 is consistent with a broader strategy to put into place a robust high-voltage transmission system that supports cost-effective and reliable electric service in California and a broader and deeper regional electricity market (WAPA, 2003).

The California Independent System Operator's Board of Directors approved the upgrade of Path 15 in June 2002. Construction is set to begin in spring 2003 with the line energized in late 2004. It was in the 1980s that the WAPA and PG&E began studying the possibility of making additions to relieve constraints over Path 15. (WAPA, 2003).

Despite an Environmental Impact Statement in 1988 which concluded that construction of the upgrades would produce no significant adverse environmental impacts, the project was still not re-considered until May 2001, another casualty of California's extreme environmental policies.

#### Maintenance Problems and Outages at Electric Generating Facilities

According to the Department of Energy, "During 2000, approximately 10 gigawatts of generation capability was out of operation during some of the high demand times, which contributed to power shortages" (EIA, 2002b, "Factors contributing to the energy crisis," §4). When compared with statistics for the previous year, outages in the Cal-ISO area show an increase of as much as 2,900 MW. Interestingly, the first four

months of 2000 saw significantly lower numbers of planned outages than in 1999; unplanned outages were much higher in May through August, particularly in July and August (FERC, 2000a, p. 2-1).

“Based on an hour-by-hour and plant-by-plant analysis of this data, this report concludes that most of California’s power blackouts and service interruptions need not have occurred” (CPUC, 2002, p. 1). These disruptions affected roughly one-third of all Californians and “certain large commercial and industrial customers who had agreed to limited service interruptions in exchange for lower rates (‘non-firm’ customers) had to shut down operations much more frequently than was necessary or anticipated, often day after day” (CPUC, 2002, p. 1). In its report on the blackouts in 2000-2001, the CPUC “makes NO finding that any of the blackouts or service interruptions was unavoidable. The analysis merely establishes that Californians need not have experienced the large majority of blackouts and service interruptions in 2000-2001” (CPUC, 2002, p. 3).

There are two sides to the issue of generator outages during the 2000-2001 crisis. On the one hand, the CPUC report released in September 2002 accuses five independent generators of intentionally withholding output to raise prices. While they do not directly accuse the generators of criminal behavior, nor of collusion, they assert that there were strategic decisions made by the generators that adversely affected the supply of power in the state. They found that

The rate of plant outages during the energy crisis was well above historical averages. The fact that between 30% and 50% of the plants owned by the five generators collectively were out-of-service on so many days during the energy

crisis seems anomalous. Had the outage rate for these plants been consistent with historical averages, more blackouts and service interruptions could have been avoided. (CPUC, 2002, p.44)

The CPUC analyzed sales data, documents and electronic records of the five largest non-utility power generators between November 2000 and May 2001 and concluded that Duke Energy, Dynegy Power Marketing Inc., Mirant Americas Energy Marketing, Reliant Power Generation, and AES Corporation/Williams Energy Marketing and Trading Company did not offer the state all available electricity from their power plants despite emergency requests from power grid operators (Gaudette, 2002).

The combined data shows that between 37% and 46% of the total generating capacity of the five generators was either not available, or not supplied, on the 32 statewide blackout and service interruption days that are the focus of this report. (CPUC, 2002, p. 3)

“During all the statewide blackouts and service interruptions, the five generators also failed to bid all available power into the ISO’s markets” (CPUC, 2002, p. 3).

Throughout the crisis, the ISO was declaring emergencies on an almost daily basis and urgently seeking all available power, making it obvious that wholesale electricity generators should have bid in, or otherwise provided, every last megawatt of power in order to help alleviate the crisis. There are a number of possible reasons why a given generator did not generate power on a given blackout or service interruption day. . . . None of these reasons provides a

justification for the generators' failure to bid in all available power on a blackout or service interruption day. (CPUC, 2002, p. 5)

The five generators responded to the CPUC report through an industry spokesperson and denied any wrongdoing. They attribute the interruptions to the increase in demand and assert that without the necessary maintenance, the whole grid might have failed, creating a much bigger emergency than random outages. "Industry representatives, however, say the numbers do not tell the whole story. Instead, they maintain the companies bumped output up or down based on orders from the CA ISO, which manages much of the state's power grid" (Gaudette, 2002, §4). An article in the Washington Post quotes Duke spokesman Patrick Mullen; he said Wednesday that the PUC report contained "blatantly false and misleading statements" and that the North Carolina-based company made all electricity available to the state when its power plants were not down for maintenance or to avoid breaking air pollution standards, statements echoed by representatives of other companies (Gaudette, 2002). Similar sentiments were echoed by Jan Smutny-Jones, executive director of the Independent Energy Producers, a trade group:

California's merchant generators ran at historically high levels to power our state throughout the crisis. . . . The average age of these plants is over 36 years old. Despite their age, California's power plants ran 88 percent harder in 2001 than they did in 1999, and some increased output as much as 206 percent to meet our state's energy needs, making up for decreased energy imports from the Northwest caused by a drought. (Broder, 2002, p. A22)

The industry was not alone in its dispute of the CPUC report. “Despite the claims to the contrary, we found no seller market power abuse. Indeed, we found that sellers mostly operated their units beyond the limits of their engineering capabilities” (California Electricity Market, 2002). Notwithstanding Congressional testimony to the contrary, the CPUC clearly believed that the generators were withholding more power than they should. Page 6 of their report states that

further legislative action may prove necessary to protect Californians from future power shortages. Specifically, if conditions warrant, the California Legislature could modify or repeal Public Utilities Code Section 216(g), which provides that the generators are not treated as public utilities under state law solely by virtue of their ownership or operation of wholesale electrical generation facilities. This reform would make it possible for California to assure that generators are not able to withhold power in the future. (CPUC, 2002, p. 6).

Apparently the CPUC has concluded that threatening generators with state takeover of their facilities is a good way to prevent future crises, showing just how far from deregulation California has drifted.

### Conclusion

The complete solution to the California electricity problem includes a combination of long-term contracting and real-time pricing for consumers. Consumers facing a single constant price for electricity have no more incentive to conserve during peak hours, such as on a hot summer afternoon, than during low consumption times, such as during the night. They also have no incentive to shift

consumption away from times when production capacity of the grid is strained and production costs are highest. Real time electricity pricing involves adjusting the retail electricity price to reflect the marginal or opportunity costs to producers. It leads to lowering the overall consumption of electricity and creates opportunities for customers to save on their bills. (Hutchinson, 2001, §16)

Unless the state government undertakes dramatic change to its troubled electricity structure, California will remain vulnerable to additional crises in the future. Its first priority should be to completely redesign the market. Unfortunately at this time it appears that the government is more eager to re-regulate and protect consumers from high prices than address the issues raised by a free market.

## CHAPTER 4

### TEXAS

Retail competition for all customers of the electric utility industry in Texas began January 1, 2002, in accordance with Senate Bill 7, signed June 18, 1999, by then-Governor George W. Bush. According to the Texas Public Utility Commission (TPUC), the law will lower the price of electricity over time, make new service products available, and assure the continuation of reliable service for Texas electric consumers while giving them more choice and control of their electric power. “The rules that have been developed in Texas have planned to take the best features from other areas while at the same time avoiding the worst features” (Texas Public Utility Commission [TPUC], 2001, p. 3).

The TPUC 2003 Report to the Legislature estimates that retail customers saved, at a minimum, over \$1.5 billion in electricity costs during the first year of competition, with residential customers saving approximately \$900 million (TPUC, 2003a). While only about 5% of residential customers had switched to competitive retailers by December 2002, almost one-third of the state’s commercial and industrial customers had changed providers and as a result they have seen significant savings, paying approximately \$645 million less in 2002, compared to their 2001 bills (TPUC, 2003a).

Overall, about 23 percent of the state’s electricity load has been moved to a competing electric company. The PUC says that about 80 percent of commercial

and industrial customers have either switched companies or renegotiated their contracts with their existing providers. (Reddy, 2002b, §24-25)

With nearly 21 million residents in the year 2000, the State of Texas has the second largest population of any of the states and is the largest state in land mass; since 1990, the state's population has increased 22.8% (Doolittle & Egan, 2003). Statewide, Texas spent nearly \$20 billion on electricity in 2002, yet less than 1% of its power is imported from other states during peak demand.

Texas has considerable diversity in its generation of power; plants produce electricity from natural gas and coal, as well as renewable fuels, such as wind, water, and solar. As part of its restructuring legislation, the state committed to using more renewable sources of power by 2009. In the case of wind, the state is ranked third in the world behind Germany and Spain and ahead of the other 49 states in installation of new wind-energy generators (Hoffman, 2002a). But the fact remains that Dallas-based TXU is the largest buyer of wind power in Texas and the third-largest purchaser in the nation and still only about 2 percent of its total power is generated from wind (Reddy, 2002a). Despite significant decreases in cost since the 1970s, wind energy continues to cost more than natural gas, oil or coal. Wind generators can now bring power to market at 4 to 5 cents a kilowatt-hour, although they are dependent upon on a controversial federal 1.5-cent per Kwh production tax credit to make wind price-competitive. First implemented in 1992, the tax credit lapsed in 1998 was renewed through 2000, before lapsing again, and currently ends again at the end of 2003, with no word yet on getting it renewed until 2007 (Hoffman, 2002a).

Despite its continued unpopularity with environmentalists, nuclear power appears to be making a comeback of sorts. Texas has four operating nuclear power plants – Comanche Peak units 1 and 2 and South Texas units 1 and 2 – that together produce almost 5,000 Mw of electrical energy at a cost that is less than even the newest power plants that burn natural gas.

The fact is, nuclear power is growing, adding the equivalent of 24 large power plants since 1990. Steady improvements in the efficiency of nuclear plants led to the production of 768 billion Kwh of electricity in 2001, up from 754 billion KWh in 2000 and 557 billion Kwh in 1990. (Poston, 2002, §5)

Efficiency is at an all-time high with improved and significantly shortened maintenance schedules that allow a plant to run nearly two years without a shutdown for refueling. The largest factor causing nuclear power's surge in popularity remains its cheap output: generating costs average 1.7 cents per Kwh when electricity produced from natural gas costs nearly twice as much (Poston, 2002). Another reason for nuclear power's comeback is that plants produce no carbon dioxide or other airborne emissions, as do coal, oil, and even "clean" natural gas facilities (Poston, 2002).

The idea of building another nuclear plant might seem like a pipe dream to some, but it isn't. The Nuclear Regulatory Commission has pre-certified the designs of three types of advanced nuclear plants for construction. At least three utilities have designated sites for new units and are seeking approval from the commission under its new review process. One critical benefit of the new review process is that it should only take 18 to 30 months. Under old procedures, securing permits

to build and operate nuclear plants could take a decade or more. (Poston, 2002, §12)

With its considerable demand for electric power, the Texas government has long worked to create an environment that encouraged sufficient generation and has provided incentives to producers. Consequently, significant investments in generation have been made in Texas over the last few years; forty-seven new generation plants were installed in Texas between January 1999 and August 2002, giving the state reserve margins of power that were expected to be in excess of 35% for 2002 (TPUC, 2003a).

#### Restructuring Begins

Restructuring of the electricity sector in Texas occurred in two phases. The first began in 1995, with the passage of legislation to open the wholesale market to competition. This legislation, House Bill 2128, is also referred to as the Public Utility Regulatory Act of 1995 (PURA '95) as it amended the Texas Public Utility Regulatory Act. As a part of these amendments, independent power producers (IPPs) were permitted to construct generation facilities and were granted access to transmission lines so that they could move power to wholesale customers (TPUC, 2003a). Allowing electric utilities to purchase power from competing generation companies prompted the construction of many new, more efficient power plants, further increasing Texas' already substantial electric power generation capacity.

A vibrant wholesale market is important for a retail market to work. The Federal Energy Regulatory Commission (FERC) introduced competition in the wholesale sale of electricity in the rest of the country at the same time that it was introduced

in Texas. Wholesale competition has allowed new market participants to build generation facilities and sell the output at market-based rates. In Texas and in a number of other areas new merchant power plants are being planned and built to sell power into competitive wholesale and retail markets. (TPUC, 2001, p. 4)

The 1995 bill created two roles: generation of electricity and distribution and sales. Under the plan, electricity could be generated by the existing utilities or a new entity called an exempt wholesale utility generator (EWG). The existing utilities continued to oversee the transmission of electricity as well as the marketing to retail consumers (The Road to Deregulation, 2003).

As part of the Public Utility Regulatory Act in 1995, The Electric Reliability Council of Texas (ERCOT) was designated as the region's Independent System Operator (ISO), with responsibility for security of the bulk power system, market facilitation, and transmission coordination and planning (Kiesling, 2001). ERCOT has played a vital role in the Texas electric power sector since its inception. As the corporation that administers the state's power grid it serves about 85% of the electrical load within the state of Texas and oversees the operation of approximately 70,000 Mw of generation and over 37,000 miles of transmission lines (Energy Institute, 2002).

ERCOT is one of ten Regional Reliability Councils in the North American Electric Reliability Council (NERC) organization and represents a bulk electric system located totally within the State of Texas (although it does not include all of the state). The membership of ERCOT currently consists of retail customers, six cooperatives and river authorities, six municipals owning generation or

transmission, four IOUs, thirteen independent power producers, twenty-three power marketers and fourteen transmission dependent utilities. (Energy Institute, 2002, p. 3)

Designed to level the playing field for all participants following regulation, ERCOT provides unbiased and impartial access to the transmission system. Power within the ERCOT wholesale market is traded primarily on a bilateral basis, allowing retailers to buy power via long-term contracts and/or to buy power for future delivery, thereby reducing their exposure to the risks of higher prices in the wholesale market. ERCOT is entirely within the boundaries of the State of Texas, and so falls exclusively under the jurisdiction of the TPUC; the production and sale of electricity in Texas is not subject to regulation by the FERC. For areas outside of ERCOT, FERC is the primary regulatory authority for the independent organization.

ERCOT also now has the responsibility of managing the flow of electricity such that reliability is maintained across the network. To perform this task, ERCOT manages and operate markets in which generators bid to provide the services needed to ensure that supply and demand balances in real time. (TPUC, 2003, p. 19)

In its 2003 Report, *Scope of competition in electric markets in Texas*, the TPUC gives a detailed description of the process whereby ERCOT operates:

REPs generally provide electricity to customers by purchasing wholesale electricity from generators located within the ERCOT region. REPs use a Qualified Scheduling Entity (QSE) to schedule power through ERCOT to meet

their customers' daily energy needs. All schedules and transactions within ERCOT 'flow.' This means that schedules are not contingent upon a determination that there is adequate transmission capacity available to move power from the generation resource to the load. If all of the schedules submitted for a particular day or hour cannot be accommodated because of transmission constraints, ERCOT uses a market-based congestion management system to clear the congestion and maintain reliability. The costs associated with clearing the congestion are assigned to market participants under methods outlined in the ERCOT Protocols and approved by the Commission. (p. 19)

Unlike the California Independent System Operator, the ERCOT ISO is strictly a provider of information and a coordinator of supply and demand when faced with extraordinary circumstances. Participants in Texas electric markets have the use of all types of financial instruments, including spot and forward contracts and puts, calls, swaps, and collars to manage risk. "This flexibility will create a more stable environment for both buyers and sellers, which will encourage alternate supplier entry and further competition. Stability is also likely to translate into price stability for retail customers" (Kiesling, 2001, p. 16-17).

In 1997, the Texas Legislature debated retail competition but failed to pass a bill.

#### Senate Bill 7

The second phase of competition began when Senate Bill 7 (SB 7), the 1999 Texas Electric Choice Act, was signed into law June 18, 1999. The objective of the Texas law to restructure the electricity markets is to allow competitive markets to work

wherever possible and to regulate only those functions that are truly monopolistic and deemed to require government intervention, according to the TPUC (TPUC, 2003c).

Senate Bill 7, like the Public Utility Regulatory Act of 1995 before it, amends the Texas Public Utility Regulatory Act; taking competition a step further past the wholesale markets, it permits providers to compete for retail customers who are then allowed to choose their electricity supplier in competitive areas.

Texas lawmakers changed state law to allow customers to have more control over their purchase of electricity because they believe competition is good for Texas. Over time, competition for electric service is expected to lower rates and speed the development of new products and services. Competition is also expected to create new jobs, stimulate economic development and help our environment. (TPUC, 2003c, p. 1)

Municipally owned utilities and the governing boards of co-operatives were given the authority to decide if they wanted to participate in the restructuring of the retail market. The investor-owned utilities were the only participants required by SB 7 to open their service to retail competition. Senate Bill 7 applies to all investor-owned utilities in the state of Texas – with only one exception. Investor-owned El Paso Electric was excluded by SB 7 from competition until provisions of the company’s 1992 bankruptcy expire in 2005; the Panhandle won’t be eligible for deregulation until at least 2007 (Hoffman, 2002b). As previously mentioned, the state’s 78 electric utility cooperatives and 77 municipally owned utilities are allowed to choose whether and when to open their systems to retail competition. Municipal-owned utilities and electric cooperatives

together make up about 30% of the electric load inside ERCOT and so far none have chosen to compete. About 25% of the state's electric customers and 40% of power usage remained regulated in December 2002.

Senate Bill 7 was intended when enacted to address a multitude of potential issues or problems within the Texas electricity market following deregulation. Several strategies were a direct result of the examination of California's flawed restructuring legislation; several mirror tactics used in California.

State lawmakers learned from the mistakes and successes of other states and nations before drafting Texas' 1999 deregulation law,' said Kathleen Magruder, vice president of government affairs at New Power Co. 'All things considered, it is the perfect piece of legislation,' she said. (Oldham, 2002, §19-20)

There were numerous aspects of SB 7 that have made it the leading example to date of state restructuring legislation. Table 4 lists the key legislative decisions and policies concerning electricity in Texas

Table 4

*Key Restructuring Policies in Texas*

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Retail Default Price Determination / For-Profit Market Trading

Unbundling of Utilities / Generation Sell-Off / Retail Electric Providers (REPs) /

Provider of Last Resort (POLR)

Stranded Costs

“Price to Beat” / Rate Freeze

Renewable Resources / Low Pollution

Education Campaign / Discounts for Low Income Customers

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Retail Default Price Determination / For-Profit Market Trading

Texas implemented retail default rate determination while California chose to determine its default price by administrative cost allocation. The deregulation framework in Texas was designed to allow trading through multiple for-profit markets, rather than directing it to a single, nonprofit agency like the CAISO.

Although transmission and distribution facilities remain regulated by the Commission, the prices for the production and sale of electricity to both wholesale and retail customers are now predominantly dictated by market forces instead of regulatory rate-setting procedures. . . . retail prices in the marketplace are not subject to [Texas Public Utility] Commission regulation or oversight, and customers are free to choose among the variety of options in the marketplace.

(TPUC, 2003a, p. 17-18)

A key feature of the ERCOT competitive retail electricity market is that it is not based on the “pool” model, but instead on long-term bilateral transactions directly between energy buyers and sellers. Markets in Texas include incentives for the continuing expansion of capacity when needed as bilateral contracts allow both suppliers and consumers to hedge against future price volatility. Retail competition allows for passing the wholesale market price fluctuations on to end-users, even though fluctuations could just as easily mean increases in price as decreases. Nevertheless, long-term contracts should make for less volatile price fluctuations over the long term (Energy Institute, 2002, p. 9).

There is a \$1,000 Mwh cap on prices in Texas and also in the Northeast, but not in California or 10 other Western states.

Unbundling of Utilities / Generation Sell-Off / Retail Electric Providers (REPs) /  
Provider of Last Resort (POLR)

The investor-owned utilities (IOUs) were required by SB 7 to separate their companies into three functions: power generation, transmission and distribution, and retail electric provider services, prior to the January 1, 2002 start date of retail competition. Each of the three functions must be operated as a separate company. (This model has not been adopted by any other state in their restructuring.) More than just three separate functions, SB 7 required the utilities to form three individual companies: a power generation company (PGC), a transmission and distribution utility (TDU), and a retail electric provider (REP). Power generation companies (PGCs) are intended to

operate as wholesale providers of generation services, in the same manner as independent generators.

The transmission and distribution utilities (TDUs) remain regulated by the TPUC and are required to provide non-discriminatory access to the power grid at rates and with terms of access determined by the TPUC. It was this choice that is viewed as one of the strongest points of the Texas legislation. “The decision to deal with wholesale issues at the outset by leveling the playing field for equal transmission access promises to create a strong retail market” (Kiesling, 2001, p. 15).

One aspect of the plan that is similar to another state is the mandate that no single power generation company is allowed to own and control more than 20% of the capacity in a power region; this mirrors Pennsylvania’s plan. The legislation limits the market power of incumbent suppliers by prohibiting the affiliated companies of TDUs from owning more than 20% of the generation capacity within a power region. Senate Bill 7 also requires utilities with generation capacity to sell at least 15% of that capacity through auctions to ensure sufficient capacity for competitors to resell. Those utilities that have yet to recoup investment costs that they will not recover through the sale of their generation capacity will be able to impose a fixed transition cost on consumers, or to recoup these stranded costs through securitization (Kiesling, 2001).

A booklet was sent to all residents in Texas by the Public Utility Commission prior to January 1, 2002: “Your Power Guide to Electric Choice: A Guide to Understanding Electric Competition in Texas.” Within its pages lies a basic description of what customers can expect under a deregulated system of electric generation. Perhaps

the best explanation of the thinking behind the plan to keep transmission and distribution regulated lie in its pages:

In the past, all parts of your electric service (generation, transmission and distribution, and retail sales) were provided by your local electric utility. With Electric Choice, these parts are separated. The delivery of electricity across the wires and poles is called transmission and distribution. These services will continue to be provided by your local utility, which will be called your local distribution utility (LDU). The delivery of your electric service by your LDU will continue to be regulated by the PUC of Texas to ensure safety and reliability. (TPUC, 2003c, p. 3)

Retail electric providers (REPs) operate as the named retail providers of electricity and energy services, and have the primary contact with retail customers. Under restructuring, consumers are given the opportunity to shop for a REP which will then in turn purchase electricity from a generation company and sell it to the customer. As mentioned above, the REPs will deliver the power over the wires of the regulated local transmission and distribution companies.

The TPUC's brochure also details the protections electric customers can expect and describes the limitations and responsibilities placed on the Retail Electric Providers (REPs) under SB 7:

- It is illegal for a REP to switch your service without your permission. This is called "slamming."
- REPs must follow PUC standards to investigate customer complaints.

- No REP can release any customer-specific information to any other company without that customer's permission.
- REPs may not discriminate.
- All REPs must provide customers with an Electricity Facts Label. (The Electricity Facts Label contains standardized information about rates, contract terms, sources of power generation, and emissions.)
- REPs must provide you with a "Terms of Service" document. This is your contract for electric service. You should review it carefully.
- REPs must provide you with a "Your Rights as a Customer" disclosure. This informs you of your customer rights as mandated by the PUC.
- REPs must make customer information available in Spanish. Additionally, a REP must make all materials available in the language(s) in which they market electric service.
- All REPs are required to offer customers an Average Payment Plan. (TPUC, 2003c, p. 9)

For those customers who 'choose not to choose' a new REP, electric service is provided by the affiliate REP, a company associated with the company that runs the local wires near the customer. These companies are then required to offer those customers a standard rate for electric service called the 'Price To Beat' which has been set by the PUC and reflects at least a 6% decrease in electricity rates. After January 1, 2002 consumers were free to choose to switch to a new REP at any time.

One potential problem with Texas' electricity market restructuring is a regulatory order that may leave utilities in the position of acting as providers of last resort. Providers of last resort provide electricity service at regulated rates to those who do not choose or are left without competitive suppliers. Providers of last resort could take losses if they were required to supply electricity at lower rates than prevail on the free market. (Brown, 2001c, §6)

As a failsafe to protect consumers, the restructuring legislation creates the "Provider of Last Resort" (POLR). Should a customer's REP terminate their contract for non-payment of electric bills, the REP is not allowed to turn off electric power to the customer. If a contract is terminated by an REP the power remains on and service is automatically transferred to the Provider of Last Resort. The POLR is intended as a temporary solution until another REP agrees to serve the customer; the POLR is allowed to require a deposit and charge higher rates. Only the POLR may turn off a customer's electricity for non-payment.

#### Stranded Costs

Under SB 7, Investor-Owned Utilities in Texas may recover their stranded costs, and the cost of investments previously authorized by the TPUC that might not be recoverable from customers in a competitive market. SB 7 creates two methods for the recovery of stranded costs: competition transition charges and securitization, separately or in combination. The TPUC will determine how much utilities may recoup from their customers and "over recovering" is explicitly prohibited as excess revenues must be

returned to ratepayers. The adjustments will go on for years and will take into account multiple market factors.

The recovery of stranded costs has been the most controversial and contested element of electric industry restructuring. SB 7 provides that an electric utility is allowed to recover all of its net, verifiable, nonmitigable stranded costs incurred in purchasing power and providing electric generation service. However, SB 7 also requires utilities to pursue commercially reasonable means to reduce their potential stranded costs, including good faith efforts to renegotiate above-market fuel and purchased power contracts. Under SB 7, stranded costs will be recovered from all existing or future retail customers, and customers cannot avoid stranded cost recovery charges by switching to another electric service provider or on-site generation (Vinson & Elkins, 1999).

Utilities may choose to recover stranded costs through a competition transition charge, which is allocated among customer classes in accordance with the methodology used to allocate the costs of the utility's underlying assets in the utility's most recent rate order. Utilities with stranded costs will be required to use these revenues to reduce the net book value of its stranded costs. However, utilities without stranded costs may use any excess revenues to improve or expand transmission or distribution facilities or to improve air quality. However, any unused revenue must be flowed back to the customers. Utilities must file an annual report detailing their costs and revenues to aid in the determination of invested capital. To ensure that utilities do not over-recover for stranded costs, SB7 calls for a "true-up proceeding" that will finalize stranded costs and reconcile

those costs with the estimated stranded costs used to develop the competition transition charge. (Vinson & Elkins, 1999, “II. Recovery of stranded costs,” §3)

Securitization is the other option available to those utilities seeking to recover their stranded costs:

This [securitization] allows utilities to recover much of their stranded costs up front by issuing bonds and giving bondholders the right to receive transition charges. This type of debt will lower the carrying costs of assets relative to the costs that would be incurred using conventional utility financing methods.

Utilities who choose this option may securitize 100% of regulatory assets and up to 75% of estimated stranded costs. These factors ensure that securitization will provide tangible and quantifiable benefits to both utilities and ratepayers. Utilities who choose this option must apply to the Commission for a financing order detailing the amount of regulatory assets and stranded costs to be recovered and the period over which the transition charges will be recovered (not to exceed 15 years). Like the competition transition charges, the transition charges authorized by a finance order would be nonbypassable, and an annual true-up proceeding would prevent over-collection of stranded costs. (Vinson & Elkins, 1999, “II. Recovery of stranded costs,” §4)

“Price to Beat” / Rate Freeze

Lawmakers did not mandate price caps; rather, the “Price To Beat” serves a de facto role and is effective for only five years. REPs were required to lower rates 6% from existing frozen rates (they were frozen in 1999 as part of wholesale restructuring) for

residential and small commercial customers who did not choose a new provider. That price is known as the “Price To Beat” although it was anticipated that new companies would offer electricity at even lower rates initially. The Price To Beat will stay in effect for 36 months from the launch of the deregulated market (2005) or until rivals control 40% of the residential and small-business markets in the investor-owned utility’s service areas.

This price-to-beat concept is perhaps the single most important provision of SB 7 with respect to the development of the competitive retail market for residential and small commercial customers. If the price to beat charged by the affiliated REPs is below market rate, other REPs will be unable to compete for customers, and competition will not develop. . . . In most areas of the state that are open to competition, these price-to-beat rates charged by affiliated REPs provide a 6% reduction from January 1999 market rates, adjusted for changes in fuel costs. These rates appear to have remained above market rates, permitting other competitive REPs to enter the market and profitably serve retail customers. Generally, REPs must be able to price at a level sufficient to recover expenses associated with paying for transmission and distribution service, wholesale generation costs, and costs related to operating a retail business. This difference between the price-to-beat and the costs incurred by non-affiliated REPs is referred to as ‘headroom,’ as it defines the range of price in which non-affiliated REPs can profitably price their services and still entice customers to switch by providing a discount off the price to beat. (TPUC, 2003a, p. 19)

The rate cut was intended to guarantee that all customers in Texas benefit from lower electric rates, even if they remain customers of their original incumbent utility.

The retail competition model in Texas provides price certainty for residential and small commercial customers for five years. A retail electric provider that is affiliated with an electric utility must offer these customers a fixed “price to beat” when competition begins. This rate is a price floor for three years or until the affiliated retailer loses 40% of its residential and small commercial load. The price to beat remains in effect as a mandatory offer of the affiliated retailer for five years, however. The price to beat will act as a price ceiling for the five-year period. This will give the legislature and the PUC time to assess the market and the extent of competition and make changes in the market rules, if necessary, prior to the removal of this price protection. (TPUC, 2001, p. 39)

Because the utilities can request rate adjustments based on changes in the cost of fuel for generating electricity, there has been some concern that the utilities will take advantage. One of the biggest sources of disagreement in the deregulated system has been the formula used to determine rate-increase requests. Some consumer groups claim that in an effort to prove that competition is working, the ‘price to beat’ has been artificially pushed higher (Reddy, 2003).

The law allows utilities to request changes to the ‘price to beat’ if they demonstrate that their fuel calculations do not reflect ‘significant changes in the market price of natural gas and purchased energy used to serve retail customers.’ Different groups have taken that to mean different things. The PUC wrote

regulations that allow a fuel price adjustment if an average of natural gas prices on the market goes up 4 percent over a 10-day period. An incumbent utility can request a change in the fuel formula twice a year. The reasoning: Most competing companies buy their electricity from power plants that use natural gas. If gas prices go up, and incumbent utilities' rates don't go up along with them, then competitors won't have a price differential on which to compete. . . . Under the old system, utilities could recover all of their costs for fuel, and consumers paid interest on that fuel as it was spread out over monthly electricity bills. Now, utilities have the burden of balancing their fuel costs with the risk of losing customers when gas prices go up, Chris Schein of TXU said. 'Critics of the system want it both ways,' he said. (Reddy, 2003, §18-24)

The Texas rules will encourage new competitors to enter the retail market. The price to beat for residential and small commercial customers will freeze the incumbent retailers' rates at a level that the new competitors should be able to undercut. New competitors should be able to enter the market, gain customers, and make a profit. In addition, ERCOT is building common interfaces and centralized systems to support all retailers participating in this market, resulting in lower costs to enter the market (TPUC, 2001).

While affiliated retailers are not obligated to offer a price to beat to large commercial and industrial customers, the experience in other states suggests that these customers will have a number of ways to insulate themselves from price volatility. They should have substantial leverage in negotiating power supply

arrangements with retailers, and many of these customers have the ability to reduce their demand if prices are high. These customers treat electric purchases as a business decision like the many other decisions they make in running their businesses. If price information is conveyed to them in a timely fashion, some business customers will be able to reduce their consumption when prices are high. The Commission will continue to work with ERCOT to develop the infrastructure that will get these customers timely information about prices so that they can make informed decisions. Finally, large customers are expected to be able to enter longer-term contracts that include a mix of services, such as load management, energy efficiency, and risk management, in addition to the supply of electricity. (TPUC, 2001, p. 39)

#### Renewable Resources / Low Pollution

“Another crucial component of the legislation was the encouragement of using renewable energy sources in generation. . . . Generators will also earn tradable credits for producing renewable energy” (Kiesling, 2001, p. 15). Senate Bill 7 established a minimum annual renewable energy requirement for each retail electric provider, municipally owned utility, and electric cooperative operating in Texas and encouraged the development, construction, and operation of new renewable energy projects at those sites in this state that have the greatest economic potential for capture and development of the state’s environmentally beneficial renewable resources (Senate Bill 7, 1999).

Texas has been proactive in reducing pollution from its many generating facilities. Even environmental groups such as Public Citizen recognize the efforts made by the

state: “Except for Texas, no state deregulation scheme addresses the toxic pollution produced by the 500 coal-fired power plants that, in 1977, became exempt from provisions of the federal Clean Air Act” (Higley, 2000, §20).

#### Education Campaign / Discounts for Low Income Customers

The Legislature allocated \$36 million over three years to the TPUC for an information campaign about deregulation (Oldham, 2001). Customers are not accustomed to the idea of shopping for electricity, and most states have recognized that educating customers about retail competition is important in helping competition succeed. Senate Bill 7 requires the Commission to conduct a customer education program to educate the public about retail competition.

Residential customers have an expectation that prices will be stable and low as a result of the regulation of prices over a long period. Most are not aware of the price of electricity, and to a large extent, utilities have not developed methods for communicating prices to their customers. In other markets such as gasoline, customers are typically very aware of prices, retailers clearly communicate changes in prices (through signage), and customers may change their consumption to respond to even a slight change in prices.

One of the challenges of the customer education program is to let customers know that prices may be more volatile, and that in choosing a supplier they need to be concerned about whether the supplier can change the rates, how often it may do so, and the kind of advance notice they can expect. (TPUC, 2001, p. 40)

The Texas PUC has also successfully implemented the low-income discount programs mandated by SB 7. Low-income residential customers have received an additional \$68

million in discounts from the price to beat or competitive offers under this program through the end of October 2002, or a total average savings of \$136 per customer through October 2002 (TPUC, 2003a).

### Problems of Restructuring in Texas

Although there are many who hold Texas as an example of everything that can go right with restructuring and deregulation, there are, of course, those who feel that it has caused a lot of problems, primarily for consumers. The transition has not been completely smooth, and there have been problems for some, mostly in the area of technology.

Technology problems have been the uninvited guest at Texas' competition party. They stem from a solution policy dreamed up to avoid the terrible slamming the state experienced when telecom opened up. To stifle slammers, registration and billing were centralized in ERCOT where every meter in the state was randomly assigned a 39-digit number. Switching requests go through ERCOT, the wires company serving the customer, the old REP, the new REP and everyone has to coordinate a final meter reading. That's very complicated, but it's a long-term blessing all the same. (North America's Top Marketer, 2002, p. 3)

So even as problems have occurred during the transition, it appears that for the most part the problems are resolvable and have been addressed by the companies and by the state. It must have been particularly frustrating, though, for those customers who were trying to switch providers to take advantage of competition to run into roadblocks.

Some consumer groups say the transition to deregulation has brought unfavorable results, from a potentially unstable electric system to thousands of billing and

switching errors and skyrocketing consumer complaints. Data errors between electric companies and the state's electricity grid plagued the marketplace early in the year. Many residential customers were unable to get their power turned on while hundreds of thousands of Texans – including many who never tried switching – had their bills delayed for months. More than 80,000 Texans, or about 1 in 70 consumers, are still missing one or more electric bills for the year. Some customers, largely at incumbent utilities, have been lost in the system – receiving electricity but not being charged for it. The PUC received almost 1,500 complaints from electric customers last month [November 2002], five times more than it received in November 2001, before deregulation. But companies and state officials say the figures do not necessarily equate to dissatisfaction with the system. Some consumers have filed complaints simply because they are confused about their bills. (Reddy, 2002b, §15-19)

A final troubled area in the early stages of competition was billing. There was a lack of coordination between the Retail Electricity Providers (REPs), ERCOT, and the Transmission & Distribution Utilities (TDUs).

The REPs' inability to issue accurate bills has a significant impact on retail customers when the customer's REP is unable to issue a bill (or bills) to the customer for several months. . . . Billing performance has improved dramatically in recent months, and by November 2002, most customers were receiving bills on a timely basis. Several REPs have continued to lag in issuing timely bills, and the

Commission is working with these companies to improve their performance.

(TPUC, 2003a, p. 14)

Every systemic problem that has been encountered since the transition to competitive electricity in Texas has been successfully addressed by ERCOT and the Texas PUC. Further, those bodies are taking proactive steps to improve their processes for the future, looking ahead to what can be done to make their roles more efficient.

### Conclusion

Electricity deregulation has begun in Texas, not with a bang but a whimper.

Despite aggressive promotional campaigns, the average Texas consumer still isn't convinced there is much value in switching providers. Interest does appear to be higher among commercial and industrial companies, but they aren't stampeding to change providers either. (Richarme, 2002, §1)

Maybe the greatest compliment that can be paid to the architects of the restructuring legislation in Texas is that few retail residential customers have even noticed the change to competition or felt the need to switch providers. Of course, Texas had some of the lowest electric prices in the country going into deregulation, so that was never really of great concern. Indeed, another reason why competition has been so successful is that "Texas was in a strong position as it underwent the transition and was not responding to a crisis; it was undertaken during a period of relative stability" (Perryman, 2003). The 'price-to-beat' as legislated has also contributed to the lack of residential switching – consumers found that their rates were lower even without switching.

Even though residential customers have been somewhat negligent in taking full advantage of competitive markets and pricing, business have been quick to utilize competition to the most.

State officials are quick to note the larger savings by businesses, which generally use more electricity than households, in explaining their faster adoption of electric competition. For the average residential consumer, the savings amount to \$5 to \$10 a month, compared with hundreds or even thousands of dollars for business customers. (Reddy, 2002b, §6)

Since the scale of cost savings for residential customers is not large enough at this point to make consumers interested in switching providers, a clear next step for the REPs is more education for customers and additional incentives to attract customers.

What does the future hold for electric markets in Texas? Its considerable success during its first year coupled with its extensive long-term preparation for opening its electric market to competition is a great example for other states of how to proceed with their own restructuring efforts. “Texas, we believe, will define the future of competitive markets in the United States” (Oldham, 2002, §24).

## CHAPTER 5

### COMPARISON OF CALIFORNIA AND TEXAS

Since the commercial application of electric power became a reality in the late nineteenth century, generation has gone through periods of competition and regulation. Recall that the city of Chicago had over thirty generation companies operating at one time in the early twentieth century. But competition was soon squelched as the leading men of the industry saw that it would not be profitable for them to allow others to participate in the sale of electricity. The idea of natural monopoly was born and a path of regulation and restriction was chosen. Deregulation and restructuring cannot undo the past. The choices that were made early in the 20<sup>th</sup> century forever altered the landscape and it is impossible to know what might have happened had competition been allowed. It is really quite fascinating to consider what our landscape might have looked like had power providers been driven by competitive forces to be innovative and creative instead of selling out for a guaranteed steady return on their investments. The electric industry would undoubtedly be quite different. What might have happened if Samuel Insull and the others had decided to fight the reformers who demanded some form of government control? What if they had decided to risk it all to keep control of their businesses? It is hard to imagine what all they might have accomplished given the right circumstances and a less restrictive regulatory environment. Why was it easier for those men to choose to allow outside forces to take over the industry? Why did they view regulation as an

inevitable force instead of fighting it with all of their might? Those men made the decisions that they felt they had to make at that time and Americans have been living with the consequences ever since.

Now we find ourselves in a situation where state legislatures, at the behest of the FERC, are attempting to undo what their predecessors did nearly a century ago. Mistakes are unavoidable when attempting to undo what has already been done and it should come as no surprise that the methods chosen were not perfect – there will likely never be a flawless solution in the future, either. We have learned, however, that it is worthwhile to make such attempts though. Even with all of the negative aspects of AB 1890 and the crisis in California, it all comes down to the facts, that:

There are economic, technological and regulatory developments that justify restructuring in the power sector. The old argument of ‘economies of scale’ justifying ‘regulated natural monopolies’ has been pierced. New generation technologies make it possible to build smaller, more efficient power plants faster at a lower cost. We now realize that these efficiencies can best be exploited if there is competition in generation, creating incentives for higher efficiencies and greater productivity, and in the retail provision of electricity so that savings from competitive generation can be passed on. Only the ‘wires’ businesses, transmission and distribution, will remain regulated. Open and nondiscriminatory access to the wires will facilitate efficient competition throughout the marketplace. (Energy Institute, 2002, p. 11)

How tremendous that any of the states were willing to attempt the transformation of their electric power markets, in the hopes of reaping the undeniable long-run benefits of a free market economy. As in Texas, such efforts can be wildly successful and cause no disruption of power service and provide lower rates for residential and commercial consumers. This is clearly the goal in any restructuring attempt. California stepped out boldly and eventually fell flat on its face; there is much to be said for making the effort. California's failures should be viewed as learning tools – not as an excuse to stop trying.

Why has Texas has been able to successfully implement an electric restructuring plan while California has decided to end its direct access program for the indefinite future? The key difference between the two states proved to be the timeframe put in place by the legislation enacted by the two legislatures. Texas chose to implement deregulation in stages, allowing time to identify errors and problems within the wholesale market first, before exposing retail customers to the frustration of a less than perfect system. As Texas allowed its utilities to purchase power from multiple generating companies in 1995, competition worked and new, more efficient power plants were constructed, generating additional capacity and setting the stage for a successful move to retail competition. By opening wholesale markets first, Texas allowed the markets to find their natural equilibrium and adjust themselves to the new conditions. California, on the other hand, jumped in feet first and was forced to make changes to a system that had already been implemented, rather than fixing the problems during a planning stage, and they could not undo the promises they had previously made to consumers about the immediate benefits

they would receive. Texas did not legislate instantaneous cost savings and benefits for consumers on a guaranteed 10% scale.

In addition to the timeframe put in place, the most important difference in the two plans is the legislation itself. AB 1890 was a series of compromises that could never possibly have solved all of the problems faced by electric consumers unhappy with the Investor-Owned Utilities in the state. Although the CPUC's Book study seemed to address many of the issues involved, in the end, the legislation fell prey to political agendas and unrealistic expectations about electric markets, and could not possibly have addressed the unique level of complexity inherent in such a market. SB 7 remains unique among deregulation bills in its requirement that all IOUs be broken into three separate companies based on function: power generation, transmission and distribution, and retail electric provider services. No other state has mandated such a break, and no other state has had a smoother transition period to deregulation. As in the other states, transmission and distribution functions remained regulated by the state to guarantee fair access for all power generators.

It is unrealistic to expect a newly deregulated industry to police itself, so California's establishment of new institutions to regulate the industry while it migrated to its newly restructured form was not entirely inappropriate. What is out of place is a new regulatory body, which in effect, cancels out deregulation. The California Power Exchange proved the most egregious mistake made in California. Intended to operate as a surrogate market, it supplanted market forces and created an environment prone to manipulation by those it was intended to serve. By requiring the three IOUs in the state to

participate, the utilities were unable to hedge their risk through long-term contracts and were forced to buy and sell power exclusively through the PX's volatile spot markets. Under the PX system, the utilities were forced to sell the power they generated to the PX and then purchase back power at whatever price the PX was offering at the time, rendering any cost-cutting measures irrelevant and unusable. What California's legislators seem to have forgotten is that by allowing competition and the fluctuations that come with allowing the market to "set its own price," prices can just as easily increase as decrease.

Prices will go up and down according to supply and demand, which is precisely what a competitive marketplace is all about. California has attempted to have it both ways, with prices controlled at the retail level but uncontrolled at the wholesale level. (Weinstein, 2001, §4)

As in California, Texas created a regional Independent System Operator to operate in the deregulated market, The Electric Reliability Council of Texas (ERCOT), although ERCOT preceded restructuring by several years. Unlike the California Independent System Operator (CAISO), ERCOT acts as a provider of information, not a market maker. Spot sales are not a requirement as in California. Bilateral trades orchestrated through, not by, ERCOT, allow retailers to use long-term contracts and hedge risk.

Recently, even Texas has discovered that market forces are not foolproof as the state experienced a price spike to rival those in California during the crisis. In February of 2003, there was a spike to \$990/Mwh in the ERCOT balancing market, just short of ERCOT's \$1,000/Mwh price cap. As a result, sales in the spot market were reduced even

further, to no more than 10 percent of a generator's purchases, and an even greater emphasis has been placed on bilateral contracts. Unlike the situation in California, Texas was able to deal with the problem quickly and few people even realized that there was a price "crisis" at all; this should be the goal of any deregulation scheme.

The idea of a safety net in conjunction with free market competition is counterintuitive. This type of thinking led the flaws evident in AB 1890. The system was never planned to be entirely deregulated for fear of what would happen, dooming it to failure.

Our least surprising conclusion is that, wherever they can be relied upon to do the job, market forces are preferable to governmental intervention. Whenever competition has become sufficiently powerful to protect the legitimate interests of both consumers and regulated firms, the electric utility should be granted full freedom from regulation, subject only to surveillance by the regulatory agency to confirm that market forces are operating as expected and have not eroded.

(Baumol & Sidak, 1995, p. 3)

Fortunately there are still individuals within the state of California who realize that what they were attempting was worthwhile and that it is important that they work to reform their restructuring, not abandon it entirely. They will feel the same fear and uncertainty at times that those early pioneers of the electric industry felt. Let us hope that they do not cave in to those same pressures and competition and free markets rule the future of the electric power industry throughout the United States of America.

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