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Deregulation and the California Problem

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Abstract: Background and historical information are provided for the electric power industry from its beginnings to the present. Major legislation affecting the industry is also explained. The concept of deregulation is defined. California is taken as a case study of implemented deregulation, and its problems are outlined. Steps taken to contain the widespread problems are examined, and other possible solutions to California's problems are offered.

INTRODUCTION

The goal of this paper is to gain an understanding of the historical structure of the United States' electric utility system and the changes to this structure currently taking place by "deregulating" the industry. Throughout the paper, the state of California is used as a case study of the procedures through which deregulation is to be accomplished. The degree of success of California in deregulating its power system is also examined along with suggestions for improvement.

HISTORICAL BACKGROUND

Electric Utility Beginnings

The modern electric utility industry began in the 1880s with the need for efficient power delivery for nighttime street-lighting systems. The first major system, which opened on September 4, 1882 in New York City, was Thomas Edison's Pearl Street electricity generating system. The system initially supplied 59 customers with electric power, but with the demand for power for electric motors came the need for a utility that would be operational 24 hours a day. By the late 1880s, small central stations, located near their end users, were built in many U.S. cities.

Up to this time, stations were direct current (dc) stations and were inefficient in transmitting electricity over long distances. This changed in 1896 with the development of Niagara Falls by George Westinghouse. This station transmitted electrical power over 20 miles to Buffalo, New York using an alternating current (ac) structure. AC transmission is much more efficient than DC transmission, especially over long distances. This results because the power losses in a transmission line occur as \( \text{current squared times line resistance} \). Thus, higher operating voltages for the same power output result in lower currents and lower losses. Because there is no single device that behaves as a DC transformer (these DC-DC converters came along much later with the advent of power electronics and still are not as efficient), AC transmission was chosen as he means of delivering power. The Niagara Falls plant was the first to prove that generating stations could be placed some distance from end-users and still be feasible.

By the beginning of the 20th century, approximately 40 percent of the electric power generated in the U.S. was produced by vertically-oriented utilities—utilities which are responsible for generating, transmitting, and distributing power. Many businesses still produced their own electricity for in-house use. As utilities began to install larger and more efficient generators and transmission networks, industrial users began to shift their generating needs to those utilities.

Because electrical utilities were natural monopolies, regulation was a necessity. Many states began their own public service commissions to deal with the regulation of these large utilities. Rate-based regulation became the norm.

Electric utility holding companies, which were companies that owned stock in several utilities, began developing in the early 1900s. In the 1920s, 94 percent of the electric utility industry was controlled by holding companies. By the late 1920s, the 16 largest holding companies controlled 75 percent of the nation's generating capacity, and three of these controlled over half. Because these holding companies owned large blocks of utilities spanning several states, state regulatory boards could not control them. As a result, unregulated holding companies increased prices to increase their own profits. When several holding companies collapsed, the federal government had to step in to insure the continued operation of the industry.

Public Utility Holding Company Act

The Public Utility Holding Company Act of 1935 (PUHCA) was aimed at breaking up and regulating the large holding companies that controlled much of the nation's electric utility system. Under PUHCA, the Securities and Exchange Commission (SEC) was given the power to break up the large holding companies. The SEC required the holding companies to divest themselves of their assets until each company served a particular geographical area. Holding companies were also required to register with the SEC, and were permitted by law only to engage in those activities deemed appropriate for a single, integrated utility. Under PUHCA, the SEC was
authorized to supervise these holding companies. The SEC also decided, on a case-by-case basis, whether each registered utility would need to be regulated or could be exempted from some requirements of PUHCA.

At first, holding companies resisted the Act. Some even challenged its constitutionality. All of this ended when the Supreme Court upheld PUHCA’s legal status. By 1950, the utility reorganizations were virtually complete.

**Public Utility Regulatory Policies Act**

PUHCA and its policies remained virtually unchanged from its inception in 1935 through the late 1960s. The electric power industry continued to meet increased demand with increased generation and transmission capacity. In October 1973, Nations of the Organization of Petroleum Exporting Countries (OPEC) imposed a ban on oil exports to the United States. The ban on oil was brought about for several reasons, the most major of which was the 1973 war between Israel and Egypt. OPEC threatened to ban petroleum exports to any countries that did not support the Arab position during the war. When U.S. President Richard Nixon proposed a $2.2 billion military aid package to Israel, OPEC banned all oil exports to the United States. Although the ban was lifted in 1974, the months of minimal petroleum production piqued public interest of energy issues, resulted in higher energy prices, and contributed to inflation.

The 1973-1974 period prompted Congress to propose and adopt the National Energy Act in 1978. This plan was comprised of five major parts: The Public Utility Regulatory Policies Act (PURPA), the Energy Tax Act, the National energy Conservation Policy Act, the Powerplant and Industrial Fuel Act, and the Natural Gas Policy Act. The National Energy Act was enacted mainly to reduce the United States’ dependence on foreign oil and the impact of energy shortages on price.

PURPA requires utilities to allow any qualifying facility (QF) to connect to the utility’s power grid. Utilities are also required to buy power from these QFs at the avoided cost of not producing the power themselves. PURPA created a market in which QFs would be guaranteed a purchaser of their power. To ease the cost of interconnection to power grids, Congress exempted most QFs from regulation by the SEC under PUHCA and from state regulation.

For a non-utility to be classified as a QF, it had to meet one of two basic criteria: cogeneration or renewable resource. Cogenerators are generators that produce two distinct types of power either simultaneously or sequentially using the same fuel source. One example of this is a petroleum processing plant, which uses natural gas to produce electricity; the waste heat from combustion is used to create hot water and steam used in the plant for thermal processes. For a generator to be classified as a renewable, it must produce electricity from a resource that is renewable or virtually inexhaustible. Renewable energy sources include solar panels, wind turbines, and hydroelectric plants.

By requiring utilities to purchase power from any QF and allow it to connect to the power grid, PURPA began the shift away from a monopolistic electric utility structure to one of some competition. This shift would continue as new legislation was enacted.

**Energy Policy Act**

Even before the passage of PURPA, many groups had attempted to change the policies set forth in PUHCA. These changes finally began with the passage of PURPA by allowing non-utilities to enter the electricity generation market. With the passage of the Energy Policy Act (EPACT) of 1992 by President George Bush, the electric utility industry could shift from a monopolistic structure to one of competition.

EPACT created a new class of electrical generators called Exempt Wholesale Generators (EWGs). Like QFs, EWGs are exempt from PUHCA constraints of SEC regulation. Unlike QFs, EWGs did not have to meet the cogenerator or renewable classification, and utilities do not have to purchase power from them. Thus, EWGs introduced a truly competitive element to the electric utility industry.

Besides allowing EWGs to enter the wholesale power supply market, EPACT also changed the transmission grid access available to non-utilities. These changes have led to open-access electric power transmission grid for wholesale transactions; in other words, any producer may connect to the grid and produce power, although no one is required to buy it. Non-utilities have to pay a fee to the grid owners for this access, but this fee is set at a “just and reasonable” rate by the Federal Energy Regulatory Commission (FERC).

**DEREGULATION**

**What it is & How it Works**

Deregulation refers to the process by which the electric utility system changes from a regulated, monopolistic environment to a competitive environment. Historically, most utilities are vertically-oriented. That is, the utilities generate, transmit, and distribute electrical power to the end-users. In a deregulated market, a single utility still owns and operates both the transmission system and the distribution system; this would still be the most efficient way of transmitting power, as it would require one single, consolidated electrical network. Generators, on the other hand, are owned and operated by private companies in a competitive environment. Under this
system, electrical consumers are allowed to choose from which generator they would like to buy. Thus, generation becomes a competitive market in the hopes that by fueling competition, prices for the consumer will ultimately decrease, or at least not increase as fast as with the regulated system.

**CASE STUDY: CALIFORNIA**

**California's Deregulation Decision**

Many factors came into play when California's legislature chose to move to a deregulated system. In April 1996, FERC issued Orders 888 and 889. Order 888 required all electric utilities operating within the U.S. to have a non-discriminatory access tariff for facilities wishing to connect to the utilities' transmission systems to produce power available to customers. Order 889 established the Open Access Same-Time Information System (OASIS), which forced utilities to make information regarding transmission access and prices available to the public. These orders also forced utilities to abandon any practice of favoring their own generation capabilities over those of non-utilities, thus paving the way for a competitive market in any state. After FERC issued Orders 888 and 889, California decided to deregulate its entire system. In 1996, California had the tenth highest electricity price rate of the 50 states and the District of Columbia. Long before its decision to deregulate, California had rates approximately 50 percent higher than the rest of the country.

AB1890 created many changes in California's system. Rates were frozen at the June 10, 1996 level, and residential and small commercial users were given a ten-percent rate reduction from those levels. These rates were to remain frozen until March 31, 2002. An independent system operator (ISO) and the California Public Exchange (CalPX) were created; both were independent of the utilities and thus could not be controlled by them.

The ISO was responsible for insuring fair and impartial access to the transmission grid for all generators while maintaining reliable operation. Although the transmission system would continue to be owned by the investor-owned utilities (IOUs) as before the change, the ISO would control the network. The ISO insured that no company could block the access of another, and it charged fees required to keep the system operational and reliable.

The CalPX, which was regulated by FERC, served as a public auction for the buying and selling of electricity. The three largest power-producing IOUs—Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E)—were required by law to sell their power to the CalPX. Any other generators, even those located out of state, had the option of selling their power to the CalPX if they wished to do so. The CalPX would accept bids to purchase a certain quantity of power at a given price. The CalPX then gets bids from generators until it has purchased the demanded power at the lowest possible price. This created a "spot market" in which electricity prices changed on an hourly basis. PG&E, SCE, and SDG&E were forced to buy their power from the CalPX for four years after its inception to sell to utility customers.

**Problems with the California System**

California's deregulated system worked fairly well for about two years after its inception, with prices remaining stable and the utilities able to meet demand. During the summer of 2000, however, electricity prices in California skyrocketed to reach an all-time high. Generation capacity shortages, both within California and outside of it, also contributed to rolling blackouts in Northern California. The problems with California's deregulated electric utility system can be grouped into three broad categories: very high volatility in wholesale electricity prices, intermittent power shortages (rolling blackouts), and severe financial problems of the three largest IOUs (PG&E, SCE, & SDG&E).

**High Wholesale Prices**

Wholesale electricity prices on the CalPX began increasing around June 2000, and continued to do so through the remainder of the year. Prices rose approximately 270 percent from the June-July period in 1999 to the same period in 2000. From December 1999 to December 2000, wholesale prices...
rose from 2.971¢ per kilowatt-hour (kWh) to 37.699¢ per kWh, an increase of approximately 1000 percent.

These high prices can be linked to several factors, one of which is the high price of natural gas, which began escalating in the summer of 2000 and reached an unprecedented high during the fall and winter of 2000.

Natural gas prices rose for several reasons, the most prominent of which is the deregulation of the natural gas industry around this time. Because the majority of California’s generation is fueled by natural gas, the electric system was affected.

Also, increasing demand for the fuel played a part. Simply put, natural gas is an excellent residential heating fuel, as well as an efficient method of producing electrical power from gas turbines. When demand increased in industrial, residential, and utility sectors, prices rose. The increased demand also forced natural gas companies to lower their reserve stocks to an all-time low, effectively raising prices as well.

Aside from the increased demand, an El Pas natural gas pipeline explosion in August 2000 factored into the price increases. Even after repairs, the federal government shut down portions of the pipeline when investigators found internal corrosion at the breakage site and other areas. This pipeline supplies a significant portion of California’s natural gas demand.

The high wholesale prices in turn created high retail prices for customers of SDG&E. In July 1999, the rate freeze was eliminated for SDG&E, and the high prices beginning in the summer of 2000 were passed on to retail customers.

Intermittent Power Shortages

Power shortages in California were another reason for the severe electricity problems the state faced. These occurred for several reasons. One reason is the lack of investment in new power plants. From 1990 to 1999, California’s in-state generation capability decreased by two percent, whereas the demand for electricity rose 11 percent during the same period. In fact, no new generation had been built in California during that entire time.

California also relies on a significant amount of out-of-state hydroelectric power, much of which is located in the Northwestern U.S. During the times of peak prices, hydroelectric power production was reduced in the Northwest due to low water levels.

Out-of-state producers exacerbated these blackouts in other ways. During this period of high wholesale costs and fixed retail prices, out-of-state companies refused to sell needed power to the three main California IOUs because of their questionable financial status. Because California traditionally relies on imports (11% in 2000), power was not available for customers.

Financial Problems of the Three Largest IOUs

The third broad reason for deregulation problems in California was the severe financial problems of PG&E, SCE,
and SDG&E, the state’s three-largest IOUs. As is mentioned previously, the three IOUs lost huge amounts of money because of the retail price fix. Because of increasing wholesale costs, the IOUs could not pass the prices increases onto customers. PG&E has had the worst financial trouble: on April 6, 2001, it filed Chapter 11 bankruptcy. PG&E estimated its non-recoverable costs at $9 billion. In November 2000, SCE estimated its non-recoverable costs at $2.6 billion. That number has since increased beyond $6 billion. Because SDG&E’s price fix was eliminated, it did not incur as much debt; however, SDG&E estimated its own non-recoverable costs at $747 million.

Figure 4 shows California's historical reliance on imported power. For California to be self-reliant, it must add much more generation capacity. Governor Gray Davis has approved some projects in light of the electricity shortages, but it will not be until mid-2003 before California can fully provide its own power. By the end of 2005, California should have enough generation resources to be able to supply itself with power even when some power plants are offline for both planned and unplanned maintenance.

Aside from this, the power plants should be designed to use certain types of fuel: namely, those fuels that either have a regulated price, or those fuels that are not used by residences for heating or other uses (natural gas). By using these types of fuels, price projections are more easily made, and supply interruptions cannot cause intermittent price surges.

### Bail out the Indebted IOUs

California’s three largest IOUs have all suffered severe financial trouble as a result of the deregulation plan. Since these IOUs are responsible for producing and controlling the majority of California’s power, the state should step in to give monetary aid to these companies. Aside from issuing bonds, California should allow these companies to charge higher rates when wholesale prices are low (as they are now). This would allow for some cost recovery, and the IOUs would eventually be creditworthy.

California has allowed some of these activities since the problems first occurred. In December 2000, California allowed the three largest IOUs to purchase power from sources other than the CalPX if they chose to do so. CalPX was discontinued in January 2001, and PG&E, SCE, and SDG&E were given leave to raise rates to recover costs. More rate hikes were approved in March 2001.

### Return to the Price-Regulated System

Electricity is critical for everyday operation, and as such, its prices and supply should remain stable. When done improperly, deregulation can cause instabilities (as is the case with California).

The power companies should be able to purchase power long-term. This helps to keep prices stable by allowing fixed rates for the duration of the contract.

One reason for California’s decision to deregulate was the state’s historically higher electricity rates when compared to the national average. However, there are several reasons that California should have higher rates. One prominent reason is the strict environmental stance of the state; another is the high risk of earthquakes. Californians, by virtue of their chosen living location, should expect to pay higher rates to offset the
costs investors must pay to build and maintain generation facilities in that state.

California has attempted to achieve these goals with some success. On March 21, 2002, the state passed laws completely suspending retail choice (the hallmark of a deregulated system) as of September 20, 2002 for all customers except those with preexisting contracts. As the law stands now, however, those customers with the contracts would not be fiscally responsible for the debts previously incurred by the state.

California has also been instrumental in purchasing long-term power contracts to insure a stable supply. As of this point, the state has purchased approximately $45 billion in electrical contracts. Governor Gray Davis made these deals at the height of the state’s power crisis; since then, power prices at the wholesale level have fallen off significantly. The state’s Public Utilities Commission (PUC), working with Governor Davis, is currently attempting to reduce the cost of these contracts by $21 billion, but that appears to have little chance of success. As it stands now, the state expects to lose eighty cents on every dollar spent on these contracts.

CONCLUSION

California is still in the mid-stages of its electrical problems. The state has pledged an exorbitant amount of money to recover in the face of financial disaster, but California still has many years before it can correct for its deregulation problems.

Although California has had historically higher electricity prices when compared to the U.S. average, those prices were stable. As such, California residents and industries could plan for those power costs far into the future. Before the deregulation decision, the cost-of-living in California was approximately 40% higher than the national average; electricity costs are about 50% greater. Californians have chosen to implement strict environmental laws and refuse to build coal- or nuclear-powered plants, and because of this residents should expect to pay more for their power.

In summation, California's utility industry was never broken before the deregulation decision. Because the electric system is so critical for everyday operation, it should never have been altered.

REFERENCES


