

# Southwest Economy



## California's Electricity Woes: A Vision of the Future?

California has long been in the vanguard of national trends. Since mid-2000, California has experienced a considerable number of problems with its electricity market, including fluctuating prices and shortages. California's electricity woes give us reason to pause and consider the future of U.S. electricity markets and of energy policies in general.

Electricity is an important part of the U.S. energy infrastructure, accounting for more than one-third of U.S. energy consumption. If other states experienced problems with their electricity markets similar to those in California, the effects would be felt throughout the economy.

Nearly half the states are restructuring their electricity markets, and many more are considering doing so. As Chart 1 shows, eight states have already implemented restructuring of their electricity markets. Sixteen states and the District of Columbia have enacted legislation or issued regulatory orders that will restructure their electricity markets, while 18 states are investigating the possibility of restructuring. Only eight states are not currently taking any steps toward electricity market restructuring.

*(Continued on page 2)*

*INSIDE:*  
*Regional Electricity  
Reliability: A Brief Look  
at U.S. Prospects*

*•*  
*Currency Board and  
Market Intervention  
in Hong Kong*

## Banks as Real Estate Brokers— Letting Free Enterprise Work

A proposal that would open real estate brokerage and management to banking organizations has generated a maelstrom of controversy, as evidenced by more than 44,000 comment letters and e-mails that have deluged the Federal Reserve Board.

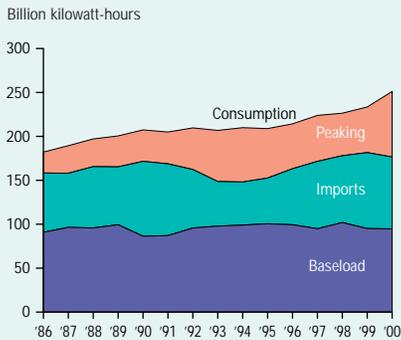
The major banking industry trade groups have joined forces as proponents of the proposal, squaring off against the National Association of Realtors, which spearheaded a write-in campaign opposing it. The realtors' arguments caught the attention of Congress, which prevailed upon the Fed to extend its deadline for submission of comments to May 1, 2001, and prompted the House Financial Institutions and Consumer Credit Subcommittee to hold hearings on the proposed regulation.

*(Continued on page 9)*



Chart 2

### California Electricity Consumption Growing



SOURCES: Energy Information Administration; author's estimates.

mediate costs because of the added transportation costs. Peak supplies cost the most and are typically produced in oil- and natural gas-fired power plants that operate intermittently to meet peak demands.

As its electricity consumption grew, California became more reliant on costly sources of electricity because it had not developed additional baseload capacity. The expense of operating peaking facilities rose substantially with oil and natural gas prices.

Seasonality is an important aspect of California's electricity woes. As shown in Chart 3, 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.

As the California economy grew, its energy demand also grew, but the ability to produce electricity in less expensive baseload plants did not expand. The development of new electricity generation facilities was checked for environmental reasons. Californians did not want the pollution associated with the additional electric power plants. In addition, 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 further dented the development of new power plants.<sup>1</sup>

Without additions to baseload capacity or additional imports, an increase in demand increases the reliance on higher-cost peaking facilities and could result in a shortage during periods of extreme demand, such as might occur in summer. An increase in the strength of seasonality accentuates the problem. Moderate reductions in baseload supply and imports further increase reliance on peaking facilities and expose the state to more power-shortage episodes.

But many Californians seem surprised to be paying the higher electric rates that resulted from the policies that made electricity scarce. They fail to make the connection between opposition to new power plants and increased reliance on higher-cost sources of electricity.

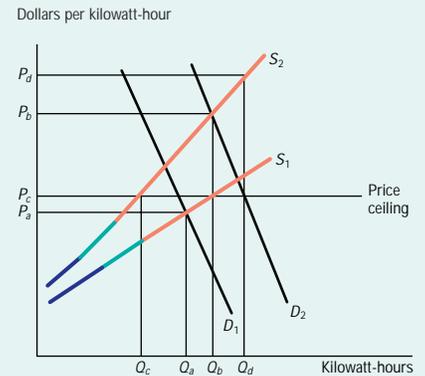
### An Economics 101 Perspective

Most aspects of California's electricity problems can be illustrated with a supply and demand diagram (Chart 4). First consider the market before restructuring. California's electricity supply comes from lower-cost baseload plants, intermediate-cost imports and higher-cost peaking facilities. Higher prices support production at more facilities, and, therefore, more electricity is available at higher prices along the supply curve ( $S_1$ ). A demand curve ( $D_1$ ) shows consumers willing to purchase more electricity at lower prices. Together, supply and demand establish a market-clearing price and quantity (at  $P_a$  and  $Q_a$ , respectively).

When California opened its electricity generation market to competition,

Chart 4

### The California Electricity Market: An Economics 101 Perspective



policymakers hoped competition between power plant owners would shift the supply curve outward, but they also imposed a price ceiling (at  $P_c$ ) to maintain stable retail prices.

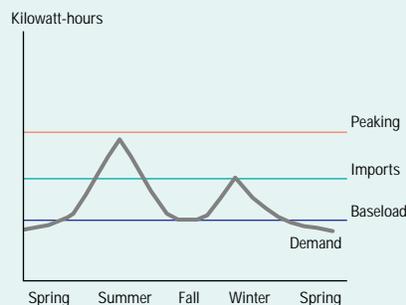
Rising energy prices and the reduced availability of baseload capacity and imports curtailed electricity supply in California (to  $S_2$ ).<sup>2</sup> Costs rose most at peaking plants that rely on natural gas. At the same time, strong economic growth boosted electricity demand (to  $D_2$ ). These changes should have established a new market-clearing price and quantity (at  $P_b$  and  $Q_b$ , respectively).

As shown in the chart, however, the market-clearing price was higher than the price ceiling and could not be charged to the consumers. With the price ceiling in place (at  $P_c$ ), consumers tried to purchase much more electricity ( $Q_d$ ) than producers were willing to sell ( $Q_c$ ) at the ceiling price.

If we stopped here, we would have a classic shortage at the price ceiling. But electric utilities have a duty to serve under the law. Consequently, California's utilities were legally obligated to supply all the electricity consumers wanted to purchase ( $Q_d$ ) at the ceiling price. To do so, utilities were forced to pay a much higher price ( $P_d$ ) for electricity on the open market. Because the utilities did not quite succeed in obtaining all the electricity customers wanted at the ceiling price, the result was a combination of shortages and utilities paying higher prices for electricity than they could sell it for to their own customers.

Chart 3

### California's Electricity Woes Are Seasonal



By the end of 2000, California utilities were paying a wholesale spot price of about 40 cents per kilowatt-hour, but they were only allowed to sell it to their customers for about 10 cents per kilowatt-hour (*Chart 5*). California's failure to allow retail prices to rise to reflect market conditions has had several effects. The most obvious is that it put a financial burden on the utilities, which led to the bankruptcy filing of one of the two major California utilities. In addition, low prices discourage the development of additional supply while encouraging customers to continue low-valued uses of electricity.

### Economic Effects Are Relatively Small

Although we have heard stories about how the electricity blackouts are affecting industry, the disruptions of electric service appear to have had only a mild aggregate effect on the California economy. A few analysts have speculated that sustained service disruptions that are no worse than those already experienced would reduce California's gross state product by about 0.2 percent below what it would otherwise be. Taking into account California's size and the negative ripple effects to other states, we might guess that the total impact on the national economy would be to reduce GDP by about 0.1 percent—though some analysts suggest the spillovers to the national economy would be smaller.

If California does not resolve its electricity problems, however, the longer-term effects on the state may be significant. Unreliable electricity service could make California less attractive to business and slow the state's economic growth. Some of that growth could be displaced to other states.

### Successful Electricity Market Restructuring

To develop standards for evaluating the restructuring of electricity markets, we can draw upon what appears to be a successful experience in the United Kingdom as well as fundamental strategies suggested by analysts. We can use these standards to evaluate and suggest changes in the electricity market restructuring in California, Texas and other states.

Successful restructuring of electricity markets includes several key elements:

- Ensuring sufficient generation capacity (and fuel supplies).
- Opening power generation to competition with the free entry of new power plants and private contracts.
- Opening marketing and sales to competition.
- Freeing electricity prices to move with changes in market conditions.
- Allowing a range of market instruments, including long-term contracts and spot sales.
- Encouraging private market-making activity.

Success should not be judged by the often-used political barometer of stable prices, but rather by the extent to which the market is allowed to operate freely with minimum disruption. With energy prices rising and environmental restraints curtailing electricity production, higher prices will help allocate scarce electricity and clarify the costs of environmental protection.

### Improving California's Electricity Markets

California has room for improvement in most areas. California entered deregulation with insufficient capacity. The state has deregulated its power generation market, but it must also reduce its regulatory impediments to power plant development. It is taking some steps in that direction. California should also allow the development of additional natural gas pipelines to enhance natural gas deliverability to power plants using that fuel.

California could accomplish much

by opening marketing and sales to competition. It also should allow electricity prices to move freely with market conditions. Freely moving prices would encourage consumers to conserve electricity and, at the same time, stimulate the construction of new power plants.

California has begun seeking electricity supply under long-term contracts, but it has interjected the state and its nonprofit electricity system operator into the process. California needs to allow a range of market instruments, including long-term contracts and spot sales, as well as private market-making activities.

In the short run, these solutions are likely to raise electricity prices in California, which would reflect the state's scarcity of electricity. But the philosophy of market-determined prices would encourage the building of new power plants, while higher prices would discourage consumption. In the long run, prices would fall, but probably not as low as they were prior to restructuring—unless overall energy prices also fall.

### Electricity Market Restructuring in Texas

Texas is in the process of restructuring electricity markets in most areas of the state. Restructuring will be completely phased in by the end of 2001. As Texas approaches its restructuring, success seems very likely.

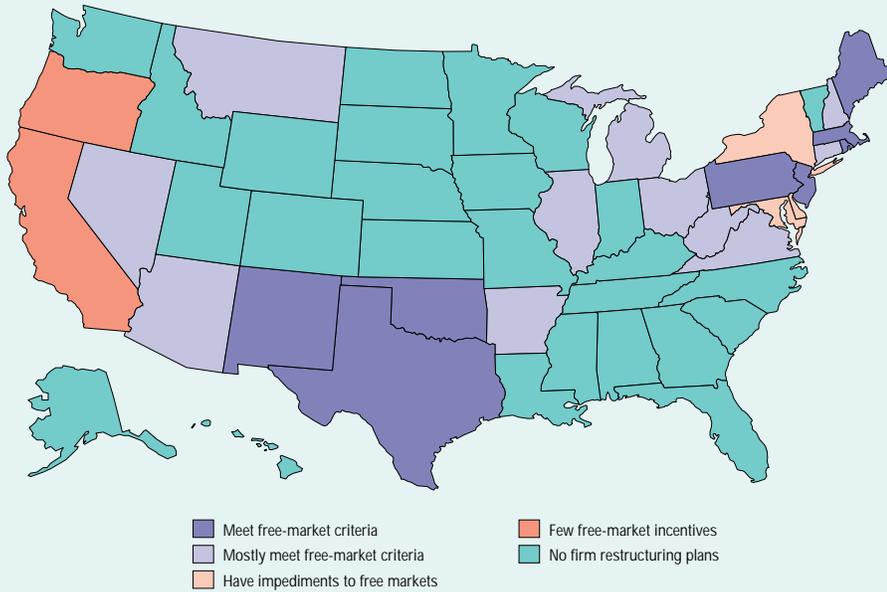
Texas is entering deregulation with sufficient generation capacity and fuel supplies. It is opening electricity generation to competition with the free entry of new power plants and private contracts. Marketing and sales to consumers will be opened to competition. Electricity prices will be free to move. Texas is allowing a range of market instruments such as long-term contracts and spot sales and encouraging private market-making activities.

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.



Chart 6

### Most States Creating Freer Markets Than California



SOURCES: Author; Department of Energy.

### Electricity Market Restructuring in Other States

Most states progressing toward electricity market restructuring are creating freer markets than California did. Of the 24 states and the District of Columbia that have deregulated or taken concrete steps toward deregulation, eight seem to meet the criteria for a successful transition to a free market—though Pennsylvania and Texas are requiring utilities to act as providers of last resort (*Chart 6*). In Pennsylvania, some of the major utilities have had some difficulty securing supply to fulfill their role as providers of last resort.

Eleven states are entering deregulation in pretty good shape. Nine of these states have price caps but sufficient in-state generating capacity. Connecticut and Virginia do not have price caps but do import significant quantities of electricity. Arizona and Virginia have providers of last resort.

Three states and the District of Columbia are in only slightly better shape than California. They import significant quantities of electricity. In addition, Maryland, Delaware and the District of Columbia have price caps, and New York has other impediments to freely functioning electricity markets.

Only Oregon seems to be freeing its electricity markets as little as California. Oregon imports significant quantities of electricity, is not allowing for entry into marketing and sales, is retaining regulated prices and is discouraging market-making activities. The other 26 states do not currently have concrete plans for restructuring and are in a position to learn from those that are preceding them.

### A Wake-Up Call?

In some sense, California's electricity woes should serve as a wake-up call for thinking about the direction of U.S. electricity markets and energy policy. The Department of Energy forecasts that U.S. electricity consumption will grow by more than 30 percent over the next two decades, while the use of natural gas to produce electricity will increase by nearly 60 percent (*Chart 7*). That forecast calls for a much stronger growth rate in the use of natural gas for electricity generation than occurred over the past 30 years.

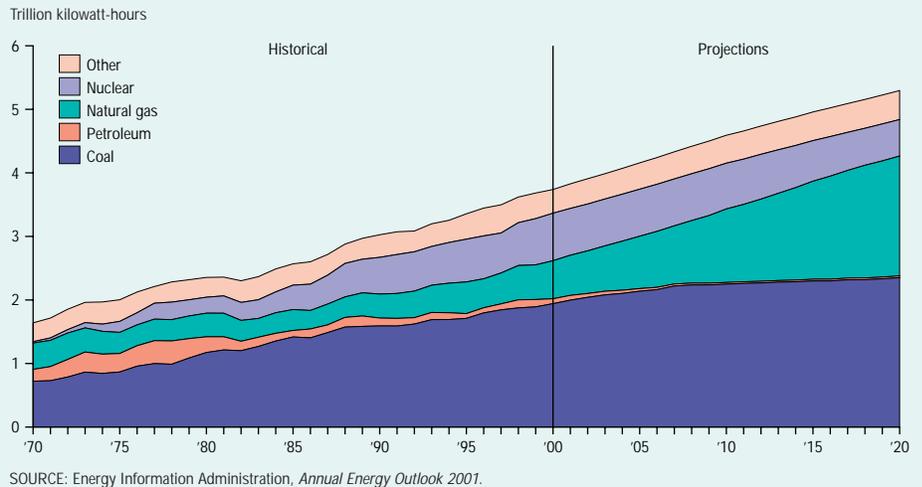
The infrastructure to produce the additional electricity and supply the additional natural gas does not currently exist. If people in other states take the same attitude toward the development of new electric power facilities and natural gas pipelines as Californians have taken over the past 20 years, electricity will be relatively scarce, and either higher prices or electricity shortages will result.

In a broader sense, we face the same issues in thinking about future economic growth and the resulting growth in energy demand. As shown in *Chart 8*, the Department of Energy forecasts that U.S. energy consumption will grow by more than 40 percent (about 1.8 percent annually) over the next 20 years, while real GDP grows by 3 percent annually.

Restricting the growth of energy consumption to pursue other goals—such as a cleaner environment—will re-

Chart 7

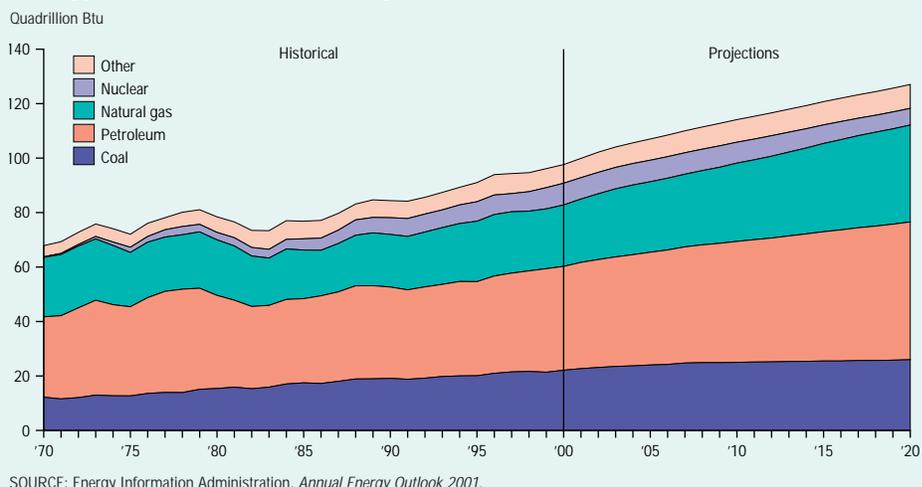
### Electricity Consumption Growing



SOURCE: Energy Information Administration, *Annual Energy Outlook 2001*.

Chart 8

### Energy Consumption Growing



*California's electricity problems remind us that economic growth is facilitated by abundant energy supplies. Limiting energy consumption in the pursuit of other goals—such as a cleaner environment—has a cost.*

duce 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.

#### Learning from California

The effective restructuring of an electricity market creates a transition to a free market, but California's restructuring plan was far from yielding a free electricity market. California's course corrections to date do not represent much more of a transition to a free market. Most of the states moving toward electricity market restructuring are going much farther toward creating free markets for electricity than California has, but only eight seem to be making a complete transition to free markets.

If they do not worsen, California's electricity woes should have a small but noticeable effect on economic growth. Nonetheless, California's electricity problems remind us that economic growth is facilitated by abundant energy supplies. Limiting energy consumption in the pursuit of other goals—such as a cleaner environment—has a cost. In making policy, we should explicitly consider these costs rather than pretend they do not exist. The resulting policy will have a much sounder basis in economic reality

than in wishful thinking. And California's woes will be a wake-up call rather than a vision of the future.

—Stephen Brown

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#### Notes

- Thanks to Charis Ward for outstanding research assistance.
- <sup>1</sup> Grobman and Carey (2001) show that electricity price caps can deter the development of new generation facilities and result in higher average consumer prices for electricity.
  - <sup>2</sup> Joskow and Kahn (2001) find evidence that prices were above marginal cost and power-generating companies withheld production from some of their higher-cost facilities during periods of California's peak demand during the summer months of 2000. Joskow and Kahn tentatively interpret their findings as evidence of the exercise of monopoly power, and some recent settlements may provide confirming evidence. Nonetheless, their findings also could be the result of a rational response to the probability that the California utilities purchasing the electricity were having financial problems and might default. Given the probability of default, electricity producers might require higher prices as compensation for the risk and not use facilities where the price does not compensate for production costs plus the additional risk.

#### References

- Jeffrey H. Grobman and Janis M. Carey (2001), "Price Caps and Investment: Long-Run Effects in the Electric Generation Industry," *Energy Policy* (June), 545–52.
- Paul Joskow and Edward Kahn (2001), "A Quantitative Analysis of Pricing Behavior in California's Wholesale Electricity Market During Summer 2000," NBER Working Paper Series, no. W8157 (Cambridge, Mass.: National Bureau of Economic Research, March), online at <http://papers.nber.org/papers/w8157>.