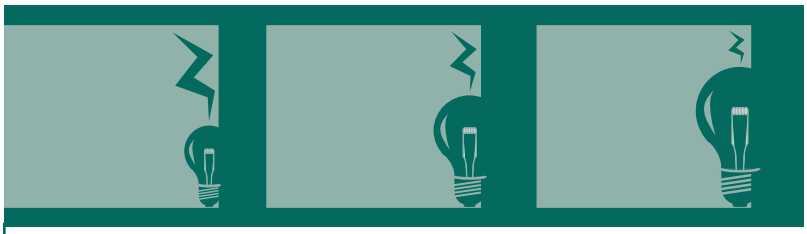

California at a Crossroads:

Options for the Long-Term Reform of the Power Sector

Bay Area Economic Forum

A partnership of the Bay Area Council and the Association of Bay Area Governments

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BAY AREA COUNCIL

BAY AREA ECONOMIC FORUM

A Partnership of the Association of Bay Area Governments and the Bay Area Council

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Contributors from McKinsey included Jim Robb, principal in McKinsey's San Francisco Office, Olga Perkovic, Jason Hicks, Zander Arkin, Bret Connor, and Andy Heiz. This group benefited from the efforts of other McKinsey colleagues including Matt Rogers, Paul Jansen, Clive Peers, Mary Foretich, and Rita Koselka. In addition, a number of individuals within the academic community and the industries studied were helpful in providing a range of information and insight. Fred Furlong of the Federal Reserve Bank of San Francisco was also helpful.

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Bay Area Council
200 Pine Street, Suite 300
San Francisco, CA 94104
Phone: (415) 981-6600
Fax: (415) 981-6408
E-mail: info@bayareacouncil.org
Web site: www.bayareacouncil.org

Bay Area Economic Forum
200 Pine Street, Suite 300
San Francisco, CA 94104
Phone: (415) 981-7117
Fax: (415) 981-6408
E-mail: info@bayeconfor.org
Web site: www.bayeconfor.org

Association of Bay Area Governments
101 Eight Street
Oakland, CA 94607
Phone: (510) 464-7900
Fax: (510) 464-7970
Web site: www.abag.ca.gov

Executive Summary

California's electricity industry, which was deregulated in 1998, is emerging from a crisis. Many believe the crisis was caused by deregulation itself. However, a previous report by the Bay Area Economic Forum and its sponsoring partners, the Bay Area Council and the Association of Bay Area Governments, entitled "The Bay Area — A Knowledge Economy Needs Power," found that a flawed deregulation model, poor policy decisions, and a confluence of extraordinary events actually caused the crisis.

The state is at a crossroads today and a core policy question needs to be answered: whether to continue along the path of market-based competition, or whether to re-regulate the industry. This report examines the viability of competition and presents California's options for proceeding with a market-based model for its power sector.

Based on experience in other industries that have deregulated, as well as in other power jurisdictions, competition delivers major benefits: lower and more efficient prices, more efficient operating and investment decisions, and improved product choice and service quality. Although the transition to deregulation is sometimes challenging, the state should not foreclose competition as an option.

The state should consider the positive lessons from other power jurisdictions:

- Three competitive market models for wholesale generation work well. Two of these explicitly address a key issue: how to promote sufficient reserve capacity under competition. In any model, it is important to ensure quick power plant permitting and to promote demand-side response. Generators also should be allowed to sign bilateral contracts.
- Efficiency improvements are possible in electricity transmission and distribution, even though these are natural monopolies. Regional transmission organizations and performance-based distribution rates tend to promote greater efficiency.
- Retail choice promotes efficiency and innovation in service options. Retail prices should be allowed to float with underlying wholesale prices because this encourages demand response. Auctioning off the default utility franchise to new providers also promotes innovation. Retail suppliers should be allowed to manage their risks with bilateral contracts.

The state should also review its energy-related institutions. The mandates and the jurisdictional authority of these institutions can be clarified and their capabilities upgraded. A clearer and more consistent set of rules is necessary to achieve regulatory stability and to send consistent signals to the market.

Introduction: California at a Crossroads

Despite dire predictions, California emerged from the summer of 2001 with the lights on. In fact, energy prices in wholesale markets started falling in May 2001 and have returned to pre-crisis levels, due in part to new generation capacity, increased availability of existing capacity, and reduced electricity usage. As of August 2001, average peak wholesale prices[1] were $45/megawatt-hour (MWh), down 78% from the previous year and 88% below the high point of the crisis in December 2000. Although the situation has improved, critical questions remain about the long-term health and direction of the power industry. In particular, actions taken by the state of California and the federal government represent at least a partial pullback from a competitive market structure.

Among the most far-reaching actions taken to date has been California's decision to accumulate a large portfolio of long-term power purchase contracts (which lock-in supplies for up to 20 years), the formation of a state Power Authority with broad powers (even potentially to compete with private producers), and the suspension of retail competition. In addition, the Federal Energy Regulatory Commission (FERC) has imposed a system of region-wide price controls on wholesale power sold in the Western U.S.

Although government interventions have been well intentioned, they have not been developed and implemented with an integrated view of the future state of the industry. Any short-term benefits may come at the expense of significant future costs for Californians, in terms of higher power prices, higher taxes, and a less attractive business climate. As a consequence, now is a crucial time for state policy makers to decide what the appropriate role of market forces and regulation will be in the state's electric power sector and to articulate a long-term policy.

The Origin of the Crisis[2]

On the eve of utility restructuring[3] — often referred to as a deregulation — in 1994, California had total available generation supplies that were 26% higher than expected peak demand. This represented a substantial reserve margin (the excess quantity of generating capacity relative to demand), which was well above the typical 15% to 20% maintained by utilities in the U.S. As demand for power grew in the state's robust economy, supply did not keep pace. In fact, between 1994 and 1998 there were no new applications to build power plants in the state. Moreover, between 1994 and the beginning of 2001 only six new small plants were built, representing less than 2% of the state's total capacity. Risk and regulation contributed to the dearth of construction. First, the state's utilities were unwilling to build new plants during the period of significant regulatory uncertainty that immediately preceded restructuring. In addition, the difficulty of entering into long-term contracts to sell power following deregulation, in the “forward market," increased the risks that independent power developers faced when attempting to finance projects[4]. And, finally, those developers who did consider California an attractive place to build faced a costly, time-consuming permitting and siting process, lasting 20 months on average[5], far above the U.S. norm.

At the end of 1999, California was expected to make it through 2000 with a 12% reserve margin, below the typical comfort level of 15% to 20%. This tight supply market was squeezed further during 2000, pushing the reserve margin well below the 12% originally expected, due to an unexpected confluence of events:

- Multiple temporary power plant shutdowns took between 6,000 and 9,000 megawatts (MW) of capacity, on average, off-line during the spring and fall of 2000 and almost 4,000 MW off-line during the summer peak.

1 Average monthly price for peak-period electricity (i.e., electricity delivered between 6:00 a.m. and 10:00 p.m., Monday through Saturday).
2 A previous report by the Bay Area Economic Forum and its sponsoring partners, the Bay Area Council and the Association of Bay Area Governments, entitled "The Bay Area — A Knowledge Economy Needs Power," presented a detailed analysis of the causes of the California energy crisis and its potential impact on the Bay Area economy (referred to later as the “previous report”).
3 The changes brought about in California's electric utility industry during the late 1990s are better described as a restructuring than a deregulation since key functions such as transmission and distribution were to remain regulated and prices to consumers were to be regulated during a 4-year transition period. The restructuring did expand the role of competition among generators and wholesale traders and did allow retail energy service companies to offer competitive services to end-users.
4 The incumbent utilities, which were the natural counter-parties for power purchase contracts, were precluded from entering into long-term contracts.
5 In comparison, siting and permitting new generation facilities in Texas takes 7 months on average.

- Drought conditions in the Pacific Northwest during the year reduced hydroelectric production available for export to California by 28% compared to 1999.
- Transmission constraints — including those across Path 15, which separates the northern and southern halves of California — made it even more difficult for any excess generation that became available to reach the parts of the state where power was in the greatest demand.
- A lack of stored natural gas, as well as limited gas pipeline capacity, contributed to a rise in the price of natural gas, one of the most important fuels for power producers in California. Thus, some power generators reduced production in the winter of 2000/2001. Gas pipeline constraints even contributed to some power plant curtailments.
- Private generators owned a significant amount of power generating capacity and had incentives to bid high prices to maximize their profits while supply was tight. They were also allowed to bid in up to 10 different markets, creating opportunities for them to take advantage of any inefficiencies across these markets.[6]
- Finally, compounding the problem, the same price caps in California that had been intended to protect consumers actually gave generators an incentive to sell power to neighboring states where prices were not capped. This resulted in another 3,000 to 5,000 MW loss of generation (compared to 1999) available to serve California.

Customer demand also contributed to the crisis. The summer of 2000 brought warmer than usual weather, resulting in an increase in demand for air conditioning. Since full retail competition had yet to emerge in California, the overwhelming majority of consumers were still taking service at a regulated, fixed price from their local utility. These regulated prices provided no incentive for consumers to respond to increasing wholesale power costs by reducing demand. The two largest utilities, Pacific Gas & Electric (PG&E) and Southern California Edison (SCE), were required under deregulation transition rules to continue charging their customers these fixed prices through March 2002, after which retail rates were expected to float with wholesale power costs.

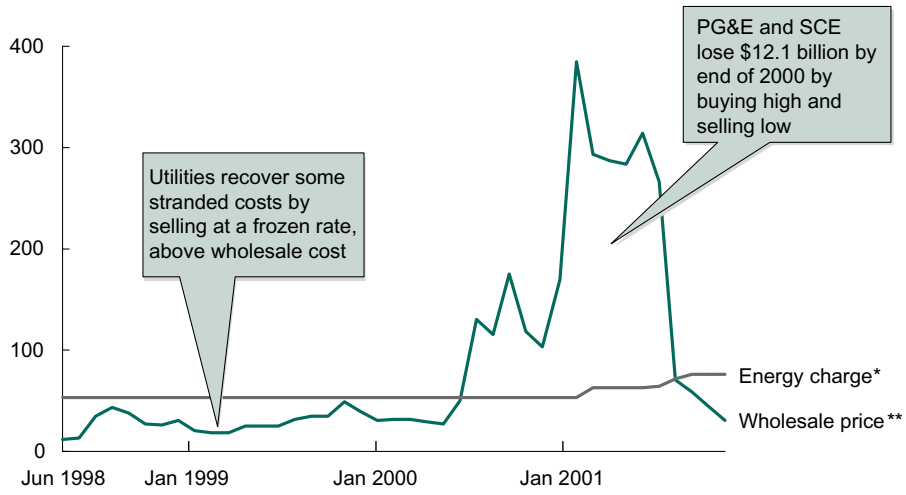
As supply conditions deteriorated and demand increased, wholesale prices surged. PG&E and SCE began to mount huge financial losses by purchasing wholesale power at an average cost in excess of $150/MWh and reselling it to customers at a fixed price below $60/MWh (Exhibit 1)[7]. By the end of 2000, these two utilities claimed they had accumulated $12.1 billion of power costs that they were forbidden to pass on to customers. Faced with looming utility insolvency, power generators limited in-state sales by pulling out of California's Power Exchange[8], contributing to 6 days of rolling blackouts between January and May 2001. Since then, PG&E sought protection from its creditors through a voluntary bankruptcy. SCE is in technical default on its financial obligations related to power purchases and is at risk of involuntary bankruptcy.

6 There have been allegations that generators charged prices that were too high. These allegations are being investigated by state and federal authorities.
7 San Diego Gas & Electric (SDG&E) had recovered all of its stranded costs and stopped charging retail customers fixed prices before wholesale power prices began to increase.
8 Generation facilities that had been divested by the utilities were under no contractual obligation to the utilities to provide power.

EXHIBIT 1

UTILITIES ACCUMULATED LOSSES AS WHOLESALE PRICES EXCEEDED RETAIL PRICES

California wholesale and retail electricity prices
$/MWh



* Average price charged by PG&E and SCE for electricity only (excludes transmission, distribution, and other charges), as adjusted by CPUC

** Monthly average, volume-weighted spot market price

Source: Bloomberg; CPUC

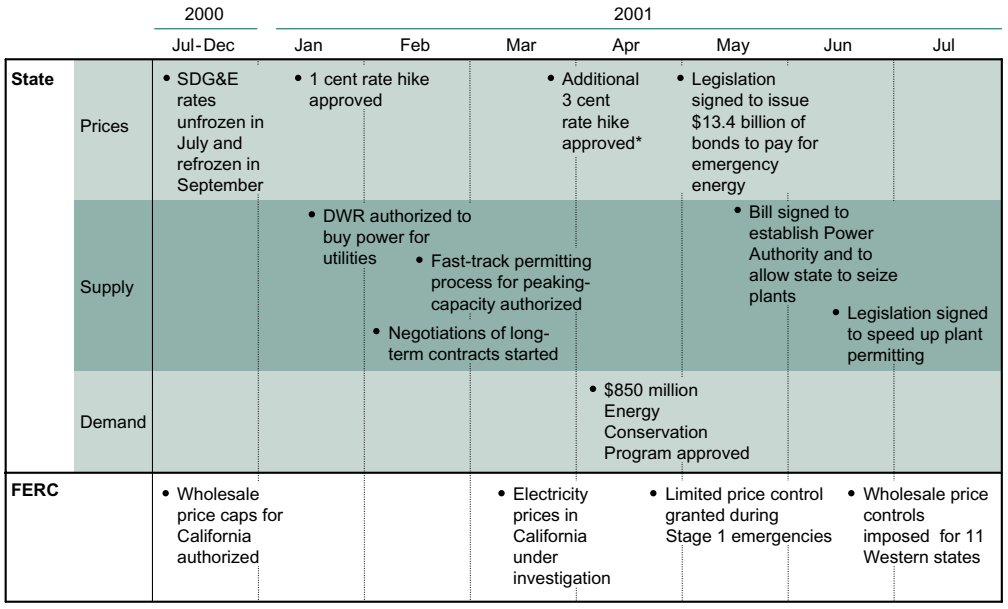
THE STATE AND FEDERAL RESPONSE TO THE CRISIS

As international attention focused on the likelihood of large-scale blackouts in California, the state and the FERC acted to bring short-term stability to the market (Exhibit 2). The worst aspects of the crisis have been averted for the time being and the power market has improved:

- Sufficient power was available from in-state generators and imports to prevent supply disruptions during the summer of 2001.
- Monthly average peak prices fell from as high as $390/MWh in December 2000 to around $45/MWh in August 2001, a reduction of 88%. Compared to August 2000, monthly average peak prices have fallen by 78% (Exhibit 3). The range of daily average peak prices has also narrowed from between $190 and $1,400/MWh in December 2000 to between $25 and $70/MWh in August 2001.
- Prices forecasted for electricity to be delivered over peak hours in 2002 (which can be observed through traded forward contracts) fell from approximately $150/MWh in April 2001 to $47/MWh at the end of July 2001 (Exhibit 4).

EXHIBIT 2

CALIFORNIA STATE GOVERNMENT AND FERC TOOK ACTIONS TO HELP END THE POWER CRISIS

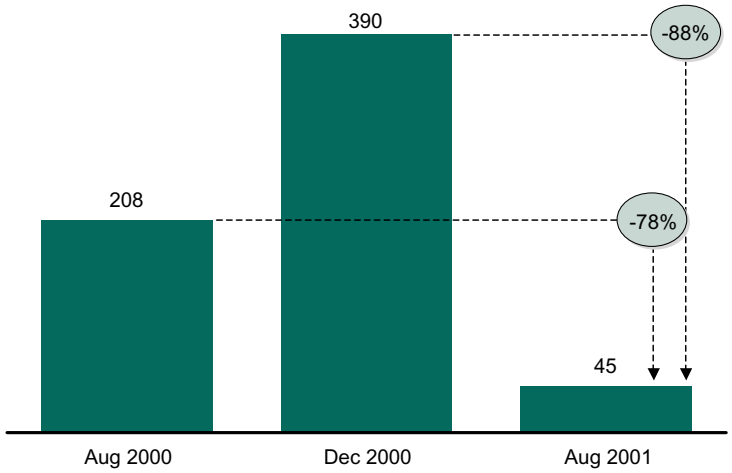


* Did not apply to SDG&E, but future increase was expected

EXHIBIT 3

PEAK PRICES HAVE DECREASED SIGNIFICANTLY IN CALIFORNIA

Average wholesale peak price*
$/MWh



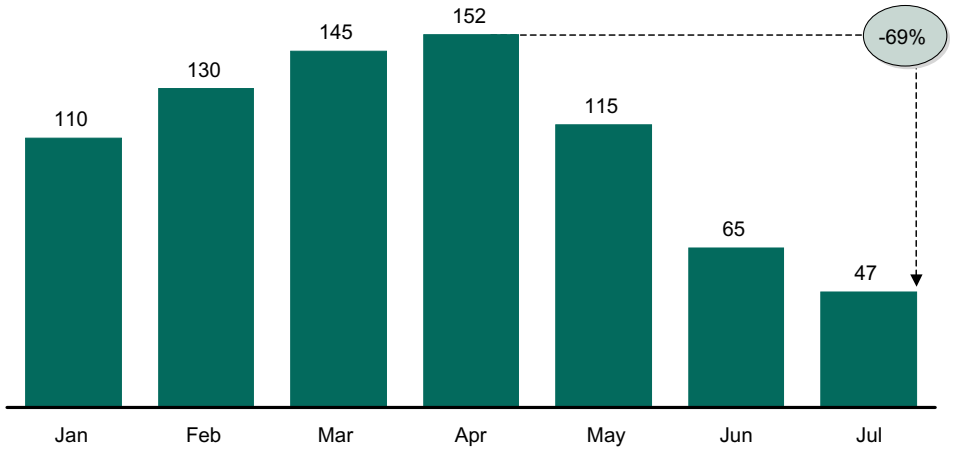
* Monthly volume-weighted peak average

Source: CalPX for August and December 2000; Bloomberg for August 2001

EXHIBIT 4

FORECASTS OF ELECTRICITY PRICES IN 2002 HAVE DECLINED

Peak prices* for electricity delivered in 2002, forecasted at various times in 2001
$/MWh



* For all peak hours (6 a.m. to 10 p.m.) in 2002 with delivery at Palo Verde, Arizona (major trading hub with interconnections to Southern California)

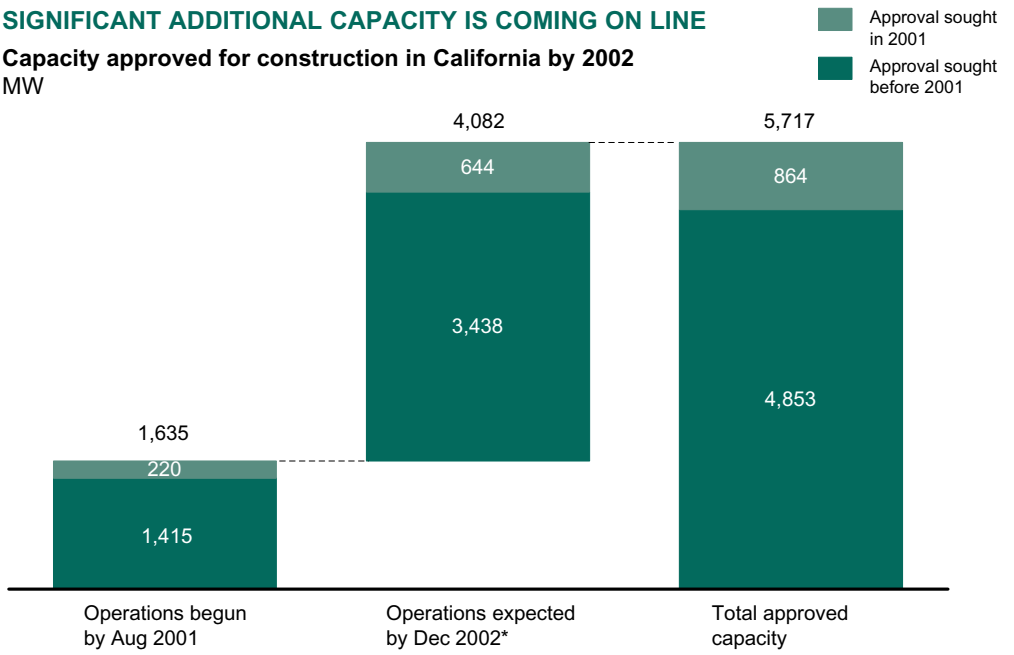
Source: Bloomberg

Short-term market stability has come from a number of factors. First, the state assumed purchasing responsibility for the insolvent utilities so that generators could more safely sell energy on credit. Moreover, since the beginning of 2001, six new power plants, representing 1,635 MW of capacity have come on line. Another 4,082 MW of plants have been approved to come on line by the end of 2002. Of the combined new capacity, 85%, or around 4,853 MW, was already in the development pipeline prior to the crisis (Exhibit 5). Accelerated permitting and approval processes may contribute to more than 5,000 MW of additional new capacity by 2002, on top of what has already been approved, primarily from small-scale "peaking" units.

EXHIBIT 5

SIGNIFICANT ADDITIONAL CAPACITY IS COMING ON LINE

Capacity approved for construction in California by 2002
MW



* Approved by California Energy Commission as of August 28, 2001

Source: California Energy Commission

Reduced demand by electricity users also contributed to the return of normal prices, helped in part by state actions that encouraged demand reduction:

- The state increased average retail electricity prices by 10% in January 2001 and by another 30% in June. The business community was required to bear a disproportionate share of this increase, with their rates increasing by almost 50% compared to residential increases of between 32% and 37% (Exhibit 6).
- The state launched a number of conservation programs, including mandatory reductions in power usage at government facilities, a massive public education effort ("Flex Your Power"), industrial and commercial curtailment programs, and a host of new financial incentives such as rebates for energy-efficient appliances and the "20:20" retail rewards program[9].

9 The "20:20" program gives the customers of PG&E, SCE, and SDG&E rebates of 20% on their bills in June, July, and August if they use 20% less electricity than in the previous year. $60 million in rebates were paid out to utility customers by August 2000.

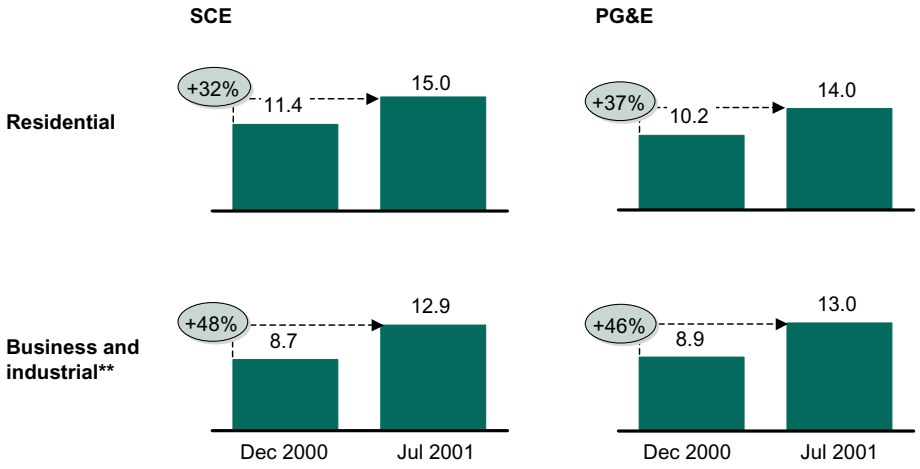
- Independent initiatives by the business community introduced voluntary conservation efforts. These efforts included an initiative by the Bay Area Council, with the Bay Area Economic Forum and the San Francisco Partnership, to mobilize CEOs, businesses, and economic organizations. The group agreed on a declaration of voluntary measures to collectively reduce its energy usage by 20%.
- Consumers responded to the crisis, reducing demand for electricity shortly after they received their first unusually high-priced Winter 2000/2001 natural gas bills. These natural gas bills were one of the first clear economic signals to consumers that California faced an energy crisis.

EXHIBIT 6

RETAIL RATES INCREASED BY 40% IN 2001

Tariffs by customer segment*

¢/kWh



* System-wide increases average 1 cent in January and 3 cents in June 2001

** Also includes some other nonresidential customers

Source: CPUC, March 2001

By August 2001, demand was down significantly from a year ago, with cooler temperatures and conservation efforts contributing equally to a 7.5% reduction in demand compared to August 2000 (Exhibit 7). Demand first started to drop appreciably, compared to a year earlier, beginning in February 2001. On top of these reductions in consumption, slower growth in industrial production helped to dampen potential demand growth. Combined with new generating capacity and higher power plant availability, the reserve margin in California increased to 16.1% in August 2001, compared to only 0.7% in August 2000 (Exhibit 8)[10].

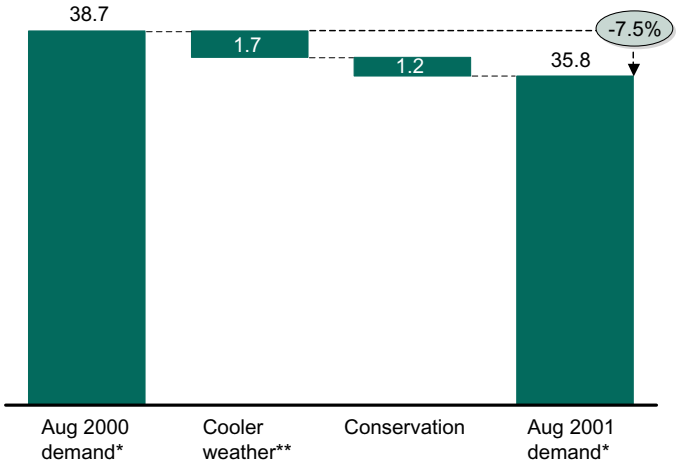
There were other longer-term actions taken by state and federal authorities in response to the California power crisis. The California Department of Water Resources (DWR) signed more than 40 long-term power purchase contracts to buy power for up to 20 years into the future. In 2001, the contracts will account for up to 15% of California's peak demand, with the contracts increasing to 21% of peak demand by 2004 (Exhibit 9).

10 These reserve margins are for the California ISO's control area. In August 2000, the reserve margin was a slightly higher 3.5% for the entire state.

EXHIBIT 7

ELECTRICITY DEMAND HAS DECLINED DUE TO CONSERVATION AND COOLER WEATHER

California retail demand reduction
GW

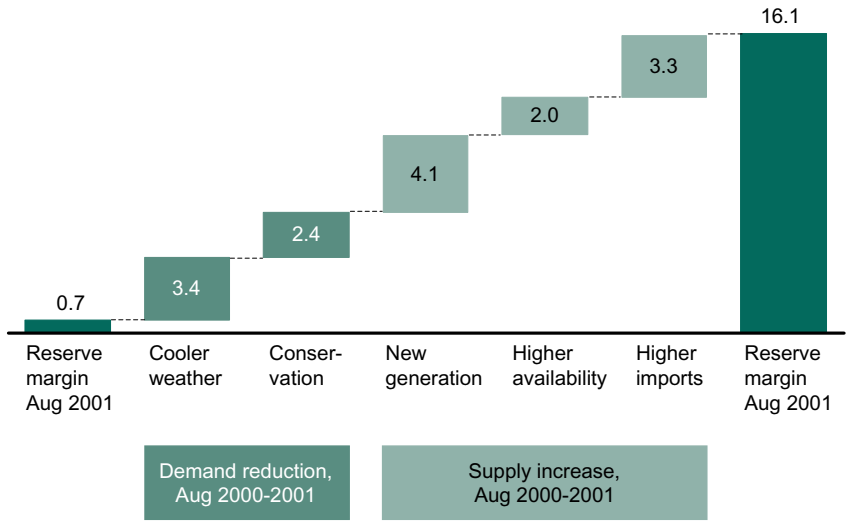


* Average California ISO daily peak loads for August 2000 and 2001
** Impact of lower average state temperature estimated using EIA short-term energy outlook demand model
Source: California ISO; Energy Information Administration (EIA)

EXHIBIT 8

RESERVE MARGINS INCREASED SIGNIFICANTLY SINCE AUGUST 2000

Reserve margins*
Percent

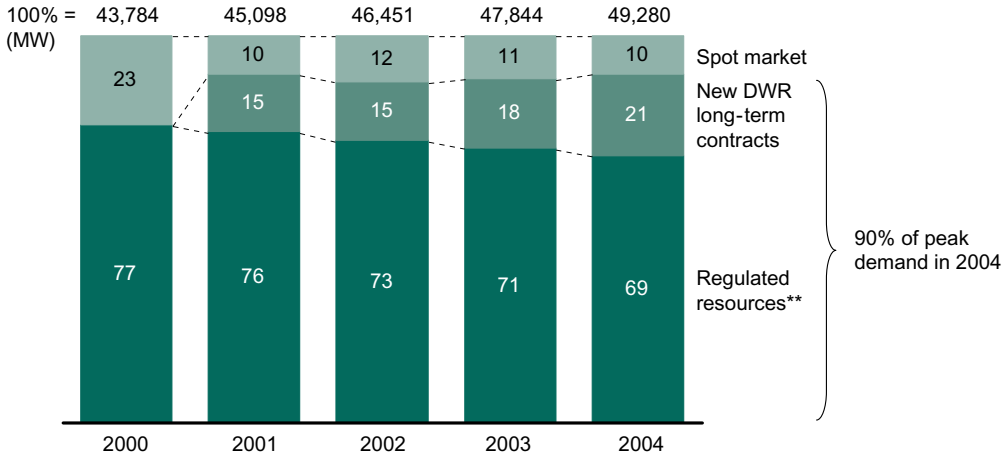


* Calculated based on monthly peak demand in the California ISO
Source: California ISO; EIA

EXHIBIT 9

THE STATE OF CALIFORNIA HAS SIGNED A LARGE PORTFOLIO OF LONG-TERM POWER CONTRACTS

Capacity used to serve peak demand*
Percent



* 2001-2004 peak demand forecasted based on 2% annual growth
** Includes IOU capacity, long-term QF contracts, state-owned generating plants, and municipal and federal generating capacity

Source: California Energy Commission; California State Controller's Office

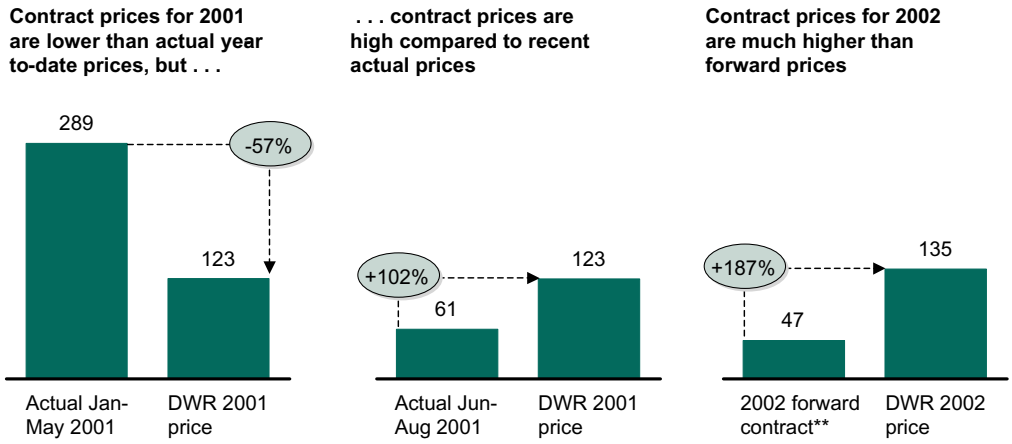
The point of signing the contracts was to achieve lower and more stable prices compared to the prevailing spot market. However, there are already signs that the state may have paid a high price to achieve this price certainty. The state agreed to pay an average of $123/MWh for peak power under the contracts during the second half of 2001. This compares favorably to the $290/MWh average spot price during the beginning of 2001 but is more than 100% higher than recent average prices. Moreover, the average price for peak power under the contracts increases to $135/MWh in 2002, which is almost 200% higher than current forecasts for 2002 (Exhibit 10). To ensure recovery of the costs of these high-priced contracts, the state recently suspended retail choice. The California Public Utilities Commission has indicated its intention to force renegotiation of these contracts, arguing that the prices are too high and will harm customers.[11]

11 *San Francisco Chronicle*, "State PUC Seeks to Void Davis' Contracts; Deals Gouge Consumers, Agency Tells Federal Regulators," October 1, 2001.

EXHIBIT 10

THE STATE HAS PAID HIGH PRICES UNDER NEW DWR LONG-TERM POWER CONTRACTS

Peak prices*
$/MWh



* Actual prices are time weighted; DWR contact prices are volume weighted
** As of July 30, 2001
Source: Bloomberg; California State Controller's Office

The state also formed a Power Authority with broad responsibilities to ensure sufficient capacity reserves so that consumers "never again face electricity shortages or outrageous prices."[12] Although its ultimate role is still being clarified, the Power Authority has a broad goal to keep prices low. It also has $5 billion in financing authority and is pursuing plans to construct or purchase up to 2,000 MW of gas-fired peaking plants and 1,000 MW of renewable energy resources by the summer of 2002.

In addition, the state has been actively seeking recourse from power generators, including refunds for high prices. The state's investigation of the generators' behavior has been characterized by inflammatory rhetoric, including threats to seize assets and throw generating company executives in jail. This has led some developers to conclude that future investment in California poses significant political and regulatory risks.

On the federal level, the FERC responded to the crisis by imposing wholesale price caps on sales by power generators, first with a fixed cap on wholesale power delivered within California in 2000, and then a system of floating, cost-based caps on the entire interconnected western markets in 2001.[13]

* * *

Actions by state and federal agencies, power generators, and consumers have all been needed to contain the crisis in California's restructured electricity industry. However, it is important for policy makers in California to consider what the future role of competition will be in the state's power sector and how fundamental issues that still challenge long-term industry health will be addressed.

12 http://www.capowerauthority.ca.gov
13 On December 15, 2000, FERC imposed a $150/MWh cap on prices in California. Transactions could occur at prices above this level, although subject to refund and verification that the prices were not excessive. On April 26, 2001 a cost-based cap system, based on administratively determined generating costs, was introduced within California. On June 19, 2001 a revised system of cost-based caps was imposed on all of the interconnected western states. A maximum price for non-deficiency periods (when capacity reserves exceed 7%) is also enforced, equal to 85% of the market price during the most recent deficiency period.

DEREGULATION EXPERIENCE IN FORMERLY REGULATED INDUSTRIES

After the crisis that accompanied California's troubled electricity market restructuring, the most obvious question for policy makers is whether competition in the power sector is still a viable and worthwhile goal. Can California's power industry be made competitive? Will consumers benefit?

THE CONTEXT FOR RESTRUCTURING

The deregulation of the power sector in the U.S. is only the latest in a trend to introduce competition in formerly regulated industries. The last 3 decades have seen the systematic decontrol of pricing, operations, and investment decisions in long-distance telecommunications, passenger airlines, trucking, retail banking, and natural gas (Exhibit 11). The reasons behind the prior government regulation of these industries varied, but were generally based on an economic argument of market failure that required government intervention for the protection of consumers.

EXHIBIT 11

POWER INDUSTRY IS AMONG LATEST IN TREND OF DEREGULATION

	Timing		
	Start	End	Key actions
Long-distance telecommun-ications	1969	1984	• 1969: MCI allowed to connect its long distance equipment to the public network • 1984: Long-distance service separated from local service; AT&T forced to divest local operations; local exchange companies required to provide equal access to long-distance carriers
Airlines	1978	1985	• 1978: Airline deregulation act signed; regulations regarding entry and pricing lifted • 1985: Civil Aeronautics Board (CAB) dissolved after route and fare authority had been terminated
Trucking	1980	1994	• 1980: Motor Carrier Act signed; entry and pricing restrictions lifted for interstate trucking • 1994: Intrastate trucking deregulated
Retail banking	1980	1999	• 1980/1982: Interest rate regulations lifted and new products approved • 1994: Limitations on interstate banking and bank mergers relaxed • 1999: Banks allowed to increase involvement in securities underwriting and insurance
Natural gas	1985	1993	• 1985-1993: Wellhead gas prices increasingly deregulated • 1985: FERC Order 436 issued, providing open access to pipelines; pipelines still allowed to trade gas • 1992: FERC Order 636 issued, prohibiting pipelines from merchant functions; transport fully unbundled from commodity
Electric power	1992	Present	• 1992: Energy Policy Act allowed increased entry by independent power producers • 1996: FERC Order 888 issued, granting open access to transmission system • 1998: California retail market is first in U.S. to deregulate • Present: Transmission and wholesale market design continuing, retail restructuring ongoing

For example, in the power industry, power generation was thought to be a natural monopoly, until the advent of smaller-scale and more efficient turbine generators. Formerly, regulators sought to encourage economies of scale from large-scale generation facilities by providing monopoly franchises to utilities while, at the same time, requiring prices charged to consumers to be “just and reasonable.”

Although the intention of regulation has been to correct for potential market failures, evidence of regulatory failure has mounted over time. Even with the best of intentions, many regulations contributed to inefficiencies as participants responded to perverse incentives. The natural gas industry in the 1970s provides a salient example. In the 1970s, the gas industry operated under a system of price controls at the wellhead, where natural gas is extracted from the ground. For most gas producers, regulated prices failed to cover their costs and to provide a sufficient return on investment. This led to a substantial tightening of supply and, ultimately, supply interruptions.

In response, the federal government established a dual pricing system to promote new production. Under this system, “new” gas would receive a higher price than “old” gas; that is, gas from existing wells. The new regulation did achieve its aim of increasing supply. However, it had a significant unintended consequence: many producers shut down older, lower-cost wells and drilled newer, more expensive ones to take advantage of the higher prices.

Regulation has often failed to provide the best incentives in the power sector, as well. Under the typical regulatory regime, electricity prices are set so as to allow utilities the opportunity to recover their costs and earn a fair return on their investment. Such a system provides only limited incentives for utilities to improve operational efficiency, since cost reductions are eventually passed on to customers. In addition, a guaranteed return on investment provides utilities an incentive to over-invest, or gold plate their system. Incentives to make large capital investments are cited as a key reason behind many U.S. utilities' disastrously expensive nuclear power plant construction programs in the 1970s and 1980s.

LESSONS LEARNED FROM DEREGULATION

The growing recognition of regulatory failure combined with pressure from consumers — both large and small — for lower cost goods and improved service, led to the substitution of market forces for regulatory decisions in many industries. Generally, only certain components of these industries that were considered to be potentially competitive were deregulated.[14] By and large, these deregulation experiments have brought lower prices, improved operational and investment efficiencies, and better product choice and customer service levels.

Impact of deregulation on pricing

In most industries, competition has contributed to lower prices at the wholesale and retail level. For instance, between 1983 and 1994, following natural gas deregulation, real prices of wholesale gas declined by 50% (Exhibit 12). Since then, however, prices have become more volatile, reflecting underlying supply and demand conditions.

Trucking also has seen significant real price decreases, on the order of 2% per year over the last 20 years (Exhibit 13). Prices fell once regulated tariffs were removed and new entrants began to compete to provide trucking service at competitive prices.

At the retail level, consumers have benefited from competition and the decontrol of prices in long-distance telecommunications. In the 35 years before the break-up of AT&T, long-distance prices declined an average of 3% per year. These price reductions were somewhat higher in the mid 1960s as AT&T began to make significant technology improvements and in the 1970s as AT&T began to face initial competitive pressures from MCI and other companies. However, since long-distance was fully opened to competition in 1984, prices have decreased by more than 8% per year (Exhibit 14). Competition is currently being introduced at the local telecommunications level to bring similar results, although it is proceeding at a slow pace due to more confusing rules, high fixed investment costs, and opposition from the local Bell operating companies.

In the airline sector, average revenue per passenger mile (a proxy for average prices) has fallen for 30 years (Exhibit 15).[15] The rate of reduction spiked during the transition to deregulation that culminated in 1985. It slowed subsequently, due to new revenue management programs, through which airlines charge business customers higher, differentiated prices for last-minute travel. This increased customer segmentation is a common feature of competition, generally leading to more

14 For instance, pricing in the natural gas industry was decontrolled at the wellhead level, not at the interstate pipeline level, which is still regulated as a natural monopoly.
15 It should be noted that the period of airline regulation also coincided with significant technological advances, including the development of commercial jet aviation, which contributed to rapid cost reductions.

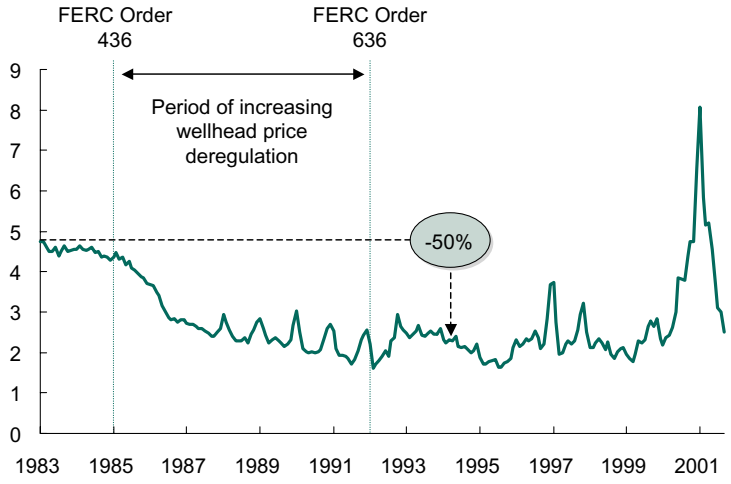
efficient pricing and service options for customers. Airline price declines have also eased somewhat because there has been less new entry in the years following full deregulation than there was during the initial transition to competition, as the industry has become more mature.

Lower prices spurred by competition often come at the expense of greater price volatility, as the natural gas industry demonstrated. If consumers value price certainty, a natural question to ask is whether they might be harmed by prices that adjust quickly in response to temporary changes in supply and demand. Not necessarily. Price fluctuations provide important signals that help market participants identify the need for new investment. Moreover, as long as competitive retail markets are allowed, suppliers will develop products for customers that provide price certainty. Customers might pay a premium for this certainty, but the total cost is still likely to be lower than under regulation. Once again, customer segmentation under competition promotes the development of these types of products. Finally, even following deregulation, there still may be a role for the government to protect vulnerable consumers and businesses from undue price risk.

EXHIBIT 12

GAS PRICES DECLINED BUT BECAME MORE VOLATILE FOLLOWING DEREGULATION

Gas price*, January 1983-September 2001
Real $/Mcf (2001)

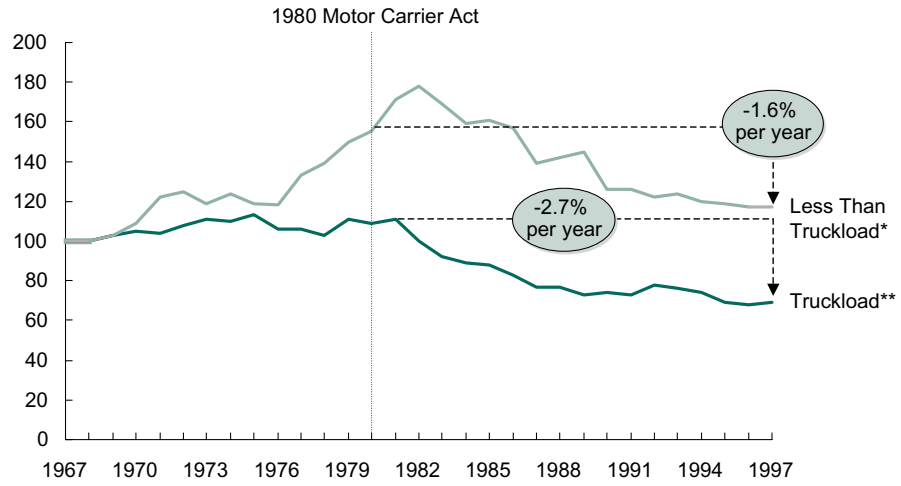


* January 1980-May 2001 national average wellhead price, June-September 2001 Henry Hub price
Source: EIA

EXHIBIT 13

TRUCKING PRICES DECREASED FOLLOWING DEREGULATION

Real prices per ton
Index 1967 = 100

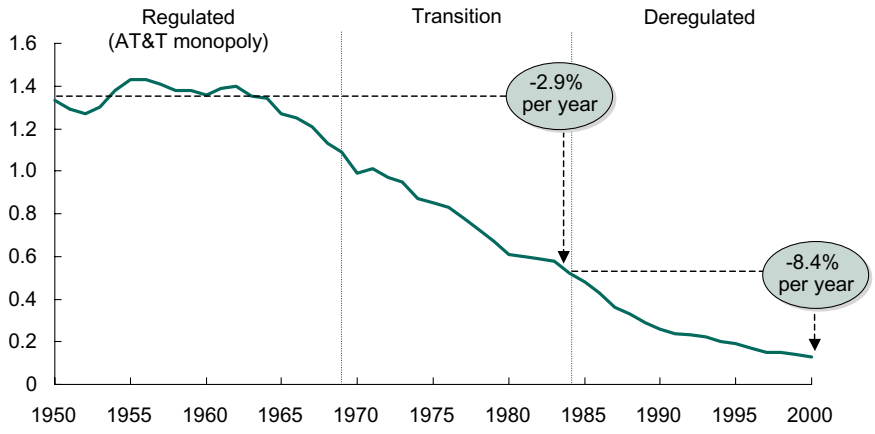


* Less Than Truckload: freight loads of multiple customers aggregated in distribution centers
** Truckload: whole truck dedicated to one customer point to point
Source: Transportation Technical Services

EXHIBIT 14

LONG DISTANCE PRICES DECLINED FOLLOWING DEREGULATION

Long distance average revenue per minute
Real $/minute (2000)

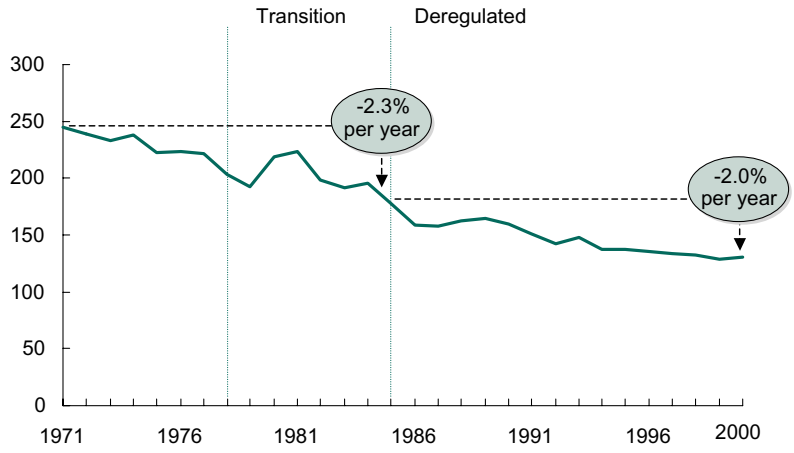


Source: Federal Communications Commission

EXHIBIT 15

AIRLINE FARES CONTINUE TO DECLINE FOLLOWING DEREGULATION

Airline fares
Real $/revenue mile (1996)



Source: BACK Aviation

Impact of deregulation on operations and investment efficiency

Competition provides incentives for producers to operate more efficiently and improve investment decisions since they bear both the risks and the rewards of their actions. Regulation in the trucking sector limited the number of players and placed strict controls over what carriers could ship and between which points. Deregulation lifted the limits on the areas that carriers were allowed to serve and thereby removed the need to use multiple carriers when shipping across service areas. Moreover, carriers can now broker their excess capacity to other shippers to ensure higher overall capacity utilization. Between 1977 and 1993, operating costs dropped 8% per year for full truckload service and 3% per year for less than truckload service (Exhibit 16).

Deregulation in the airline industry introduced new competitors, which contributed to price declines. Incumbent airlines were forced to improve operations to compete. They did so by developing the hub-and-spoke routing system, standardizing aircraft for maintenance economies and sizing their planes more efficiently for expected loads. Combined with improved pricing programs (the so-called revenue management programs which began in the 1980s), airlines increased their capacity utilization from 58% in 1984, just prior to full deregulation, to 71% in 2000 (Exhibit 17).

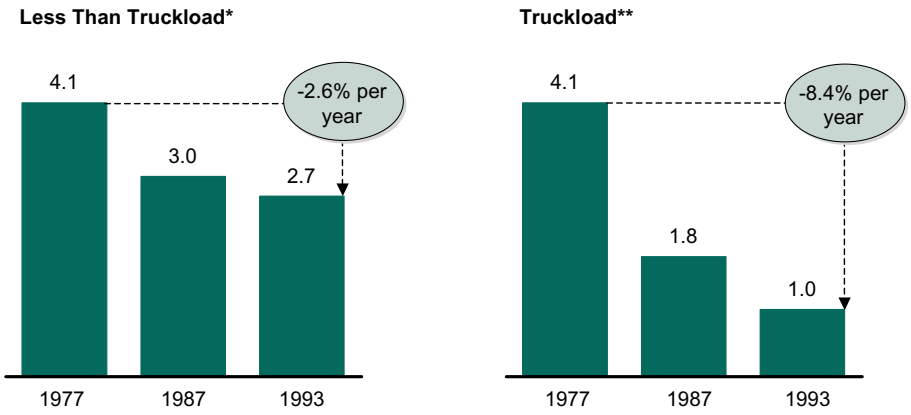
Operational improvements have also occurred in segments of these industries that have remained regulated. For instance, in the natural gas industry, exploration and production is now deregulated, but the interstate natural gas pipeline system continues to be regulated by the FERC. Starting in 1992, however, the FERC stopped requiring pipelines to submit their costs for review every year, so long as pipelines did not ask for price increases. As a consequence, many pipelines have been charging flat prices since 1992, as if there were a nominal price freeze. This has resulted in a real price reduction of 4% per year for shippers since 1992. At the same time, pipelines have had an

incentive to reduce their costs, because any cost reductions through operational efficiencies go directly to their bottom line. Between 1994 and 1999, operating margins on interstate pipelines increased from 19% to 25%, due to large reductions in operating costs, while revenues decreased (Exhibit 18).[16] It is important to note that the type of regulation made a significant difference. These operational efficiencies would have been less likely under a traditional cost-based regulatory regime in which all savings would have been passed on to consumers.

EXHIBIT 16

LOWER OPERATING COSTS INDICATE MORE EFFICIENT TRUCKING INDUSTRY

Interstate trucking operating costs
Real $/mile (1987)



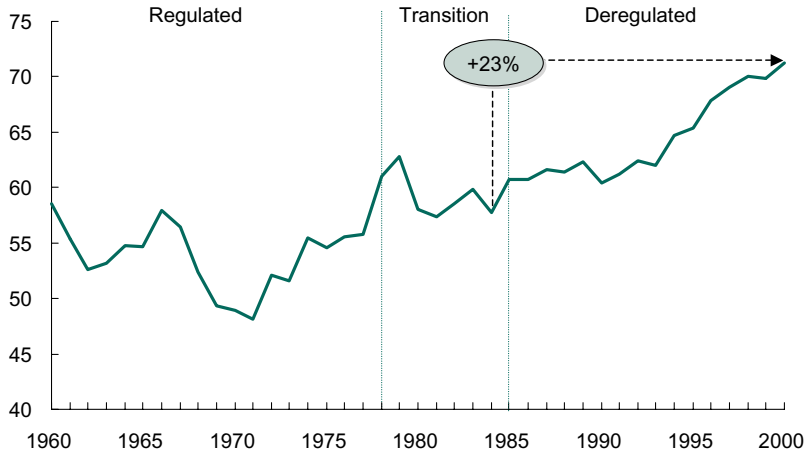
* Less Than Truckload: freight loads of multiple customers aggregated in distribution centers
** Truckload: whole truck dedicated to one customer point to point
Source: Center for Market Processes

16 Revenues declined partly due to shippers signing fewer long-term capacity contracts with pipelines following deregulation and partly due to mandated price reductions following mergers.

EXHIBIT 17

AIRLINES ARE USING CAPACITY BETTER SINCE DEREGULATION

Airline capacity utilization
Percent of available seat miles* filled

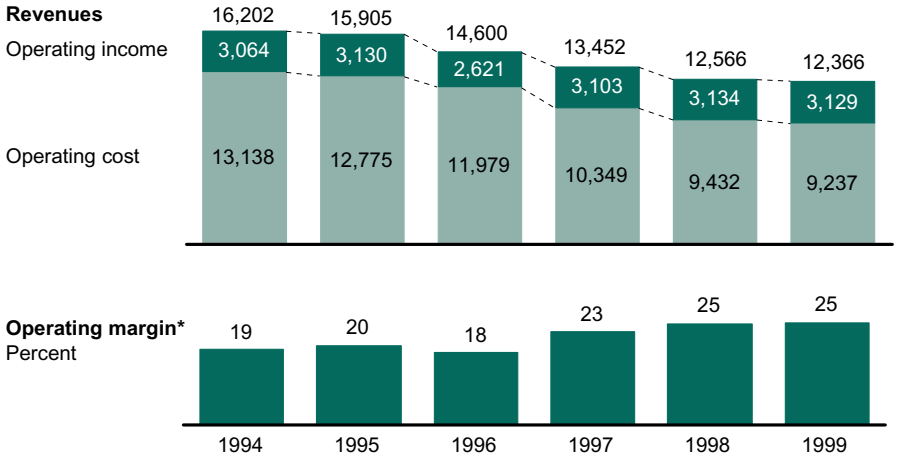


* Available seat miles: miles traveled by an aircraft multiplied by number of seats available on that aircraft
Source: Air Transport Association; BACK Aviation

EXHIBIT 18

NATURAL GAS PIPELINES IMPROVE OPERATIONAL EFFICIENCY UNDER PRICE FREEZE

Performance of interstate natural gas pipelines
Real $ Millions (1999); percent



* Operating margin: ratio of operating income over revenues
Source: FERC

Impact of deregulation on product choice and service quality

With increased competition comes an increased focus on customers, facilitated in part by more efficient customer segmentation. In the trucking sector, shippers have been prime beneficiaries, because trucking companies now have incentives to compete on the basis of price, frequency of service, transit times, and reliability. Modern just-in-time manufacturing has only become possible because of a more efficient transport infrastructure that keeps transit prices low and delivery times predictable.

In the airline industry, lower overall prices spurred record demand following deregulation. Under former Civil Aeronautics Board (CAB) regulations, overall rates and pricing structures were strictly limited. Customers now have more choice in the type of fares being offered. Today, passengers on a given flight may have anywhere from 15 to 25 different pricing options, offering those with most flexibility in travel plans the greatest discounts, and allowing the market to clear at a higher price for next-day, inflexible passengers.

In the telecommunications sector, the deregulation of AT&T's monopoly on telephone equipment in 1976 resulted in a plethora of choices of phones for consumers, replacing the ubiquitous black phone rented from AT&T. Following long distance deregulation, customers saw substantial new pricing choices, such as special weekend calling rates and MCI's “Friends and Family” program. Moreover, competition by new entrants such as Sprint increased service quality for all users and stimulated more rapid adoption of new technologies. AT&T accelerated construction of its fiber-optic network by at least 5 years and all long-distance providers were forced to increase their service quality to “pin-drop” quality.

While the level of service generally increases following deregulation, there has been some dissatisfaction among customers, particularly during the transition to deregulation. Deregulation also forces customers to make new choices, requiring them to read through confusing tariff schedules and complicated product descriptions.

Difficulties encountered in transition to competitive markets

There are some clear long-term benefits from deregulation in the sectors examined above. The process undertaken in each industry, however, has not always been easy. For example, in the retail banking sector, consumers have certainly benefited from new products and increased convenience. The transition to deregulation in the sector, though, is best known for contributing to the 1980s savings and loan (S&L) debacle.

Before deregulation, S&Ls had been limited in the interest rates they could set. As these price limits were lifted, S&Ls began to compete to attract new deposit customers and raised the interest rates they offered. This put downward pressure on their profits. At the same time, general changes in interest rates in the economy reduced the value of existing loans held by S&Ls, which reduced their equity values. To offset the higher interest rates offered on deposits and make up for falling equity values, S&Ls began lending to higher-risk borrowers that were willing to pay higher interest rates. All the while, the thrifts and their depositors knew that federal deposit insurance programs — which continued to exist following deregulation under more relaxed limits — would protect depositors if the thrifts failed.

If the higher-risk strategy had paid off, shareholders (and managers) would have reaped the benefits. Unfortunately, not all of the bets made by the S&Ls paid off, resulting in massive thrift failures following deregulation (Exhibit 19). Taxpayers were left to pick up the tab, to the tune of nearly $150 billion.[17]

17 According to 1996 estimate by the General Accounting Office.

Yet, the S&L crisis does not prove that competition was an undesirable goal in the banking sector. Rather, it illustrates that partial deregulation of an industry — without proper adjustments to the remaining regulated mechanisms — can have adverse outcomes. In this case, federal deposit insurance programs, combined with relaxed limits on S&L lending and reserve requirements, exacerbated a "moral hazard" problem. There was little downside for depositors to providing S&Ls with funds, because these funds were fully insured. Moreover, with low equity values, many S&Ls had little to lose and much to gain from taking big bets on loans to risky customers.

Consolidation often accompanies deregulation, as more innovative and efficient producers are able to squeeze out their formerly protected competitors. The airline industry provides a good example. Following deregulation, the top four carriers' share of passenger boardings increased from 41% to 53% between 1978 and 1998, and their share of revenue earning passenger miles increased from 44% to 65% over the same time period (Exhibit 20). Also, a few large airlines have consolidated their control of gates at important hub airports (Exhibit 21). This form of consolidation may lead to higher prices for customers at certain airports and shows that competition requires continued oversight to ensure that the full benefits are delivered to consumers.

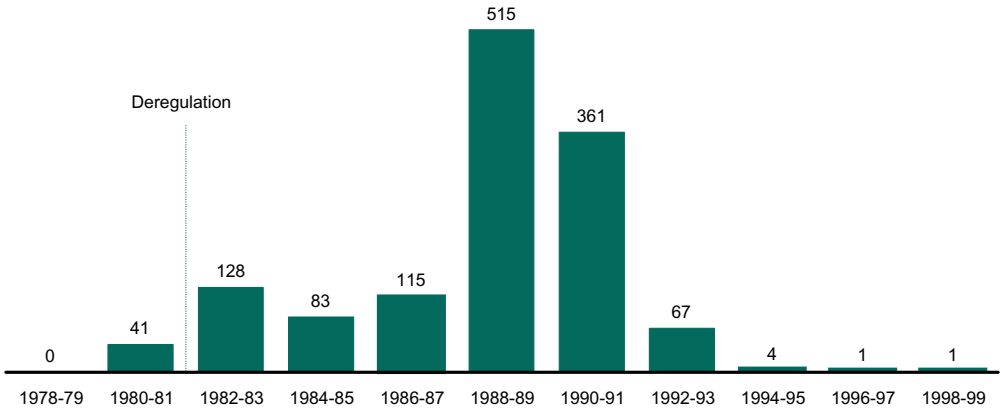
Another lesson is that deregulation cannot be confined to a single sector in an otherwise closely interconnected industry. For practical purposes, the restructuring of an industry may need to proceed in various phases, but closely related sectors of an industry must be deregulated together to avoid adverse outcomes. For example, deregulation in the trucking sector first occurred in 1980 for interstate shipments, and then for intra-state shipments in 1994. This led to perverse incentives and inefficient shipping decisions. As noted by Representative Thomas Delay (R-TX) in 1988: "In Texas, if you're shipping, say, from San Antonio to Texarkana, the Texas side of Texarkana, you send it to Lafayette, Louisiana, then to Texarkana because it's cheaper to do that across that border than it is to send it straight to Texarkana.[18]"

18 Cato Institute, "Intrastate Trucking: Stronghold of the Regulators", February 16, 1994.

EXHIBIT 19

POOR OVERSIGHT CAUSED MASSIVE THRIFT FAILURES FOLLOWING DEREGULATION

U.S. thrift failures
Institutions per year

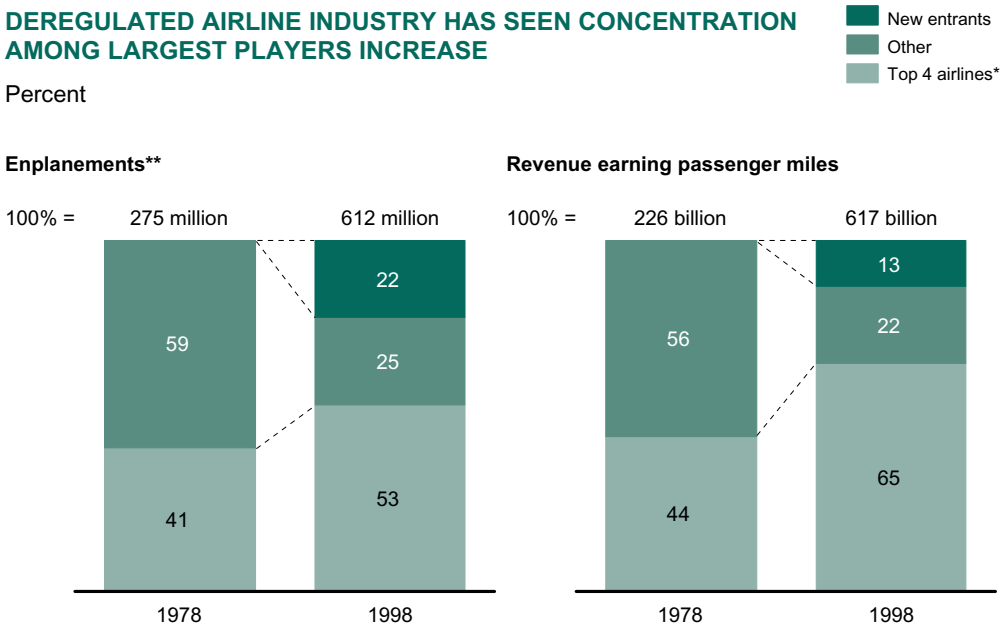


Source: Federal Deposit Insurance Corporation

EXHIBIT 20

DEREGULATED AIRLINE INDUSTRY HAS SEEN CONCENTRATION AMONG LARGEST PLAYERS INCREASE

Percent

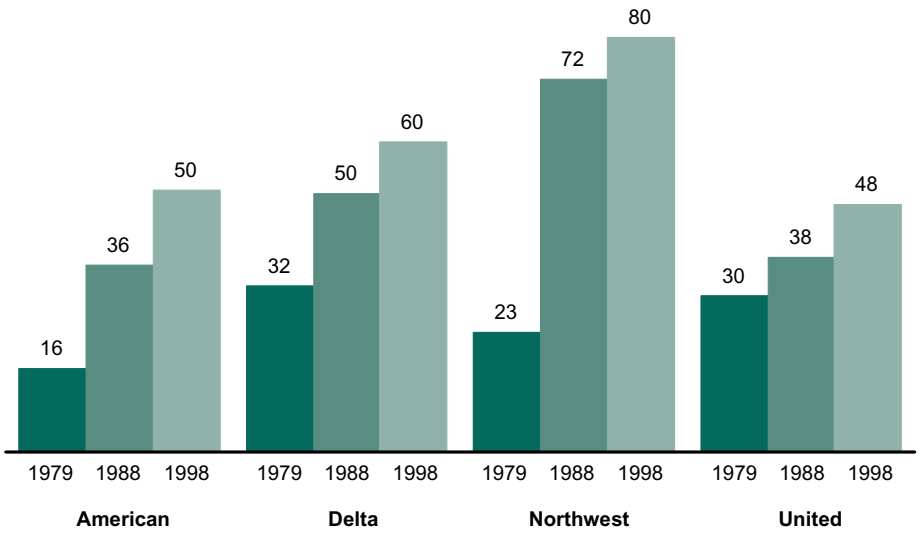


* American Airlines, United, Delta, Northwest
** Enplanement: a passenger boarding a plane
Source: Department of Transportation; Airline Economics

EXHIBIT 21

TOP AIRLINES INCREASE DOMINANCE AT CORE HUBS

Share of seats at core hubs
Percent of scheduled seats



Source: Department of Transportation; Airline Economics

Impact of restructuring on workers and shareholders

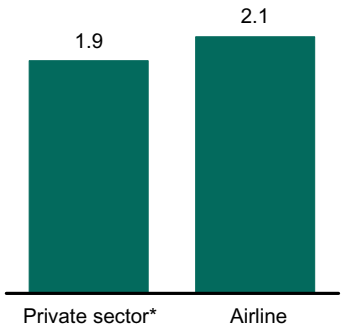
Consumers are the key stakeholders, though certainly not the only ones, considered in the decision to deregulate a market. Both labor and shareholders are affected, too. Experience indicates that labor often initially suffers following deregulation, as overall employment and wages are reduced. In the trucking industry, for example, wages declined significantly following deregulation. But labor is not always worse-off in the long run. In the airline industry, as lower prices made passenger travel more affordable for budget-oriented customers, the increase in demand led to an increase in employment. Even accounting for the downsizing efforts between 1978 and 1983, employment in the airline industry grew at a faster rate than in the private sector as a whole following deregulation (Exhibit 22). Airline employees also have maintained salary levels higher than the average private sector worker, in part because of strong unions, although the gap between the two has narrowed in the 20 years since deregulation (Exhibit 23).

The message for shareholders is mixed. In general, industries produce lower returns once they face competitive pressure. More importantly for shareholders and management, however, deregulation widens performance differences. There is more opportunity for innovative, well-managed companies to reap the benefits of their actions. In the airline sector, for instance, annual shareholder returns began to diverge dramatically in the years following deregulation, as winners and losers emerged from competition (Exhibit 24).

EXHIBIT 22

AIRLINE EMPLOYMENT GROWTH OUTPERFORMS PRIVATE SECTOR EMPLOYMENT

Annual employment growth, 1978-2000
Percent



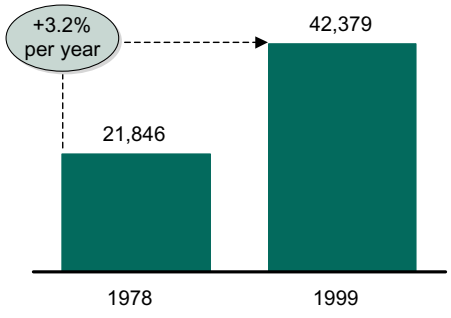
* Non-agricultural workforce
Source: Air Transport Association; BACK Aviation; Bureau of Labor Statistics

EXHIBIT 23

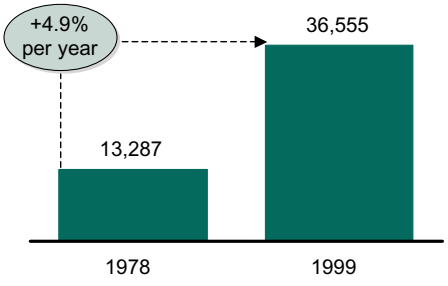
AIRLINE SALARIES GROW MORE SLOWLY BUT REMAIN ABOVE AVERAGE FOR OTHER INDUSTRIES

Dollars

Airline salaries, 1978-1999



Average salaries for all industries, 1978-1999

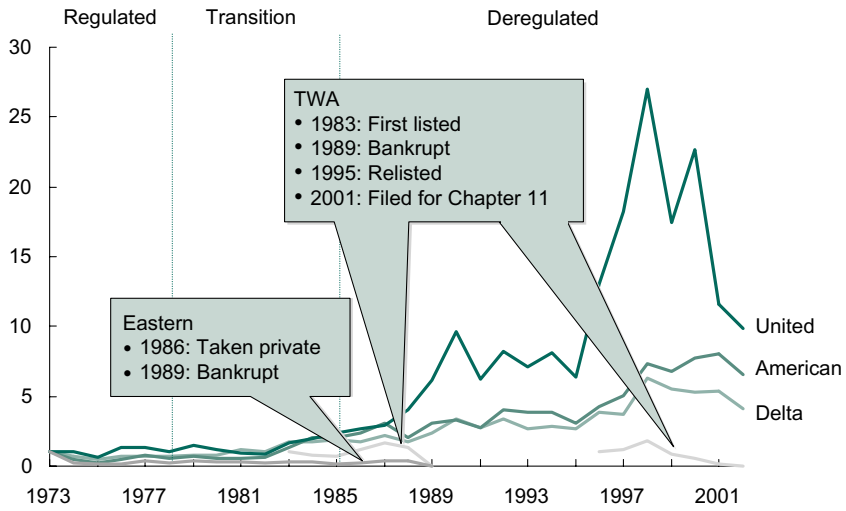


Source: Statistical Analysis of Transportation in the U.S., 2000

EXHIBIT 24

AIRLINE INDUSTRY RETURNS VARY WIDELY AFTER DEREGULATION

Value of $1 invested in 1973 or at listing
Dollars



Source: Compustat

Deregulation Experience in Other Power Markets

The evidence from the long distance, airlines, trucking, retail banking, and natural gas industries shows that properly structured deregulation can deliver benefits to consumers. Is electricity any different as a commodity or an industry?

Electricity is certainly a unique commodity. First of all, it is difficult to store electricity in large quantities.[19] So, unlike oil or agricultural products, inventories cannot be relied upon to prevent intermittent supply-demand imbalances and to smooth out price fluctuations. Another key difference between electricity and other commodities is that electricity production must always be matched perfectly and instantaneously with consumption. If available production and consumer demand are not instantaneously balanced, the resulting fluctuations in electric voltage and frequency can contribute to a failure of the power grid and blackouts can result. The value placed on the last MW of power produced can therefore be very high, because the costs of a system failure are extraordinary. As a consequence, when capacity is in short supply, generators may be able to charge very high prices. Finally, in a number of instances there are no reasonable substitutes for electric power.

Like a number of utility services, electricity is viewed as a social good. The belief has been that prices should be low and stable, with guaranteed service for all. Consequently, in most jurisdictions retail electricity customers pay fairly constant prices for their power, which change — if at all — only with a significant lag to the changes in the underlying costs.[20] This means that electricity end-users are largely insulated from volatility in wholesale markets. Since retail consumers in most power markets do not experience price changes very frequently, they generally have no incentive or signal to adjust their usage. As a consequence, power generators may be able to charge prices well in excess of their costs without any fear of demand reduction. Likewise, there is a risk that shortages can occur.

These physical and institutional characteristics of electricity make it a challenging industry to deregulate. However, this does not make it impossible. There are multiple examples of successful electricity market deregulation across the U.S. and around the world.

Restructuring in Electric Power Markets

In the U.S., wholesale competition was introduced in power generation in the mid-1990s, allowing transactions between generators, energy retailers, and power marketers at market prices, rather than regulated rates. At that time, wholesale power competition — often as part of the privatization of the power industry — had already been introduced in a number of international markets, including Argentina, Chile, the UK, Scandinavia, Australia, and New Zealand. Retail competition, which allows end-use customers (such as households or businesses) to choose from alternative competitive electricity suppliers at a non-regulated rate, is still in the early stages of being introduced in the U.S. and is proceeding on a state-by-state basis. California was one of the pioneers of retail electricity deregulation in the U.S., although its model for retail competition has not proven to be effective. Retail competition has been introduced in several international markets, with the most success so far in the UK, where competition has been phased in over the past 10 years.

The experience of other power markets — both with wholesale competition and, increasingly, with retail competition — provides policy makers today with a rich body of evidence to draw upon when examining whether competition is a viable goal in the power sector. The experience is promising: a properly structured transition to deregulation can bring benefits to consumers. In power markets outside California, restructuring has resulted in more efficient operations and consumers have benefited from new products and improved service quality levels. Although wholesale prices have not always declined following deregulation, other power markets have avoided California-style problems of bankrupt utilities and blackouts.

19 Hydroelectric dams are a form of storage, although they rely in part upon rainfall. Back-up generators can possibly be considered a form of storage. Large batteries can store power, but are too expensive to be practical.

20 Natural gas prices to consumers in the U.S. are generally more responsive to changes in the wholesale cost of gas than retail electric bills are to changes in the cost of wholesale power. During the tight gas market of 2000 and 2001 in California, customer bills rose dramatically, providing a clear (if painful) signal to reduce consumption. Consumption did fall significantly.

Impact of deregulation on wholesale prices

Since one of the ultimate goals of deregulation is to reduce prices, the most natural metric for examining competition in the power sector is the level of prices in various restructured markets. The evidence is complicated on its face: some markets experience decreases in prices; others increases; and all markets experience higher volatility.

The most compelling evidence of wholesale price declines has occurred in the restructured wholesale markets in Argentina and in Victoria, Australia (Exhibits 25 and 26). What these markets had in common were a high level of capacity reserves at the outset of competition and historically inefficient operations. Both of these features were the primary drivers behind the introduction of competition. Prices have fallen significantly since deregulation in Argentina with an overall price decline of 50% over 9 years. In Victoria, after power plants were placed in new, private hands between 1994 and 1996, competition led operators to improve both labor productivity and capacity utilization, translating into price reductions of 50%. Prices remained at these much lower levels for several years in Victoria, although they have increased in 2000 as reserves have tightened.

Other markets were more efficient than Victoria and Argentina at the outset of the deregulation process and, consequently, did not experience such significant initial price reductions. In markets with a higher level of operational efficiency, the primary drivers of prices immediately following deregulation are changes in fuel prices and weather. In New Zealand, for example, hydroelectric power is the main supply source and prices follow rainfall levels (Exhibit 27). This outcome makes economic sense — and should be expected in a competitive market — since the potential for high prices provides incentives for hydroelectric plant operators to optimize their use of water, preserving it for when it is expected to be most valuable. Likewise, it is important for prices to rise when there is less capacity available, to send signals to consumers that resources are more scarce and should be used more judiciously. In power markets that have higher operational efficiencies at the outset of competition, only as investments are made in newer, more efficient power plants over time will efficiency gains be translated into lower wholesale prices.

The experience in other deregulated wholesale power markets shows that prices rise in these markets when the level of generating capacity falls relative to demand. In fact, one of the primary goals of deregulation has been to substitute such price signals for direct regulatory control. Relying on a market-based mechanism for establishing wholesale prices shifts the risks (and rewards) associated with making new generation investments away from regulated consumers or taxpayers and onto private developers.[21] Private developers are forced to decide when, how much, and what type of capacity to build. If they build too much capacity, customers will not be harmed by their mistakes; and timely investments in more efficient power plants are rewarded by profits.

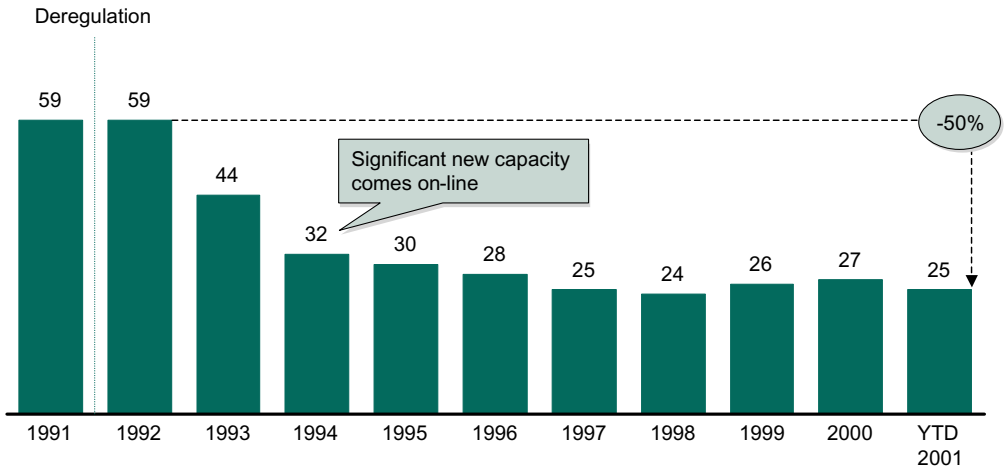
There are multiple examples of prices responding to the overall supply and demand balance. For instance in Victoria, Australia, at the outset of deregulation, reserve margins were well above 20%. Over time, however, as demand increased, the reserve level fell to around 5%. There was a corresponding increase in average prices from $24/MWh (Australian) between 1996 and 1999 to $40/MWh (Australian) between 2000 and 2001 (Exhibit 28). Private developers are responding to higher prices with investments in new capacity, with several new power plants in development or in construction with operations expected by the end of 2002.

21 Regulations must exist, however, to prevent market abuses. In addition, deregulated generation markets may include explicit requirements for the maintenance of generating reserves. Such requirements are not incompatible with competitive markets, since signals from both energy and capacity markets will direct private investment decisions.

EXHIBIT 25

ARGENTINA'S WHOLESALE POWER PRICES DECLINED MORE THAN 50% FOLLOWING DEREGULATION

Wholesale power prices
Real U.S. $/MWh (2000)*

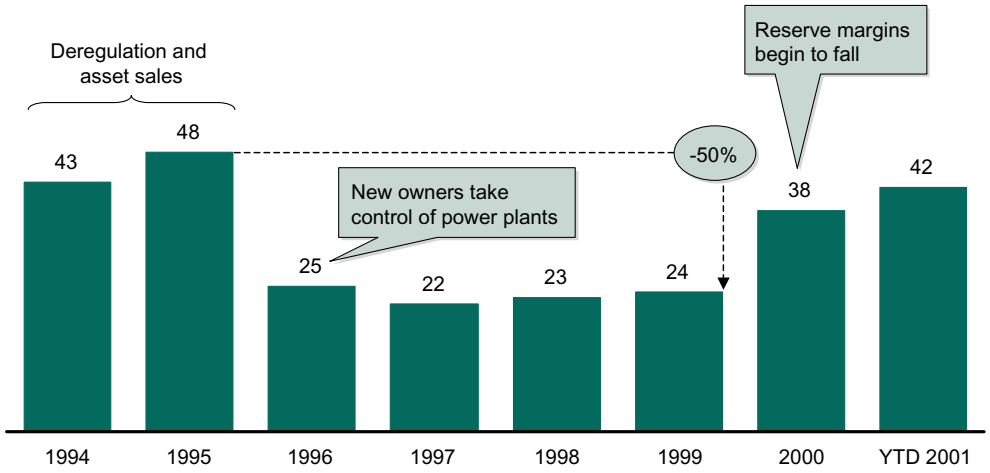


* Time weighted annual averages
Source: EIA; CAMMESA

EXHIBIT 26

VICTORIA'S WHOLESALE POWER PRICES FELL BY 50% FOLLOWING DEREGULATION BUT HAVE INCREASED RECENTLY

Wholesale power prices
Real AUS $/MWh (2000)*

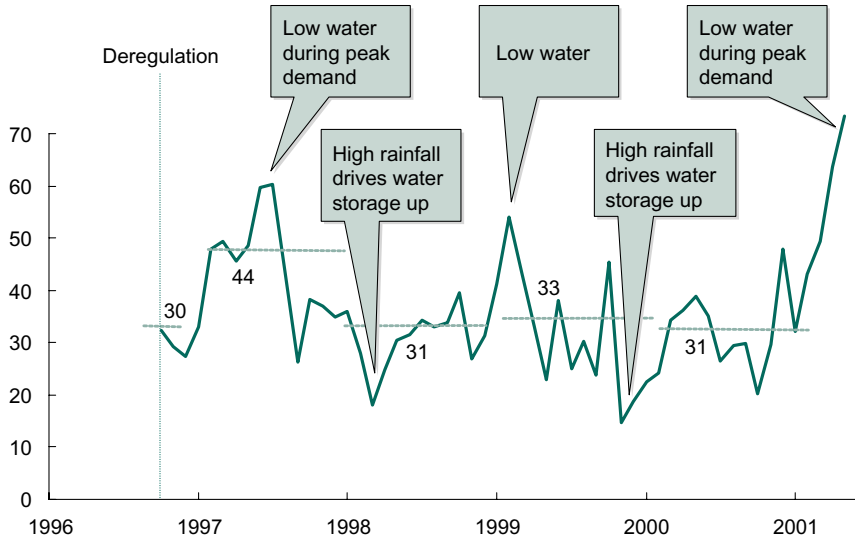


* Time weighted annual averages
Source: EIA; Victoria Power Exchange; NEMMCO

EXHIBIT 27

WEATHER IS A MAJOR DRIVER OF ELECTRICITY PRICES IN NEW ZEALAND

Wholesale electricity prices
Real NZ $/MWh (2000)



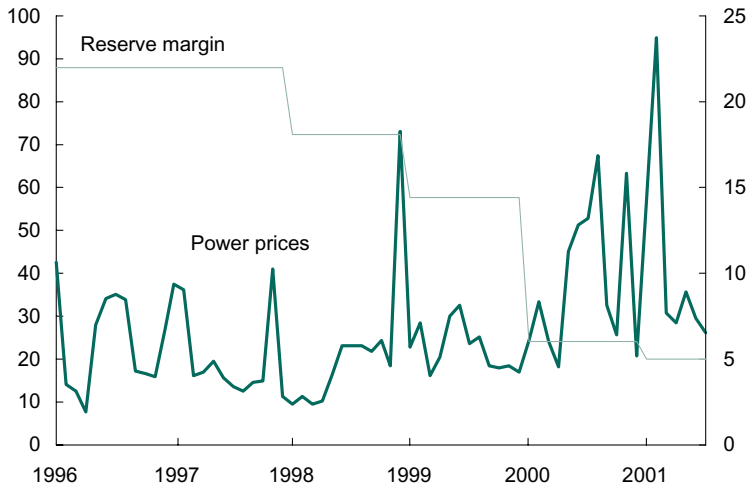
Source: M-Co (operator of New Zealand's wholesale electricity market)

EXHIBIT 28

VICTORIA'S WHOLESALE PRICES INCREASED AS RESERVE MARGINS FELL

Power price
Real AUS $/MWh (2000)

Reserve margin
Percent



Source: National Electricity Market Management Company

Impact of deregulation on operational efficiency and investments in new capacity

As shown in other industries, bearing the risks and rewards of operational and investment decisions drives firms in competitive industries to greater levels of efficiency. Evidence from other power markets provides additional support.

As a result of deregulation, employment has fallen significantly in the UK power industry and in the Pennsylvania-New Jersey-Maryland power market (PJM), by 51% and 27% respectively (Exhibit 29). While employment has fallen in PJM, utility production has actually increased, meaning productivity per employee has grown significantly. Likewise, in the UK power generation sector employee productivity has grown dramatically. The two main generators in the UK — PowerGen and National Power — posted efficiency improvements of 86% and 113%, respectively over the 6 years following deregulation (Exhibit 30).

Although operational efficiency gains are important, it is the efficient and timely expansion of generating capacity that is of greatest importance to policy makers in California. The examples of Alberta, Canada, and Chile are instructive in showing that private developers in these markets are responding efficiently to price signals with both their timing and their choice of new capacity.

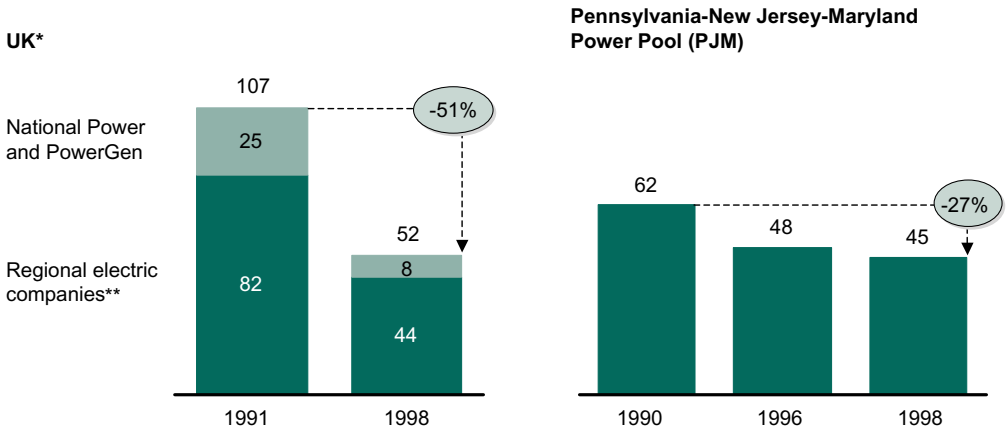
When the wholesale power market in Alberta was deregulated in 1996, reserve margins were at healthy levels. At the time, the existing fleet of low-cost, coal-fired plants also kept wholesale prices at very low levels, reducing the incentive for competitive developers to add new capacity. Prices gradually increased and by 1999 began to fly-up to levels high enough to encourage the construction of new gas-fired generation. Developers planned or built 1,500 MW of new capacity between 1999 and 2001 (a 17% increase in capacity) and another 2,500 MW is planned for construction between 2002 and 2004 (another 25% increase in capacity) (Exhibit 31). These capacity additions have already put downward pressure on power prices and will help to increase Alberta's reserve margins in the future.

In the late 1990s, Chile experienced an extended drought that significantly reduced reserve margins and raised wholesale power prices, since a significant portion of the country's power came from hydroelectric facilities. In response, private developers built new capacity, mainly fossil-fuel burning plants. The new plants have contributed to a healthier overall mix in Chile's generating capacity (Exhibit 32).

EXHIBIT 29

UTILITY INDUSTRY EMPLOYMENT HAS FALLEN SIGNIFICANTLY IN THE UK AND PJM

Thousands of employees



* Generators and regional electric companies

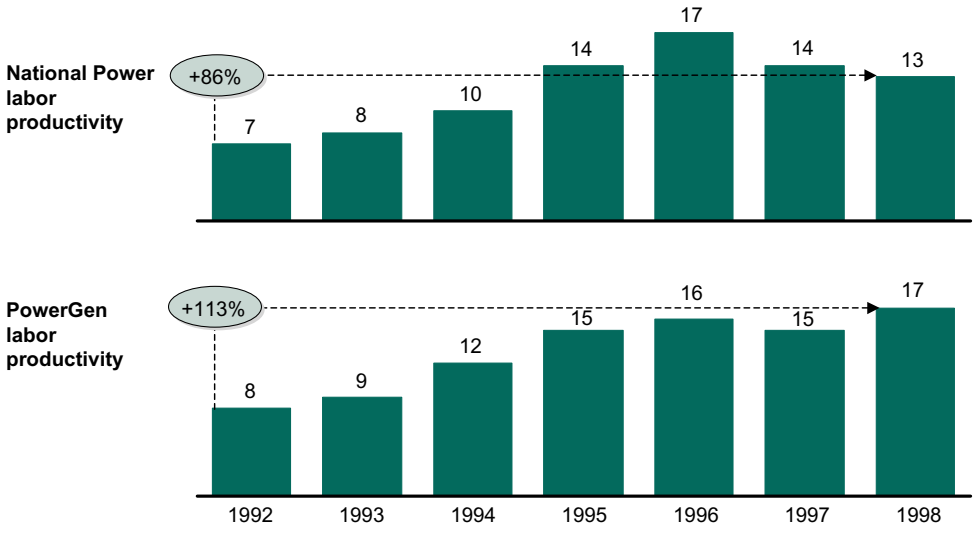
** Regional electric companies perform distribution and retail functions

Source: Annual reports; RDI; Energy Information Administration

EXHIBIT 30

PRODUCTIVITY INCREASED SIGNIFICANTLY IN UK POWER GENERATION

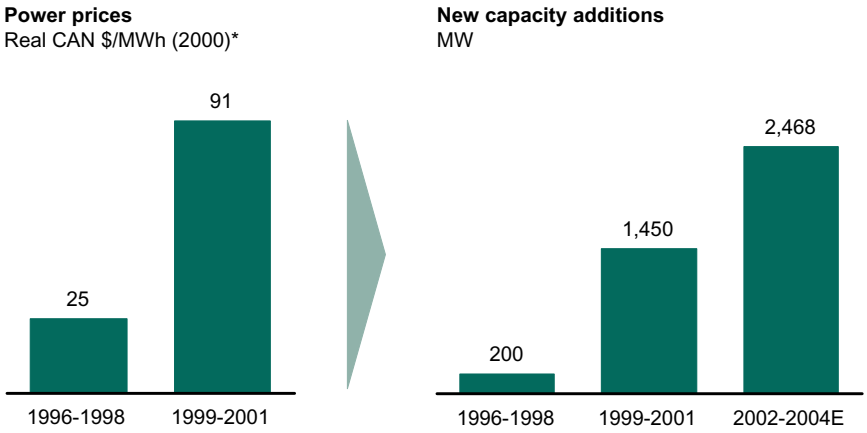
GWh/employee



Source: Company annual reports

EXHIBIT 31

DEVELOPERS ARE ADDING SUBSTANTIAL NEW CAPACITY IN ALBERTA IN RESPONSE TO RISING POWER PRICES

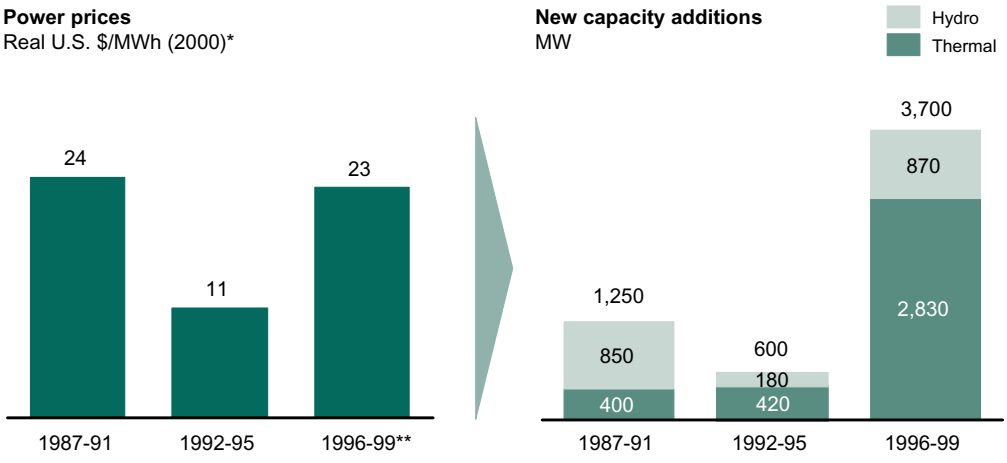


* Volume-weighted averages

Source: Alberta Power Pool; Alberta Department of Energy

EXHIBIT 32

DEVELOPERS IN CHILE RESPONDED TO HIGH PRICES WITH NEW CAPACITY



* Time-weighted averages

** Price increase triggered by significant drought

Source: UDI; CDEC-SIC

Impact of deregulation on product choice and service quality

The final dimensions for examining the viability of competition in the power sector are improvements in product choice and service quality. Early evidence from multiple markets shows that consumers are benefiting from electricity deregulation. Consumers are being offered and are taking advantage of new electricity products. In Pennsylvania over 100,000 customers are now buying "green power," which comes from environmentally cleaner sources than traditional power in the state. In the UK and some U.S. markets, customers are choosing to buy both natural gas and electricity from new competitive suppliers who can provide dual-fuel bundles at a discounted price. Competitive retailers in the U.S. and the UK offer several new pricing and billing options to customers, including multi-year fixed price contracts, prepayment options, and discounted prices for direct debit billing. Large commercial and industrial users in the U.S. have the potential for even larger benefits, as competitive energy service companies offer guaranteed savings packages that include energy procurement, risk management, and energy efficiency services.

Consumers appear to be satisfied with the service they receive in deregulated power markets. The risk of losing their retail customers has made utilities more responsive to customers, and they have invested in customer service. As a result, in the UK instances of customer complaints fell by more than 80% following deregulation, based upon the number of payments that utilities made to compensate customers for violating service standards (Exhibit 33). Customer satisfaction levels in the UK and Pennsylvania indicate that satisfaction with incumbent providers is somewhat higher following deregulation and that customers are increasingly happy with competitive providers (Exhibits 34 and 35).

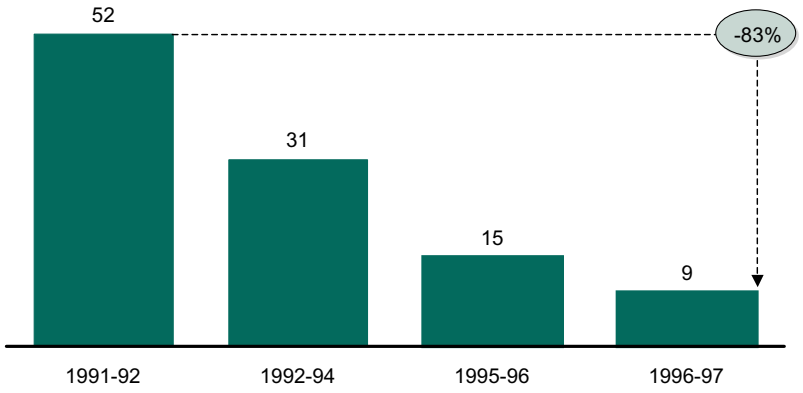
The number of retail customers switching to new, competitive retail suppliers differs greatly across markets, however, pointing to the central role that the design of retail markets plays. In the UK, retail competition has been phased in over the past 10 years. Commercial and industrial customers were the first to be given retail choice, followed by medium sized businesses, and finally residential customers in 1999. Customer choice has been a great success with 78% of large commercial and industrial customers, 55% of medium-sized customers, and already 17% of residential customers switching to new retail suppliers (Exhibit 36).

The UK's broad success with retail competition provides a contrast to the U.S., where retail competition is still in the early stages. In Pennsylvania, which is considered to be relatively welcoming to retail competition, the percentage of industrial and commercial customers served by competitive suppliers peaked at 27% and 15%, respectively, in July 1999. More recently, as wholesale prices rose, competitive retailers stopped serving these customers and these customers were switched back to incumbent utilities for service. As a consequence, the percentage of industrial and commercial customers served by competitive suppliers fell to 3% in July 2001. Under Pennsylvania's transition rules, incumbent utilities must offer all customers a fixed, default price for energy, which is currently set below wholesale market prices. This explains why competitive suppliers have stopped serving customers — they cannot compete with the below market price offered by incumbents. Residential switching in Pennsylvania has been fairly low, with only 8% of customers using a new supplier in July 2001 (Exhibit 37). Residential switching rates would be even lower, if it were not for fixed price contracts, which are currently below market, that a few competitive suppliers offered to customers.

EXHIBIT 33

UK UTILITIES RECEIVED FEWER COMPLAINTS FOLLOWING DEREGULATION

Remedy payments by supplier under guaranteed standards
Number per 100,000 customers

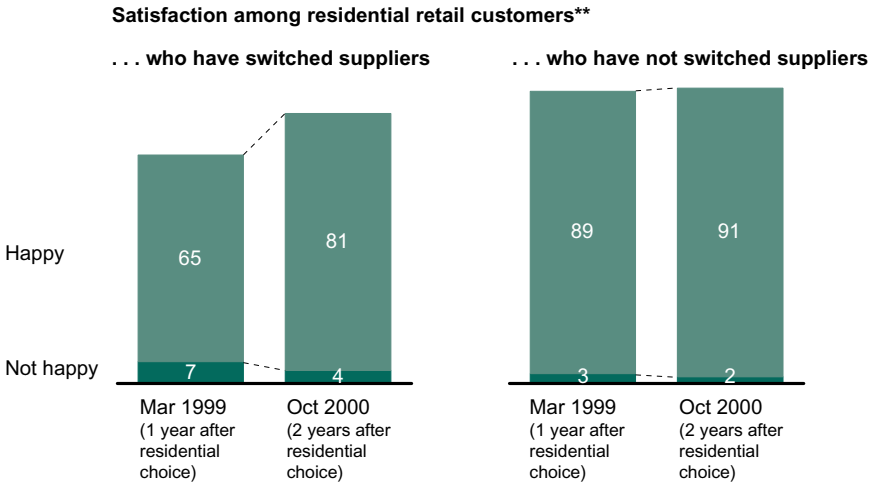


Source: Office of Electricity Regulator

EXHIBIT 34

UK RESIDENTIAL ELECTRICITY CUSTOMERS ARE HAPPIER WITH SUPPLIERS FOLLOWING DEREGULATION

Percent of customers surveyed*

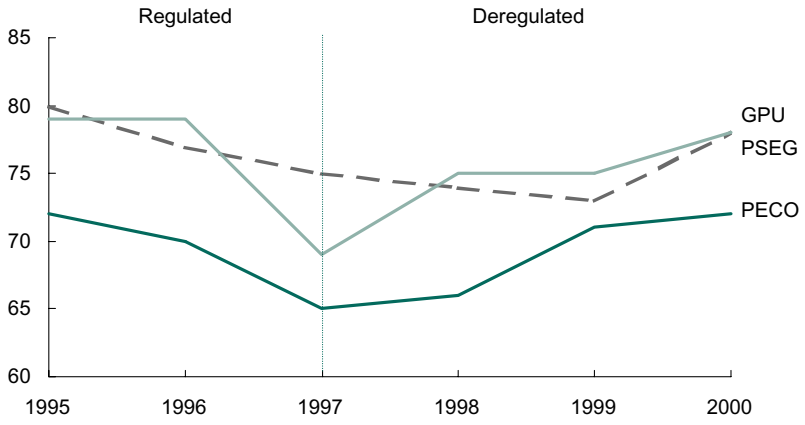


* Less than 100% due to undecided or indifferent responses
** "Fairly happy" and "very happy" responses
Source: Office of Gas and Electricity Markets; MORI

EXHIBIT 35

SATISFACTION AMONG PENNSYLVANIA UTILITY CUSTOMERS FELL PRIOR TO DEREGULATION BUT HAS INCREASED SINCE

Satisfaction score
100-point satisfaction index*

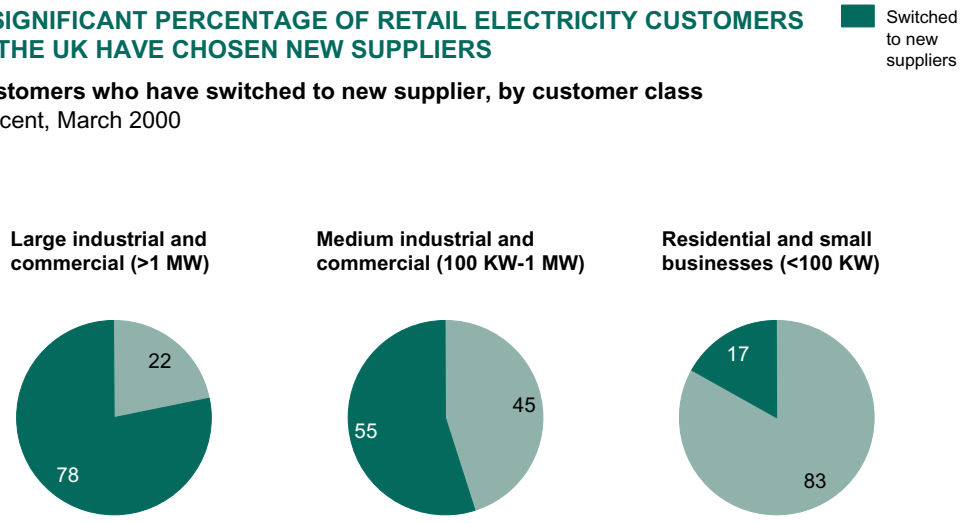


* The American Customer Satisfaction Index
Source: University of Michigan

EXHIBIT 36

A SIGNIFICANT PERCENTAGE OF RETAIL ELECTRICITY CUSTOMERS IN THE UK HAVE CHOSEN NEW SUPPLIERS

Customers who have switched to new supplier, by customer class
Percent, March 2000

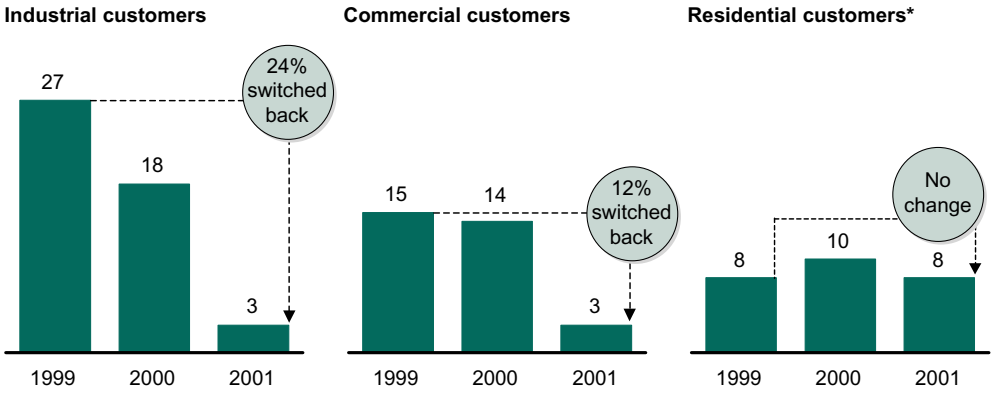


Source: Office of Gas and Electricity Markets

EXHIBIT 37

ONLY A SMALL NUMBER OF CUSTOMERS IN PENNSYLVANIA SWITCHED TO NEW ELECTRICITY SUPPLIERS, AND MANY HAVE SWITCHED BACK

Customers who have switched to new supplier, by customer class
Percent



* Only limited switching back in 2001 because many of PECO's and Duquesne's residential customers are served by retailers under multiyear fixed price contracts that are currently below utility prices

Source: Pennsylvania Office of Consumer Advocate

DIFFICULTIES IN TRANSITION TO COMPETITIVE POWER MARKETS

The discussion above shows how restructured power markets can deliver benefits to consumers and society as a whole similar to those benefits observed in other industries. These benefits include lower and more efficient prices, more efficient operations and investment decisions, and improved product and service quality. As any observer of the California experience would conclude, however, pitfalls may accompany the introduction of competition in power markets just as in any other formerly regulated industry. Moreover, there are a number of challenges that must be addressed on an on-going basis following electricity restructuring. Specifically, the evidence of other restructured power markets indicates the importance of maintaining sufficient reserve levels, guarding against anti-competitive market behavior, and ensuring consistent regulations across inter-related markets.

Maintaining sufficient reserve levels

One of the most important concerns for policy makers is how to maintain healthy reserve generating capacity in a deregulated wholesale power market following the introduction of competition. As seen in California, low reserve levels shortly after deregulation led to an extended period of high wholesale power prices. Combined with inflexible retail prices, low reserve levels also contributed to power shortages. The lesson here is that restructured markets must provide an appropriate way to encourage investors to provide reserve capacity, since these reserves provide a valuable service to the market even if the capacity is rarely used to produce electricity.

Guarding against anti-competitive market behavior

Deregulated power markets may be prone to market power if a small number of power generators own a substantial share of the most important generating capacity. The restructured UK market is an important example of how a poor initial wholesale market structure allowed market power to emerge and contributed to a period of high prices. The power sector in the UK was privatized from a single, state-owned enterprise into three separate, privately owned generating companies. One of these, British Energy, inherited a fleet of baseload nuclear plants that operated at a cost below those of nearly all other plants. The other two generators, PowerGen and National Power, assumed operations of almost all of the remaining power plants, which were mostly fossil fuel plants.

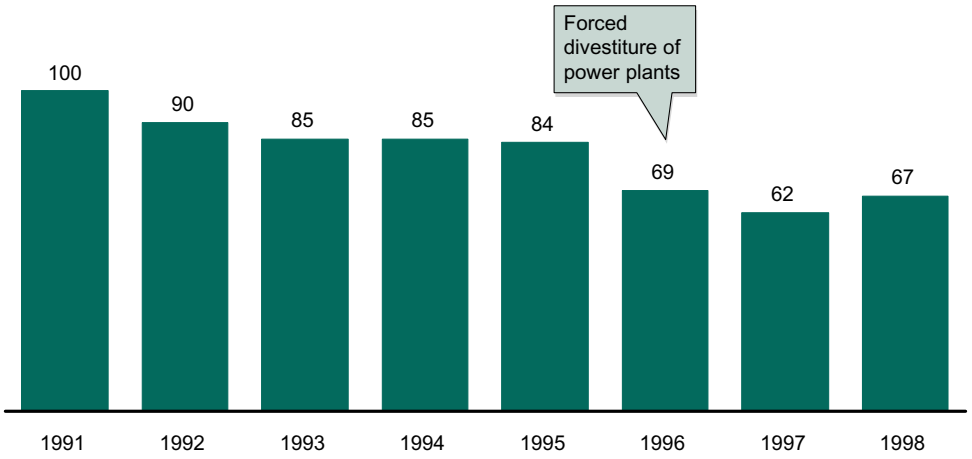
Despite the entry of new generators, PowerGen and National Power controlled such a large portion of generating capacity that they were able to set prices in the UK's power pool more than 80% of the time through 1995 (Exhibit 38). Since then, several mitigating steps have been taken to limit the ability of these generators to exert monopoly power. Forced divestiture of power plants in 1996 and 1999 has resulted in PowerGen and National Power transferring a 41% share of the market to new competitors, leading to an average price decline of 20% from the days of market power to the end of 2000 (Exhibit 39). And in March 2001 additional changes were made to the UK's wholesale market, which eliminated the requirement that all power sales be made through a single, centralized power exchange. Bilateral contracts between buyers and sellers of electricity are now allowed, which the regulator believes will reduce the potential for market gaming.

Even in cases when there are many competitors and an overall low level of concentration, market power may be possible, because of the unique features of electricity. First, changes in supply and demand must be carefully and instantaneously balanced to prevent system failure. In addition, if retail consumers pay fixed prices for their power, demand is insensitive to price. On top of this, transmission constraints can limit the geographic size of a power market, reducing the number of competitors. As a result, there may be opportunities for power generators to exert market power over short time periods, raising their prices to very high levels. This poses a challenge for policy makers. Rules such as well-defined price caps are often used to prevent these types of abuses. However, it is hard to get price caps right. Moreover, if it is fairly easy to build new generating capacity the threat of new entry should limit potential market power and make price caps unnecessary.

EXHIBIT 38

NATIONAL POWER AND POWERGEN SET PRICES IN THE UK POWER MARKET MORE THAN 60% OF THE TIME

Price setting by National Power and PowerGen*
Percent of hours setting price

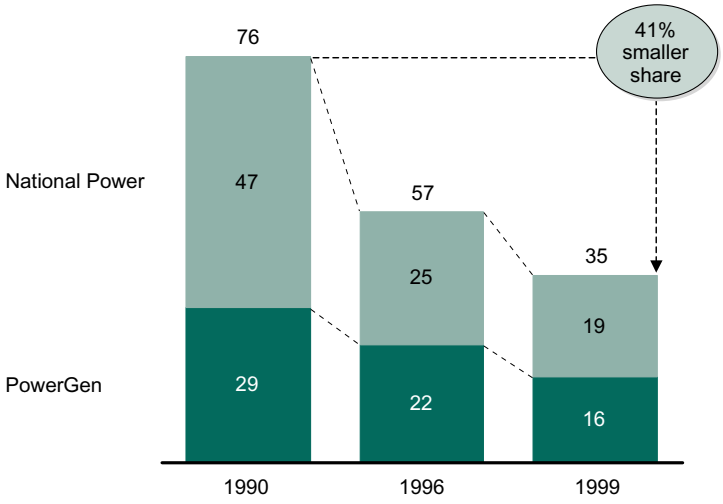


* "Power Markets and Market Power," by D. Newbury, The Energy Journal, Vol. 16, No. 3
Source: Office of the Electricity Regulator

EXHIBIT 39

NATIONAL POWER AND POWERGEN LOST MARKET SHARE DUE TO FORCED DIVESTITURES

National Power and PowerGen market share
Percent



Source: National Grid Company; Office of Gas and Electricity Markets

Consistent regulations across inter-related markets

Finally, care must be taken to ensure consistent regulation across related markets. Just as in the trucking sector, where continued regulation of intra-state transportation led shippers to move goods unnecessarily across state lines, wholesale generators can move power to regions that do not have price caps. For instance, during the recent power crisis in California, a price cap that applied only to power sold within the state provided incentives for generators to sell power out of the state. This exacerbated the problem of an already tight market.

Wholesale and retail power markets are also intimately related and require consistent regulations. As seen in California, fixed retail prices in the presence of a floating wholesale power price — without any opportunities for utilities to hedge their exposure to the associated price risk — is a recipe for bankruptcy. Other jurisdictions in the U.S., for instance Pennsylvania and Massachusetts, have adjusted their retail rate structure in response to changes in the wholesale market, thereby avoiding an insolvency crisis. Utilities in these jurisdictions also have the option of hedging their wholesale price exposure either physically, through generation ownership, or financially.

The Long-Term Reform of California's Power Sector

California emerged from the summer of 2001 with a stable electricity market and generating reserves that appear sufficient to prevent shortages in 2002. Now that the crisis has subsided, the state needs to turn its attention back to the long-term reform of the power sector. The new Power Authority and a poor market design may threaten the success of wholesale competition in the future. In addition, the state has suspended retail choice, stepping off of the competitive course that it started on in 1998.

The state has a core policy decision to make: whether to continue on the path toward competition, or to re-regulate its power sector. There are valid reasons for choosing either course. The benefit of regulation is that prices are generally smooth and fairly certain. However, regulation often results in higher overall prices, inefficient operations, excess investment, and lower service quality. Compared to regulation, competition in other industries and in other power jurisdictions has delivered significant benefits. But, competition is accompanied by higher volatility and may include a challenging transition period. Although California has struggled with both of these features of competition, it should not be forgotten that prior to deregulation the state had the second highest power prices in the U.S. These high prices were cited as a major drag on the economy.

Given low levels of efficiency in the regulated environment and success with deregulation in other jurisdictions, the state should consider continuing on the path toward competition and reform. The state should identify options for:

- Improving the design of its competitive wholesale market to promote more efficient prices and encourage sufficient generating capacity.
- Promoting greater improvements in the efficiency of transmission and distribution businesses, which will remain regulated.
- Restructuring the retail market to promote efficiency, as well as to encourage innovations in product options and service quality.

Power sector reform should also include a review of California's energy related agencies. Currently, multiple agencies with overlapping jurisdictions regulate the electric industry and administer energy programs. These agencies do not follow a consistent set of rules and should consider improving their capabilities.

WHOLESALE GENERATION RESTRUCTURING

Many other jurisdictions outside California have opened their wholesale generation markets to competition. One of the primary goals of competition in generation is to promote more efficient prices that send signals to power plant developers and power users. Another important goal is to encourage more efficient investment and operating decisions, with resulting benefits for consumers.

Since competition leads to higher price volatility, policy makers also often have a goal of minimizing volatility. This is desirable, but only to the extent that policy makers do not take actions that reduce competitive efficiency. In fact, many financial products have emerged on their own in competitive wholesale markets that offer price certainty for customers, without requiring action by policy makers.

Models for competition in wholesale generation

Any wholesale market model that California chooses should encourage power companies to maintain sufficient generating capacity and should also promote the timely addition of new capacity. There are three alternative competitive market designs that California's policy makers may consider (Exhibit 40). They each promote more efficient price signals by introducing competition. They differ in the manner in which sufficient generating capacity is encouraged:

- The first model allows the forces of supply and demand (unconstrained market forces) to promote sufficient reserve capacity.
- The second model requires power companies to maintain a mandatory level of generating reserves.
- The third model makes incentive payments to power companies to encourage reserves.

Ultimately, the manner in which generating capacity is encouraged in the different models affects the level of volatility observed in these markets.

EXHIBIT 40

THERE ARE 3 COMPETITIVE MARKET DESIGNS FOR WHOLESALE GENERATION

	Unconstrained market forces	Mandated reserve levels	Incentive payments for reserves
Description	• One market for energy only • Supply and demand determine prices • Private developers decide on capacity additions	• Separate markets for energy and capacity • Supply and demand determine prices • Independent authority sets mandatory level of reserves	• Single market for energy with incentive payment for capacity reserves • Supply and demand determine prices • Private developers decide on capacity additions
Examples	• Alberta, Canada • California (original plan) • UK (March 2001-present)	• PJM • New England • New York	• Argentina • UK (March 1990-March 2001)
Advantages	• Clear price signals • Simple market	• Explicit price signals for capacity • Lower price volatility • Lower risk of shortages	• Clear price signals
Disadvantages	• High price volatility • Higher risk of shortages	• Price signals dampened • Two markets to monitor • Hard to set optimal reserve level	• More complex market to monitor • Hard to determine optimal payment • No guarantee of sufficient capacity

Wholesale model one: an unconstrained market

In the first model, a fully competitive market allows the forces of supply and demand to freely determine the price for energy. There is no separate mechanism outside the energy market for encouraging sufficient levels of generating capacity. Under this model, private generation companies freely determine when and how much generating capacity to build and operate based on their assessment of current and future energy prices.

California's original restructuring plan attempted such a model. However, before producers could build new plants or consumers could respond to higher prices, rolling blackouts and insolvency brought the state's restructuring experiment to a very public halt.[22]

22 The previous report provided three core reasons for why power generators did not build significant new capacity: regulatory uncertainty, the lack of a clear forward market for power sales, and difficulties in getting siting approval for new power plants.

The basic model of an unfettered generation market is being used with much greater success in Alberta, Canada.[23] As expected in a market of this type, prices in Alberta have been volatile, fluctuating as fuel prices, reserves, and demand have changed over time. In fact, volatility has been higher in Alberta than in other markets that impose constraints on market forces (Exhibit 41). Prices have risen since deregulation, from an average of $25/MWh (Canadian) in 1996-1998 to $91/MWh (Canadian) in 2000-2001. This has been driven by increased exports to the Western U.S., more dependence on higher-cost but environmentally cleaner gas-fired plants, and high demand growth. Power plant operators have responded to these high prices by adding significant new capacity (Exhibit 31).

Although prices have risen recently, Alberta's model has avoided a California-style crisis, because of key differences in its market structure. On the supply side, the approval process for adding new capacity is relatively fast. It takes an average of 3 to 9 months for approval of new generation; whereas, in California it took an average of 20 months. Although reserve levels fell over the past several years in Alberta during a period of low prices, recent price increases have stimulated enough new construction that reserves will return to healthy levels — above 15% — by the end of 2001 (Exhibit 42). Prices should decline as a result.

Alberta has a healthier demand side market than California, as well. First, there is no cap on the price charged to medium and large business customers, so these customers have an incentive to reduce their consumption when wholesale prices rise. Although there is a cap on the price charged to small customers, it is currently set at a level much higher than wholesale market prices: the cap is set at $110/MWh (Canadian) for 2001 versus year to date wholesale prices of $85/MWh (Canadian). The price cap can be increased in future years if wholesale prices rise. There are also plans to remove the cap when the market matures.[24]

The advantage of the relatively unfettered Alberta model is that price signals are clear for developers. This has encouraged substantial new generating capacity. A disadvantage of the Alberta model is that completely unfettered wholesale prices can be quite volatile, especially in the absence of any mandated reserve levels. In addition, if there is no demand response when capacity gets tight, there is a risk of shortages. Fortunately, Alberta's retail market — which allows prices to float for all but the smallest users — generally promotes demand side responses to high prices.

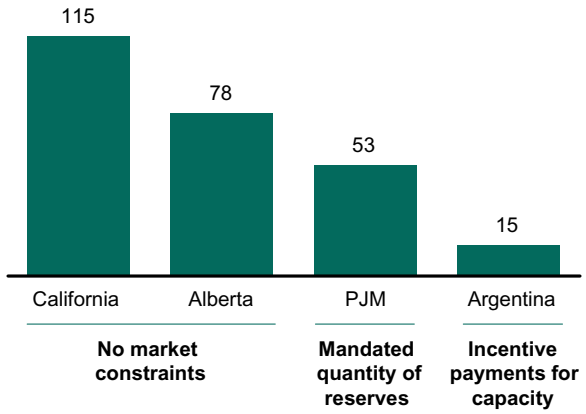
23 Approximately 25% of Alberta's capacity remains state-owned and sells power at cost into the pool. This may slightly mitigate prices in an otherwise unfettered market. Alberta intends to privatize this capacity in the future.

24 Alberta's deregulation rules allow the utilities that provide regulated default service to small customers at capped prices to recover any losses that they incur under the price cap, in the event that wholesale prices rise above the price cap. So, unlike in California, the utilities are not at risk of insolvency because of the price cap.

EXHIBIT 41

VOLATILITY IS HIGHEST IN MARKETS THAT HAVE NO CONSTRAINTS

Price volatility*
Percent

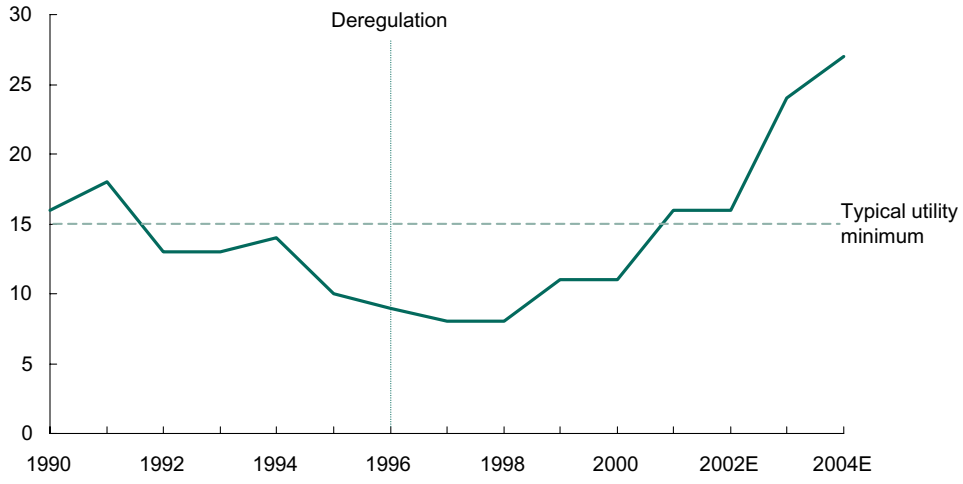


* Measured by standard deviation divided by average of monthly wholesale prices, April 1998-June 2001
Source: California PX; Alberta Power Pool; PJM ISO; CAMMESA

EXHIBIT 42

ALBERTA'S RESERVE MARGIN IS PROJECTED TO INCREASE AS A RESULT OF NEW CAPACITY ADDITIONS

Reserve margin*
Percent



* Forecast after 2001 is based on 2% demand growth and announced capacity additions
Source: Alberta Department of Energy

Wholesale model two: mandated reserve levels

Instead of leaving the decision of how much generating capacity to build to private investors, California could choose a competitive market model that requires a minimum level of generating reserves, with monitoring by a regulator or independent body. A competitive market would set the price paid for these reserves and there would still be a competitive market for the sale of energy. The goal of setting mandatory reserve levels is to reduce the risk of shortages as well as to dampen potential volatility.

The PJM power pool follows this approach, with the system operator requiring retail suppliers, including incumbent utilities and competitive retailers, to keep excess capacity at a level of 15% to 20% higher than expected demand. Retail suppliers in PJM have multiple avenues for meeting their capacity obligations. They may operate their own generation capacity, purchase rights to generation owned by third parties, or they can buy capacity rights from a spot market for capacity to meet any shortfalls.[25] Ultimately, retail suppliers must recover their capacity purchase costs from their customers, in addition to their costs of buying energy.

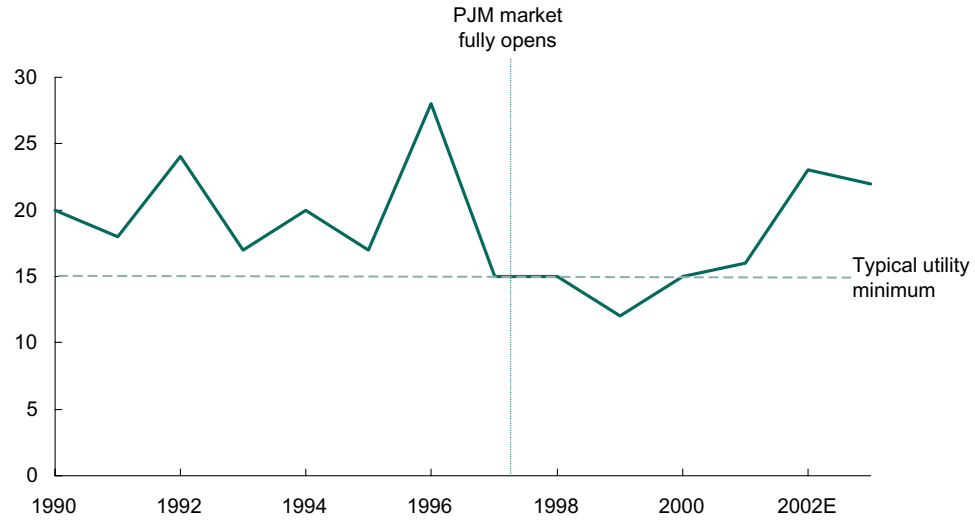
A spot market for actual energy production runs in parallel to the spot market for capacity. Energy prices still send signals to power plant developers and customers, and reflect the marginal costs of the resources being used.

The PJM market has demonstrated lower volatility than the completely unfettered wholesale power markets in California and Alberta (Exhibit 41). Reserve margins are also currently at healthy levels and are projected to stay so in the future, in part because of new construction by private generators (Exhibit 43).

EXHIBIT 43

PJM'S RESERVE MARGIN HAS GENERALLY STAYED AT A HEALTHY LEVEL AND IS PROJECTED TO INCREASE

Reserve margin*
Percent



* Forecast after 2001 is based on 2% demand growth and announced capacity additions
Source: NERC ES&D database 2000; NERC 2001 summer assessment

25 Retail suppliers can also sell any excess capacity that they have unnecessarily contracted for into the spot market for capacity rights, so that they are not paying for more capacity than they need.

The advantages of the PJM model are that there is greater certainty regarding reserve capacity than in a completely unfettered market and that price volatility is lower. A disadvantage, however, is that a separate market for the sale of capacity rights represents a new market for regulators to monitor. There is also a risk that mandatory capacity levels will be set at levels that are too high, contributing to higher costs for customers than under unfettered competition. Finally, meeting mandated reserve levels could be difficult for new competitive retailers whose customer base may change rapidly, making demand hard to forecast.

Wholesale model three: incentive payments for reserves

The final competitive generation model to be considered for California makes explicit incentive payments to generators for providing reserve capacity, without requiring a specific level of reserves.

Argentina's power market uses such a model. There is a competitive spot market in which generators sell energy, just as in Alberta and PJM, which provides signals of the underlying cost of power on an hourly basis. In addition, all generators who produce power during peak hours are paid a fixed capacity payment of $10 for each MWh they generate. During high demand periods, generators who make capacity available to the market receive an additional variable capacity incentive payment, regardless of whether they generate. This payment increases as reserve margins fall.[26] It encourages capacity reserves by providing incentives for generators to keep capacity available during tight peak hours.

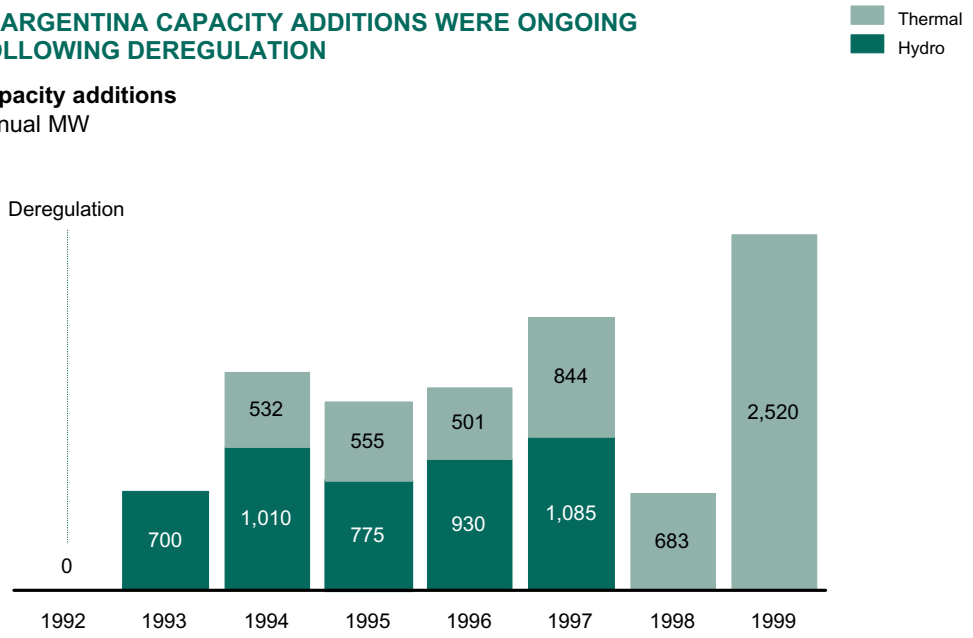
All retail suppliers in Argentina, as well as some large business customers, buy wholesale power from a centralized power pool and must pay the market clearing price for any energy purchased, as well as all capacity charges that apply during the hours in which they purchase power. Ultimately, these costs must be recovered from end-use customers.

Since the introduction of this system in 1992, Argentina's prices have followed a downward trend (Exhibit 25). This is in part because private developers have added new generating capacity on an ongoing basis since deregulation (Exhibit 44). Argentina's explicit attention to maintaining adequate reserves has helped to mitigate volatility. In Argentina, volatility has been the lowest of the competitive markets that are presented in this chapter (Exhibit 41).

26 The variable capacity payment in place in Argentina is analogous to the capacity payment and uplift payments in the England and Wales power pool prior to recent wholesale market changes.

EXHIBIT 44

IN ARGENTINA CAPACITY ADDITIONS WERE ONGOING FOLLOWING DEREGULATION



Source: EIA; U.S. Department of Energy; CAMMESA

The advantage of Argentina's model is that incentive capacity payments help to encourage reserves. However, the fixed capacity payments that generators are paid during peak hours may somewhat alter the bidding strategies of generators in the energy market, because of the expectation that fixed capacity payments will help to cover lower energy bids. An additional disadvantage of Argentina's market is that it may be hard for the regulator to determine the right level at which to set variable capacity incentive payments, resulting in either too much or too little capacity.

California's current wholesale restructuring efforts

California's current efforts to restructure its wholesale power market are inconsistent with any of the three competitive models for wholesale generation. The state has created a Power Authority that may own and operate power plants. As a consequence, the state may compete against private power plant developers in the wholesale generation market. This will likely be troubling to private investors, because the state-owned capacity will not necessarily be required to earn a competitive return or even a profit. Since private developers will only build new capacity in California in the future if they expect to earn a sufficient return themselves, they may choose to stop investing in the state. If this occurs, the state may have to return to a central planning process with guaranteed returns to attract private investment.[27]

The Power Authority could play a constructive role in the future, as long as it does not compete against private generators. For example, the Power Authority could help to establish a mandatory level of reserve capacity that private market participants should maintain. This would encourage a model of the type used in PJM, which has been successful so far. The Power Authority could also play other productive roles: it could help facilitate faster power plant permitting; act as a central authority for analyzing and forecasting future power plant needs; and provide guidelines and incentives for a more diverse mix of generating capacity, including renewable energy sources.

27 If California cannot attract private investment, or at least not at a reasonable cost, it will have to expand state ownership to make up any investment shortfall.

Key issues in all wholesale generation markets

In any competitive wholesale market, it is important that generators be allowed to build new capacity in a timely fashion. As the experience in Alberta shows, fast power plant siting helps generators respond quickly to high prices. California, on the other hand, is an example of a market where slow siting led to delayed generating plant additions and prolonged periods of high prices.

Market power monitoring is also important in all market designs. If reserves fall to low levels, generators that control a large portion of important capacity may have an ability to set unreasonably high prices.[28] Regulatory agencies should monitor the concentration of generators in the market to be sure no single generator or group of generators exercises undue influence. Although price caps are generally not desirable, if there is clear market power these might be an option until market power is corrected through divestitures or new entry. However, price caps may not work properly if fuel prices change or if nearby markets do not use similar caps. It should also be noted that if new entrants can build power plants quickly to respond to high prices, there is less need for price caps.

Promoting demand response is always important. It can help to mitigate market power, because if generators charge unreasonably high prices this may cause consumers to reduce demand. Demand responsiveness can also prevent shortages and contribute to more efficient consumption, by encouraging users to reduce consumption during periods when supply is scarce. In Alberta, most retail customers are exposed to changes in wholesale prices. As a consequence, there are incentives for customers to reduce demand when supply becomes tight or when generators charge very high prices.

Finally, it is important to allow generating companies to enter into bilateral contracts with utilities and other retail suppliers. Both financial hedging contracts as well as contracts for the physical delivery of power allow generators to manage their risks in a competitive market. In California, where generators were unable to sign contracts with incumbent utilities, it was difficult for private investors to finance new capacity. This slowed down new power plant development.

TRANSMISSION RESTRUCTURING

The transmission system is critical to the efficient use of power plants and to the reliability of the entire interconnected Western power system. Transmission expansion can be a substitute for the construction of new power plants and may occasionally be a better option. Transmission restructuring has received little attention from state regulators, policy makers, and the news media. This is partly because the electric transmission system is a natural monopoly that will remain under the regulatory control of the FERC.[29] But this does not mean that California cannot take an active role in promoting transmission policies that improve the short-term operations of the system, as well as promote long-term expansion of the grid.

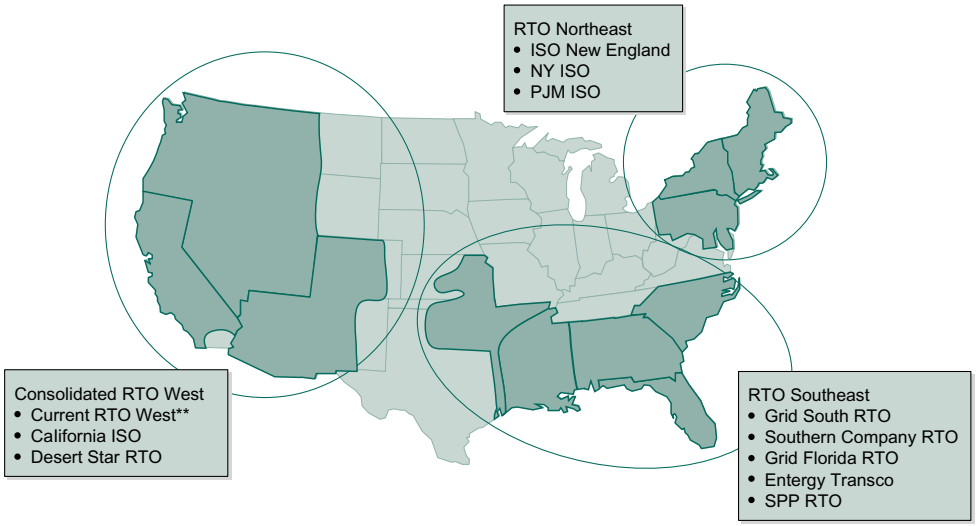
California should not try to operate its transmission system as if it were an island. Power flows across transmission lines according to the laws of physics, not state boundaries. Decisions such as which power plants to dispatch for service and where to build transmission lines will have consequences for the entire Western power system. At the federal level, the FERC has recognized the interdependency among neighboring transmission systems and has directed existing independent system operators (ISOs) in the Northeast and Southeast to form two consolidated regional transmission organizations (RTOs) (Exhibit 45). FERC has not directed the West to form a single consolidated RTO yet, but this has been largely because of the West's need to resolve its recent power crisis.

28 It is often hard to define what qualifies as an "unreasonably" high price. As a consequence, it is best to choose a market model that does not lend itself to market power in the first place. Promoting demand side responsiveness and facilitating fast power plant siting are key to preventing market power.

29 Currently, there are some limited proposals in the US by private investors to build unregulated, merchant transmission lines. These projects are special cases (none so far have actually commenced construction) and in general transmission will continue to be regulated, with ownership by utilities. The FERC will require any future merchant transmission owners to coordinate their activities with federally approved RTOs.

EXHIBIT 45

FERC HAS DIRECTED THE FORMATION OF RTOs IN THE NORTHEAST AND SOUTHEAST AND MAY REQUIRE A CONSOLIDATED RTO WEST*



* Boundaries are approximate and participation in RTOs subject to further evolution
** RTO West: Avista Utilities, Energy Northwest, Idaho Power, Montana Power, PacifiCorp, Portland General Electric, Puget Sound Energy, Sierra Pacific Power, TransConnect, participating cooperative utilities and public power, other non-IOU transmission
Source: FERC; Edison Electric Institute; trade press

California should champion the RTO process and use its influence in the West to bring all parties to the table. By coordinating operations and long-term planning across the entire region, transmission bottlenecks can be better eliminated and generation resources more economically shared across the region. California benefits from low-cost hydroelectric resources in the Pacific Northwest, as well as cheap coal-fired power plants in other Western states. Also, California needs more power during the summer time, when demand in the Pacific Northwest is low; whereas, the Pacific Northwest needs more power during the winter, when hydroelectric sources offer less power and California is more likely to have excess capacity. Through coordinated planning, Western states could develop a common set of rules for promoting the construction of new transmission lines within and across their states. This would provide additional options for California in preventing power crises in the future.

A final point is that allowing the state's power agencies to exercise undue influence over the operations of the transmission system could be costly. There have been allegations recently that the state has chosen not to dispatch low-cost generating resources owned by private companies, in order to allow higher cost resources that operate under long-term contracts with the state to produce power. The FERC is currently reviewing the independence of the California ISO.[30] The state should allow the ISO to make efficient operating decisions — free of the political influence of state agencies — in order to promote the lowest overall prices for California's customers.

DISTRIBUTION RESTRUCTURING

Like transmission, distribution is a natural monopoly and will remain regulated by the state. The state's ability to determine how to regulate the distribution system provides it with an important tool for promoting operating and investment efficiency, as well as reliability.

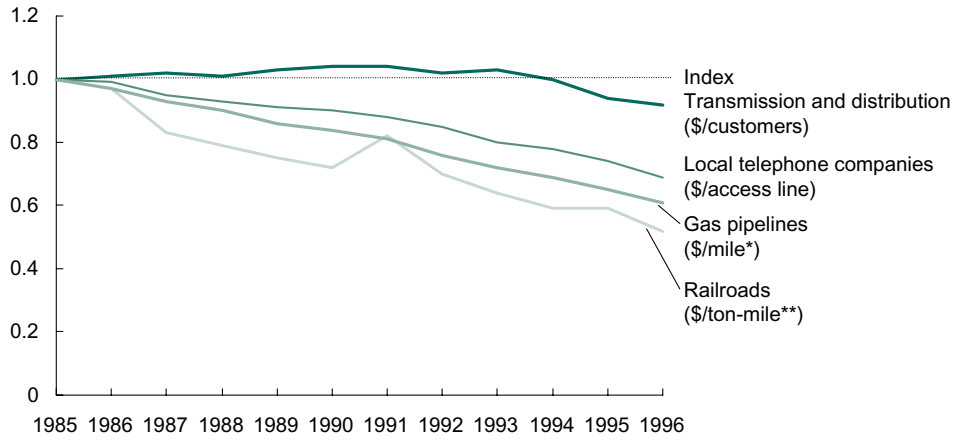
30 *Dow Jones On-line News*, "Cal-ISO Violating Federal Law By Making Utilities Buy State Power," September 7, 2001 (regarding Cal-ISO's decision not to dispatch lowest-cost resources); *Electric Power Daily*, "FERC Sets Out Aggressive Schedule to Speed Forming Regional Transmission Organizations," September 27, 2001; *Wall Street Journal*, "FERC Chairman Plans to Force Utilities to Join Regional Transmission Groups," September 27, 2001 (regarding FERC's RTO orders and review of Cal-ISO independence).

Traditionally, distribution rates have been set to allow utilities to recover their costs as well as earn a return on their investments. If costs are lower than anticipated and the distribution business earns profits in excess of its regulated return, prices are adjusted downward. Prices are adjusted upward if costs or returns are not recovered. Because prices are adjusted following any cost reductions, there are only limited incentives for distribution companies to improve efficiency. Compared to other capital intensive industries in the U.S., regulated electric distribution businesses have seen only very slow efficiency improvements over the years (Exhibit 46). Further, providing distribution businesses with a guaranteed return on investment provides only limited incentives to utilities to reduce capital spending. In the case of California, the three major utilities spend around $1.2 billion per year on capital investments on their distribution businesses.[31]

EXHIBIT 46

TRANSMISSION AND DISTRIBUTION BUSINESSES HAVE BEEN RELATIVELY SLOW AT IMPROVING OPERATING EFFICIENCY

Real unit operating costs for U.S. network industries
Index



* Estimated curve based on 1984, 1991, 1997 data
** Costs include passenger service
Source: Statistical Abstract of the United States 1998 and 1995; FERC Form 2; World Steel Dynamics; McKinsey analysis

Instead of using the traditional cost-of-service model, with its focus on determining whether costs were prudent and requiring frequent price adjustments, California should consider expanding the use of alternative, performance-based ratemaking mechanisms. The state currently is using an earnings sharing mechanism at two of its utilities: SCE and San Diego Gas & Electric (SDG&E). Prices are set by the regulator that allow these utilities to recover their costs and a fair return on investment. They are also given an extra incentive to cut costs, because over a pre-defined time period they are allowed to keep a portion of their excess earnings without a price adjustment. California should consider allowing PG&E to use this type of mechanism as well.

An alternative performance-based mechanism that has worked well in the UK is a price cap. In the UK, distribution prices are capped every 5 years, with caps that include annual inflation adjustments and require efficiency improvements. Under this type of rate regime, distribution companies in the UK have reduced their costs per unit of electricity delivered by 31% between March 1991 and March 2000, while prices to consumers per unit delivered have fallen by 20%. Overall, operating

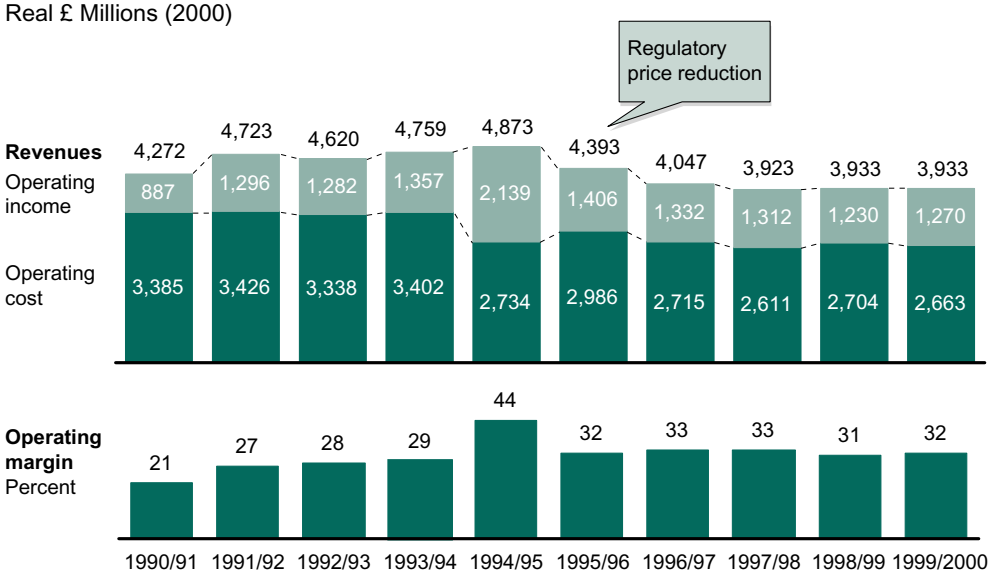
31 RDI PowerDat.

margins have increased from 21% at the end of March 1991 to 32% at the end of March 2000, due to improvements in operating efficiency (Exhibit 47). The U.S. natural gas transmission industry is also allowing interstate pipelines to operate under prices that are effectively capped, which has resulted in declining real prices to shippers and improved operational efficiency (Exhibit 18).

EXHIBIT 47

UK DISTRIBUTION COMPANIES HAVE IMPROVED THEIR OPERATING EFFICIENCY UNDER PRICE CAP REGULATION

Performance of UK distribution companies
Real £ Millions (2000)



Source: UK Regulatory Accounts

RETAIL SERVICE RESTRUCTURING

Experience from other power markets shows that developing competitive retail markets is challenging but, if done correctly, can deliver substantial benefits to customers.[32] The general goals of a successful retail model are to promote the low-cost procurement of power and to encourage innovation in service options and customer service quality.

When California chooses a retail model, one of its highest priorities should be to consider ways of encouraging consumers to respond to conditions in the wholesale power market. A lack of demand side responsiveness contributed to the recent crisis. The state will also need to decide upon whether to re-introduce retail choice and how to structure default service for customers.[33] If the state re-introduces retail choice, it should allow suppliers — including incumbent utilities — to enter into bilateral contracts in order to manage their risks. The recent power crisis in California and the state's actions to bring stability to power markets do not preclude retail competition or an improved retail market design.

32 California's experiment with retail competition never provided competitive suppliers with a strong incentive to enter the market: prices charged by utilities for energy were exactly equal to wholesale market prices, with no allowance for the cost of supplying customers; and the energy price charged by utilities was capped at a level that turned out to be well below wholesale prices.

33 Under regulation, default service is the name given to retail service provided by the monopoly utility. In a market where there is retail choice, default service refers to retail service provided by a supplier who serves any customer that either has not chosen a competitive provider or had service cancelled by a competitive provider.

Importance of demand side responsiveness

Regardless of the retail model that California chooses, the responsiveness of customer demand to changing wholesale market conditions is an important issue. It takes time for developers to build new power plants and sometimes existing plants experience mechanical failures that force them to shut down. As a consequence, during periods when demand is high and generating capacity is scarce, demand must adjust; but if retail prices are fixed, customers have no financial incentive to reduce consumption. In this case, wholesale markets are forced to rely upon high reserve margins, blackouts, or other forms of supply curtailment to balance supply and demand.[34]

To encourage truly efficient responses from electricity customers, two things must happen. First, retail rates must fluctuate with wholesale prices to give consumers an incentive to shift their demand from high priced to low priced periods. When supply is scarce, customers will have financial incentives to reduce demand because prices will rise.[35] Second, customers must have the ability to respond to fluctuating prices in real time. To accomplish this in California much of the existing utility metering and communications infrastructure needs to be upgraded. For a broad-scale deployment of the necessary infrastructure, California regulators should consider adding a mandatory surcharge to distribution rates, which can pay for upgrading the infrastructure.[36]

Floating retail prices and real-time metering can be implemented in a competitive retail model or in a regulated environment. Even if California chooses not to allow retail competition, a regulated environment should include these features in its retail design. If it does not, high reserve margins and potential demand curtailments will be the only options for keeping supply and demand in balance.

Key issues in choosing a retail model

In choosing among the many options for retail market design, the state will have to resolve a number of issues:

- Deciding whether retail choice by customers will be allowed.
- Determining how regulated prices for default service will be set.
- Deciding who will provide default service to retail customers.

The retail market design that California chooses will depend upon how it resolves these issues (Exhibit 48). Choosing to address any one of these issues in a particular way does not limit the state's options along the other two dimensions. For example, the state could choose to prohibit retail choice by customers, but could still choose to auction off the default retail franchise periodically to new retail suppliers.

If the state decides to prohibit retail choice and allows incumbent utilities to continue to hold a monopoly over default service, there will be no competition in the retail market. This is likely to reduce incentives for efficiency and innovation. However, the state could still promote demand side responsiveness by allowing retail prices to float with wholesale prices.

34 California ordered six rolling blackouts in the state in 2001, when generators reduced their sales to the Power Exchange. Consumers had no incentive to reduce demand, because their prices did not change.
35 In addition, those customers who value electricity the most — and are willing to pay the most for it — will receive it.
36 A recent McKinsey study estimated that nationwide deployment of real-time metering could result in $10 billion to $15 billion per year in savings to customers on their electricity bills. The investment would require a 5- to 6-year payback period.

EXHIBIT 48

POLICYMAKERS HAVE SEVERAL OPTIONS FOR ADDRESSING KEY ISSUES IN RETAIL MARKET DESIGN

Issue	Options	Advantages	Disadvantages
Retail choice	• Choice	• More pricing and payment options	• Potential for initial confusion
	• No choice	• More certainty • Low risk of loosing supplier	• Limited incentives for service improvements
Default prices	• Floating	• Demand response encouraged	• Price risk for consumers
	• Fixed	• Price certainty for consumers	• Potential for inefficient consumption • Potential for utility losses
Default provider	• Utility	• No transition costs associated with franchise auctions	• Limited incentives for service improvements
	• Competitive bidders	• High quality and low-cost service encouraged by competition	• Potential for customer confusion • Transition costs

Retail choice

Retail choice involves letting customers select their retail supplier, no longer requiring them to rely only upon a monopoly provider. Experience in other industries and other power markets offers evidence that retail choice can bring benefits to consumers. Competition in long distance service helped to speed up technology improvements and improve long distance quality. In the UK electricity market, a large portion of retail customers are being served by new suppliers and customers are happy (Exhibits 34 and 36). Moreover, retail electricity customers in both the UK and the U.S. have more pricing and payment options today than under regulation. Retail suppliers in both markets — as well as in Alberta, Canada — are offering fixed price options to customers, which allow customers to eliminate their exposure to wholesale market volatility.[37]

An important requirement for effective retail competition is that retail suppliers be allowed to sign bilateral contracts with generators or financial intermediaries to manage their risks. In California, the incumbent utilities were prohibited from entering into bilateral contracts following deregulation, which made it impossible for them to manage the risks associated with their obligations to serve customers under a retail price cap. In a fully competitive market, retailers will be less likely to offer products that provide price certainty to customers if they cannot manage their own risks through bilateral contracts.

California's recent crisis has introduced a few special issues that will affect the structure of retail choice in the state. The state's obligations under its long-term contracts need to be repaid. In addition, the state's utilities may be entitled to recovery of historic investment costs and recent power purchase costs. The state will have to ensure that all customers — including any who choose new suppliers — pay their fair share of these costs. This can be achieved by adding a mandatory surcharge to all customers' distribution bills to recover these costs. As a consequence, these obligations should not preclude the re-introduction of retail choice.

37 In Alberta, Canada, where residential competition was introduced in 2001, ENMAX Energy Corporation is offering 1-, 2-, and 3-year fixed price packages, with prices slightly higher than recent wholesale prices, but well below year to date averages (ENMAX September 19, 2001 Press Release, "ENMAX Offers Electricity Contracts to Residential, Small-Commercial Markets). The prices offered are 40% lower than current retail price caps.

Default prices

Whether or not there is retail competition, California will need to settle upon a mechanism for setting regulated default prices for retail customers. Under a fully regulated system, default prices represent the regulated rates that all customers must pay. Under retail choice, the default price is the price that customers will be charged if they do not switch to a competitive retail supplier, or if their competitive supplier stops serving them. Default service is important, because customers need to be guaranteed retail service from a default provider in the event an alternative supplier goes out of business, or in the event they do not choose an alternative supplier under competition.

In general, default prices can either be allowed to float with wholesale prices, or can be set at a fixed level. If California chooses to prohibit choice for customers, regulated default prices should be structured to encourage conservation in the face of tight supplies and should float with the underlying wholesale cost of power.

If California decides to re-introduce retail choice, default prices could be set at a high, fixed level to give customers a default option that removes any exposure to volatility. If a fixed default price is chosen, it should not be set so low that new entrants are unable to compete with default suppliers. It should be higher than the underlying cost of wholesale power and should provide an opportunity for retail suppliers to cover their operating costs. A floating default rate is also an option under retail choice and is probably the better option, because it eliminates the risk that a fixed default price will be set too low. Regardless of how default rates are structured, low income assistance can be provided to customers who need it.

Default provider

Traditionally, regulated utilities have provided default service to retail customers. An alternative approach that California could consider is to auction off the default service franchise to competitive bidders for a pre-defined franchise period. This approach can be used whether or not retail choice is allowed. Bidders for the default franchise can be traditional utilities or new entrants. The goal of an auction would be to promote competition among potential retail suppliers to offer the lowest-cost service or the highest guarantee of service quality over the franchise period. When the franchise period ends, there is pressure on new bidders to identify opportunities for even lower costs or higher service quality.

In California, the state's current utility franchises could be divided into multiple customer blocks and placed out to competitive bid. Competitive providers could be granted the right to market other products and services to customers, such as gas service, telecommunications service, or cable service.

An auction could take many forms. For instance, the state could choose a winner by selecting the company that offers to serve customers for the lowest fixed price. Alternatively, the state could establish a fixed price that default suppliers would be required to charge customers. Bidders would then decide how much they are willing to pay (or be paid) to supply power to customers at that price. In any form of auction, a potential retail supplier could be required to take over management of a portion of California's long-term power purchase contracts.

Examples of an integrated retail model

Resolving the three issues of retail choice, default price, and ownership of the default franchise will result in an integrated retail model. The success of the resulting model in promoting demand side responsiveness, as well as encouraging operating efficiencies and innovation, will depend upon the choices that are made. The UK and PJM are examples of jurisdictions that have resolved the three key issues of retail design in different ways.

In the UK, customer choice is allowed for all customers. The incumbent utilities provide default service. Default prices are allowed to float with wholesale prices for large customers. For small customers, default prices float as well, but are capped at levels well above current wholesale power costs. By 2002, price caps for small customers will disappear. Retail deregulation in the UK is working well: customers have better service, there are more service and pricing options, and satisfaction is high.

Pennsylvania has structured its retail market slightly differently. Retail choice is allowed. Default prices, however, are fixed for all customers, including large customers. Of particular interest, the default franchise is being auctioned off by a number of utilities. In Philadelphia, 25% of residential customers are now receiving default service from a new provider. So far this appears to be working well. The one recent flaw with Pennsylvania's model, however, has been that fixed retail prices have proven to be too low. Wholesale prices recently rose above the fixed price and competition has stalled as a result.

INSTITUTIONAL REFORM

The final topic policy makers must address as they move beyond California's power crisis is how to reform the agencies that regulate electricity in the state and administer its energy related programs. The state should consider rationalizing the key functions of these institutions, as well as improving their efficiency and the consistency of their decision making.

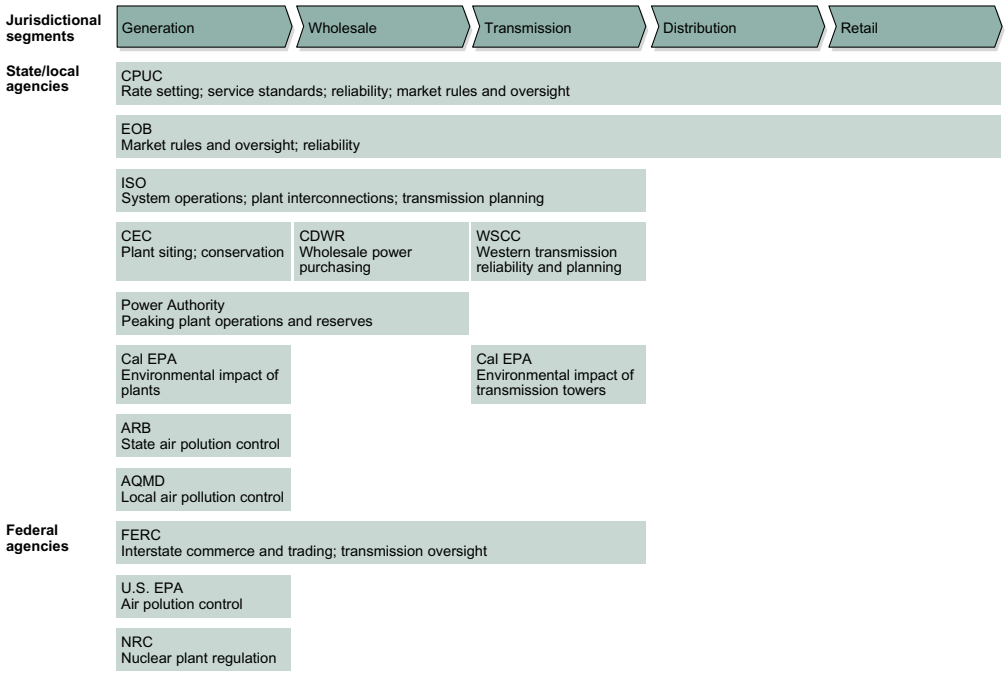
Clear jurisdictional authority and policy mandates

California's energy institutions need more clearly defined mandates and regulatory jurisdictions. California's power regulation is complex and currently there are several agencies that have overlapping responsibilities (Exhibit 49). At least five different agencies are involved in permitting a new power plant and connecting it to the transmission system, including the California Energy Commission (CEC), the California EPA, the Air Resource Board, the local Air Quality Management District, and the California ISO (Cal-ISO), not to mention other local government authorities. There is no formal coordination between these agencies to balance the various interests that they represent and any one of them can prevent a new power plant from being built. As another example, at least three different agencies exercise some form of regulatory oversight for the California electricity market as a whole, including the California Public Utilities Commission (CPUC), the Energy Oversight Board (EOB), and the Cal-ISO.

Clear jurisdiction and mandates would streamline regulation and policy administration, as well as reduce overhead costs. In 2001, the state of California supported the construction of a new power plant in San Jose that would have relieved transmission constraints and contributed power to one of the most rapidly growing areas in the state. Local oversight boards, however, disagreed and a separate review and permitting process delayed and threatened to deny the plant's approval. Ultimately the plant was approved, but only after the impact of California's power crisis became clear, and not without having to seek approval twice.

EXHIBIT 49

CALIFORNIA'S POWER REGULATION IS COMPLEX



Improved market monitoring capabilities and expertise

California's regulatory institutions should be reformed so that they can better comprehend and deal with market realities. California must identify the data it will require to monitor and manage energy issues over which it maintains jurisdiction. It must then establish a system to collect, process, and analyze this data. It should take a more active role in publishing research results and policy perspectives to inform its governing bodies, sister agencies (including the FERC, WSCC, and the Power Authority), private sector players (for example, utilities and generation developers), and the general public.

The staff of the CEC, CPUC, and EOB, or their successors, would all benefit from greater access to and understanding of market data, as well as greater depth of experience. Many of the current and former commissioners of the CPUC have only limited — if any — prior experience in the energy industry (only two of the five current commissioners had any experience with energy prior to joining the CPUC). As a consequence, it is important for them to attract and retain knowledgeable staff, who can collect and analyze relevant market information and trends, as well as assist in making policy decisions.

More consistent rules and decision making

Finally, California's energy institutions should make an effort to behave predictably and consistently over time. Private investors currently perceive that the state's energy institutions make arbitrary decisions and change rules and procedures often. Avoiding these perceptions is a basic requirement if the state plans to rely at all on private sector investment to provide for its energy needs. This is not as easy as it sounds, because policy makers and regulators have to balance many competing

objectives. Thus, making predictability and objectivity a part of the charters of the state's energy institutions and part of the requirements of officials and employees would be useful in enforcing the necessary discipline.

* * *

Whatever California chooses for its electricity industry, it should be an integrated approach. The success of any model for wholesale competition depends in part upon the structure of the retail market. For example, if retail customers are not exposed to wholesale price fluctuations, there may be shortages as reserves fall. Low-cost generation also does not benefit consumers unless transmission is optimized. And unless distribution networks are operated efficiently, retail users will not benefit fully from restructuring.

Competition is a viable goal in California's electricity industry and the recent power crisis does not preclude competition in wholesale or retail markets. There are several lessons for how the state could restructure its power sector, based on experience in other jurisdictions:

- There are three models for wholesale competition that work in other markets. Two of these models explicitly encourage reserve capacity. Regardless of the wholesale model, it is always important to have an efficient permitting and siting process for new generation, as well as to encourage demand side responsiveness. Generators should also be allowed to enter into bilateral contracts with retail suppliers.
- Although transmission and distribution are regulated monopolies, regional transmission planning and an expanded focus on performance-based distribution rates can promote greater efficiency.
- Retail choice delivers benefits for consumers. In addition, allowing retail prices to float with underlying wholesale prices promotes efficiency. Auctioning off the default retail franchise to new entrants could also promote efficiency and innovation. Retail suppliers should be allowed to manage their risks through bilateral contracts, just like generators.

Regardless of whether California proceeds with competition, it should reform its energy related institutions. These institutions would benefit from clear jurisdictional authority and improved market monitoring capabilities. They should also focus on being more consistent in their decision making.

GLOSSARY

Baseload Plant – A power plant that operates on an almost continuous basis to provide power throughout the day. These are typically large coal-fired plants, nuclear plants, or new combined-cycle gas-fired plants.

British Thermal Unit (Btu) – The standard measure of heat energy. It takes one Btu to raise the temperature of one pound of water by one degree Fahrenheit at sea level. For example, it takes about 2,000 Btus to make a pot of coffee.

CPUC – California Public Utilities Commission.

Demand – The quantity of electricity (in kilowatts or megawatts) that consumers desire to buy and use at a certain time and price. Generally, as prices increase, demand decreases.

Dispatch – The operating control of an integrated electric system to: 1) assign output of specific generating stations and other sources of supply to effect the most reliable and economical supply as loads rise or fall; 2) control operations of high-voltage lines, substations, and equipment; 3) operate system interconnections; and 4) schedule energy transactions with other interconnected electric utilities.

Distribution System – The low voltage wires of utilities that are not under the control of the independent transmission operator and that are used to transmit power to end-users. The distribution system includes electric wires that connect with homes and businesses.

Dual-fuel Bundle – A combined gas and electricity offer by a retail supplier. Typically, the bundle is offered under more attractive pricing than separate gas and electricity contracts would provide.

Electrical Capacity – The rated continuous load-carrying ability of generation, transmission, or other electrical equipment (expressed in megawatts (MW) or megavolt-amperes (MVA)).

Energy Efficiency Services – Services primarily targeted at large commercial and industrial customers, to help them make more efficient use of energy and thereby reduce cost. Services can include optimization of equipment, operations, etc.

FERC – Federal Energy Regulatory Commission.

Generator – An entity capable of producing electrical energy.

Grid – An electric system linking transmission lines both regionally and locally.

Independent System Operator (ISO) – The ISO is the FERC regulated control area operator of the transmission grid. Its responsibilities include providing non-discriminatory access to the grid, managing congestion, maintaining the reliability and security of the grid, and providing billing and settlement services. The ISO has no affiliation with any market participant.

Load – An end-use device or an end-use customer that receives power from the electric system. Load should not be confused with Demand, which is the measure of power that a Load receives or requires.

Marginal Cost – The additional (marginal) cost incurred by producing an additional unit. In a perfectly competitive market, the market-clearing price is expected to be equal to the marginal cost of the most expensive unit sold.

Market Clearing Price – The price at which supply equals demand in a competitive market. In general, supply increases with increasing prices, while demand decreases. Any demand at or above this price has been satisfied, and all supply at or below this price has been purchased.

Market Participant – An entity that participates in the electrical energy marketplace through the buying and selling of electrical energy or services.

Market Power – The ability for companies to price above marginal cost without sales declining to zero. Market Power exists, to some degree, in all markets that lack perfect competition.

Marketer – An entity that takes title to electric power, transmission rights, or other energy commodities and services, and then resells these to other marketers or end use customers.

Natural Monopoly – A business with economics that allow only one player (the natural monopolist) to survive. In natural monopoly businesses there are continuously increasing economies of scale. This implies that the largest player always has a competitive advantage and its competitors ultimately will be forced out of business. Natural monopoly businesses call for regulation in order to protect against high prices that would be set by an unregulated monopolist.

MWh – 1,000 kilowatts or 1,000,000 watts. One megawatt is roughly the amount of electrical capacity needed to supply electricity to 1,000 homes.

Oligopoly – A market with only a few suppliers.

Peak Load, Peak Prices – In California, the prices and load observed during the 16 peak hours per day, typically between 6 a.m. and 10 p.m.

Peaking Plant (Peaking Capacity) – Power plants that have the capability to respond quickly to load changes. Typical peaking plants are small gas turbine generators and water storage based hydro plants. Peaking plants are ramped up and down frequently to follow daily demand patterns.

Reliability – The degree of performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. May be measured by the frequency, duration, and magnitude of adverse effects on the electric supply.

Reserve Margin – The additional capacity available to provide for maintenance, emergency requirements, and unforeseen demand (available capacity - peak demand)/peak demand).

Retail Market – The market in which retailers sell electricity to residential as well as commercial and industrial customers.

Wholesale Market – The market in which electricity generators sell electricity to large consumers, utilities, and retail marketers.