

# CURRENT ISSUES

## IN ECONOMICS AND FINANCE

December 2000

Volume 6 Number 14

## Lowering Electricity Prices through Deregulation

Thomas Klitgaard and Rekha Reddy

---

*A wave of regulatory reform is now transforming the U.S. electricity industry. As state and federal authorities allow independent power producers to compete with utilities in supplying electricity, consumers are paying close attention to the effects of this change on their energy bills. Although deregulation poses significant structural challenges, the introduction of competitive pressures should ultimately lead to efficiency gains for the industry and cost savings for households and businesses.*

Last summer, electricity prices surged in states actively engaged in deregulating the electricity industry. Newspaper stories covering the development suggested that deregulation had failed to deliver one of its promised benefits—a cut in the prices paid by consumers.<sup>1</sup> Indeed, many observers concluded that opening the industry to competition was actually driving up electricity rates.<sup>2</sup>

In this edition of *Current Issues*, we consider the consequences of injecting competitive forces into a system previously made up of regulated monopolies. We begin by reviewing the developments that have led to the deregulation of the electricity industry. We then look at the economic basis of deregulation and explain why, over time, restructuring should improve the efficiency of the industry. Although the reforms have clearly been accompanied by some problems, we argue that both consumers and businesses should see lower electricity prices—relative to those that would have prevailed under a regulated system—as competitive forces take hold.

### The Structure of the Electricity Industry

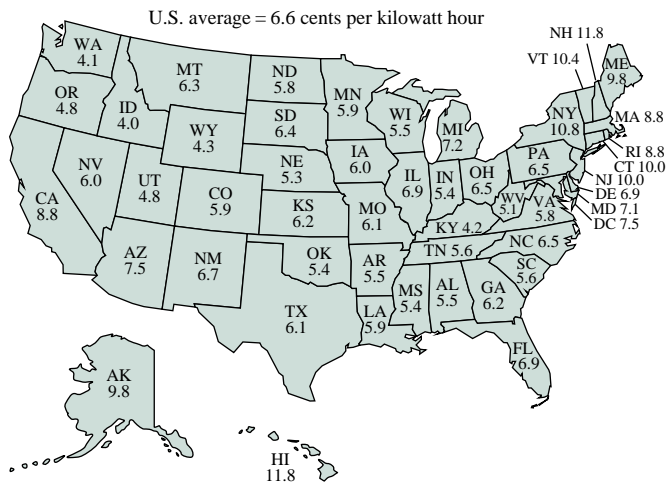
The electricity industry has three essential functions: the generation, transmission, and distribution of electric power. Electricity generated in power plants is first transmitted over high-voltage wires, then distributed over relatively low-voltage wires to homes and businesses.

Historically, responsibility for all three functions in a given region has belonged to a single utility.<sup>3</sup> Regional utilities were created in the belief that one large firm, acting as a monopoly, could perform these functions most efficiently. Such a firm would have the resources to build and operate power plants on a large scale, with no wasteful duplication in transmission and distribution systems. As the only supplier in the region, this firm would also be in an excellent position to monitor demand and coordinate production to meet ongoing changes in the public's energy requirements. Overall, this arrangement promised a high level of system reliability. As for the costs to consumers, the government regulators of the utilities were expected to ensure that prices remained reasonable.

This industry structure has worked better for some states than for others. As Chart 1 suggests, average electricity rates differ significantly across states. For example, rates in the Northeast tend to be roughly 50 percent above the national average, while rates in the Midwest and Northwest are generally below the average.<sup>4</sup> In recent years, these large rate disparities have prompted many states—particularly those paying higher rates—to begin deregulating the electricity industry. In taking such a step, the states have been encouraged by the reduction in prices achieved in other highly regulated industries that were opened to competition.

**Chart 1**  
**Differences in State Electricity Rates**

Average Revenue per Kilowatt Hour in 1999, in Cents



Source: U.S. Energy Information Administration (2000d, Table 55).

Note: Average revenue is used as a proxy for the retail price of electricity. See U.S. Energy Information Administration (2000a).

The movement toward deregulation has also been spurred by advances in technology. These advances have eliminated some of the advantages traditionally attributed to large monopoly suppliers and made it possible for smaller firms to compete. Innovations in power generation—including the shift from coal-fired boilers to natural-gas-fired turbines—have reduced the optimal size of power plants. Perhaps more important, improvements in computer technology and telecommunications have enabled independent energy suppliers to coordinate production in a given region so that the total supply of electricity can adjust to the constantly changing demand for energy.

At this stage, only the generation component of the electricity industry is being opened to competition. The restructuring is advancing on two levels: the wholesale level, where federal legislation is driving the changes, and the retail level, where state authorities are directing the reforms. The next two sections examine how change is coming about in each of these arenas. The discussion makes clear why deregulation should, over time, bring lower electricity prices to both consumers and businesses.

### Competition in the Wholesale Market

The first step in deregulating electricity generation has been to create a wholesale market that allows independent power firms to compete against one another and against plants owned by utilities.<sup>5</sup> A state-regulated system of monopoly suppliers, of course, has no need for such a market.

### Background

The development of a wholesale market began during the oil crisis in the late 1970s when the Public Utility Regulatory Policies Act of 1978 was passed. The act encouraged the participation of independent power plants that relied on renewable sources of energy as their fuel for generating electricity. Utilities were required to connect these independent facilities to the nation's transmission system, or "power grid," and to pay them a fee set by the state regulators. This arrangement demonstrated that non-utility generators could be successfully integrated into the power grid.

The passage of the Energy Policy Act of 1992 further encouraged the participation of independent facilities. This legislation set up a framework for widening access to transmission lines operated by utilities under the Federal Energy Regulatory Commission.<sup>6</sup> In 1996, the commission made broader access a reality by specifying the conditions under which independent power producers and power "traders" are given access to these transmission lines.<sup>7</sup>

Admitting independent producers to the country's transmission system proved critical in creating a wholesale market for electricity. It enabled unregulated power firms to sell electricity directly to utilities, without the expense of building their own power grid or developing their own customer base.

In the last three years, regional wholesale auction markets have emerged throughout the nation.<sup>8</sup> In these markets, both independent power producers and utilities buy and sell electricity. The existence of the wholesale markets has not only encouraged the start-up of new energy firms but also radically changed the way many utilities operate. Given the opportunity to buy electricity in a spot market rather than from their own generating plants, these utilities have chosen to give up the business of generating electricity and to focus instead on the still-regulated transmission and distribution components of the industry.

### Effect on Prices

How will the development of a wholesale market lead to lower prices for businesses and consumers? First, both independent power producers and the utilities have a clear incentive to operate efficiently. Under a regulated system, power plants face little or no competitive pressure to lower production costs. The utilities charge their customers a rate that is fixed as a markup over production costs—an arrangement devised by regulators to guarantee utilities a "reasonable" rate of return. Although the states monitor the operations of their utilities in an effort to keep costs down, the absence of competing suppliers means that the states

have no standard of comparison for assessing the efficiency of a given utility's operations.

With the creation of a wholesale market, however, power plants lose the guarantee of a reasonable return and must instead compete for profits. In this environment, the most efficient power plants earn profits at the expense of high-cost power plants. Over time, market forces push firms to develop new technologies and better operating procedures to gain cost advantages over their rivals. These cost advantages should ultimately translate into lower prices for consumers and businesses.

### Competition in the Retail Market

Most of the downward pressure on prices from deregulation will come from promoting efficiency at the firm level though wholesale competition. Some states, however, are concerned that utilities and independent power producers will not be sufficiently motivated by market forces to pass on any efficiency gains to consumers. Consequently, a number of states have moved to reinforce deregulation at the wholesale level by creating a competitive retail market for electricity.

At the retail level, competition means that individual consumers are free to buy electricity from their local utility or from another supplier while the utility retains responsibility for transmission and distribution. Giving consumers the power to choose between competing firms helps ensure that the price savings realized at the wholesale level benefit consumers. In addition, retail competition provides firms with incentives to match their products to differences in customer preferences. For example, power companies can offer customers electricity from renewable energy resources or charge lower prices (or offer rebates) to those willing to cut their use of electricity during peak-demand periods.

Predictably, the states with the highest electricity rates are at the forefront of the deregulation movement.<sup>9</sup> California and Rhode Island began deregulation in early 1998. They were followed by other high-cost states, including Massachusetts, Pennsylvania, and New Jersey. As of November 2000, twenty-four states and the District of Columbia had enacted restructuring legislation or issued regulatory orders to promote competition (Chart 2). Other states are investigating reforms of their own, although many, particularly those with relatively low rates, are approaching deregulation more cautiously.

### Deregulation Issues for State Governments

Economic logic suggests that deregulation will, in fact, increase competition and lead to lower prices in the long run. Nevertheless, state regulators must resolve some complex institutional issues when they set out to create a competitive retail market for electricity.

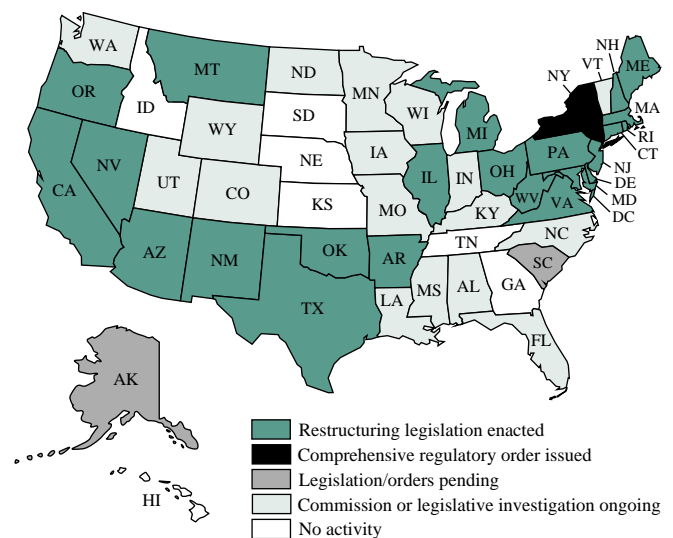
*Compensation for utilities.* One important question is how much to compensate the utilities for any unprofitable business pursuits they have undertaken at the direction of state regulators. Key examples include investments in nuclear power plants and costly long-term contracts for oil fuel that were signed when oil prices were high in the 1970s and early 1980s.

Under a state-regulated monopoly system, the utilities were permitted to charge customers higher prices in order to recover their losses on such ventures. But with the restructuring of the industry, the utilities no longer enjoy such protection against bad investments. If forced to shoulder the full cost of their earlier commitments, the utilities would be at an extreme disadvantage in competing with new entrants in the power generation industry. Utilities argue that, in fairness, they should receive compensation because the business commitments that proved so unprofitable were backed by the regulatory authorities.

Each state that has pursued restructuring has in fact agreed to some amount of compensation.<sup>10</sup> As part of the deregulation process, utilities and regulators negotiate the amount of compensation that will be collected over a set period of time. Consumers are charged a fee, regardless of whether they remain with the utility, until the agreed sum of money is paid.<sup>11</sup>

In some cases, the size of the compensation bill for consumers may shrink as deregulation progresses. Many utilities in states that have established retail competition are divesting themselves of some or all of their

Chart 2  
Restructuring the Electricity Industry:  
Where the States Stand



Source: U.S. Energy Information Administration.

power plants. These utilities are at times able to sell the plants at prices higher than those anticipated when the compensation figure was determined. If so, the amount that customers are required to pay the utility will decrease, accelerating the expected decline in electricity rates under deregulation.<sup>12</sup>

*Divestiture.* State regulatory authorities must also decide on a divestiture policy. Some states offer financial incentives to induce utilities to sell their power plants; other states have simply ordered the utilities to remove themselves from the energy supply business. Regulators see divestiture as a sound strategy because it eliminates the conflicts of interest that may arise when a utility can choose to supply electricity from its own facilities or from independent power producers. In the regulators' view, a utility that has no power plants of its own can be relied on to buy the cheapest energy available in the wholesale market or, alternatively, to transmit electricity purchased by consumers directly from an independent energy supplier.

*Mandated rate cuts.* The states must also weigh the pros and cons of mandating rate cuts when retail competition is introduced. By demonstrating the gains to be achieved from deregulation, rate cuts can help to justify restructuring efforts to consumers.<sup>13</sup> However, rate cuts can also reduce the incentive for consumers to switch to a new provider, discouraging both energy suppliers and customers from participating in the new market.

*Selection of reference rates.* Regulatory authorities seeking to develop a retail market typically set a reference rate—an estimate of the price at which the local utility is selling electricity, exclusive of any charges for transmission, distribution, or other services. The reference rate, known as the “shopping credit” or “backout rate,” is used by consumers to compare offers from competing electricity suppliers.

The authorities have some discretion in setting the reference rate. To provide the right incentives to the developing competitive market, the rate should be a true measure of the cost of generating electricity. A rate that is too low will discourage entry by independent energy producers by making the electricity supplied by the local utility seem relatively inexpensive, while a rate that is too high could increase purchases of electricity from power plants that are less efficient than those operated by the utility.<sup>14</sup>

*An ongoing role for government.* States must determine who will be the provider of last resort for low-income users and how to fund public policy programs—such as those promoting conservation efforts—that were previously financed by the regulated rate structure. Federal lawmakers will need to clarify the dividing line between state and federal jurisdiction, particularly in

matters of interstate power transmission and wholesale market activity. Finally, the institutions entrusted with oversight of the industry will need enforcement power in order to maintain the reliability of the power grid and ensure compliance with fair business practices.

### Operational Challenges

Deregulating an industry, particularly one as crucial as electricity, entails some significant operational challenges. Perhaps the most daunting task is ensuring that a deregulated system is able to maintain the power grid's minute-to-minute stability. Because electricity, by its nature, cannot be stored, supply must be constantly adjusted to match demand if the system is to continue operating. This complex coordination effort is more difficult when the supply of electricity to the power grid flows from multiple firms rather than a single utility.

In response to this challenge, government authorities are working to set up Regional Transmission Organizations (RTOs) that will take over from the utilities the responsibility for adjusting the supply of electricity to meet changes in demand. The RTOs will coordinate operations and planning among utilities and independent power suppliers on a regional and interregional basis.<sup>15</sup> The creation of these organizations represents a significant start-up cost in developing a deregulated electricity market.

Building sufficient capacity in a restructured industry is another important challenge. In the first phase of deregulation, firms may delay adding capacity to their power plants until they have a clearer idea of how the market will operate. But even after a competitive system is established, market forces may be inadequate to guarantee that providers can always deliver a sufficient quantity of electricity to maintain the power grid's stability during peak-load periods. Under a regulated system, the authorities pushed utilities to build capacity significantly above typical peak-load requirements as insurance against any unusually large spikes in demand. Utilities were compensated for maintaining this degree of readiness by being allowed to charge higher electricity rates.

With deregulation, consumers will see market-driven rates that are more volatile than prices in the past and that more accurately reflect the true cost of electricity. Rates will be higher in the summer and lower in the winter (see box). Such seasonal fluctuations will encourage conservation efforts and more efficient energy management—for example, by prompting large commercial and industrial users to find ways to cut their requirements in high-demand periods in exchange for lower rates at other times. On the supply side, price spikes will motivate power-generating firms to build

## Price Volatility

Deregulation exposes the inherent volatility of energy prices. With the development of wholesale markets for electricity, price swings in response to changes in supply and demand conditions can be observed by utilities, independent power producers, and consumers.

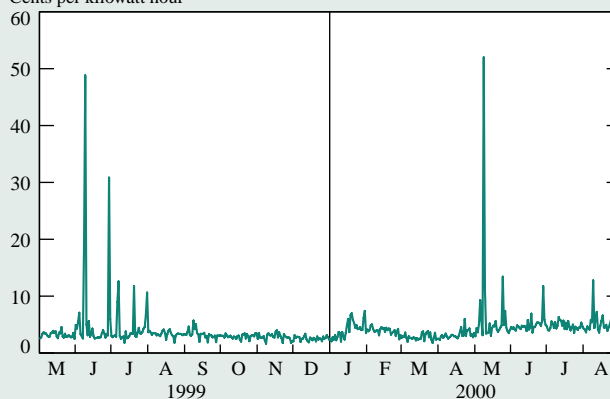
The chart tracks daily prices in the New England Power Pool, a recently formed wholesale auction market, over a sixteen-month period in 1999-2000. Note that while prices remained relatively low and stable most days, dramatic price spikes occurred at times because of supply disruptions or high demand during heat waves.

One by-product of deregulating the electricity industry will be the development of a host of financial instruments to help market participants hedge their exposure to price volatility. Adopting strategies often applied to other commodities, these firms will increasingly rely on futures and options to limit their exposure to changes in the market price of electricity.

## New England Power Pool Hourly Spot Market

Price at Noon

Cents per kilowatt hour



Source: ISO New England, <[http://www.iso-ne.com/Historical\\_Data/](http://www.iso-ne.com/Historical_Data/)>.

capacity that can be brought on line during peak-demand periods to maintain the power grid's reliability.

Clearly, many adjustments will have to be made as states move forward in deregulating their electricity industries. But the states will eventually learn the best way to implement deregulation, and buyers and sellers will become more comfortable with a competitive market for electricity. In the end, consumers should see electricity rates that are lower than they would have been under a regulated system. Although quantifying consumer gains from deregulation is very difficult at this stage, the Department of Energy has estimated that a typical family of four will save about \$250 a year through lower energy bills and reduced expenditures on other electricity-dependent services and goods.<sup>16</sup>

## Conclusion

Federal legislation to open the wholesale market to independent power producers is bringing market discipline to a sector of the economy previously composed of regulated monopolies. As a result, profits will flow to those firms that build and operate efficient power plants. State authorities are adding to competitive pressures on the industry by opening up the retail market, giving consumers the power to choose their energy suppliers directly.

As the states move away from an exclusive reliance on utilities for the generation, transmission, and dis-

tribution of electricity, they will face a number of operational challenges. Most notably, they must learn how to coordinate output from independent producers and how to ensure that the system has sufficient capacity for peak-load periods. If these challenges are met, then the market forces introduced to the industry by deregulation should cause electricity rates to drop below the levels that would have prevailed under a monopoly system. The lower rates, in turn, should lead to an increase in consumers' disposable income and a drop in the production costs of firms.

## Notes

1. See, for example, Neela Banerjee, "A Dwindling Faith in Deregulation," *New York Times*, September 15, 2000, sec. C, pp. 1, 4.
2. In fact, sharply higher prices for oil and natural gas—fuels used to generate electricity—were largely responsible for the increase in rates. Capacity shortages in some regions also contributed to higher rates.
3. A number of smaller utilities relied on electricity generated from other utilities.
4. Of course, rate differences across states stem in large part from differences in the type of power used to generate electricity. Hydroelectric power, which is prevalent in the Northwest, tends to be the cheapest, while oil and nuclear power, which are common in the Northeast, are the most costly. In addition, some states are at a disadvantage because their utilities signed long-term contracts for a type of power that was priced very high at the time. Differences in state taxation and operational costs may also contribute to rate disparities.

5. Useful discussions of electricity deregulation can be found in Brennan et al. (1996), Council of Economic Advisers (1999), Joskow (1997), and U.S. Energy Information Administration (2000c).
6. Congress is considering additional legislation dealing with interstate transmission and wholesale activity. The legislation would address concerns about the adequacy and reliability of power in a deregulated system where transactions may involve multiple players and multiple states.
7. Note, however, that government-owned utilities such as the Tennessee Valley Authority are not bound by the 1992 legislation.
8. Independent System Operators (ISOs) under the supervision of the Federal Energy Regulatory Commission set up these markets. Operators include the California Power Exchange, the New York ISO, ISO New England, and, in the mid-Atlantic region, the PJM Interconnection.
9. The benefits of competition will be less dramatic for states that already enjoy relatively low rates, such as the mountain states and states in the Pacific Northwest and the mid-South. Nevertheless, other factors, including intrastate price variation and the need to encourage firms to build more capacity over time, may compel states to pursue retail competition.
10. The states differ in their time horizons for paying off “stranded” costs. For example, Massachusetts set a ten-year horizon, while California limited payment to five years.
11. In California, discontent over compensating utilities fueled a backlash against deregulation. Proposition 9, put forward in 1998, contained provisions to prevent utilities from claiming such funds and to force a 20 percent rate reduction. The proposition was voted down. Also in 1998, Massachusetts voted down an initiative that challenged the mechanism for recovering stranded costs.
12. The amount of compensation that will ultimately be paid by consumers to utilities is uncertain. Estimates range from \$10 billion to \$500 billion. See U.S. Energy Information Administration (2000a, p. 17).
13. Note, however, that the rate cuts are only temporary discounts, because they are inconsistent with rates dictated by market conditions.

14. For a fuller discussion of this issue, see Flaim (2000).
15. The RTOs are also responsible for monitoring transmission lines, a task that includes preventing utilities from using their ownership of transmission lines to favor their own power plants. The RTOs take two forms—Independent System Operators and Independent Transmission Companies.
16. See U.S. Energy Information Administration (2000b).

---

## References

- Brennan, Timothy J., Karen L. Palmer, Raymond J. Kopp, Alan J. Krupnick, Vito Stagliano, and Dallas Burtraw. 1996. *A Shock to the System: Restructuring America's Electricity Industry*. Washington, D.C.: Resources for the Future.
- Council of Economic Advisers. 1999. *The Economic Report of the President*. Washington, D.C.: Government Printing Office.
- Flaim, Theresa. 2000. “The Big Retail Bust: What Will It Take to Get True Competition?” *Electricity Journal* 13, no. 2 (March).
- Joskow, Paul L. 1997. “Restructuring, Competition, and Regulatory Reform in the U.S. Electricity Sector.” *Journal of Economic Perspectives* 11, no. 3 (November): 119-38.
- U.S. Department of Energy. Office of Economic Electricity and Natural Gas Analysis. 1999. “Supporting Analysis for the Comprehensive Electricity Competition Act.” Washington, D.C., May 1.
- U.S. Energy Information Administration. 2000a. *The Restructuring of the Electric Power Industry: A Capsule of Issues and Events*. January.
- . 2000b. <<http://www.hr.doe.gov/electric/summary.html>> (January 5, 2000).
- . 2000c. <<http://www.eia.doe.gov/cneaf/electricity/page/restructure.html>> (March 29, 2000).
- . 2000d. *Electric Power Monthly*. <<http://www.eia.doe.gov/pub/pdf/electricity/02260003.pdf>> (October 2000).

---

## About the Authors

Thomas Klitgaard is a research officer in the International Research Function of the Research and Market Analysis Group; Rekha Reddy, formerly an assistant economist in the function, is now a senior project manager for the New York City Economic Development Corporation.

*The views expressed in this article are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.*

*Current Issues in Economics and Finance* is published by the Research and Market Analysis Group of the Federal Reserve Bank of New York. Dorothy Meadow Sobol is the editor.

Subscriptions to *Current Issues* are free. Write to the Public Information Department, Federal Reserve Bank of New York, 33 Liberty Street, New York, N.Y. 10045-0001, or call 212-720-6134. *Current Issues* is also available at the Research and Market Analysis Group's web site: [http://www.ny.frb.org/rmaghome/curr\\_iss/2000.html](http://www.ny.frb.org/rmaghome/curr_iss/2000.html).

---