



# BRIEF ANALYSIS

## Electricity Deregulation: Taking the Next Step

by Joe Barnett and Sean Shurtleff

A new technology called “smart” metering and innovative residential pricing plans have the potential to revolutionize the electric power industry and reduce monthly electricity bills for many consumers. Utilities in the states that have deregulated electric power have the strongest market incentives to implement these new features, and customers in some states are beginning to reap the benefits.

**Partial Deregulation.** During the 20th century, most electricity was provided by vertically-integrated utilities that generated the power, transmitted it cross-country through high-voltage power lines and distributed it to industrial, commercial and residential users. Utilities enjoyed government-granted monopolies to sell and distribute electricity in each community. Electricity prices were set by state regulators, who allowed utilities to charge consumers for the fuel they used to produce power and gave the utilities a guaranteed return on their investment in plant and equipment.

Most economists argued that deregulation — competition among suppliers and prices set by the market — would improve the efficiency of the electric power industry, spur investment and innovation, and reduce costs to consumers, just as deregulation of the airline industry reduced air fares. Beginning in the 1990s, 20 states deregulated (or restructured) electric power, allowing customers to choose their electricity providers and requiring regulated utilities to transmit the power produced by independents.

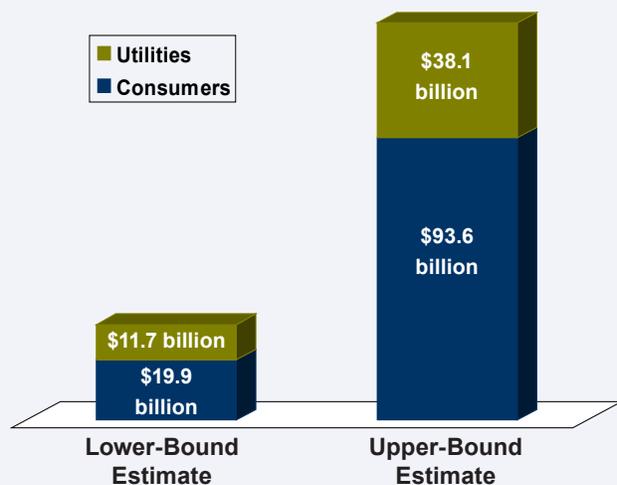
However, deregulation has been incomplete. Most states have continued to require power sellers to get permission from the government to raise prices, and they have not required utilities (or “wires companies”), which operate the electric power grid, to divest themselves of excess generating capacity. Continued regulation led to power blackouts and extreme price fluctuations in California and other states. In many areas, utilities still compete with independent generating companies for customers’ business — and in some areas consumers still have no choice of suppliers.

Despite these limitations, consumer savings have been significant in states that substantially deregulated their markets. For example, the Pennsylvania Public Utility Commission concluded that by 2003 commonwealth consumers had saved \$6 billion from deregulation. Unfortunately, five of the states that deregulated electric power have reimposed price controls in the face of rising electricity prices.

**Rising Fuel Costs.** Electricity prices have been rising the past few years due to fuel costs. From 1999 to 2005 the average price of residential electricity in the United States increased 16 percent, a little more than 2 percent per year. According to the Edison Energy Institute, climbing fuel costs and rising prices for wholesale power that the utilities purchase from independent generators account for 95 percent of the growth in costs for the regulated utilities. For example, since 1999 the cost of natural gas used by the electric power industry has increased more than 300 percent and the cost of petroleum rose more than 270 percent.

The U.S. Energy Information Administration predicts that demand for electricity will grow 40 percent by 2030.

### Smart Meter Savings over 20 Years (in billions of dollars)



Source: Walter S. Baer, Brent Fulton and Sergej Mahnovski, “Estimating the Benefits of the GridWise Initiative,” RAND Corporation, 2004.

Given rising fuel costs, electricity prices are likely to increase substantially. However, there are opportunities for consumers to substantially lower their electric bills if utilities and power generators are allowed to implement new technologies and service plans.

#### **Smart Meters and Demand Response Pricing.**

Smart electrical meters hold the key to lower costs. Unlike mechanical meters that merely record electricity usage and have to be read manually by legions of meter readers, smart meters are electronic. They can continuously communicate information about electric power usage through broad-band over power lines (BPL), computer signals over radio frequency (Wi-Fi), or normal radio frequency (RF) transmission. These capabilities allow utilities to monitor power outages and spikes, and to reduce the flow of power to specific customers.

Smart metering is essential to demand response (DR) electricity pricing plans. DR plans charge customers rates that are based on the time of day and the customers' willingness to reduce electricity consumption, or to have their service temporarily interrupted when demand overloads the system. Customers are charged lower rates during off-peak hours, and more when demand is highest (usually between 8 a.m. and 10 p.m.). The system can notify consumers when they should reduce their consumption and when their power will be interrupted.

**Potential Consumer Savings.** Demand response allows residential and commercial customers to lower their electric bills by controlling the amount they use. For example, in a California pilot project involving 2,500 customers:

- The average customer reduced demand during the hottest summer hours by 13 percent in response to peak prices five times the standard price.
- Customers who had smart thermostats (which automatically raise the temperature setting two or four degrees at critical times) reduced their load about twice as much (27 percent).
- And customers with gateway systems (which adjust the electricity use of multiple appliances) reduced their usage 43 percent.

Participants in an Illinois DR pilot project saved an average of 20 percent on their electric bills. If smart metering and innovative service plans were implemented nationwide, consumers and utilities could save \$32 billion over 20 years, according to a 2004 RAND Corporation study, and if all the regulatory barriers to competition were eliminated, they could save up to \$132 billion. [See the figure.]

A variety of demand response programs are currently being implemented. For example:

- In Illinois, customers save 10 percent on their bills by paying \$2.25 a month to use a smart meter and receive real-time pricing under a plan offered by Ameren Illinois Utilities and administered by CNT Energy.
- In Maryland, Baltimore Gas and Electric (BGE) will begin a pilot project in 2008 to test smart meters and time of use pricing in 5,000 homes; if successful, BGE plans to provide meters to all its customers.
- In 2005 the Texas legislature passed a law allowing utilities to recover costs from investing in BPL smart meters, and soon afterward the state's largest wires company, TXU Electric Delivery, announced plans to provide smart meters to all its customers by 2011.

In Pennsylvania and Wisconsin, 40 percent of customers have smart meters and access to DR pricing plans, according to the Brattle Group, an economic consultancy. However, nationwide, only 6 percent of electricity customers have smart meters. The federal Energy Policy Act 2005 requires all states to offer consumers time-based rates. But utilities are uncertain about the extent to which customers will reduce their consumption, and regulators in many states fear a political backlash from market-based pricing. As a result, most utilities do not yet offer such plans.

**Increased Efficiency and Conservation.** The United States will need 258 gigawatts of new generating capacity by 2030 that will cost \$412 billion to build. The Brattle Group conservatively estimates that implementing DR nationwide would reduce peak electricity demand by 5 percent. This would eliminate the need for 625 power plants and associated infrastructure that are used only during peak loads. The savings in avoided investment in plant and equipment would amount to \$35 billion over 20 years. By contrast, installing the technology nationwide will require an estimated investment of \$14 billion to \$26 billion, according to the Federal Energy Regulatory Commission (FERC).

**Conclusion.** The North American Electric Reliability Corporation projects a 19 percent growth in peak summer demand for electricity within 10 years — whereas the amount of available power is projected to grow only 6 percent, according to FERC. Available power can be rationed by allowing the market to set prices, or it will be rationed by blackouts and brownouts. However, many consumers will be able to avoid huge price hikes, or at least slow the growth in their energy bills, by using smart technology to manage their electricity use.

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