# RISING ELECTRICITY COSTS: A Challenge For Consumers, Regulators, And Utilities

Electricity is the lifeblood of the U.S. economy. It powers our homes, offices, and industries; provides communications, entertainment, and medical services; powers computers, technology, and the Internet; and runs various forms of transportation. Not only is electricity the most flexible and most controllable form of energy, its versatility is unparalleled.

Clearly, electricity is a crucial commodity we all take for granted. We scarcely think about it, unless we don't have it. Fortunately, almost without exception, electricity is there for us when we flip the switch—Americans enjoy the benefits of the world's most reliable electric system.

What's more, continuing advances in more efficient electric technologies make electricity cleaner and more valuable. And still, it remains one of the true "bargains" among crucial U.S. commodities. Today, electricity costs are generally inexpensive, comprising a modest part of most customers' monthly expenses.

Within the next few years, regulators and utilities in several states will be revisiting electricity rates that have been frozen for years. The new rate proceedings are needed to fund new infrastructure investments and to ensure electric rates cover today's higher fuel and operating costs. Devising ratemaking strategies that address the new realities of today's energy markets will be a challenge. But, they are a necessary step if the electric utility industry is to make the long-term investments needed to help ensure reliable, affordable, and increasingly clean electricity.

### **EDISON ELECTRIC INSTITUTE**

## **Electricity: A Great Value**

Today's high-technology society demands electricity to power nearly all new products that come to market. Electricity and the many technologies that it powers enhance the quality of life for their users, and contribute to the progress and success of our nation. Electricity intensity in the U.S. economy (measured by electricity consumption per dollar of real gross domestic product) is significantly related to the general level of economic activity, as illustrated in Figure 1.

Electricity prices—unlike the prices for most other popular consumer goods—did not keep pace with the rate of inflation for many years, despite an ever-increasing national appetite for electricity. In fact, from 1985 to 2000, electricity prices rose, on average, by 1.1 percent per year, while inflation rose at a rate of 2.4 percent per year during this timeframe.<sup>1</sup> (Economists consider 2 percent retail price inflation normal in our economy, although price inflation has varied dramatically over the past 60 years.)

Since 2000, electricity prices have increased at a 2.5 percent annual rate, which is slightly higher than the 1.99 percent rate of inflation. Even with recent price increases, the growth rate for electricity prices remains comparable to, and even lower than, other important goods. As Figure 2 illustrates, the price of one kilowatt-hour of electricity (in nominal dollars) has increased by just 27 percent since 1985, while the prices of most other consumer goods have risen at much higher levels. This evidence points to an industry that has become more efficient itself—both in management and in technology.

#### Figure 1: U.S. Economic Growth Is Linked to Electricity Growth



Continuing advances in more efficient electric technologies have made electricity a more valuable commodity. Today's electricity is also much cleaner than it was in the 1980s. In fact, since 1980, electric utilities have reduced air emissions significantly, while electricity use has increased by 77 percent, as illustrated in Figure 7 on page 7.

<sup>1</sup> Mark Newton Lowry, David Hovde, and Steve Fenrick. <u>Assessing Rate Trends of U.S. Electric Utilities</u>. Pacific Economics Group, LLC. January 2006. Page 7.



#### Figure 2: Electricity: A Great Value

Sources: U.S. Department of Labor, Bureau of Labor Statistics (BLS), and U.S. Department of Energy, Energy Information Administration (EIA)

## Fuel Diversity Is Key to Affordable and Reliable Electricity

The greatest attribute of electricity is its ability to be generated from many diverse fuel sources, as illustrated in Figure 3. These include coal, nuclear energy, natural gas, oil, hydropower, and other renewable energy resources such as wind and solar. Fuel diversity is key to affordable and reliable electricity.

Across the United States, a diverse mix of fuel is used to generate electricity. Several factors influence an electric utility's decision to use particular fuels. These include the price and the availability of supply. Figure 4 illustrates the diversity of fuel use and shows how the electricity generation mixes in various regions of the country differ.

An important long-term solution to high fuel costs is to maintain the diversity of our nation's available fuel resources to ensure that we do not become too dependent on one fuel source. But, this requires higher capital costs and new infrastructure investments.

#### Figure 3: Electric Utilities Use a Diverse Mix Of Fuels to Generate Electricity



\* "Other" includes generation by agricultural waste, batteries, chemicals, geothermal, hydrogen, landfill gas recovery, municipal solid waste, non-wood waste, pitch, purchased steam, solar, sulfur, wind, and wood.

Source: U.S. Department of Energy, Energy Information Administration (EIA), 2005 preliminary data



#### Figure 4: Different Regions of the Country Use Different Fuel Mixes to Generate Electricity

# Continuing Advances in Energy Efficiency Make Electricity Even More Valuable

The increased efficiency of electric products further demonstrates the value of electricity in our society. Today's modern appliances are often larger, offer more features, and use less energy than their older counterparts. At the same time, technological advancements have created many new uses for electricity that continue to enrich our lives.

#### **APPLIANCES**

Refrigerators/freezers (shipment weighted averages) made in:

	1972	2004
Size (cubic feet):	18.16	21.52
Annual energy usage:	1,726 kWh	500 kWh
Average hourly usage:	197.0 W	57.1 W

#### Stand-alone freezers made in:

	1981	2004
Size (cubic feet):	25.53	21.43
Annual energy usage:	837 kWh	448 kWh
Average hourly usage:	95.5 W	51.1 W

#### Clothes washers made in:

	1988	2003
Size (cubic feet tub volume):	2.61	3.01
Energy usage per cycle:	2.74 kWh	1.97 kWh

Source: Association for Home Appliance Manufacturers

#### **ROOM AIR CONDITIONERS**

Room air conditioners are rated on a federal energy efficiency rating called the Energy Efficiency Ratio, or EER. Technology advancements allow the units to run more efficiently and decrease energy usage.

Room air conditioners made in:

	1982	2004
Average cooling capacity:	10,801 Btu/hr	9,735 Btu/hr
EER:	7.14	9.71
Annual energy use:	1,135 kWh/yr	752 kWh/yr

Source: Association for Home Appliance Manufacturers

#### **PERSONAL COMPUTERS**

The number of households with personal computers in the United States more than tripled from 1993 to 2001, according to the Energy Information Administration. From 1997 to 2001, the number of households with computers increased 92 percent, while the amount of electricity used to operate the computers increased by less than 64 percent.

#### Personal Computers in the United States:

Year	# of Households* (Millions)	Annual PC Electricity Consumption (million MWh)
1993	22.6	N/A
1997	35.6	11.3
2001*	* 68.4	18.5

\*Number of households with at least one computer.

\*\*Latest available data.

Source: U.S. Department of Energy, Energy Information Administration, Residential Energy Consumption Survey











## **Today's Electric Utility Rate Environment**

The electric utility industry is among the country's most capital-intensive sectors, with many of its costs stemming directly from investments in and maintenance of the power plants, transmission and distribution lines, equipment, and structures that are used to deliver electricity. Utilities typically cannot recover their costs when they are incurred; instead, they are required by regulatory authorities to spread out their costs to customers over the physical life of the investment-sometimes as long as 30 years-under the assumption that there will be a stable customer base.

While all electric utilities use similar methods to generate electricity, each operates differently to meet the unique needs of its service area. Variables such as regulatory policy, customer demographics, usage patterns, fuel availability, and geographic conditions have a major impact on the cost of providing service, and, therefore, on electricity prices.

Most of the revenue utilities receive is used to pay operating and maintenance costs. Purchased power and fuel are the largest operating expenses for an electric utility; taxes are the next largest expense. The cost of salaries, materials, supplies, services, and a variety of other expenses also must be met. In addition, the utility must be compensated for the cost of depreciation, amortization, and the cost of capital, which includes the return paid to debt and equity investors for the use of their money.

Today, the electric utility industry is facing steadily increasing costs to generate and deliver electricity to American homes, businesses, and industries. While electric utilities make continuous efficiency improvements and are working closely with regulators to contain costs and to keep electricity prices as low as possible, the bottom line is that rising costs are becoming inevitable throughout the United States.

#### The Costs to Generate Electricity Are Rising

Electric utilities use a variety of fuels to generate electricity. Fuel prices greatly affect the price of electricity. After peaking in the early 1980s, fuel prices trended downward until 1999. Economists point to these decreasing fuel prices as an important reason for the lower, more stable electricity prices during this time period.<sup>2</sup>

However, as illustrated in Figure 5, fossil fuel prices have risen considerably since 1999, particularly for natural gas. The average price electric utilities paid for natural gas rose from \$2.57/million Btu in 1999 to \$8.20/million Btu in 2005. Coal prices to electric utilities also have increased each year, rising from \$1.22/million Btu in 1999 to \$1.54/million Btu in 2005.<sup>3</sup>

Electric utilities take steps to help shield customers from these rising fuel costs. For example, they frequently try to mitigate market volatility by "hedging," or entering into

#### Figure 5: Average Cost of Fossil Fuels 1995-2005



Source: U.S. Department of Energy, Energy Information Administration (EIA)

long-term, fixed contracts at set prices. But not all companies have this option, and such forward contracts cannot cover all of their fuel needs. At some point, customers inevitably will see these rising fuel costs that electric utilities must pay reflected in their electric bills.

#### Demand for Electricity Is Growing

While efficiency improvements have had a major impact in meeting national electricity needs relative to new supply, the demand for electricity continues to increase. According to the U.S. Department of Energy's Energy Information Administration (EIA), consumer demand for electricity is projected to grow at an average rate of 1.5 percent per year through 2030. Overall, electricity consumption is expected to increase 45 percent by 2030.4

To meet this increasing demand for electricity and to ensure fuel diversity and reliability, electric utilities must invest in new baseload power plants. According to EIA, 347 gigawatts (GW) of new capacity-both electric power sector capacity and customer-owned distributed generation-will be needed by 2030. Based on EIA assumptions, if all of this new capacity is built, costs would be in excess of \$300 billion (2005\$). It is likely that electricity

<sup>&</sup>lt;sup>2</sup> Pacific Economics Group, p. 12.

<sup>&</sup>lt;sup>3</sup> U.S. Department of Energy, Energy Information Administration.

<sup>&</sup>lt;sup>4</sup> U.S. Department of Energy, Energy Information Administration, Annual Energy Outlook 2006, February 2006.

### **Today's Electric Utility Rate Environment**

demand could be 200 GW more than otherwise expected, were it not for energy conservation and efficiency programs.

The utility industry has been planning for the additional capacity needed to meet long-term growth in electricity demand and to mitigate exposure to high fuel prices. According to EIA, coal is expected to be the primary fuel for electricity through 2030, with its share of total generation increasing from 50 percent in 2004 to 57 percent in 2030.

EIA also projects that nuclear generating capacity will increase—from about 100 GW in 2004 to 109 GW in 2030. The projected increase in nuclear capacity includes 3 GW expected to come from uprates at existing plants and 6 GW from newly constructed plants.

#### Infrastructure Investment Costs Are Growing

In addition to building new power plants, electric utilities must reinforce the nation's electricity delivery infrastructure, namely, the high-voltage transmission lines, substations, and distribution systems that carry electricity to the customer. Though we continue to enjoy the world's most reliable electric system, the reality is that more investment is needed to ensure that we have a robust network of "pipes and wires" to keep it that way.

#### Figure 6: Actual and Planned Transmission Investment 1999-2008

\$ Millions (Real \$2005)



p = preliminary

Note: In 2004 and 2005, the industry exceeded investment projections in its transmission capital budgets. The Handy-Whitman Index of Public Utility Construction Costs used to adjust for inflation from year to year. Data represents both vertically integrated and stand-alone transmission companies.

\*Planned total industry expenditures estimated from 95% response rate to EEI's Electric Transmission Capital Budget & Forecast Survey. Actual expenditures from EEI's Annual Property & Plant Capital Investment Survey and FERC Form 1s. This presents challenges. First, investment in power lines lagged behind growth in demand for electricity during the 1980s and 1990s. Second, regulatory rules and market structures were revised in many areas of the country to create more competitive power markets at the wholesale level. This has increased demand for use of the transmission grid. In order to build the system to better meet current and future demand, to alleviate congestion, and to reinforce system reliability, electric utilities have earmarked billions of additional dollars for investment in the coming decade.

As illustrated in Figure 6, investment in transmission has increased 116 percent since 1999, and electric utilities are planning to invest an additional \$18.5 billion through 2008 on transmission infrastructure—a 25-percent increase over the previous three years.

#### Environmental Compliance Costs Are Significant

Still another major financial challenge looms for the electric utility industry—the massive price tag for compliance with environmental regulations. All electric utilities are subject to literally hundreds of environmental rules, including dozens of federal and state air and water quality requirements created in the wake of the Clean Air Act and Clean Water Act.

The combined impact of these regulations—and newer regulations—is the annual expenditure of billions of dollars to help ensure protection of the air, land, and water. From 2002-2005, the electric utility industry as a whole spent \$24 billion on compliance with federal environmental laws; state and local rules drive that total even higher.

Electric utilities are more than ready to do their share to help preserve and improve our nation's environmental quality, and the evidence is there to support that. As illustrated in Figure 7, since 1980, air quality in the United States has improved dramatically, and emissions of nitrogen oxides (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>) have fallen significantly—all during a time in which demand for electricity increased.

But the costs associated with continuous environmental improvements are significant. For example, according to the U.S. Environmental Protection Agency, complying with two new federal regulations—the Clean Air Interstate Rule and the Clean Air Mercury Rule, which are aimed at further reducing power plant emissions of  $NO_x$ ,  $SO_2$ , and mercury—will cost the electric utility industry \$47.8 billion between the years 2007 to 2025.<sup>5</sup> As utilities enter another phase of emissions reductions, those costs will be reflected in customers' electric bills and must be borne equitably by all customers on the system.

Source: Edison Electric Institute

#### Figure 7: Power Plants Reduce Emissions Despite Increasing Electricity Demand 1980-2004



## Price Caps Set During Industry Restructuring Are Expiring

A major shift in the utility landscape began in the mid-1990s, as a number of states, especially those in the Northeast, Mid-Atlantic region, and the Midwest, along with California, moved to restructure portions of the retail electricity industry. Aiming to lower costs by stimulating competitive markets for the generation portion of customers' bills, these states moved away from the traditional model in which state regulators set the retail prices for power.

Today, 19 states and the District of Columbia have adopted programs for retail electric competition. One prominent hallmark of nearly every state that adopted such markets was this—as part of the gradual transition to competition, state policymakers decreed that customers' bills would be frozen, and in many cases reduced, typically for a period ranging from two to ten years. The first rate caps were put in place in 1997, and the last are set to expire in 2011.

Beginning in 2004, many of those rate freezes and reductions began to be phased out. The result is that many customers now perceive that their rates are being "increased," when in fact they are gradually reflecting the costs already incurred by utilities.

### What Steps Are Electric Utilities Taking to Help Control Rising Prices?

Over the past decade, the electric utility industry has focused on improving the operations of its baseload generating fleet. Since 1995, coal and nuclear generation capacity factors—a measure of plant productivity—have increased by 15 and 17 percent respectively. Over the same period of time, operations and maintenance (O&M) costs have decreased by 17 percent for existing coal-based generators and 30 percent for nuclear generating units.

To help their customers manage their electricity costs and use energy wisely, electric utilities have taken a leading role in developing energy efficiency and demand response programs for residential, commercial, and industrial customers. Between 1989 and 2004, electric utility efficiency programs saved about 736 billion kilowatt-hours of electricity. That is enough electricity to power nearly 68 million average U.S. homes for one year. [To learn more about electric utility programs and incentives to improve energy efficiency and reduce energy, visit www.eei.org/wiseuse.]

Efforts like these have been, and will continue to be, key factors in helping to mitigate rising fuel costs and the need for new infrastructure investments.

<sup>&</sup>lt;sup>5</sup> U.S. Environmental Protection Agency, Office of Air and Radiation, October 2005.

### **Investing in America's Electric Future**

Capital-intensive industries, such as the electric utility industry, often experience cycles of growth in which investments are made in new equipment and new facilities to meet current and future demand. Research shows that new capital investment, which tends to increase retail prices initially, will result in more stable prices in the future.

Electricity prices nationwide remained relatively stable from 1990 to 2000. Since 2000, utility operating costs have increased as utilities confront higher fuel costs and make investments in infrastructure and environmental improvements. Today, electric utilities are entering a new cycle of growth and investment, and a new era of ratemaking.

Clearly, electricity is an indispensable commodity that is crucial to our daily lives and to our nation's continued economic growth. And the costs needed to reinforce the nation's electric power system are worthy long-term investments. The bottom line is that we are living in a rising cost environment, and electricity prices have been a great deal for many years. Even with expected rate increases, electricity prices are projected to remain below the rate trends of other goods and services. In fact, the national average price for electricity today is significantly less than what it was in 1980, adjusted for inflation.

Of course, that is small comfort to customers who will be opening costlier electric bills in the coming months. And no one—utility, regulator, or customer—is eager to see electricity prices increase. The unavoidable reality, however, is that we all must address the fact that in order to ensure that electricity remains affordable and reliable, we must help shoulder the expense of reinforcing and upgrading our electricity infrastructure. It is the only way to be certain that electricity will be there when we need it, and at a price we can afford over the long term.



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