

Understanding California's Electricity Prices

Executive Summary

Most industry experts predict that average electricity prices throughout the U.S. will increase significantly over the next decade. Californians in particular should expect to see high price increases, averaging 5-7% per year, given stronger environmental legislation and historical underinvestment. Consequently, businesses should proactively manage future energy costs.

In order to better manage these costs, managers must first understand the key indicators and drivers for California electricity rates. These include:

- **Historical trends point to steep rate increases over time** - In California commercial rates have increased 6-8% annually since 2000 and approximately 7.5% in 2008. If the current trends continue, prices are projected to increase by similar amounts in the next decade.
- **Infrastructure** - Over the next 10 years, over \$7 billion dollars will need to be injected into the grid to upgrade existing infrastructure and accommodate new capacity and Smart Grid requirements. This will result in 2-2.5% annual rate increases over the next 10 years.
- **Fuel costs** - Fuel costs (e.g., natural gas) are projected to double by 2020, which translates to a 1.5-2% annual increase in average retail electricity prices.
- **Climate change** - The approval of 33% Renewable Portfolio Standard in California will likely increase average electricity rates 2-2.5% annually until 2020.

"Today's energy markets are more volatile than ever. The days of cheap power are now a distant memory and all businesses must learn to not only adjust, but survive, in this type of purchasing environment."

– Richard Soultanian, co-president of the NUS Consulting Group¹

¹ "Annual Utility Cost Survey", NUS Consulting, May 2008, www.nusconsulting.com

Introduction

While most businesses explicitly track labor and raw material costs, not many know their cost of electricity or how much it increases year to year. However, in the past decade electricity rates have skyrocketed as rising costs coupled with new regulations forced utilities to charge customers higher rates. In fact, these forces drove California electricity prices to increase more than 45 percent since 2000².

In this paper we explore recent trends and forecasts for average retail and commercial electricity prices in California. More importantly, we discuss the main drivers for future increases including:

- Infrastructure investment
- Fuel costs
- Climate change legislation

Overall, the key message for business leaders is that it is no longer prudent to assume that electricity will be consistently cheap or reliable. The drivers listed above indicate that, on average, California electricity rates will rise by 5 to 7 percent annually until 2020, making energy cost management an inevitable part of future business operations.

Electricity prices outpaced inflation since the 1970s

Average retail electricity prices across the nation have increased significantly since the 1970s and particularly since 1999 (see chart³). According to the U.S. Energy Information Administration (EIA), the average U.S. retail price of electricity increased more than 85% over the past 25 years and over 8 percent during the first quarter of 2009 compared to the first quarter of 2008. Moreover, large states such as New York and California saw prices increase at an even faster rate, causing concern for residential and business customers alike.

In California, power prices rose sharply after the electricity crisis in 2001 and have been rising steadily ever since. According to the California Public Utility Commission (CPUC), average prices for Pacific Gas & Electric (PG&E) and Southern California Edison's (SCE) customers have increased 44 to 65 percent since 2000. This translates to average rate increases of nearly 6 percent annually.⁴ Since the 1970s, California customers have also experienced two energy crises: the 1970s fuel crisis and the California electricity crisis of 2001. As a result of these crises, rates jumped up to 30% at certain points, but price decreases have never totaled more than 7%.

² EIA. "Annual Energy Outlook 2009." April 2009, <http://www.eia.doe.gov/oiaf/aeo/>

³ "Utilities Seek Round of Rate Increases." *Wall Street Journal* November 27, 2009.

⁴ CPUC, Electricity Rate Charts and Tables 2000-2009, http://www.cpuc.ca.gov/PUC/energy/Electric+Rates/ENGRD/ratesNCharts_elect.htm

Price increases for California businesses have been particularly sharp. Since 2000, commercial and industrial rates in California have escalated 6 to 8 percent annually and close to 7.5 percent since March 2008. Moreover, regulatory bodies periodically approve emergency rate hikes to help California utilities meet their revenue requirements. In August 2008, the Federal Energy Regulatory Commission (FERC) authorized San Diego Gas & Electric (SDG&E) to increase average rates 2.7 percent above and beyond rate increases originally approved by the CPUC⁵. As a result, SDG&E commercial customers saw rates rise more than 7 percent over a few months.

Based on historical trends and current market forces, most industry experts predict that average electricity prices throughout the U.S. will continue to increase rapidly. Californians in particular should expect to see even higher price increases during the same timeframe given stricter environmental regulations. In both cases, electricity prices will certainly outpace inflation and may reach 7 percent annually.

Infrastructure: Capital Costs Continue to Rise



Capital costs related to improving the grid play a key role in determining retail electricity prices. During the 1970s, 80s and 90s, national investment in transmission and distribution infrastructure dropped substantially. The Department of Energy (DOE) reported that as electricity demand increased 50 percent from the 1970s to the 1990s, annual investment in new transmission capacity fell from \$5.5 billion to less than \$3 billion.⁶ Because of this underinvestment, the North American Electricity Reliability Corporation (NERC) states that demand for transmission capacity will exceed supply starting in 2013.⁷

To compensate for decades of underinvestment, utilities have started reinvesting in core infrastructure. The Edison Electric Institute (EEI) estimates that over the next 20 years, the U.S. electric utility industry will need to spend “between \$1.5 trillion and \$2 trillion dollars” on these types of capital projects. Experts at the California Independent Service Operator (CA ISO) and the California Energy Commission (CEC) project that California

⁵ “San Diego Gas & Electric Rate Hike,” *Union Tribune*, August 13, 2008.

⁶ “Why Are Electricity Prices Increasing?” The Edison Foundation, June 2006.

⁷ “NERC 2007 Long-Term Reliability Assessment,” NERC, October 2007.

utilities will need to spend close to \$5 billion to update the current system and another \$2.6 billion to accommodate additional capacity being built to meet current demand for electricity.⁸⁹ Furthermore, California utilities predict that upwards of a quarter trillion dollars are needed to make the current system “smart” by incorporating smart grid technology to achieve current environmental standards.

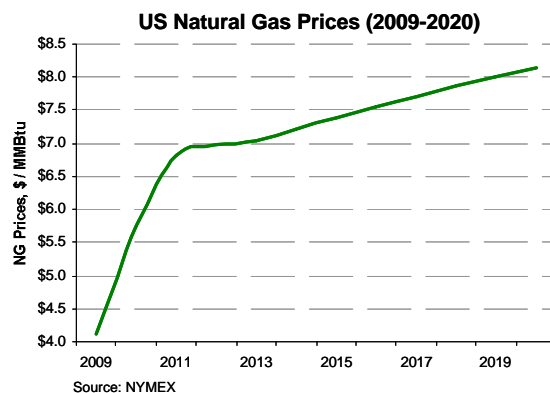
Moreover, construction and land costs have risen over the past five years, making infrastructure investments more costly. According to Edison Electric Group, utility construction costs have increased from 25 to 100 percent since 2000.¹⁰ In 2008, Southern California Edison (SCE) began building a 25.6-mile, 500 kV transmission line between its Antelope and Pardee substations. Initial cost estimates for were \$80.3 million, however rising prices forced SCE to increase cost projections 15% to \$92.5 million, or more than \$3.5 million per mile.¹¹

A November 2009 Wall Street Journal article titled “Utilities Seek Round of Rate Increases” illustrates the trend of rising infrastructure costs. The article states that “fuel costs are [currently] low but utilities are investing more money in their networks” and describes coming 2010 rate increases of 5 – 8 percent in many U.S. utilities.¹²

Utilities will continue to face pressure to fund capital improvements, and these investments will be recovered through higher rates. Capital improvements are expected to raise retail electricity rates 2 to 2.5 percent annually for the next 10 years. However, as California customers become more energy efficient, these fixed costs will be spread over fewer total kilowatt hours (kWh), resulting in higher still increases.

Fuel costs to increase 2X by 2020

The electric utility industry is the largest consumer of coal and natural gas in the U.S and the cost of these fuels help drive retail electricity prices across the U.S. Nearly 50 percent of the nation’s energy is produced using coal, and when coal prices increased over 25% in 2008, utilities saw their generation costs soar¹³. Going forward, both the financial markets and the EIA estimate that natural gas prices will double over the next



decade as a result of 30 percent higher demand.¹⁴ In addition, natural gas prices might even surpass current projected levels if climate change legislation forces domestic generators to switch from coal to cleaner substitutes such as natural gas.¹⁵

⁸ “CAL ISO Report on Preliminary Renewable Transmission Plans,” CAL ISO, August 2008. <http://www.caiso.com/2007/2007d75567610.pdf>

⁹ “Transforming America’s Power Industry,” The Brattle Group, November 2008.

¹⁰ “Rising Utility Construction Costs: Sources and Impacts,” Edison Electric Group, September 2007.

¹¹ Ibid

¹² “Utilities Seek Round of Rate Increases.” *Wall Street Journal* November 27, 2009.

¹³ “Coal prices surge to record high,” BBC News, February 4, 2008

¹⁴ “Natural Gas Price Forecast and Uncertainty,” Working paper presented by Ruben Tavares at the *Joint IEPR and Electricity & Natural Gas Committee Workshop*, June 2009.

¹⁵ Interviews with National Renewable Energy Lab researchers, LBNL, June 2009.

In California, natural gas-powered generation dominates, but only 13 percent of natural gas is supplied in state and that number is falling.¹⁶ Consequently, California utilities are openly exposed to market price volatility. For example, gas prices more than quadrupled in 2001 causing California utilities to spend nearly \$19 billion on natural gas - twice as much as in normal years. Six months later electricity rates skyrocketed 29 percent and never returned to pre-2001 levels.

As a result, the California Energy Commission estimates that “doubling of natural gas prices increases average electricity rates by about 3.5 cents/kWh [over 2008 prices].”¹⁷ Given future price levels and inflation estimates, this equates to rate increases of 1.5 to 2 percent annually from rising fuel prices alone.

Impact of Climate Change

Today, Congress and the President are considering sweeping climate change legislation. Bills under discussion aim to implement national energy programs such as the low carbon fuel standard for motor vehicles in addition to a carbon cap and trade program aimed at limiting total emissions of greenhouse gases. If passed, both Republicans and Democrats agree that the bill will have an immediate impact on energy costs, including raising electricity prices somewhere between 35 to 90 percent over the 2035 baseline price.¹⁸ Cambridge Research Associates International, an independent energy consultancy, published a study in January 2008 forecasting a 50% increase in electricity prices above business-as-usual due to carbon caps.¹⁹ However, even if weaker standards are set, industry experts predict that climate change legislation will cause electricity rates to increase anywhere from 1 to 3 percent annually *over and above* current forecasts.²⁰

California passed its own climate emissions bill, AB 32, in August 2006. The law calls for a 10% reduction of greenhouse gases and places strict regulations on power plant emissions. To comply with these regulations, generators must make expensive improvements or pay penalties, which in turn make power more costly.²¹ Furthermore, Governor Schwarzenegger issued an executive order to revise the current Renewable Portfolio Standard (RPS) and require Californian utilities to source 33 percent of their power from renewable sources by 2020. Like AB 32, this law is expected to cause retail electricity rates to increase significantly. According to a California CPUC report published in June 2009, inflation-adjusted electricity rates will increase 5.0 to 6.5 percent above current baseline projections to meet California’s clean energy requirements.²²

¹⁶ Natural Gas Price Forecast and Uncertainty,” Working paper presented by Ruben Tavares at the *Joint IEPR and Electricity & Natural Gas Committee Workshop*, June 2009.

¹⁷ CEC Natural Gas Assessment, California Energy Commission, November 2008.

¹⁸ Heritage Foundation Report on Waxman-Markey Bill, Heritage Foundation, June 2009; “Preliminary Analysis of the Waxman-Markey Discussion Draft,” EPA, June 2009.

¹⁹ “Managing the Risks of Greenhouse Gas Policies,” CRA International. January 2008.

²⁰ Heritage Foundation Report on Waxman-Markey Bill, Heritage Foundation, June 2009; “Preliminary Analysis of the Waxman-Markey Discussion Draft,” EPA, June 2009.

²¹ Interview with Catherin Wolfram, PhD., UC Energy Institute, July 2009.

²² “RPS Implementation Report”, CPUC, June 2009.

Conclusion

Energy prices have risen steadily over the past twenty years, and historical increases are likely to continue, driven by three structural forces:

- Infrastructure upgrades: 2-2.5% annual increase
- Fuel cost increases: 1.5-2% annual increase
- Climate change legislation: 2-2.5% annual increase

The combination of these factors makes it highly likely that electricity costs will be a major concern for California businesses over the next decade. Business leaders should consider this important trend in their strategic planning.

Supplemental Resources

- CPUC RPS Implementation Report (June 2009) - <http://www.cpuc.ca.gov/NR/rdonlyres/1865C207-FEB5-43CF-99EB-A212B78467F6/0/33PercentRPSImplementationAnalysisInterimReport.pdf>
- EIA Annual Energy Outlook (April 2009) - <http://www.eia.doe.gov/oiaf/aeo/index.html>
- EPA Economic Analysis of “The American Clean Energy and Security Act” (June 2009) - http://energycommerce.house.gov/index.php?option=com_content&view=article&id=1685:epa-releases-analysis-of-american-clean-energy-and-security-act&catid=122:media-advisories&Itemid=55
- Heritage Foundation Report on Waxman-Markey Bill (June 2009) <http://www.heritage.org/Research/EnergyandEnvironment/wm2450.cfm>