

Electricity Conservation – Can It Work?

Introduction

For many people, the word conservation brings back memories of President Jimmy Carter delivering a policy address in a sweater and asking Americans to “conserve more”, or Vice President Dick Cheney demeaning conservation as a “personal virtue”. Or perhaps it brings to mind the best (or worst) aspects of environmental protection. However, if the politically-charged associations with the word “conservation” are left aside, and we examine what is meant by “conservation” purely in a pragmatic fashion, we can better understand if it might be a solution to our troubling energy issues. In fact, since the first oil shocks in 1973, conservation has “worked” remarkably well with few government programs or incentives, and the United States uses energy nearly twice as efficiently in 2005 as in 1973.¹

As electricity cost and usage increases, consumers are becoming more aware that long-term thinking and strategic planning about their energy future can provide the best possible outcome to their electricity needs. A combination of electric utility incentives, government initiatives, and minor changes to consumer behavior can produce the best possible outcome for consumers - continual supply at reasonable prices without unnecessary or unwise investments in electricity infrastructure.

A Pragmatic Approach

The most practical way to view conservation is in a purely economic fashion – what is the cost of conserving a resource versus the cost of using more of a resource to achieve the same economic outcome? Such a definition eliminates any political bias we or others may have, and results in the most efficiency in the economy. Consumers are doing this analysis now as they decide whether to switch from sport utility vehicles (SUV) to cars as gas prices rise – they ask “would I rather keep the SUV and pay more for gas, or get from point A to B in a car and pay less for gas”. The consumer who switched made a choice to conserve the resource (gasoline) to achieve the same outcome (getting from point A to point B).

Conservation – Not to Be Confused with the Stone Age

Those who profit from selling more of a certain product are understandably upset when someone advocates using less of that product. However, the consumer of that product is usually quite happy using less and paying less, especially if they can conserve and not notice a difference in their lifestyle. Such is the case with the energy and electricity industry. Those who produce, transport, or sell the energy or electricity to consumers make more money when they sell more energy or electricity, and tend to be the first to try to convince consumers that “conservation means colder, darker houses” or “a lower standard of living”. However, nothing could be further from the truth. Conservation is a “win-win” for the consumer. In fact, the US Energy Information Agency reports that in

¹ As measured by energy intensity in the US Department of Energy Energy Information Agency 2007 Annual Outlook.

2005, electric utility demand side management programs saved 60 billion kWh (kilowatt hours) at a cost of a little more than 3 cents/kWh and reduced peak demand by 25.7 Gigawatts.² Three cents/kWh is a very good price for electricity, and a 25.7 GW reduction in peak demand means not having to build 100 medium-sized power plants and the associated transmission infrastructure.

Types of Conservation

There are several ways that electricity can be conserved. Most require a reduction of electricity use, but some merely shift electricity demand from one time period to another. The components are as follows:

- Energy Efficiency
- Reduction of Peak Electrical Demand
- Elimination of Waste
- Understanding of Electricity Cost through Smart Metering
- Utility De-Coupling

Energy efficiency is relatively straightforward – make something do the same thing as before while using less energy. Refrigerators today use less than half the electricity as compared to 20 years ago, yet they are just as big and with more bells and whistles than 20 years ago. Compact fluorescent light bulbs produce the same soft-white light as standard incandescent light bulbs, but use 1/4 the energy.

If you think of the electrical transmission system as a highway, there are “rush hours” where there is a lot of traffic, and slower periods where there are very few cars on the road. Summertime (mid-June through August) represent the months of peak electrical usage, and the afternoon and evening hours represent times of peak demand in any given day. By reducing demand during the electrical “rush hours”, we won’t need to build as many new high voltage transmission lines or generation plants. That reduces costs to utilities, which in turn should reduce the rates consumers pay. This is the concept behind ***reduction of peak demand***.

The very fact that electricity is inexpensive may lead us to use more than necessary. However, when we consider the other costs of electricity generation (safety and waste management at nuclear power plants, mercury and other toxic emissions from fossil-fueled generators, carbon dioxide emissions) and the costs of transmission (unsightly and dangerous high voltage power lines near our homes), then it is easy to see that ***eliminating waste*** of electricity is a good thing.

Electric utilities, since they make more money the more electricity they sell, are really not that interested in helping you understand how much your power costs. Oftentimes, consumers are charged a “variable” electric rate with higher rates being charged during times of peak demand. If consumers knew what it cost in dollars to run a dishwasher or hot

² US Energy Information Agency, Figure 8.13 Electric Utility Demand-Side Management Programs, http://www.eia.doe.gov/aer/pdf/pages/sec8_48.pdf

water heater at a certain time, they would probably wait until a much less-expensive “off-peak” time to use that electricity. This is what *smart metering* accomplishes.

Many of these strategies have recently been adopted at the National level or are being strongly considered at the local or New York State level. For instance, the Energy Star program run by the Federal government has achieved significant energy use reductions since it was first implemented, reducing electricity demand 5% in 2006 alone (more than 170 billion kWh) and on track for a 10% demand reduction within 10 years.³ Recently, the US Congress passed the Energy Independence and Security Act of 2007 that will increase energy savings in buildings, lighting, and appliances. New York City has already committed to spending 10% of its energy budget each year on efficiency improvements in city buildings, and is also planning a wide variety of efficiency standards and improvements, including mandating real-time electricity cost feedback to consumers so that consumers can make wise choices about how and when they use electricity.⁴ Lastly, allowing a utility to profit by decreasing use of electricity is the most important policy change of all. This is called *utility de-coupling*, and it relies on the simple idea of allowing a utility to make the best return on their investment, whether it is selling additional power or reducing demand. Good utility de-coupling programs allow all of the above strategies to reduce electricity demand and lessen the need for new electrical generation and transmission infrastructure.

Conservation Sounds Great – Can it Work?

The answer is a resounding “yes”. The right policies implemented at a national, state, and local level can reduce electrical demand and costs to consumers and maintain standards of living. This electrical demand reduction can be achieved more cost-effectively than building more power plants and transmission lines, typically saving consumers \$2 for every \$1 spent on demand reduction.⁵ There are two excellent examples of good public policy, utility, and citizen involvement in conservation having a real, lasting effect on demand. They are as follows:

- **California Electricity Demand since 1980** - In 1980, California electricity consumption per person was just over 7000 kWh/year. By 2006, electricity consumption had grown only 4.4% in 26 years, an amazing achievement. Even more amazing was that consumption had dropped 5.7% from 2000 levels. Demand is estimated to stay flat through 2018.⁶ How did California accomplish such a feat? By placing energy efficiency at the top of the state’s “procurement” priorities, setting aggressive long-term goals for energy efficiency, and enlisting

3 http://www.energystar.gov/ia/partners/pt_awards/2006_Achievements_Overview.pdf

4 PlaNYC, <http://www.nyc.gov/html/planyc2030/html/plan/plan.shtml>

5 New York Times, May 29, 2007, “Efficiency, Not Just Alternatives, Is Promoted as an Energy Saver”.

<http://www.nytimes.com/2007/05/29/business/29efficient.html?pagewanted=1&ei=5088&en=db877241fb06a010&ex=1338091200>

6 California Energy Commission “California Energy Demand 2008-2018 Staff Revised Forecast”
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utilities as partners in reducing demand.⁷ These efforts have saved more than 40,000 gigawatthours (GWh) of electricity and 12,000 megawatts (MW) of peak demand, avoiding the need to build 24 large (i.e., 500 MW) power plants, and equal to the energy required to power 3.8 million homes.⁸

- **New York City Water Demand since 1980** – In 1980, water usage in New York City was at an all-time high, peaking at 1.512 billion gallons/day. Yet, by 2006, water usage was only 1.086 billion gallons/day despite a population gain of 1.1 million people (a per capita reduction of 38%), yet, except for a memorable Seinfeld episode, no one in New York City is complaining about a lack of water. How was this achieved? New York City policies that mandated water saving fixtures, smarter metering, and good maintenance solved the problem at a much lower cost to the consumer than infrastructure development.

Conclusion

Conservation is an effective method to stabilize or reduce electricity demand, and is much more cost-effective than “business as usual” policies of building more electrical generation plants and transmission lines. Studies have shown that consumers gain \$2 for every \$1 spent on electricity demand reduction while maintaining standards of living and eliminating the negative side effects of more electrical generation and transmission infrastructure (toxic emissions, pollution, reduced property values, visual blight). Electrical utilities are important partners in demand reduction, and are often allies with consumers in wanting to avoid unnecessary and unwise investments in generating plants and transmission lines.

7 California Public Utilities Commission and California Energy Commission, “Energy Efficiency, California’s Highest Priority Resource”

http://www.energetics.com/electricity_forum_2007/pdfs/CPUC_calif_cleanenergy508.pdf

8 Ibid