

The American Clean Energy & Security Act and Its Impact on Energy Prices

- Energy Price Forecasts
- Cap and Trade
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- Demand Management

With ongoing debate in Washington, D.C. over the future of America's energy supply, most agree that no matter what happens, electricity costs will continue to rise. With the combined rising costs of energy and planned legislation, including "Cap and Trade," one thing that retailers can count on is increased operational pressure to reduce and manage electricity usage like never before.

Overview

The American Clean Energy and Security Act is poised to revolutionize the way American business looks at energy. By implementing a “Cap and Trade” market for higher polluting industries, energy costs are expected to increase dramatically over the next two decades, according to data from the Energy Information Administration (EIA) and as evidenced by activities in California. This document explains how the energy market is expected to evolve, as well as introduces some of the technologies that can mitigate the impact of rising energy costs on retailers.

American Clean Energy and Security Act

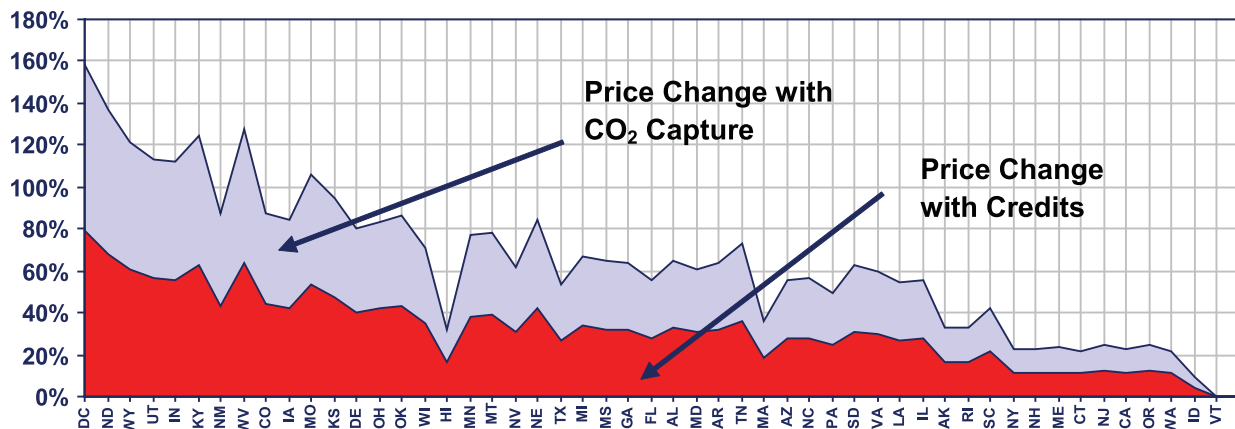
Sponsored by U.S. Representatives Henry Waxman (D-Calif) and Ed Markey (D-Mass.), the American Clean Energy and Security Act (ACESA) includes higher energy efficiency standards and emission reduction requirements. It is intended to be a comprehensive reform of the American energy market. If this bill is signed into law, starting in 2012, the federal government would begin phasing in a “cap” on emissions of greenhouse gases, and would require high-emitting industries to reduce their output to specific targets between now and the middle of the century.

The bill covers an estimated 85 percent of the overall economy, including electricity producers, natural gas suppliers, and energy-intensive industries, including supermarkets, convenience stores, and box retail operators.

More than simply restricting greenhouse gas emissions and creating a Cap and Trade market, the bill would direct an estimated \$190 billion to energy technologies and efficiency measures by 2025. While these technologies may include carbon capture, advanced automotive technologies, and scientific research, approximately \$90 billion is expected to be directed towards renewable energy sources and technologies. The federal government would initially allocate carbon offset credits to regulated companies without cost, based upon their current level of emission. Once the initial distribution has taken place, these credits may be traded or purchased from private parties at a rate determined by the free market. This is the essence of the “Cap and Trade” market that is expected to emerge. It is estimated that up to 2 billion tons of CO₂ per year may be offset through these credits.

Should a company not reduce their emissions by the required amount, and not purchase sufficient credits, a penalty equal to double the fair market value of the necessary credits would be assessed by the government.

Figure 2
Estimated energy price increases Source: FERC

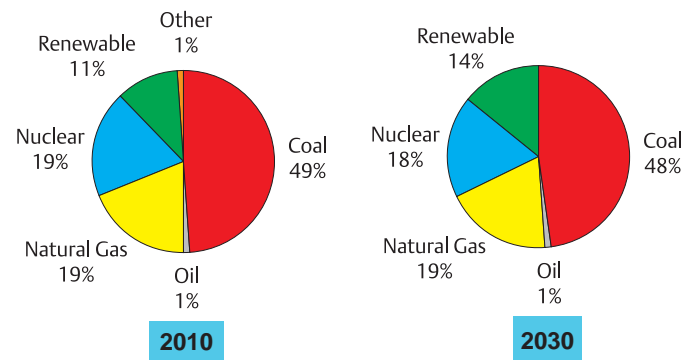


Energy Sources

The United States has long been reliant on coal technologies for electricity generation. Accounting for nearly 50% of electricity generation in 2006 (Figure 1), the Federal Energy Regulatory Commission (FERC) expects coal production to decrease only slightly in the next 25 years. As the power generation technology that emits the largest amount of greenhouse gasses, coal power will be affected significantly by ACESA.

As mentioned previously, ACESA will direct billions of dollars toward the development of renewable energy sources in the coming years. However, the FERC does not expect this to result in a significant increase in overall renewable energy production, growing to only 14% of the total American energy production by 2030.

Figure 1
Even with increased renewable energy sources, coal will remain the primary energy source for the next 20 years.
Source: FERC



Energy Prices

Given the proposed emission reduction targets, coal power plants will need to invest in either carbon sequestration technologies or sufficient credits to offset their greenhouse gas emission. As of April 2009, the EIA reported the national average commercial electricity rate was 9.99 cents per kWh. With the added costs of carbon sequestration technology, some industry sources have estimated production costs to be as much as 160% greater than current levels (Figure 2). Alternatively, industry sources estimate purchasing offset credits could increase kWh prices by as much as 80%. In all scenarios, experts believe the cost of electricity will increase considerably for commercial users. This increase would

undoubtedly put additional strain on supermarket and box retailers who already operate on narrow margins.

Although nearly all states have some renewable energy generation capabilities (Figure 3), many states are almost completely reliant on coal technologies. It is expected that energy prices in these states will see particularly large increases over the next 7-10 years.

Energy Reduction Strategies

With electricity costs expected to increase, one of the best strategies to mitigate their effect is to simply use less energy. Several technologies are available today, which help retailers reduce energy usage including demand management, demand response, and energy monitoring and targeting.

Demand Management

Demand management is the practice of voluntarily and proactively reducing a facility’s electrical usage so it does not exceed a desired limit. To practice demand management, retailers employ a facility management system that monitors a store’s power usage, continuously comparing it against the pre-determined limit. If the facility management system anticipates that the facility’s power usage will exceed the allowable maximum, it begins a load shedding routine designed to reduce the facility’s electrical demand.

Although this load shedding routine may vary with each retailer and facility, it often includes relaxing environmental and equipment setpoints as well as temporarily deactivating non-critical equipment. Developed in the 1990’s, and commonly used in large commercial buildings, this critical power management strategy can virtually ensure facilities keep their power usage at an acceptable level.

This strategy is ideal for stores that have the ability to generate power onsite, via generators, wind turbines, or solar arrays. If the facility management system estimates that power demand will exceed the preset maximum limit, these power generation sources could be engaged to reduce the amount of power required from the utility. Not only does this reduce peak demand charges, but total kilowatt hour usage will also be reduced.

Demand Response

Demand response is different from demand management in that load reductions are initiated by a utility, to create additional capacity on the grid. Although programs vary within each utility and service area, many electricity providers offer voluntary demand response programs for their commercial customers. In these programs, the retailer agrees to reduce their electrical demand by a preset amount upon request from the utility, typically receiving incentives and rebates to do so. The utility will only issue such a request if they foresee an extremely high demand period that they will have trouble satisfying in a cost-effective manner. Requiring more than a simple black box without any true control algorithms, demand response programs require facility management systems with the ability to relax setpoints and gradually cycle non-critical equipment to reduce a specific amount of power without adversely affecting retail operations.

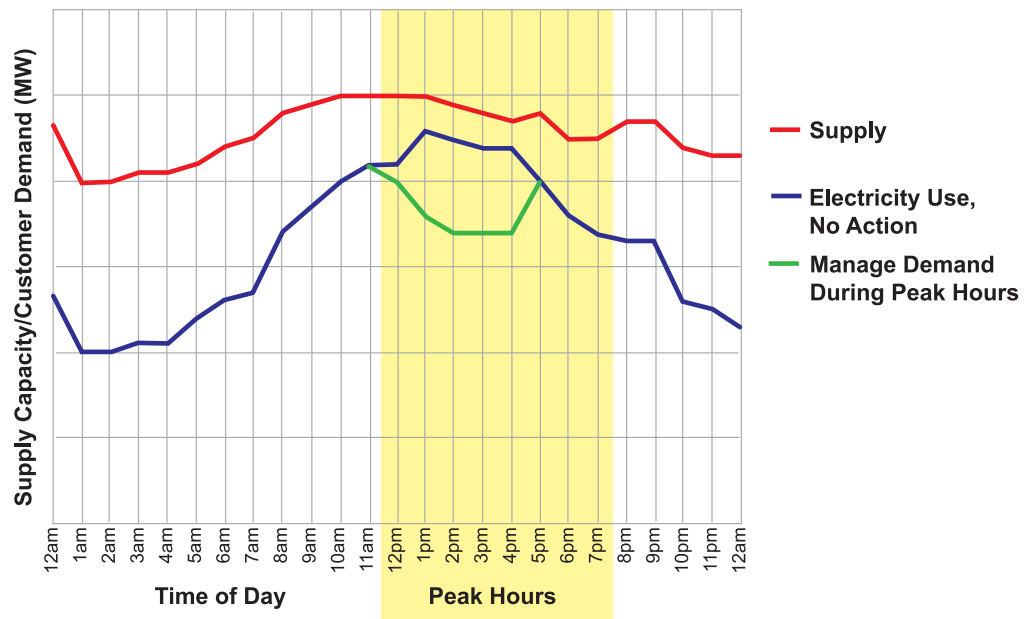
Utilities typically offer an annual credit ranging from \$620 to \$3,000 per site for participation. Incentives are often available for facility management systems as well. Practically speaking, most retailers will need to share a portion of this credit with a Curtailment Service Provider (CSP), however it is possible for a retailer to act as their own CSP. As energy costs increase, the incentive for energy reductions will help drive these programs.

Monitoring & Targeting

Already mandated for all public buildings in Europe, and currently required for all LEED® certified facilities, monitoring and targeting software will become more commonplace over the next 20 years. Energy monitoring and targeting software enables retail operators to receive power usage information from sites across an enterprise, enabling reporting and data analysis. Should a store use more energy than desired or exhibit unusual behavior, an alarm can be issued via e-mail. Since this monitoring and alarming occurs in real-time, operators are able to quickly respond to issues, often before they result in costly demand charges. More importantly, operational profiles and benchmarks may be created from either top performing locations or an ideal set of performance metrics.

Comparing particular stores against the benchmark enables operators to identify and target their worst performing locations, so actions are quickly taken to improve their performance. Various

Figure 3
Demand response programs lower power usage in periods of high consumption
Source: Flex Your Power



reports may also be created to monitor desired activity or targeted sites. Automatically generating these reports helps retailers ensure operational costs decrease and stay low. Users of this software report that the visibility of consolidated information and the benefits of targeting poorly performing stores have enabled them to reduce their energy costs by as much as 10%.

Dynamic Pricing

Energy pricing is highly volatile, changing almost constantly. Already commonplace in industrial applications, retailers will soon have the ability to monitor and track pricing in real-time via a network connection and specialized software. As prices increase above a desired price per kWh, a retail operator may elect to voluntarily shed non-critical electrical loads or opt for less expensive power sources or a combination of the two strategies.

If a retailer operates solar panels or a generator on site, they may elect to begin producing supplemental power, thus reducing their own need for power from the utility. The retailer will then get a credit for the power that was either shed or produced. Activities such as monitoring, voluntary shedding, and site-level demand offsetting as pricing changes with time will become commonplace, as the software becomes more prevalent and utilities open market pricing to all commercial customers.

In order to take advantage of this, a sophisticated control and information architecture must be in place so that control may be maintained while decisions are made in real-time. Once dynamic pricing strategies are identified, simple on/off practices are no longer adequate, as a retailer must take information from the site, combine that with utility data, automate the transfer, and monitor progress.

Emerson Can Help

Emerson's Intelligent Store™ architecture enables retailers to monitor energy usage across an enterprise, gaining succinct, actionable information that enables them to reduce their energy costs without compromising perishable product quality. With the ProAct™ software suite, power usage is monitored in real-time, retailers may profile or benchmark sites, and alarms may be generated when power consumption is above a desired threshold. The E2 Facility Management System forms the core of all store operations, controlling refrigeration, HVAC, and lighting systems, and enabling store level data to be accessed anywhere across the enterprise, including energy usage

For more than 20 years, Emerson has been at the forefront of developing new energy saving technologies for the retail market. Offering state-of-the-art facility design and valuable programs as turnkey project management, and E-Commissioning™, Emerson's retail customers include some of the leading supermarket, box retail, convenience, and drugstore chains in North America, Australia, South America, Europe and Asia. Retail Solutions is headquartered in Atlanta, Georgia. For more information, visit www.EmersonRetailSolutions.com.

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