

ENERGY

What is demand response?



Environmental Defense Fund (EDF) is working to propel the widespread adoption of demand response—an invaluable component of the smart grid that helps utilities, homes, and businesses financially benefit from conserving electricity. Demand response (DR) relies on people, not power plants, to meet electrical demand. It is an innovative tool used by utilities to reward people who use less electricity during times of peak, or high, energy demand, when power plants are pushed to their limits and struggle to supply enough electricity. Demand response also encourages people to shift their energy use to times of day when there is less demand on the power grid or when more renewable energy is abundant. These voluntary, temporary reductions or shifts in energy use empower participants to lower their electricity bills, improve air quality, and enhance electric grid reliability. Furthermore, demand response can lead to a more competitive and economically efficient electric market.

“Demand response is clearly the ‘killer application’ for the smart grid.”⁴

—Jon Wellinghoff,
 former FERC Chairman

As utilities invest around two trillion dollars over the next twenty years to modernize our century-old electric grid¹, clean technology will play a larger role in deciding how power is produced and used, and energy consumers will play a larger role in the clean energy revolution. As of 2012, nearly 72,000 megawatts (MW)² of demand response—equivalent to the power generated by roughly 144 coal power plants—were active and online across the country, but there is a much greater potential that has yet to be tapped.

Customer benefits

With the emergence of smart phones and smart thermostats, residential and small business owners can now take greater control over their energy use and lower their electricity bills through demand response. PJM Interconnection, the power grid in thirteen states surrounding Pennsylvania, launched a demand response program that is expected to pay participants

more than \$300 million in 2014/15, in addition to the \$1.2 billion they have already received through savings.³ PJM’s model to financially reward customers for reducing and shifting energy use to times of the day when the grid is less strained can be replicated across the country to lower electricity bills for consumers.

Successful demand response programs allow participants to:

- Respond to the request using automated, set-it-and-forget-it settings or decline the request altogether
- Save money by reducing non-essential energy use or shifting it to less expensive, non-peak times of the day when cleaner, cheaper renewable resources are abundant
- Potentially earn compensation for providing a net-gain in electricity to the power grid

¹ http://www.smartgridnews.com/artman/uploads/1/Transforming_Americas_Power_Industry_1.pdf

² <http://www.ferc.gov/legal/staff-reports/12-20-12-demand-response.pdf>

³ <http://spark.fortnightly.com/fortnightly/smoke?page=0%2C1>

⁴ <http://www.energyconnectinc.com/news/blogconnect/2008/12/ferc-report-marks-significant-progress-in-demand-response/>

“Demand response gives customers what they want by helping to address environmental concerns, enhancing communications and providing a wide range of choices.”⁸

—R. Blake Young,
President and
CEO of Converge

Reliability benefits

The electric grid is evolving: more renewable energy sources, such as wind and solar, are coming online and more customers are reducing energy waste by utilizing the benefits of smart meters and other clean technologies. These changes create opportunities for utilities to strengthen grid reliability with demand response. As an example, Texas has enough demand response potential to exceed the state’s electric ‘reserve margin’, a safety net established to protect Texans against rolling brownouts,⁵ without the construction of additional power plants.

By increasing their use of demand response, grid operators and utilities would gain the ability to:

- Control short-term energy spikes and enhance resiliency and reliability for customers
- Curb peak energy use during the hottest and coldest months, offsetting the need for expensive, polluting ‘peaker’ plants that only operate for a few hours each year
- Increase the flow of communication with customers regarding their energy use, advising customers on other energy and cost management tools

Environmental benefits

Reducing energy demand during rush hour times on the electric grid avoids the need to run the most expensive and dirtiest fossil fuel-fired power plants. In Utah, around 100,000 citizens volunteered for the electric utility to cycle their air conditioning units on-and-off for 15-minute intervals during high-stress times of the day through the “Cool Keeper” demand response program. This ‘saved’ energy amounted to the combined output of about seven peaking power plants, including oil-burning plants with some of the highest pollution rates in the state. In addition, demand response also can play a pivotal role in integrating clean energy



Source: Nest

resources onto the electric grid by helping match energy use to times when renewables are available and abundant.

The environmental wins that we gain through demand response are significant:

- Contribute to reducing emissions from the residential and commercial sectors, which together account for 35% of total U.S. greenhouse gas emissions from electricity generation—equivalent to more than 500 million cars on the road⁷
- Improve air quality, decreasing respiratory illnesses and related health care costs
- Harness more clean energy, which consumes zero water, unlike fossil fuel power plants, saving scarce water supplies in drought-stricken areas, like the Southwest and California

Need for Demand response is now

Demand response is good for people, business, and the environment. The voluntary reduction or shift of energy use during the power grid’s rush hour improves the health of millions of Americans and future generations, enables electric utilities to offer cost-saving products to customers, and accelerates the transition to a clean, low-carbon energy economy.

⁵ Samuel Newell et. al. ERCOT Investment Incentives and Resource Adequacy. The Brattle Group. June 1, 2012. p.90

⁶ https://www.rockymountainpower.net/about/nr/nr2010/cool_keeper_programprovesitsvalueinsummer2010.html

⁷ <http://www.epa.gov/climatechange/ghgemissions/sources/electricity.html>

⁸ <http://blogs.edf.org/energyexchange/2013/12/05/why-residential-demand-response-is-a-critical-part-of-our-nations-energy-mix/>

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