



Meeting Energy Needs with Demand Response

GLEN ANDERSEN AND MEGAN CLEVELAND

As states work to create a more dynamic electric grid that is cleaner, more reliable and more efficient, they are tapping a host of new technologies and programs. One increasingly popular energy management approach is demand response, which leverages technology to help electricity customers play the role of on-demand “virtual power plants.” This reduces operating costs while making the grid more flexible and resilient.

Demand response lets utilities and energy management companies adjust an electricity customer’s heating, cooling or other energy services, or release energy from customer-sited storage, on demand. This temporarily provides the same benefit as getting electricity from a power plant, usually at far lower cost. Benefits of demand response

include: relieving stress on the electric grid during peak hours and extreme weather events, avoiding costly transmission infrastructure upgrades, freeing up electricity during power plant or transmission outages, and helping the grid adapt to fluctuations in wind and solar energy generation.

Customers participating in demand response programs receive compensation for allowing demand response providers occasional control of their thermostats, water heaters, air conditioning and energy storage systems. If the grid abruptly needs more energy due to a spike in demand or drop in production, utilities can send a signal that discreetly adjusts thermostats, reducing energy consumption by program participants.

Demand response programs are tailored so participants are unlikely to notice the change while

Did You Know?

- New technologies enable utilities to manage electricity consumption in ways that increase grid reliability, reduce costs and increase customer satisfaction.
- Demand response programs can allow electricity customers to act as “virtual power plants,” freeing up energy demand and providing the same service as a power plant.
- Demand response contributed 5.6% toward meeting peak electricity demand in wholesale markets in 2017.

producing substantial benefits, including reduced system costs, lower emissions and increased system resilience.

One such [program](#) by the New York utility Central Hudson was developed to defer new infrastructure upgrades for five to 10 years. The program, which included the installation of 300 control devices, among other measures, reduced summer peak energy demand by making as-needed adjustments to the space-cooling equipment of residential, commercial and industrial customers. The utility reached its 50% load reduction milestone of 8.0 megawatts (MW) in late 2017.

Deployment of demand response programs is growing in many parts of the country, although barriers to their adoption remain. While the benefits for customers and the environment are numerous, technologies that enable demand response are relatively new and changing rapidly, so many utilities do not yet include demand response as a major consideration in their energy planning. Additionally, traditional regulatory models that compensate utilities based on electricity sales and capital investments make demand response less appealing to utilities compared to building new power plants and infrastructure. As noted in the State Action section that follows, several states have adopted policies to overcome these barriers.

Federal Action

The Federal Energy Regulatory Commission (FERC) has issued two orders to level the playing field for demand response in regulated wholesale power markets. [Order No. 745](#) requires wholesale markets to compensate demand response at the same rate as power generators, helping spur the growth of demand response in these markets. [Order No. 841](#), which was reaffirmed by FERC in May 2019 after being challenged, finds that existing rules in regional markets impose illegal barriers to participation for energy storage resources, thereby reducing competition and failing to ensure just and reasonable rates. Order 841 requires regional market operators to revise tariffs and establish rules to facilitate storage participation in wholesale markets.

State Action

States are increasingly exploring policies to encourage use of demand response. These include establishing demand response targets or programs, integrating demand response into renewable

portfolio standards and integrated resource plans, and commissioning demand response studies.

A handful of states have enacted legislation requiring or authorizing utilities to implement demand response programs. Maryland enacted [legislation](#) in 2008 that required utilities to implement cost-effective demand response to achieve specific percentage reductions in per capita electricity demand. In 2019, Montana enacted [HB 597](#), allowing electric utilities to implement cost-effective electricity demand-side management programs, pending approval from the public utilities commission. Virginia enacted [SB 966](#) in 2018 that, among other provisions, directs utility regulators to consider new demand-management practices.

States including California, South Carolina and Washington require utilities to include demand response resources in long-term procurement and integrated resource plans. Most recently, South Carolina enacted [HB 3659](#) in 2019 requiring utility integrated resource plans to include customer energy efficiency and demand response programs.

California enacted [SB 1414](#) in 2014, requiring utilities to include demand response in resource adequacy and long-term procurement plans while requiring regulators to ensure appropriate valuation of demand response resources. In 2013, Washington enacted [legislation](#) requiring integrated resource plans to identify methods and technologies, including energy storage and demand response, that can aid in integrating renewable resources.

Massachusetts, [Michigan](#) and [Vermont](#) have established renewable portfolio standards (RPS) or voluntary goals that integrate demand response resources. In 2018, Massachusetts enacted [legislation](#) creating the first clean peak standard in the country. The bill directs the state's Department of Energy Resources to establish a clean peak standard. It would require utilities to provide a minimum percentage of kilowatt-hour sales from clean peak resources, including certain renewable portfolio standard resources, energy storage systems and demand response resources.

States such as [Maine](#) and [Michigan](#) have commissioned studies to assess the potential of demand response. Additionally, states have supported greater deployment of demand response resources through broader policies such as [energy efficiency resource standards](#), utility revenue decoupling and performance incentive [mechanisms](#), as well as grid modernization efforts.

Additional Resources

- [Non-Wires Alternatives: Case Studies from Leading U.S. Projects, Smart Electric Power Alliance](#)
- ["Barriers and Opportunities to Broader Adoption of Integrated Demand Side Management at Electric Utilities: A Scoping Study," Lawrence Berkeley National Laboratory](#)

NCSL Contacts

Glen Andersen
303-856-1341

Megan Cleveland
303-856-1518