

Transform Every Customer into a Demand Response Resource: How Utilities Can Unlock the Full Potential of Residential Demand Response

Introduction

More and more, utilities are choosing demand response (DR) as a way to balance grid operations, lower energy prices for consumers, and integrate renewable resources like solar power.

Utilities have traditionally relied on large commercial customers to achieve those results. Yet residential customers represent a huge, untapped DR resource. The Federal Energy Regulatory Commission (FERC) estimates that utilities can deliver 65GW of peak reduction in the residential sector — equivalent to \$3 billion worth of annual capacity.¹

But, despite heavy investment, current residential DR programs engage less than 5% of homes² and fall far short of FERC's estimates of achievable potential.

“Today, the majority of DR comes from large commercial and industrial customers. However, it is the residential class that represents most untapped potential for DR.”

— FERC³

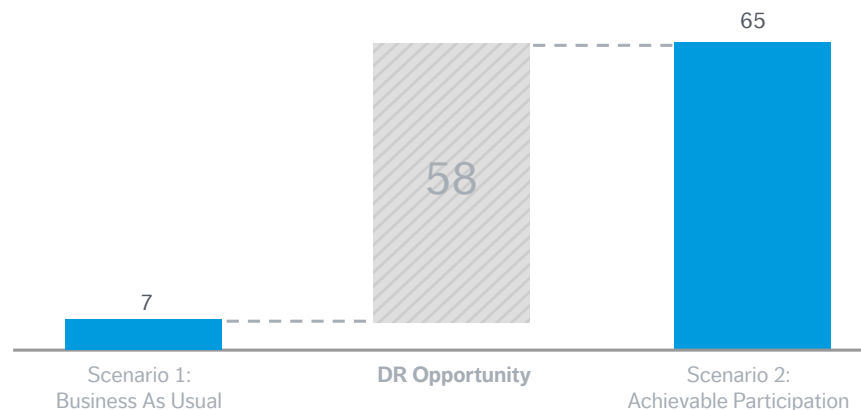


FIGURE 1. RESIDENTIAL DR PROGRAMS REACH ONLY 10% OF THE ACHIEVABLE CAPACITY POTENTIAL BY 2019 AS IDENTIFIED BY FERC³ (FIGURE IN GIGAWATTS)

“It’s not an either/or, it’s both. Customers are unique.... switches and thermostats can be enablers for [some] customers... but other customers will choose to do the behavioral work. I think you will see growth in both areas.”

—RUTH KISELEWICH,
DIRECTOR OF DEMAND SIDE
MANAGEMENT BGE⁴

How can utilities reach deeper into their service territories, engage the other 95% of homes, and unlock DR’s full potential? Leaders in the space are looking beyond existing models and employing solutions that take advantage of new customer-facing technologies, regulatory support for dynamic rates, and consumer adoption of connected devices. To reach deeper into their service territory and get the most out of their DR programs, utilities need to employ a comprehensive approach based on three key strategies:

1. **Unlock the base through behavior:** Engage up to 100% of customers through highly personalized, real-time communications
2. **Keep dynamic pricing simple:** Drive participation in dynamic pricing with simplified rate structures and engaging customer communications
3. **Deepen customer relationships with connected devices:** Encourage consumers to adopt connected thermostats through ongoing engagement and customer choice

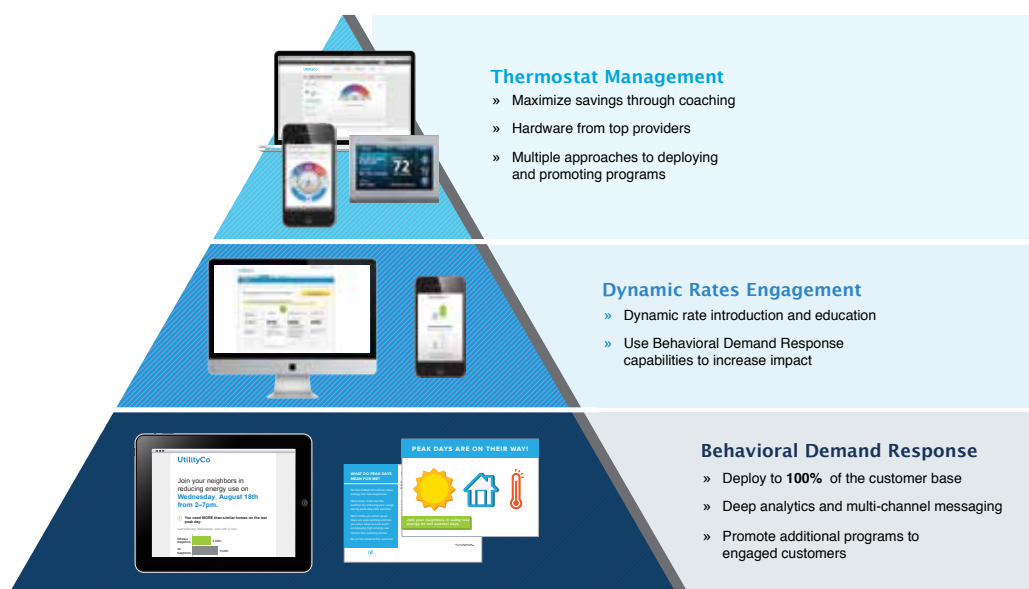


FIGURE 2. DR ENGAGEMENT PYRAMID: EXPANDING DEMAND RESPONSE TO EVERY SINGLE CUSTOMER

This white paper will explore how leading utilities are reaching across their entire service territories to realize the full potential of their residential DR programs.

1. Unlock the Base Through Behavior

Engage up to 100% of customers through highly personalized real-time communications

“A well-thought-out customer education program is needed to sustain customer response.”

— AHMAD FARUQUI,
THE BRATTLE GROUP

For most households, energy rates are static throughout the day and year, regardless of how much it actually costs utilities to generate that energy. As a result, there is little financial incentive for residential customers to engage in DR programs and reduce load during peak demand periods. In fact, just 5% of residential customers in the United States participate in DR programs, and only half know whether or not their utilities offer one.^{5,6} This is a huge opportunity for utilities — and not just from an operational perspective. Behavioral Demand Response (BDR) is a powerful tool to help utilities activate the other 95% of customers who aren't currently engaged in DR to drive meaningful peak reduction at scale.

BDR uses billing and energy data analysis, applied behavioral science, and real-time, personalized, multi-channel communications to motivate customers to decrease usage when demand on the grid is highest. Prior to peak events, customers are notified through email or interactive voice response (IVR) and given timely, energy saving tips such as adjusting their thermostat and delaying the use of large appliances. After peak events, customers receive highly personalized feedback on how their usage compared to similar households. This positive feedback loop ensures customers are aware of the need for DR and continue to take steps to meet this need.

By leveraging utilities' existing AMI investments, BDR can be deployed with ease and scale across the entire customer base without rolling a single truck or installing a single device. It unlocks previously untapped value as participants begin saving energy and money on their bills, and utilities start winning their trust. That trust then opens the door to the wider world of DR programs, like dynamic pricing and connected thermostats. Over time, utilities can move customers up the engagement pyramid by using rich analytics to promote programs to those who are most likely to benefit — deepening the utility-customer relationship and unlocking greater savings for both. Just like Opower's home energy reports did for energy efficiency, BDR is making residential peak load reduction a reality on a large scale.

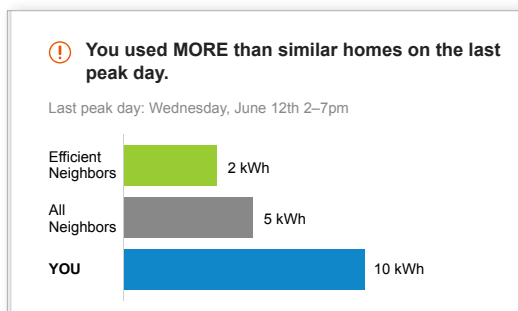


FIGURE 3. BEHAVIORAL FEEDBACK PROVIDED TO CUSTOMERS AFTER A PEAK EVENT

CASE STUDY

Behavioral Demand Response Delivers Reliable, Cost-Effective Peak Reduction

During the summer of 2014, utilities from across the Western, Midwestern, and Northeastern United States partnered with Opower to unlock the value of their existing AMI infrastructure by deploying BDR. Implemented over a few short months, Consumers Energy in Michigan, Efficiency Vermont/Green Mountain Power, and Glendale Water & Power in California engaged more than 140,000 customers with BDR. Opower's Delivery Engine provided highly personalized pre- and post-event communications based on household AMI data while Opower's Segmentation Engine tested multiple combinations of content and channels.

The results were impressive: Over the course of 10 events, BDR delivered an average load reduction of nearly 3%, which was measured using randomized controlled trials at 95% confidence. The results during extreme events were even better. In September, when record-breaking temperatures pushed peak demand to unprecedented levels in Los Angeles, nearby Glendale Water & Power deployed BDR to almost half of their customer base, delivering a peak load reduction of 5.04% at 5pm local time across all program participants. This is a powerful result, not only for its positive impact this summer, but because 5% savings across all customers could make BDR the most scalable and lowest cost residential DR resource available.

Find out more at opower.com/uaw



FIGURE 4. A GWP CUSTOMER REACTS POSITIVELY TO THE BEHAVIORAL DEMAND RESPONSE PROGRAM ON TWITTER

2. Keep Dynamic Rates Simple

Drive participation in dynamic pricing through simplified rate structures and up-front education

Nationwide, regulators are increasingly supporting time-based rates for residential customers. The Massachusetts Department of Public Utilities recently announced that they will require time-of-use rates for every customer in the state.⁷ And, in the Mid-Atlantic, utilities have started rolling out large, opt-out, peak-time rebate programs for many of their customers.

However, many customers haven't bought into dynamic pricing yet. It's largely a consequence of education — these programs have often asked consumers to interpret complicated pricing tiers without much direction. As a result, less than 2% of U.S. residential customers are currently enrolled in any form of dynamic rate program today.⁸



FIGURE 5. A SIMPLE TOOL FOR CUSTOMERS TO NAVIGATE THEIR DYNAMIC RATE OPTIONS

As new pricing schemes increase in size and scope, utilities should focus on simplifying programs and helping customers understand and benefit from them. Providing up-front education,⁹ using customer-facing tools that model the bill impact of different rates, and delivering comprehensive messaging related to peak events are important strategies for maximizing the effectiveness and reach of dynamic rates.

CASE STUDY

Baltimore Gas & Electric Scales Cost-Effective Demand Response Without Devices

In 2013, Baltimore Gas & Electric (BGE) partnered with Opower to launch one of the largest dynamic rate programs in the United States. The program, Smart Energy Rewards, is a core part of BGE's DR strategy, and will reach all BGE customers by 2015.

During four peak events in the summer of 2013, BGE used Opower's Delivery Engine to send 3.2 million highly personalized pre- and post-event communications to BGE customers via phone, email, and text message. Opower delivered these notifications within tight timeframes, providing customers individualized event performance feedback. BGE used Opower's Segmentation Engine to test multiple combinations of content and channel across key customer segments, thus optimizing communications and improving savings over time.

The results from the first year of the program were striking: Smart Energy Rewards achieved 5% average peak reduction (0.2 kW) across over 200,000 customers. On top of that, participants who chose to receive text message alerts during peak events saved an average of 15% (0.6 kW).

The load reduction from Smart Energy Rewards was 5x greater than a similar program deployed to over 1 million customers in California, for example.

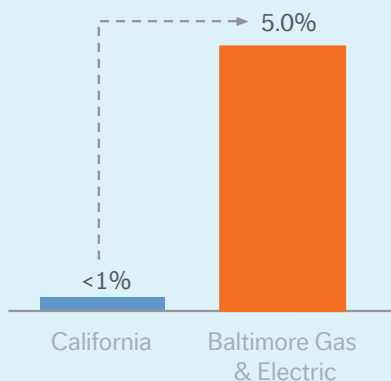
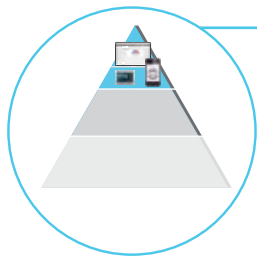


FIGURE 6. COMPARISON OF BGE'S PTR PEAK REDUCTION RESULTS TO A SIMILAR EFFORT IN CALIFORNIA¹⁰



FIGURE 7. BGE CUSTOMERS REACT POSITIVELY TO THE PEAK TIME REBATE PROGRAM ON TWITTER



3. Deepen Customer Relationships With Connected Devices

Encourage customers to adopt connected thermostats with ongoing engagement and customer choice

Traditionally, utilities have built their residential DR programs around load control switches and thermostats. In exchange for installing these devices, customers see little benefit beyond small, annual incentive payments.

Connected thermostats are a game changer. Unlike other DR devices, consumer demand for advanced thermostats is high¹¹ — and that gives utilities a huge new opportunity to deepen their engagement with customers.

That's exactly what customers want. Studies show that people are 4x more likely to consider buying a connected thermostat (or other energy management services) from their utilities than from third parties.¹²

Rather than getting cut out of the equation by new entrants, utilities should seize this moment and get the most out of their residential DR programs. That means giving customers choice. The best connected thermostat strategies offer devices at a wide variety of price points through many delivery channels — including retail, professional installers, and direct utility install.

Utility-led connected device programs can deliver more than DR value. By providing customers year-round opportunities to save energy, utilities can also reduce the need for ongoing cash incentives.

CASE STUDY

Utility Partners Achieve Meaningful Savings with Thermostats

Today, Kansas City Power and Light and other utilities are partnering with leading companies like Honeywell and Opower to deploy next-generation thermostats as part of their DR programs. Customers are getting customized insights that reflect usage, billing, thermostat, and third-party data streams — all delivered through a highly rated mobile app that delivers savings opportunities 12 months a year. And the result is real demand reduction and energy efficiency.

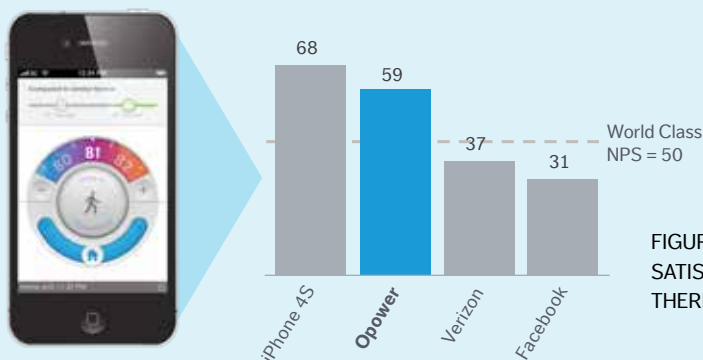


FIGURE 8. CUSTOMER SATISFACTION WITH OPOWER THERMOSTAT PROGRAMS

Moving Forward

This is a watershed moment for demand response. With the arrival of dynamic pricing, smart thermostats, and real-time analytics, utilities finally have the tools they need to get 100% of their customers thinking about peak demand. Additionally, the push for time-based rates and connected devices signals new opportunities for utilities to provide customers increased benefits through DR programs and strengthen customer relationships.



FIGURE 9. SAMPLE BENEFITS FOR A 500,000-CUSTOMER UTILITY¹³

The untapped potential is huge. A 500,000-home utility that launches a behavioral DR program across its service territory stands to reduce peak demand by 156 MWs, save 43 GWhs, and start boosting customer engagement and satisfaction in a big way.

With demand response, utilities are poised to unlock the cheapest, cleanest, most abundant energy resource of all: their customers. And there has never been a better time to act.

Find out more at
opower.com/uaw

Endnotes

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