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 10% of homes² and fall far short of FERC’s estimates of achievable potential.

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¹ Source: FERC
² Source: FERC

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, BGE

How can utilities reach deeper into their service territories, engage the other 90% 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. **Scale dynamic pricing programs**: Drive participation in dynamic pricing with simplified rate structures and engaging customer communications

3. **Engage each customer with the right device**: Target the right customers with the right device offer to maximize demand reduction

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.
In the summer of 2014, utilities in California, Michigan, and Vermont engaged 150,000 of their customers with BDR during 10 different peak events. Average savings across these 10 events was 3%. When temperature peaked, so did savings — to 5% during the hottest hour of a California heat wave. Customers who participated in these programs reported 74–85% satisfaction, and were 6–10% more likely to express trust in their utility partner. Because all of this was achieved without installing a device, these peak reductions were achieved at one-third the cost of traditional device-based demand response. As a reliable form of demand response, these programs are ready to scale to 100% of customers at any utility with advanced metering.

"A well-thought-out customer education program is needed to sustain customer response."  
— AHMAD FARUQUI, THE BRATTLE GROUP

### 1. Unlock the Base Through Behavior

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

Outside the utility world, almost no one thinks about peak energy usage. Less than 10% of residential customers in the United States participate in a DR program. Just half are even aware whether their utilities offer one. This is a huge opportunity for utilities — and not just from an operational perspective. Behavioral DR programs are powerful tools to activate historically unengaged customers.

They use billing and energy data, behavioral science, and near-real-time multi-channel customer communication to drive up to 5% peak reduction across the entire customer base without the use of a device — at one-third the cost of traditional device-based demand response. Furthermore, because customers find this personal information useful, they are 10% more likely to trust their utility. And they like these programs — 85% of customers at one utility reported satisfaction with BDR. This positive customer experience 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.

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**CASE STUDY**

Drive up to 5% peak savings and 85% customer satisfaction at one-third the cost — without installing a device.

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2. Scale dynamic pricing programs

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

Nationwide, regulators are increasingly supporting time-based rates for residential customers to align retail price with wholesale cost. The Massachusetts Department of Public Utilities recently announced that they will require time-of-use rates for every customer in the state. The California Public Utilities Commission is considering a similar transition to time-of-use rates. Utilities in Michigan and Illinois are scaling rates with advanced metering investment. And, in the Mid-Atlantic, utilities have started rolling out large, opt-out, peak-time rebate programs for many of their customers. These programs are expected to grow as the adoption of new technologies like solar and electric vehicles increases variation in energy use among 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.

“Personalized communications, customized home energy reports, and demand response are some of the many tools we offer customers to help them better manage their energy use. As we deploy smart meters across northern Illinois, we are unlocking even more value through resources like Opower’s behavioral demand response platform.”

— VAL JENSEN
ComEd

FIGURE 4. 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, 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.
In 2013, Baltimore Gas & Electric (BGE) partnered with Opower to launch the largest dynamic rate program 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 end of summer, 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 key difference between this and other programs was personalized engagement, which drove high levels of awareness and participation. To put this in perspective, the load reduction from Smart Energy Rewards was 5x greater than a similar program deployed to over 1 million customers in California, that failed to leverage similar engagement software.
In the summer of 2015, a California Utility will deliver BDR pre- and post-event communications to its customers who participate in their direct load control program. By increasing awareness of peak events through personalized engagement, this utility expects to increase satisfaction and reduce likelihood of event override and program opt-out rates.
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.

The untapped potential is huge. Opower ran a national potential analysis that shows BDR alone would generate nearly 5,000 MW of capacity savings - double the DR currently realized by utility programs. And these MW are delivered at one-third the cost of alternate options for meeting peak demand — whether power plants or device-based demand response.

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.

To learn more, contact us at DR@opower.com
Endnotes


