Putting More Energy into Peak Savings: Integrating Demand Response and Energy Efficiency Programs in the Northeast and Mid-Atlantic

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ABSTRACT

The way the electricity sector utilizes demand response opportunities is changing. Before the age of restructured electric markets, demand response was a tool that vertically integrated utilities used to maintain system reliability during costly peak usage periods. As the electric sector transitioned toward competitive wholesale markets, new constructs enabled the rise of third-party curtailment service providers who aggregate and bid demand response commitments from large customers into those markets.

More recently, the proliferation of advanced metering infrastructure and connected devices has opened a new world of opportunity for demand response. State-level policy directives are encouraging efficiency program administrators to find synergies between kWh savings and kW reductions. Smart thermostats, smart appliances, and advanced lighting controls are just a few of the technologies that offer such synergies. Efficiency program plans throughout the Northeast and Mid-Atlantic (et al.) are seeking to invest in energy efficiency measures that also enable dynamic load management. This paper explores the strategies being taken by program administrators in the region to provide benefits to their customers through demand response programs.

The first section of the paper provides background on trends toward integration of demand response and energy efficiency program offerings. The second will identify and categorize demand response offerings currently available through efficiency program administrators. The third will provide a detailed exploration of the cost-effectiveness of three such programs. The final section will provide "best practice" recommendations for utility program administrators seeking to implement demand response programs.

Introduction

Demand Response and energy efficiency have evolved along different paths during the past several decades. While investments by regulated entities in energy efficiency have enjoyed broad growth thanks top-down directives, demand response has—with some exception—remained largely within the sphere of private market third party curtailment service providers who aggregate commitments and bid them into wholesale power markets.[1] Yet, policy-makers are beginning to recognize the value of peak load reduction for deferral of distribution system investments, as well as for balanced integration of distributed generation. As such, peak capacity reduction goals have received a renewed focus as the target of incentives and mandates.

The Trend towards Integration

Gaining great momentum with the California's Public Utility Commission's move toward Integrated Demand Side Management (CPUC 2009), a trend toward the integration of Energy Efficiency and other distributed energy resources such as demand response, energy storage, and

[1] Popular third party curtailment service providers include Comverge and Enernoc.

distributed generation has emerged. This is the result of a number of factors, including: (1) the rising cost of peak power; (2) opportunities outside wholesale markets; and (3) forward thinking policy leadership at the state and federal level.

The cost of power during system peaks has risen dramatically in the past decade. Successful energy efficiency program strategies have flattened overall load growth in many regions, and peak coincident energy efficiency measures have had a major impact on peak load growth. However, peak demand continues to grow, raising transmission and distribution costs which are largely a function of peak load. For example, the New York State Department of Public Service estimates that if the 100 hours of greatest peak demand were flattened, long term avoided capacity and energy savings would range between $1.2 billion and $1.7 billion per year (NYS PSCa 2015). Figure 1 draws upon load and energy usage forecasts in the 2015 New York State Gold Book to provide a graphical description of ten year capacity and energy savings projections with and without energy efficiency.

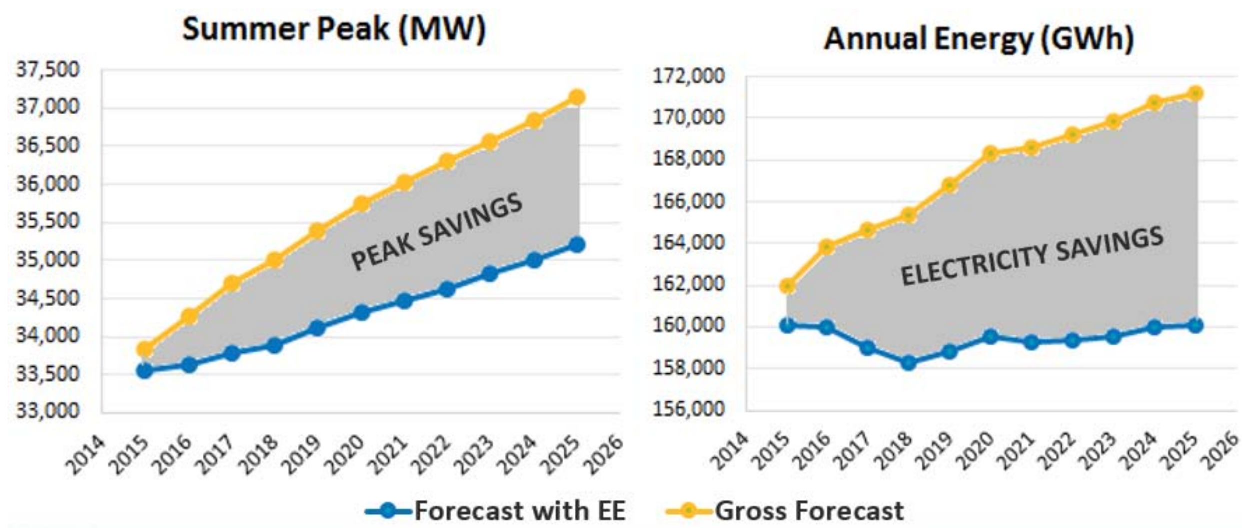

Figure 1. 2015 New York State Energy Usage and Capacity Projections. *Source*: NY-ISO 2015

Thanks in part to legal uncertainties relating to FERC's Order 745 that cast doubt upon whether demand response could participate in wholesale energy and capacity markets, distribution utilities have begun exploring demand response as an internal means to reduce their installed capacity requirements (PJM 2014). Further, as penetration of distributed energy resources increases, distribution utilities will play an increasing role in active management of locational-specific system loads. As such, a value proposition exists for demand response outside of installed capacity requirements and the few events called by wholesale market operators. This is especially true as new technologies enable programs to reach into the residential sector which has received little attention from third party curtailment service providers. While the Supreme Court's recent ruling on Order 745 may have buttressed compensation rules for demand response in the wholesale market, other rule changes and new penalties for non-performance have led some market actors to abandon their legacy demand response commitments (Brown et al. 2015).[2] A value stream for these commitments remains however, at the distribution system level.

[2] Declining participation by demand response resources in ISO-NE's Forward Capacity Market is likely due to a number of factors, including: (1) ISO-NE changed its rules to increase the granularity of any aggregations to 19

Cognizant of the growing costs attributable to peak load, and opportunities for demand response as a distribution system resource, forward thinking policy makers are designing incentives for efficiency program administrators to reach toward peak reduction goals. For example, in Rhode Island 30 percent of the efficiency program administrator's performance incentive is directly tied to a MW reduction target (RI PUC 2014). In Maryland, the legislation enabling the utility energy efficiency resource standard also mandated a 15 percent reduction in per capita peak demand by the end of 2015 (EmPOWER 2008). More recently, in New York's 'Reforming the Energy Vision' proceeding, Staff's Whitepaper on Ratemaking and Utility Business Models makes clear that MW reduction will be a key Earning Impact Mechanism under their new performance-based ratemaking model (NYS PSC 2015b). Responding to these regulatory signals, efficiency program administrators throughout the country are launching pilot programs to better understand demand response technologies, required software infrastructure, cost-effectiveness analysis, and amortization periods.

Program Administrator Demand Response Offerings

Several approaches to utility-led demand response offerings are today combined with efficiency program administration to maximize the benefits and minimize the costs associated with both strategies. Three popular approaches include: (1) manual curtailment; (2) direct load control; and (3) behavioral demand response.

Manual Curtailment

Manual curtailment is a form of demand response based upon price signals. With some variation, these programs are limited to large commercial and industrial customers, and typically require that an individual customer reduce their energy usage by at least 50-100kW, with the customer's energy usage reduction verified by interval meter data. A customer is notified of an event, either planned or unplanned, and must actively chose to reduce load. Such resources are typically used for system-critical events, but are also on occasion used for peak shaving. Program administrators generally offer two forms of enrollment in manual curtailment: (1) reservation enrollment; and (2) voluntary enrollment.

Reservation enrollment is a type of manual curtailment in which customers are contractually required to reduce their energy usage during designated events with approximately one day's advanced notice. In exchange, the customer receives a $/kW-month reservation payment for their committed capacity, and a $/kWh performance payment to account for the duration of reduction during a given event. Bonus payments are available to those customers who participate in events for longer than the duration to which they are contractually committed. Elevated performance payments are typically offered during an event called without requisite notice.

Voluntary enrollment is similar to the reservation enrollment option, but without the firm commitment to perform during an event. Voluntary enrollment customers are compensated on a pure $/kWh basis and elevated performance payments are typically available for an event called without the requisite notice.

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separate dispatch zone, making it harder to diversify resource development across a portfolio; and (2) Penalties associated with pay for performance expose capacity providers to a short position in "performance" at a rate of $2,545/MWh whenever the system experiences scarcity conditions.

Direct Load Control

Direct Load Control (DLC) programs are a form of demand response based upon direct communication between the program administrator and a customer's equipment to signal a curtailment event. With some variation, these programs target primarily residential and small business customers. Such programs typically provide the customer with a one-time incentive upon signup and a monthly incentive during the performance period. DLC programs can be segmented into two categories: (1) legacy DLC programs; and (2) Two-way communication programs.

Legacy DLC programs utilize a switch installed directly on a customer's equipment by the program administrator. The switch receives one-way communication to signal a curtailment event, controlling a customer's A/C condensing unit, heat pump, pool pump, or hot water heater. In most legacy DLC programs, the customer's equipment is cycled on and off each hour according to a customer-chosen cycling rate of 50%, 75% or 100%. A customer's incentive is dependent upon their chosen cycling rate, with 50% cycling receiving the smallest incentive and 100% receiving the largest. Capacity reductions from legacy DLC programs can be forecast with minimal variability due to their direct one-way control, and do not require verification through interval meter data.

In recent years, two-way communication DLC programs have been able to harness recent advances in information and communication technologies (ICT) by utilizing curtailable devices that can not only receive signals, but also communicate detailed information back to the program administrator. This often takes place through an existing home area network or other broadband internet connection. Perhaps the most salient example of this is the WiFi enabled thermostat; but opportunities exist for many different technologies including air source heat pumps, smart power strips, smart air conditioners, building management systems, commercial advanced lighting controls, energy storage, and electric vehicles. Many early programs and pilots have utilized Bring Your Own Device ("BYOD") strategies, enrolling customers who may have already purchased a device incented through a local energy efficiency program. Others are exploring possibilities for direct install, which offers a device to the customer for free, conditioned upon that customer commitment to participate in a demand response program.

Behavioral Demand Response

Behavioral demand response programs are based upon residential customer engagement, rather than direct load control. Program administrators partner with third parties to inform consumers of an expected curtailment event in advance through email, text messages, sports stadium advertisements, and other mass media venues. After an event, the consumer receives a report on their performance as compared to the average performance of their neighbors, providing a behavioral incentive through gamification of energy savings. In some cases, behavioral demand response programs also provide a $/kWh incentive to participants. In the case of programs that provide incentives and enroll users into the program through default service, there is generally some concern relevant to free ridership's impact on program savings.[3] Interval energy usage data and infrastructure are a prerequisite for behavioral demand response programs.

[3] While free-ridership tends to be a subject of interest in all ratepayer funded programs, it may be particularly prevalent in automatic enrollment behavioral demand response programs, where the ratepayer doesn't need to actively purchase a measure or otherwise decide to participate in a program.

Benefits and Costs by Program

As a result of the obligation placed upon regulators and utilities to provide just and reasonable rates, an extensive program evaluation framework has evolved over several decades to determine whether investments in energy efficiency by program administrators can be verified according to this standard. Currently, a standard for evaluation of program administrators' demand response offerings is less evolved. The California Public Utility Commission (CPUC 2010) and Lawrence Berkley National Laboratory (Woolf et al. 2013) have published reports on the issue, but cost-effectiveness inputs and reporting across utilities are far from standardized. Below is an analysis of filings from efficiency program administrators in three states that recently implemented or proposed implementing demand response programs. All benefit/cost ratios are expressed according to that state's interpretation of the Total Resource Cost test.

Maryland

Maryland's demand response programs are the most evolved within the Northeast and Mid-Atlantic region, with roughly 1/3 of their EmPOWER program funding dedicated to demand response program implementation. With one-way switches installed in over 350,000 residences, Maryland's Baltimore Gas and Electric (BGE) captures more than 413 MW of capacity within their PeakRewards DLC program alone (BGE 2016). BGE's legacy DLC program offers incentives to residential customers far beyond what any other program in the region offers. However, approximately 75 percent of customers participate at the lowest cycling level-50%, receiving only $50 upon sign-up, and $50 annually.

BGE's legacy DLC program enables pilots and technology conversions to remain highly cost effective because initial investments and implementation costs are judged from within the portfolio of a legacy program with almost 40 percent total penetration. Evaluated as a single program, BGE's DLC and thermostat pilots are highly cost-effective, returning more than $3 in benefits for every $1 of costs. Further, marketing and implementation of their thermostat pilot is done within their EmPOWER energy efficiency program outreach, enabling greater marketing efficiencies and reducing the costs of implementation. BGE is also one of the few program administrators in the region to invest in winter-time demand response through their water heater program. Table 1 provides an overview of Baltimore Gas and Electric demand response programs as described in their semi-annual report detailing program savings for the third and fourth quarters of 2016.

Table 1. Maryland EmPOWER Demand Response Program (Baltimore Gas and Electric)

Program type	Direct load control (A/C condenser, heat pump)	Direct load control (Two-way thermostat pilot)	Direct load control (Winter water heater)	Behavioral (Smart Energy Rewards)
Sector	Residential	Residential	Residential	Residential
Total participants (final year)	356,000	2,600	29,000, plus 59,000 legacy devices	1,100,000
Capacity saved per customer/device (kW)	~1.2kW			0.22
Total capacity (MW)	413			309
Incentives per customer	Cycle 50%: $50 sign-on/annually Cycle 75% $75 sign-on/annually Cycle 100% $100 sign-on/annually	Pending	Cycle 100% $25 sign-on/annually	$1.25/kWh saved compared to similar weather day baseline
Program average annual incentives (2015)	$24,075,969			$40,566,666
Average annual non-incentive costs (2015)	$13,577,940			Unclear
Benefit/cost ratio (TRC)	3.3			1 (assumed)

Source: Baltimore Gas and Electric Semi-Annual Report for Third and Fourth Quarters — July 1 through December 31, 2015. (BGE 2016)

BGE is also currently the largest behavioral demand response provider in the country. Investments in advanced metering infrastructure several years ago laid the groundwork for a major partnership with OPower, allowing BGE to extend their behavioral demand response program—Smart Energy Rewards—to more than one million customers, with each providing approximately 0.22kW of capacity during an curtailment events for a total of 309MW (BGE 2016). Smart Energy Rewards encourages energy savings during peak events by producing reports for how much energy a consumer has saved during an event in comparison to their neighbors, as well as a bill credit of $1.25kWh beyond their weather adjusted baseline.

A benefit/cost analysis of the Smart Energy Rewards program was unavailable, since the program is couched within a broader series of investments that included advanced metering infrastructure. These investments are also recouped via a surcharge that is supplemental to efficiency program funding. The program has faced some criticism relating to free-ridership, since it relies on automatic enrollment of customers unless they pro-actively choose to opt-out (Chang 2016).[5]

[5] In the case of smart energy rewards under Maryland's EmPOWER program, the consumer advocate has argued a significant portion of participants in an automatic enrollment program may have curtailed their usage even without the incentive, significantly raising the benefit/cost ratio the program,

Pennsylvania

During their renewal of Pennsylvania's Act 129 for a third phase, the Pennsylvania Public Utility Commission revived a demand response program which had been eliminated during Act 129's Phase II (PA PUCa 2015).[6] The demand response programs described in detail in Table 2 are derived from program administrators' proposed plans and are not retrospective evaluations of program cost-effectiveness. However, they are informed by a recent demand response potential study that identified all cost-effective demand response in the state (PA PUCb 2015).

Pennsylvania's evaluation framework averages the cost effectiveness of their demand response programs over the entirety of Act 129 Phase three, a five year term. This allows the less cost-effective years of implementation and marketing to blend costs and benefits with later, more cost-effective years.

Table 2. Pennsylvania Act 129 Phase III Demand Response Programs (Projections)

<table>
<tr><th>Program type</th><th>Sector</th><th>Total participants (final year)</th><th>Energy saved per customer/ device (kW)</th><th>Total capacity (MW)</th><th>Incentives per customer</th><th>Average annual incentives (PY 2-5)</th><th>Average annual non-incentive costs</th><th>Benefit /Cost Ratio</th></tr>
<tr><td colspan="9">Duquesne</td></tr>
<tr><td>Direct load control BYOD</td><td>Residential</td><td>~6,000</td><td>0.35</td><td>2.2</td><td>$28/season</td><td>$182,498</td><td>$146,188</td><td>0.7</td></tr>
<tr><td>Manual curtailment</td><td>Large C&I</td><td>27</td><td>387.9</td><td>10.5</td><td>$32-$40/kW</td><td>$416,096</td><td rowspan="2">$823,565</td><td>2.3</td></tr>
<tr><td>Manual curtailment</td><td>Dual enrolled large C&I</td><td>108</td><td>387.9</td><td>31.4</td><td>$16-$20/kW</td><td>$624,144</td><td>2.1</td></tr>
<tr><td colspan="9">Met Ed</td></tr>
<tr><td>Behavioral DR</td><td>Residential and small C&I</td><td>50,000</td><td>0.07</td><td>3.5</td><td>$0</td><td>$0</td><td>$206,093</td><td>1.5</td></tr>
<tr><td>Manual curtailment</td><td>Large C&I</td><td>20</td><td>256</td><td rowspan="2">22.5</td><td>$6,127</td><td>$60,858</td><td>$88,670</td><td rowspan="2">1.7</td></tr>
<tr><td>Manual curtailment</td><td>Dual enrolled large C&I</td><td>2</td><td>256</td><td>$3,063</td><td>$13,524</td><td>$22,969</td></tr>
<tr><td>Manual curtailment</td><td>Small C&I</td><td>57</td><td>801</td><td rowspan="2">202.9</td><td>$9,614</td><td>$547,722</td><td>$798,032</td><td rowspan="2">1.2</td></tr>
<tr><td>Manual curtailment</td><td>Dual enrolled small C&I</td><td>6</td><td>801</td><td>$19,228</td><td>$121,716</td><td>$202,077</td></tr>
</table>

Source: Duquesne and Met Ed Act 129 Phase III Proposals (Duquesne 2015; Met Ed 2015).

While currently providing only prospective forecasts, Pennsylvania's proposed demand response programs offer perhaps one of the broadest insights into cost-effectiveness comparisons across programs. For example, Met Ed believes that it can offer a behavioral demand response without any $/kWh incentive to customers based purely on gamification. In fact, their behavioral

[6] Pennsylvania regulators chose to retire Act 129's demand response programs after Phase I of Act 129 after determining that investments in peak coincident energy efficiency measures might provide greater overall benefits than could be provided by similar investments in demand response.

demand response program is projected to be more cost-effective than their small C&I manual curtailment program.

Duquesne's residential "bring your own device" program is also notable because it plans to enroll 6,000 households, and falls just short of providing cost-effective savings. Since the program is based upon a pre-existing device, there are no incremental participant costs, and only marketing and implementation costs can limit a programs' cost-effectiveness.

New York

New York has recently placed an increasing emphasis on peak energy savings, including through the Public Service Commission's recent Order Adopting Dynamic Load Management Filings (NYS PSCc 2015). Table 3 describes the dynamic load management programs offered by two New York utility program administrators as reported in their Dynamic Load Management Annual Reports after their first season of program implementation.

Table 3. New York Dynamic Load Control Demand Response Programs

Program type	Total participants	Total capacity (MW)	Incentives per customer	Average annual program incentives	Average annual non-incentive costs	Benefit /Cost Ratio
NYSEG						
C&I Manual curtailment distribution load relief program	none	TBD	Reservation Payment Option: $2.75/kW Month + $.15/kWh Bonus Payment= $.30kWh Voluntary Option: $.15kWh	$0	$10,640	4.419
C&I Manual curtailment commercial system relief program	8	1.2	Reservation Payment Option: $2.75-3.00/kW Month + $.15/kWh Voluntary Option: $.15/kWh	$3,678	$28,577	
Residential/small business direct load control	31	TBD	Free Load Control Device $25 sign up (Electronic Gift Card) $25/year for 80% of event hours	$1,375	$114,192	.005
Orange and Rockland (O&R)						
C&I Manual curtailment distribution load relief program	9	1.47	Reservation Payment Option: $3.00/kW Month + $0.50/kWh Voluntary Option: $1.00kWh	$12,824	$34,121	1.02
C&I Manual curtailment commercial system relief program	8	1.2	Reservation Payment Option: $4.00-5.00/kW Month + .50-1.00/kWh Voluntary Option:$1.00-1.50/kWh	$11,708	$33,967	
Residential/Small Business Direct load control	286 Customers 375 Devices	TBD	Direct Install: free smart t-stat BYOT: $85 sign up, $25/year	$31,875	$82,065	1

Source: O&R and NYSEG Dynamic Load Management Annual Reports (O&R 2015; NYSEG 2015)

The New York distribution utilities mentioned above administer energy efficiency programs, but their dynamic load management duties are currently evaluated separately from their energy efficiency programs. However, program administrators are planning to leverage marketing and administrative resource for both programs on a combined basis in the future.

The New York program administrators' annual reports offer a number of lessons. For example, having been directed to implement demand response programs two weeks before the summer season began they had little opportunity for program marketing, resulting in lackluster participation numbers. Furthermore, no events were called during the summer of 2015, resulting in poor data for program updates and cost-effectiveness evaluations.

As far as NYSEG is concerned, the benefit/cost ratio of more than 4:1 is derived from a single customer who was reserved to curtail 50kW, but actually curtailed more than 1MW. While this seems like a benefit, program administrators should be careful not to underestimate the likely performance of a participant, as it might skew the cost-effectiveness of a larger program downward due to the increased cost of incentives, lower savings, and higher free-ridership.

Further, the cost-effectiveness of NYSEG's thermostat-based direct load control program was severely limited by low participation. This was largely due to customers who received the free thermostat but failed to log into the program. To correct this, NYSEG will be considering a "rebate upon connection" strategy rather than at sign-up. It will also limit the incentives available per participant to $5 annually. At first look, it may seem that the reduced incentive would limit the ability to market the program. However, recent evaluations have found that many customers consider the mobile interface and remote control features of their devices almost as important as an annual rebate. (Seiden et al. 2016)

New York is unique in that a portion of its demand response program implementation and staff administrative costs are recovered within rates, while incentives and fees to third party partners are still recovered through a surcharge.

Best Practices and Recommendations for Further Analysis

After reviewing the above case studies, there are several best practices that begin to emerge for consideration in efficiency program administrator implementation of demand response programs.

Regulatory Leadership

Establishing the proper regulatory framework for demand response will be crucial to the effective rollout of integrated energy efficiency and demand response programs. Efficiency program administrator incentives or mandates relating to MW reduction will be a key component of establishing comprehensive programs. Perhaps more importantly, regulators must ensure that the costs of investment in demand response are allocated across the proper projected lifecycle, including initial investment and duration of the program. An opportunity may exist for the creation of a regulated asset in the case of grid-side technologies such as advanced metering infrastructure or a distributed energy resource management system. Careful consideration should be given to whether and how grid-side assets should be included within program cost-effectiveness considerations.

Properly quantifying all program benefits will also be vitally important for the initial implementation and long term viability of demand response programs integrated with energy efficiency program plans. In Massachusetts, program administrators recently published a draft addendum to their bi-annual study of avoided costs in New England examining the impact of active demand response during 4 hour "super-peak" periods of energy usage (Rudkevich et al. 2016). Fast-ramping demand response may also be able to draw additional value from participating in wholesale markets for ancillary services for spinning reserves or frequency regulation (MacDonald et al. 2012). Such ancillary services could be key to integration of variable renewable resources on the distribution system. In order to meet public policy goals relating to integration, regulators and system operators should consider a framework that allows for aggregation at both the geo-spatial and temporal level, so long as settlement quality data can be provided to verify performance at the required level of granularity.

Pilot Projects

Pilot projects to research, demonstrate, and document savings will be critical for developing cost-effective programs. Pilots for integration of demand response and energy efficiency often focus on areas of distribution system constraint, and in some cases can defer costly investments against which their cost-effectiveness can be measured. This strategy can avoid pitfalls that might be associated with demand response cost-effectiveness, especially while programs are under development. Further, opportunities exist throughout the Northeast to alleviate winter peaking constraints through direct load control of energy storage, hot water heaters, and heating devices that can shift load through pre- and post- set-forwards. Such geo-and temporal targeting of distributed energy resources will be key to deferring investments in centralized infrastructure that might otherwise become stranded assets.

Utility-Third Party Partnerships

While some program administrators in the region are undertaking pilots on their own, the vast majority are outsourcing for expertise on the subject of residential demand response. Others are reaching out to curtailment service providers who bid into wholesale markets to help identify customers who might also be candidates for curtailment events that a geared toward the distribution grid, rather than ISO dictated events. Partnerships between efficiency program administrators and third party curtailment service providers will likely be a key driver of integrated energy efficiency and demand response in future efficiency program plans.

In-Home Technology as a Bridge toward Broader Customer Engagement

Energy usage's "invisibility" has long been a problem for energy efficiency and conservation. However, demand response programs and related technologies offer the chance to drive customer engagement in a way that was never possible before. In some cases, in-home technologies such as a programmable and controllable thermostat, or an energy usage alert help drive customer engagement and satisfaction. These tools will be pivotal as the grid moves toward true cost pricing of energy usage, time varying rates, and advanced metering infrastructure.

In New York, regulators are contemplating a shift toward performance-based ratemaking that may provide utilities with an incentive to deliver efficiency and demand response programs that directly target customer satisfaction and engagement, helping ratepayers understand the value of energy savings, load shifting, and other potential streams for value creation (NYS PSCb 2015). In other states, program administrators are actively piloting customer engagement strategies enabled by advanced metering infrastructure. For example, National Grid recently filed an interim evaluation report with regulators in Massachusetts detailing a smart grid pilot project embracing customer engagement through smart devices, in home displays, time varying rates (Seiden 2016). The report found customer engagement strategies resulted in monthly energy savings of more than 30kWh per customer and peak load reductions between ten and 31 percent.

Conclusion

As some programs begin to explore opportunities for deployment of smart technologies and related demand response strategies, neighboring jurisdictions can learn from these early pilots and incentive frameworks. Consumers have demonstrated an inherent interest in information communication technology; an interest that can be a source of great savings for energy efficiency programs that capture the benefits of integrated demand side management. Learning from early efforts in California, states like Maryland, New York, and Pennsylvania are developing programs with the potential to combine energy efficiency and demand response offerings in a way that can provide greater value to ratepayers than either strategy could enable. As our electric grid begins to incorporate variable distributed resources, such strategies will be pivotal for ensuring reliability, economic viability, and customer satisfaction.

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