

MARYLAND’S BEHAVIORAL DEMAND RESPONSE PROGRAM – BALTIMORE GAS & ELECTRIC’S SMARTENERGY REWARDS

A successful transition to a 21st Century Electricity System (21CES) requires careful consideration of a range of issues that will ultimately redefine the regulatory framework and utility business model. This case study is the fourth in a series by Advanced Energy Economy Institute, America’s Power Plan, and Rocky Mountain Institute that highlights 21CES business model reforms being implemented in the United States and elsewhere. This series is published concurrently with a guiding document on Navigating Utility Business Model Reform to provide a menu of options and practical guidance for pursuing reform at the state level. This report is available at: <http://www.rmi.org/insight/navigating-utility-business-model-reform>

What Problem is Baltimore Gas & Electric’s Program Attempting to Solve?

Increased demand for air conditioning during the summer months typically raises peak electricity demand.¹ Typically, rising peak demand drives the need for additional infrastructure investments, even if overall load remains flat. In fact, approximately 10% of infrastructure investments nationally focus on serving demand in just 1% of hours of the year.² Strategic peak demand reductions can help avoid or defer capital-intensive system upgrades and save customers money.³

How is BGE Attempting to Solve That Problem?

In 2012, Baltimore Gas & Electric (BGE) – the largest electric utility in Maryland – began rolling out the SmartEnergy Rewards (SER) Program to reduce peak demand as part of its greater energy efficiency program. The program compensates customers with rebates on their electricity bills in exchange for reducing their energy usage during a handful of six-hour peak demand events (referred to as Energy Savings Days) each year. The program helps manage summer peak demand, keeping down the overall cost of electricity, reducing wholesale market prices, and easing the burden on Maryland’s electricity delivery system. The SER program is the largest dynamic pricing program in the nation, with 19.9% of all residential dynamic pricing customers in the United States as of 2017.⁴

Maryland Policies that Enable and/or Complement SmartEnergy Rewards

Energy Efficiency Resource Standard	Decoupling	Capitalization of Operating Expenses	Wholesale Revenue and Shared Earnings	Smart Meter Cost Recovery
Since 2008, Maryland has set energy efficiency goals through the EmPOWER program. Utilities must achieve annual incremental cost-effective energy savings of 2% of retail electric sales through 2023. At the time the SER program was created, Maryland also had a target of 15% reduction in per capita peak demand from 2007 levels by 2015.	Maryland has implemented full revenue decoupling since 2007. This breaks the link between the amount of energy a utility delivers to customers and the revenue it collects. Instead, revenues are adjusted so that utilities receive fair compensation to cover utility costs and to provide a fair return to shareholders delinked from fluctuations in sales.	Utility operating expenses for energy efficiency and demand response can be treated as capital expenditures that are then able to earn a full authorized return on investment (ROI) on par with other capital assets in the utility’s rate base, amortized over five years.	Maryland authorizes utilities to sell aggregated demand response commitments into the PJM capacity, energy, and ancillary services markets. The earnings from these sales are mostly passed through to customers to help finance incentives, but utilities keep a portion of the revenue.	In 2010, BGE was granted approval to move forward with an advanced metering infrastructure (AMI) deployment but cost recovery in base rates was deferred until the investments proved cost beneficial. The SER program was instrumental in maximizing the AMI business case and ultimately recovering the costs.

What was the Process to Implement SER?

In 2008, the Maryland legislature passed the EmPOWER Maryland Act, which set an energy efficiency resource standard, including a peak demand reduction target of 15% by 2015, and directed the Public Service Commission (PSC) to “adopt ratemaking policies that provide cost recovery and, in appropriate circumstances, reasonable financial incentives for gas companies and electric companies to establish programs and services that encourage and promote the efficient use and conservation of energy.” As part of its broader EmPOWER energy efficiency program, BGE conducted SER pilot programs from 2009 to 2012 before rolling out the program in the summer of 2013 to all residential customers with smart meters. The full launch included about 310,000 eligible customers. In the summer of 2014, that number increased to 860,000, and as of 2018, is around 1.1 million, or nearly all of BGE’s residential customers.

BGE committed significant resources to outreach and customer education, including print, online, and television advertisements. BGE implemented its outreach plan in three phases: 1) Create awareness through direct mailing, emails, and an educational video; 2) Generate engagement through television commercials, outbound telemarketing, and channels designed to allow customers to ask questions about the program; and 3) Encourage action through a brochure with FAQs, and a larger paid media campaign.

Key Program Attributes

Program Goals:

- Reduce peak demand on Energy Savings Days
- Achieve savings from market revenues and avoided PJM capacity costs
- Help customers reduce energy costs with bill credits for reducing their electric consumption on Energy Savings Days
- Improve the reliability of the electric grid
- Contribute to a cleaner, healthier environment

How it Works. All residential account holders with installed smart meters (~1.1 million customers) are automatically enrolled in the program, but can opt out. BGE notifies customers by phone, email, or text the day before an Energy Savings Day, and customers that reduce their usage from 1:00 PM to 7:00 PM the following day receive a \$1.25/kWh bill credit.⁵ Energy Savings Days are called by BGE based on market conditions when electric demand and the corre-

sponding market prices rise significantly or when system reliability may become compromised due to excess demand and scarce supply.

BGE not only provides multiple channels of information to customers on how to save energy during Energy Savings Days, it also notifies customers of their savings within a few days after the Energy Savings Day (via phone, email or text). This provides each customer with timely feedback and validation of the value of the program.

Cost Recovery. The peak-time rebates paid to residential customers for SER come from the surcharge that funds EmPOWER Maryland overall. The peak-time rebate charge represents the cost of the peak-time rebates paid to residential customers based on their load reductions during Energy Savings Days, net wholesale revenue achieved from monetizing the load reductions in the PJM markets. The benefits outweigh the costs of the program, with program costs ultimately reducing customer costs overall.

Program Summary and Performance to Date

Participation and Savings. Since the program’s inception in 2013, the number of eligible and participating customers has steadily increased as BGE has rolled out smart metering infrastructure, resulting in over 300 MW of peak demand reduction each year – about the size of an average coal-fired power plant. Participation and savings for the program are summarized in the table below:

SER Program Summary to Date

Year	# of Energy Savings Days	Eligible Customers	Average Bill Credit	Peak Demand Reduction (MW)	Total Bill Credits to Customers	% Participation
2013	4	315,000	\$9.03	96	\$7 M	82%
2014	2	860,000	\$6.55	209	\$5.6 M	76%
2015	4	1,020,000	\$6.67	309	\$15.5 M	81%
2016	3	1,074,000	\$6.73	336	\$11 M	71%
2017	2	1,095,000	\$6.13	330	\$6.1 M	74%

Wholesale Market Benefits. BGE is able to sell the energy and peak demand reductions achieved by the SER program directly into the PJM wholesale market. SER energy and peak demand reductions also generate dollar benefits for customers through avoided costs and wholesale energy price suppression. Furthermore, the program allows for other economic benefits such as reduced risk exposure to the wholesale markets and direct or avoided capital savings. These revenue streams are summarized in the table below.

SER Wholesale Market Benefits to Customers, 2013 to 2015⁶

	Benefits from Peak Demand Reductions			Benefits from Energy Reductions			Total
	Wholesale Capacity Revenue	Avoided Capacity Cost	Capacity Price Mitigation	Wholesale Energy Revenue	Avoided Energy Cost	Wholesale Energy Price Suppression	
Benefits	\$46 M	\$87 M	\$234 M	\$25 M	\$9 M	\$5 M	\$406 M
Share of Total	11%	21%	58%	6%	2%	1%	100%

Operational Benefits. The SER program also provides significant operational benefits to BGE. Transmission and distribution systems must reliably serve peak demand. When the SER program results in lower peak demand, it also reduces BGE’s transmission and distribution capital requirements. BGE estimated \$93M of avoided transmission capital expenditures and \$72M of avoided distribution capital expenditures as a result of the SER program from 2013 to 2015. In addition, the program results in operational and management savings for the utility, which can be retained between rate cases because of reduced stress on the utilities distribution system.

Utility Incentives. In addition to being able to capitalize the operating expenses, one of the main incentives for BGE to promote this program came out of its smart grid deployment. BGE was able to use the SER program in the benefit-cost analysis for its smart grid deployment to all BGE customers. BGE could not recover any of the AMI costs until the utility proved that the deployment had a positive benefit-cost. Furthermore, BGE is allowed to earn a 9.75% return on equity on its smart grid program (included in base rates) only if it can show the program has a positive cost-benefit ratio. This is a lot of money that the utility could either lose or gain, as the utility estimated it spent \$687 million in capital expenditures and \$165 million in operating and management expenditures on AMI deployment.⁷

Signs of Success

In large part due to the success of BGE’s EmPOWER programs, BGE was ranked fourth among 51 U.S. electric utilities in ACEEE’s first “Utility Energy Efficiency Scorecard” in 2017. While the ranking takes into account several different factors, BGE received the maximum points available for peak demand reduction and the highest peak demand reduction, at 2.54%, as a percentage of total peak demand of all utilities measured – the goal of the SER program.

The SER program, along with BGE’s overall energy efficiency initiatives, has received significant praise over the last several years, particularly for its behaviorally driven focus through its partnership with Oracle (formerly OPower). According to Oracle, the program “has been wildly successful...,” in boosting customer engagement as well as saving energy. “Cus-

tomers want to engage with BGE... [W]hile most utilities have email addresses for about 10% of their users, BGE has verified emails for more than half of its customers, in part due to this program.” Oracle also has cited BGE’s positive engagement on Twitter and other social media channels. The instant feedback provided by the program provides immediate gratification, and the competitive “gamification” of participation has led to “office competitions to generate the largest savings.”

Stakeholder Criticism

While most stakeholders praise BGE for the program, there has been some criticism of BGE’s program measurements.

According to testimony from the Maryland Office of People’s Counsel, BGE “does not appear to have accounted for free-ridership – those customers who randomly decreased load, instead of decreasing load due to the SER program.”⁸ They stated that in similar peak time rebate programs, such as Southern California Edison’s, “approximately 80 percent of the credits from its PTR program were due to random reductions in load, rather than the result of the PTR program.” The testimony argued that SER program benefits should be reduced by as much as 28% as a result of free-ridership. On the other hand, BGE noted that “the measured energy reductions, no doubt, include free riders...but that is not relevant to PJM. The only thing relevant to PJM in the context of energy compensation is the measured quantity of the energy reductions, regardless of free riders and load increasers.”⁹

Sources

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End Notes

¹ <https://pjm.com/~media/markets-ops/rpm/rpm-auction-info/2021-2022/2021-2022-base-residual-auction-report.ashx?la=en>

² Potential for Peak Demand Reduction in Indiana, <https://info.aee.net/2018-peak-demand-reduction-for-indiana>

³ <https://www.pjm.com/~media/markets-ops/dsr/end-use-customer-fact-sheet.ashx>

⁴ Dynamic Pricing 2017 Data Early Release: <https://www.eia.gov/electricity/data/eia861/>

⁵ Energy reductions are measured against a baseline (i.e., the customer’s average usage for recent historical days with similar temperature and humidity that are non-holiday weekends and non-event days) during the targeted demand period.

⁶ Wholesale capacity revenue equals quantity of SER enhancement capacity offered and cleared in the PJM capacity auction, multiplied by the clearing price, less any incremental auction purchases. Wholesale energy revenue is calculated on the same principle. Avoided capacity costs represent the savings from a reduction in the quantity of capacity cleared in the PJM capacity auction, as a direct result of SER peak demand reductions. Avoided energy costs follow the same principle. Capacity price mitigation occurs when SER peak demand reductions are monetized in the PJM capacity auction, effectively shifting capacity supply out, thus reducing the auction clearing price. SER peak demand reductions above monetized capability shift the demand curve in, also reducing the auction clearing price. Energy price mitigation results from demand reductions leading to lower prices.

⁷ Maryland Office of People’s Counsel Testimony, February 8, 2016 (Extended),

http://webapp.psc.state.md.us/newIntranet/Casenum/NewIndex3_VOpenFile.cfm?FilePath=C:\Casenum\9400-9499\9406\29.pdf

⁸ Ibid.

⁹ BGE Rebuttal Testimony, March 4, 2016, http://webapp.psc.state.md.us/newIntranet/Casenum/submit_new.cfm?DirPath=C:\Casenum\9400-9499\9406\Item_43&CaseN=9406\Item_43