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EmPOWER Maryland 2019 Q3-Q4

Semi-Annual Review Report



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Introduction

These comments are provided to the Maryland Public Service Commission (Commission) as part of the ongoing implementation of the EmPOWER Maryland Energy Efficiency Act of 2008, Md. Code Ann. Pub. Util. Art. § 7-211, (EmPOWER Act or Act). These comments pertain to the third of six semi-annual reports that the utilities will file in the 2018-2020 EmPOWER program cycle.

The Maryland Office of People’s Counsel (OPC) asked VEIC to review the ratepayer-funded and overall residential sector energy efficiency and demand response services and programs offered by five electric utility companies—the Potomac Edison Company (Potomac Edison), Baltimore Gas and Electric Company (BGE), Delmarva Power & Light Company (DPL or Delmarva), Potomac Electric Power Company (Pepco), and the Southern Maryland Electric Cooperative, Inc. (SMECO) (jointly referred to as the “EmPOWER Electric Utilities”)—and one gas utility, Washington Gas Light Co. (jointly referred to as “EmPOWER Utilities”). Additionally, we assess the ratepayer-funded limited income programs administered by the Maryland Department of Housing and Community Development (DHCD).

This document provides VEIC’s comments and recommendations based on our review of the 2019 Q3-Q4 Semi-Annual Reports and cycle-to-date program achievements and challenges.

VEIC has assisted the OPC with review and comments on the EmPOWER Maryland Utilities’ program plans and semi-annual reports since 2010. VEIC also continues to participate in a number of stakeholder meetings and work groups on behalf of the OPC. VEIC brings decades of experience in energy efficiency program design and implementation in dozens of states and provinces. We offer the following comments in a collaborative spirit and look forward to continuing to work with the utilities and all stakeholders to continually improve program design and delivery—with the ultimate aim of benefiting Maryland’s ratepayers through cost-effective, well-designed energy efficiency and demand response initiatives.

Key Definitions

The following are key terms used throughout the report:

- Program-to-date (PTD): Refers to performance of a program(s) for all years it has been in operation. For many programs, this goes back to 2009.
- Cycle-to-date (CTD): Refers to performance during the current 2018-2020 reporting cycle. For example, in this report cycle-to-date refers to performance from January 1, 2018, to December 31, 2019.
- Annualized Savings: Refers to one year of energy savings for measures installed during the reporting period. In other jurisdictions, this is often referred to as “first year savings.”
- Lifecycle Savings: Refers to the total savings of an individual measure or group of measures for their expected lifetime. For example, if an LED lighting fixture installed today has an expected lifetime of 10 years, the lifecycle savings is the total electric savings that fixture should produce over that 10 years.

For consistency of reporting among utilities and years, the graphs and tables that compare reported savings to forecasts are based on cycle-to-date forecasts divided by the six reporting periods. Percentage of goals achieved may therefore differ from what utilities report in their reports, which may be based on annual forecasts.

EmPOWER: Results and Benefits

Cycle-to-Date Performance

Commission Order No. 87082, issued on July 16, 2015, created a framework for EmPOWER electric savings goals from 2016 to 2020. The Commission ordered that the electric utilities achieve annual incremental gross energy savings of 2% of weather-normalized gross retail electricity sales per year. The Commission established electric savings targets for 2017 and ordered that the utilities use a ramp-up rate of 0.20% per year to ramp up to 2% annual savings by 2020. The 2018-2020 goals use 2016 retail sales as the baseline. The 2% annual electric energy efficiency goal was codified into law by the Maryland legislature.¹

Table 1 below shows 2018-2020 savings targets and reported performance for the EmPOWER Electric Utilities across the entire portfolio, both residential and commercial and industrial (C&I), and including savings from demand response and other programs, such as conservation voltage reduction (CVR). It is important to note that the 2019 savings targets vary widely, with Potomac Edison having a target of 1.57% while the other utilities have ramped to the 2% annual savings target.

Table 1: Annual Savings Rates per Order No. 88402 and Reported Savings.

Utility	2019 Forecasted Annualized Savings *	2019 Targets Set in Order 88402	2019 Targets as % of Retail Sales	2019 Reported Savings	Reported Savings as % of Retail Sales [†]	Savings Relative to 2019 Target
PE	118,903	116,462	1.57%	145,460	1.96%	+0.39%
BGE	675,739	632,433	2.00%	841,310	2.63%	+0.63%
Pepco	263,117	290,933	2.00%	509,367	3.50%	+1.50%
Delmarva	95,746	84,111	2.00%	117,158	2.79%	+0.79%
SMECO	67,406	67,777	2.00%	75,907	2.24%	+0.24%

* All EmPower Programs, including Energy Efficiency, Demand Response, and Other Programs such as CVR

[†] Annual reported savings compared to annual baseline (2016) weather-normalized retail sales

As illustrated in the table above, all utilities are exceeding their annual savings forecasts, and BGE, Pepco, Delmarva, and SMECO are exceeding their overall savings forecasts and the 2% annual savings goal, some by a wide margin. Performance of the residential programs is reviewed in the Residential Portfolio Overview and Key Recommendations and Cycle-to-Date Residential Performance sections.

¹ Public Utilities Article § 7-211(h)(2); Acts 2017, Ch. 14 (Senate Bill 184) at mgaleg.maryland.gov.

The EmPOWER electric utilities did not report their behavior program savings consistently. Further, the way forecasts and reported data, and participants and savings are reported are not the same. Therefore, VEIC adjusted the data as follows to make it comparable across utilities:

- For the current cycle behavior program forecast, Pepco, Delmarva, and Potomac Edison added up the annualized savings over three years to develop the cycle savings forecast, while SMECO and BGE did not. Since the program only has a one year measure life, the forecasted savings for the cycle should reflect that and not be cumulative. VEIC therefore divided Pepco, Delmarva, and Potomac Edison forecasts by three to match SMECO and BGE.

We continue to suggest that the evaluators reviewing EmPOWER programs recommend a preferred method for the utilities to report and forecast participation and savings for the behavior program, and require the utilities to be consistent with that directive for future reporting cycles.

EmPOWER’s Many Benefits

Energy efficiency continues to be a least-cost resource for the electric utility system and a wise investment on behalf of Maryland’s ratepayers. The lifecycle cost per kWh for the residential portfolio ranges from \$0.025 to \$0.033 (presented in Table 2), which is lower than the alternative option of purchasing electricity, which currently ranges from \$0.0598 to \$0.0775 per kWh in Maryland.”²

Table 2: CTD energy and cost savings—all EmPOWER electric utility programs.

Utility	Reported Total Program Expenditures (\$)	Reported Lifecycle Energy Savings (MWh)	Reported Cost per Lifecycle Savings (\$/kWh)
PE	\$49,137,439	1,468,311	\$0.033
BGE	\$293,885,619	11,572,823	\$0.025
Pepco	\$151,805,285	6,003,543	\$0.025
Delmarva	\$43,620,664	1,722,049	\$0.025
SMECO	\$43,650,732	1,329,134	\$0.033

Energy efficiency investments deliver myriad economic benefits to the electric system, in addition to the ratepayers’ cost savings from avoided energy purchases. Additional system benefits include avoided capital investments in peak production capacity, avoided investments in transmission and distribution infrastructure, reduced line losses, and avoided reserves. These savings accrue to all ratepayers—regardless of whether they directly participate in EmPOWER programs.

² The weighted average Standard Offer Service (SOS) price from October 1, 2019 to September 30, 2020 for the participating electric utilities ranges from \$0.0598 to \$0.0775 per kWh, based on the data available at <https://www.psc.state.md.us/electricity/standard-offer-service/>.

In addition to all the system-wide benefits, participants in EmPOWER energy efficiency and demand response programs receive a variety of direct benefits, such as reduced energy bills, reduced operation and maintenance costs, improved health, and increased comfort.

Beyond the direct benefits to ratepayers and program participants, EmPOWER programs result in various societal benefits. These include meeting the goals identified in Maryland's Greenhouse Gas Reduction Act (GGRA) such as reduced greenhouse gas emissions and improved air quality, benefits for low-income customers, and increased energy security and resilience. These benefits are significant and further enhance the value of Maryland's investment in efficiency.

Looking Forward

As the utilities and DHCD enter the last year of the program cycle, conversations have begun about new programs, approaches, and technologies that should be considered for the 2021-2023 program cycle. The utilities and DHCD should look to the various pilots and evaluations happening within Maryland, and consider the emerging trends in other leading states, to enhance value to Maryland's ratepayers. At the same time, it will be critical to consider the impact of the COVID-19 pandemic on Maryland customers – and identify ways for the EmPOWER programs to support the energy efficiency industry through the near-term crisis and longer-term recovery.

In this section we discuss four overarching recommendations for EmPOWER programming:

- Continue progress on Work Group assignments and deliverables
- Increase Limited Income participation and energy savings
- Consider impacts of COVID-19 on EmPOWER programs – and how efficiency programs can support resilience and recovery
- Share successful approaches for scale-up in the next cycle

Continue Progress on Work Group Assignments and Deliverables

Work Groups have continued their work in response to Commission directives. Commission Order No. 89404 detailed several key items for the Work Groups to follow up on, summarized in While many of the Work Groups are engaged in productive discussions, OPC notes that the Work Group process at this stage appears unlikely to yield consensus on several important issues. The Limited Income Work Group has not yet revisited limited income goal-setting, despite the Commission's direction to do so in Order No. 89404. In addition, while the Cost Recovery Work Group continues to work toward a September 1, 2020 deadline to provide a report, the parties appear unlikely to reach consensus as the EmPOWER Utilities seek to maintain the current approach to cost recovery and amortization, while OPC and Staff look for opportunities to reduce costs to ratepayers.

Table 3 below. We continue to support these discussions as a way to provide transparency and opportunities for stakeholder input. While many of the Work Groups are engaged in productive discussions, OPC notes that the Work Group process at this stage appears unlikely to yield consensus on several important issues. The Limited Income Work Group has not yet revisited

limited income goal-setting, despite the Commission’s direction to do so in Order No. 89404. In addition, while the Cost Recovery Work Group continues to work toward a September 1, 2020 deadline to provide a report, the parties appear unlikely to reach consensus as the EmPOWER Utilities seek to maintain the current approach to cost recovery and amortization, while OPC and Staff look for opportunities to reduce costs to ratepayers.

Table 3: Work Group (WG) activities and suggested next steps.

Work Group (WG)	WG Activities Since Semi-Annual Hearing in October 2019	Suggested Next Steps
Behavior	<ul style="list-style-type: none"> Commission Order No. 89189 approved the Advanced EM&V pilot to be offered by BGE and SMECO in 2020. No subsequent Work Group meetings have been scheduled. 	<ul style="list-style-type: none"> The Work Group should remain actively engaged to track the progress of the Advanced EM&V pilot in 2020. The Work Group should begin discussing new program approaches for the 2021-2023 program cycle which meet the Commission’s directives in Order No. 89189.
Cost Recovery Work Group	<ul style="list-style-type: none"> Order No. 89189 directed the Cost Recovery Work Group, to file a report by September 1, 2020 with further information on several issues related to cost recovery: separating the Behavior Program from amortization of other efficiency programs, providing recommendations on other costs that could be recovered over one year such as administrative costs, and considering cost recovery mechanisms to encourage third party participation. The Work Group has met several and traded proposals and comments to continue its work, but the utilities remain committed to continuing the existing methodology of cost recovery. As such, no consensus has been reached on a number of key issues. 	<ul style="list-style-type: none"> The Work Group should continue to meet and establish common understanding of the structure and current status of EmPOWER cost recovery. To the extent possible, the Work Group should work towards consensus on a cost recovery and amortization approach, and address the specific issues identified by the Commission.
Natural Gas—Electric	<ul style="list-style-type: none"> Order No. 89404 approved the Utilities’ final plan as proposed for Phase II of the 	<ul style="list-style-type: none"> The Utilities should continue progress towards implementation of a

Work Group (WG)	WG Activities Since Semi-Annual Hearing in October 2019	Suggested Next Steps
Coordination Work Group	<p>RNC program. It also directed the Work Group to consider whether to allow for varying incentives for different types of equipment.</p> <ul style="list-style-type: none"> The Utilities filed a draft report on April 15, 2020 proposing an updated incentive structure and cost sharing model for a coordinated RNC program, to be implemented starting in January 2021. 	<p>coordinated RNC program in 2021, convening the Work Group to address outstanding issues as needed.</p>
Home Performance with ENERGY STAR (HPwES)	<ul style="list-style-type: none"> Work Group activity primarily through the Natural Gas-Electric Coordination Work group. No Work Group activities occurred in Q3-Q4 2019. Order No. 89404 approved the modification of the Performance Based Incentive for HPwES/HEIP from \$1-3 to \$3-6 per lifetime MMBtu. Order No. 89404 approved Commission Staff's definition of fuel-neutrality: "providing electric and natural gas customers with the opportunity to receive equitable incentives for comparable electricity or natural gas savings measures." 	<ul style="list-style-type: none"> Work Group should convene to discuss potential modifications to the Residential Retrofit programs (QHEC, HPwES, and HEIP) for the 2021-2023 cycle to increase customer participation and integrate new non-lighting measures into the QHEC program. Work Group should discuss how enhanced financing options, such as DHCD's BeSMART loan, will be promoted and integrated into program delivery in the 2021-2023 cycle.
HVAC	<ul style="list-style-type: none"> No current activity. 	<ul style="list-style-type: none"> Given the slow start to the utilities' upstream programs and mixed feedback from contractors, the Work Group should reconvene to discuss program results to date and whether program design changes are warranted.
Limited Income	<ul style="list-style-type: none"> Work Group was very active in Q3-Q4 2019 discussing program ideas for the 2021-2023 program cycle and ways to enhance collaboration between the Utilities and DHCD. 	<ul style="list-style-type: none"> DHCD and Staff should continue to engage stakeholders proactively as it develops its 2021-2023 plans. The Work Group should reconvene to discuss an

Work Group (WG)	WG Activities Since Semi-Annual Hearing in October 2019	Suggested Next Steps
	<ul style="list-style-type: none"> Order No. 89404 declined to establish a limited income energy savings goal. It directed the Work Group to continue efforts to establish a savings goal. Order No. 89404 also directs Commission Staff and DHCD to co-lead the Work Group through the 2021-2023 planning process to increase collaboration between Utilities and DHCD on ways to increase participation. 	<p>energy savings goal. It has not done so since Order No. 89404 was issued, and a goal would help guide program planning activities.</p> <ul style="list-style-type: none"> Pursuant to Order No. 89404, the Work Group should also continue to discuss ways to increase participation of limited income customers in program offerings, especially ones that have no additional cost, and to expedite service delivery to limited income customers.
Financing	<ul style="list-style-type: none"> No activity in Q3-Q4 2019. 	<ul style="list-style-type: none"> HPwES Work Group should consider how enhanced financing options will be implemented in the 2021-2023 cycle.

Increase Limited Income Participation and Energy Savings

Commission Order No. 89404 directed the Work Group to continue efforts to establish a savings goal. While the Limited Income Work Group has extensively discussed new program ideas and ways to improve collaboration between DHCD and the Utilities, it has not yet continued discussion on energy savings goals. The conversations on new program ideas and collaboration options have been thoughtful and productive, as illustrated by the examples provided by the Utilities in their Q3-Q4 2019 semi-annual reports. Examples of increased collaboration and cross-marketing of utility and DHCD programs include:

- Utilities coordinating with DHCD on the removal and proper replacement of Demand Response devices, as reported by Pepco and Delmarva
- Providing DHCD program information to limited income QHEC customers, as reported by BGE
- Providing information to DHCD about customers that had disconnections due to nonpayment and had been reconnected, as reported by Potomac Edison
- Inclusion of DHCD program materials in a variety of customer outreach mechanisms, such as energy efficiency kits, food bank lighting distribution, and walk-in payment offices

Increasing the options for limited income customers to take advantage of the energy savings provided through EmPOWER should continue to be a strong focus as the Utilities and DHCD prepare their 2021-2023 plans. A recent ACEEE report that ranked the energy efficiency programs of the 52 largest electric utilities provides a window into how the EmPOWER Maryland

programs perform compared to peer programs.³ While BGE was the only Maryland utility large enough to be ranked, because the other EmPOWER utilities offer very similar programs and operate in the same state policy framework, they would likely receive similar scores to BGE. BGE generally performed very well, ranking fifth overall. However, BGE lagged in low-income program performance. Despite the comprehensive programs offered by DHCD, BGE achieved only 1.54 kWh of savings per residential customer – far below ACEEE’s recommended level of at least 6.00 kWh of savings per residential customer. This indicates that there is potential to significantly ramp up the level of energy savings and participation for the EmPOWER Maryland limited income programs by expanding access to existing programs and broadening the portfolio of low-income offerings. Utilities achieving high levels of low-income program savings typically offer wide range of low-income programs, such as programs supporting new construction and major renovation of affordable housing and lighter-touch programs offering efficiency kits or direct installation of low-cost measures.

We continue to believe that setting a limited income energy savings goal is essential to driving program improvements and increasing the equity of program services for limited income customers.⁴ The Limited Income Work Group has not revisited the topic of a limited income energy savings goal, despite the Commission’s direction that it should continue to work toward consensus on this issue.

It is particularly important that EmPOWER Maryland offer a comprehensive and easily accessible suite of low-income programs in the context of the COVID-19 pandemic, which is causing economic hardship for many households. We also see opportunity to increase savings by diversifying the ways that limited income customers can access EmPOWER beyond LIEEP and MEEHA. Targeting the Utilities’ QHEC program outreach and enrollment to limited income customers and communities is one way EmPOWER has successfully diversified its offerings. We expect there are other opportunities to reach more limited income customers more quickly while still providing whole-home weatherization services to those that need it most. The Work Group should focus on developing new approaches to test in 2020 that can be scaled in the next cycle.

Consider Impacts of COVID-19 on Efficiency Programs – and How Efficiency Programs Can Support Resilience and Recovery

In response to the COVID-19 (Novel Coronavirus) global pandemic, Governor Larry Hogan declared a State of Emergency on March 5, 2020. All non-essential businesses were closed pursuant to an order issued by the Governor on March 19, 2020. On March 30, 2020, the Governor ordered all Maryland residents to stay at home, with certain limited exceptions. These orders expanded the impact on businesses, and further limited allowable work activities to those considered “essential.” The March 19th and 30th orders were in furtherance of CDCP and Maryland DOH recommendations for “social distancing.” Reduced consumer spending across various business sectors has resulted in business closures and a dramatic increase in unemployment due to layoffs.

³ 2020 ACEEE Utility Scorecard, https://www.aceee.org/sites/default/files/pdfs/u2004%20rev_0.pdf.

⁴ Senate Bill 740 (House Bill 982), introduced during the 2020 legislative session, would establish a 1% goal for EE electric savings for Low Income utility customers. Neither bill has received a formal vote by the Senate or House Committees.

The EmPOWER Maryland programs are likely to experience dramatic reductions in participation and energy savings, due to both customers' increased economic hardship and restrictions on on-site efficiency services due to the risk of spreading the COVID-19 virus. For example, the utilities have canceled home energy audits and stopped scheduling new appointments for the HPwES program,⁵ and DHCD notes that it is "expecting to see a sharp decrease in its program production over the next months."⁶ Other programs that do not require on-site services, such as the Lighting Program, may be less affected, but there remains a great deal of uncertainty, and even these programs may be impacted by reduced shopping in retail stores for non-essential goods.

In the near-term, we suggest that a Work Group be convened to consider immediate measures to help the energy efficiency industry weather the COVID-19 pandemic. Many states and utilities have temporarily suspended on-site energy efficiency work, and energy efficiency contractors are laying off or furloughing workers. HPwES and weatherization programs and contractors have been particularly hard-hit. In response to this crisis, states are considering a number of near-term actions to support the energy efficiency industry and workforce.⁷ Such actions include:

- Providing 30-day advance payments or emergency loans to energy efficiency contractors.
- Allowing partial payments to contractors in advance of project completion (for example, DHCD has temporarily waived the requirement that jobs be inspected prior to invoicing for payment).
- Developing options for virtual energy audits and site inspections.
- Supporting distance learning and remote training to enhance the skills of energy efficiency contractors and workers, so they can use their time productively while unable to work on-site.
- Shifting marketing efforts to support customer education and promote participation in efficiency programs that do not require on-site work.
- Once some construction businesses are able to reopen, considering creative strategies to support on-site work that can occur with low risk, such as new construction, sidewall insulation from exterior, and insulating and air sealing basements that are accessible from bulkheads or outside doors.

As the EmPOWER Utilities look ahead to the 2021-2023 program cycle, stakeholders should consider how the energy efficiency programs can stimulate economic recovery from COVID-19 in Maryland. The Utilities should work with efficiency contractors to develop longer-term proposals to support this industry and take advantage of federal or state stimulus funds.

The EmPOWER Utilities should also consider ways to enhance flexibility and resilience within the EmPOWER portfolio, so they can manage effectively given the higher level of uncertainty over the coming months and years. The Utilities may need enhanced flexibility to shift funds across residential programs to respond to changing market conditions; DHCD recently requested this type of flexibility to shift funds between LIEEP and MEEHA.⁸ They should also consider enhanced

⁵ BGE Home Performance with ENERGY STAR, <https://www.bgesmartenergy.com/residential/help-me-save/home-performance>.

⁶ DHCD Coronavirus Update, April 2, 2020.

⁷ Building Performance Association Coronavirus Resources, <https://www.building-performance.org/coronavirus>.

⁸ DHCD Request for Approval to Transfer Funds, April 2, 2020.

incentives for hard-hit programs, such as HPwES, to jumpstart the programs once on-site work can begin. Lastly, the Utilities should evaluate how the COVID-19 pandemic could affect the market for energy-efficient products, such as lighting. For example, it may make sense to continue incentivizing LED bulbs for a longer period of time, given the combination of economic downturn and federal rollbacks on lighting standards.

Finally, program services and expenditures are likely to be reduced in 2020 due to the restrictions in on-site services caused by COVID-19. As OPC has noted in comments in the Cost Recovery Work Group, such temporary reductions in program expenditures offer an opportunity to use the underspend amount to pay down the unamortized balance associated with EmPOWER programs, which could substantially reduce the costs to ratepayers of the current approach to cost recovery and amortization. If, hypothetically, program spending and services decline by 10% this year due to COVID, the unspent funds could be used to pay down the outstanding balance. For example, a reduction in residential spending of \$12 million, if directed to paying down the outstanding balance, would result in a reduction from approximately \$52 million to \$40 million (based on the utilities' 2019 Cost Recovery reporting). There would be no rate impact from this reallocation, although the program services delivered would be reduced, and ratepayers would benefit from the reduction of future carrying costs.

Share Successful Approaches for Scale-Up in the Next Cycle

We continue to encourage the utilities to share lessons learned and best practices with one another and with stakeholders, to identify program models for broader rollout in the next three-year program cycle. For example, Utilities are employing a range of approaches to Smart Home, Smart Thermostat, and Behavior Programs, including different products and delivery channels (e.g., selling thermostats via online marketplaces). Some are integrating cutting-edge approaches such as thermostat optimization and digital engagement in Behavior Programs. Innovative behavioral pilots to test new approaches – the Budget Billing and Advanced EM&V Behavioral Disaggregation Pilots – are currently underway. Utilities should actively share results and highlight successes from these efforts, so those that have not yet deployed these innovations can “fast-follow” and scale up the most successful delivery channels and program models.

VEIC and OPC also support identification of additional pilots to advance the state of knowledge on key program opportunities. For example, we continue to highlight opportunities to test innovative financing options to complement the DHCD BeSMART loan offering. We encourage the EmPOWER utilities to report on pilot results more consistently and transparently, and to follow the Commission's systematic approach to developing and evaluating pilot programs, as laid out in Order No. 88964.⁹ We look forward to reviewing the evaluations of key pilots, such as BGE's Smart Home Pilot, for which results will be available in time to inform the Utilities' plans for the 2021-2023 cycle.

⁹ Maryland Public Service Commission, Order No. 88964, Case No. 9494.

Residential Portfolio Overview and Key Recommendations

Cycle-to-Date Residential Portfolio Performance

Cycle-to-date (CTD) residential program performance on participation, spending, and savings showed the same basic trend across EmPOWER Electric Utilities – participation and savings are typically well above forecast and spending is just slightly above forecast. After a slow start in 2018 as programs ramped up, Washington Gas has picked up the pace and has participation rates above forecast with spending and savings falling behind.

Figure 1 illustrates the utilities' CTD achievement of forecasted goals for the residential portfolio as a whole.

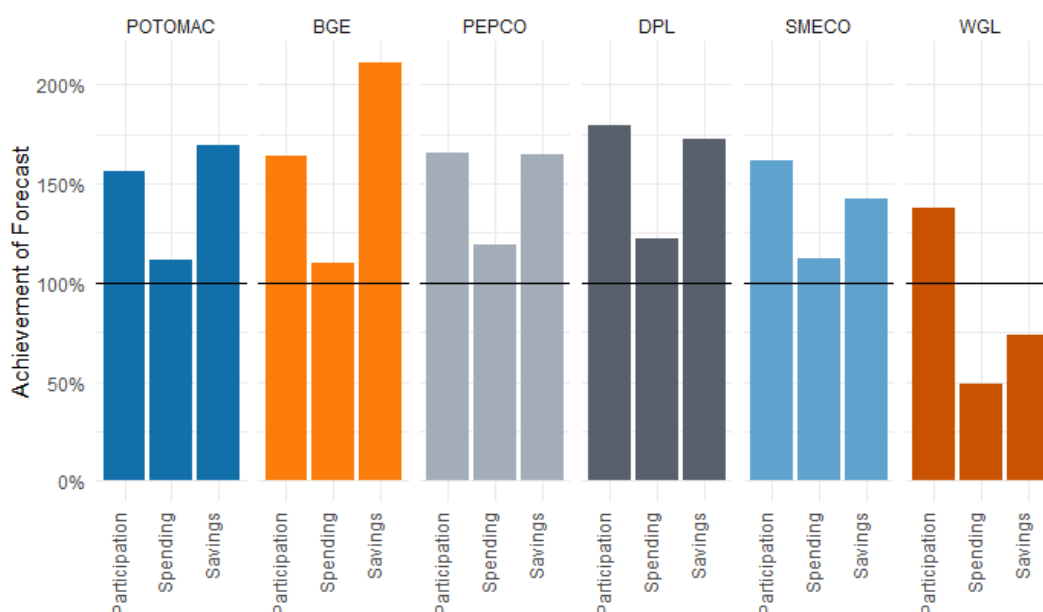


Figure 1: Cycle-to-Date residential portfolio achievement of forecasted goals. ¹⁰

Note: Goals are adjusted to treat behavior savings consistently. Electric savings are shown except for Washington Gas, for which gas savings are shown. Please note that Washington Gas did not begin reporting savings until Q4 2018.

¹⁰ As noted above, the EmPOWER Electric Utilities report their behavior program cycle participation and savings inconsistently. For the current program cycle forecast, Pepco and Delmarva Power added up the annualized participation savings over 3 years to develop cycle savings forecast, while SMECO and BGE report just 1 year of savings for the cycle. Potomac Edison reports 3 years of savings but 1 year of participation for the cycle. For the analyses in this report, we considered the utilities' cycle forecasts as the cumulative annualized savings of the 3 years of the cycle, for consistency among utilities and with the definition of cycle forecast for annualized savings as we currently understand it. We multiplied one-year annualized savings estimates by 3 to calculate the cycle annualized savings forecast.

Figure 2 shows the total CTD residential portfolio savings as a percentage of retail sales for the electric utilities, and the relative contribution of the Lighting, Appliance, Retrofit, HVAC (Heating, Ventilation, and Air Conditioning), Residential New Construction, Energy Efficiency Kits, Behavior Programs, and “Other” (Schools, Family Farms) to total savings for each utility. Lighting program savings continue to be above target for all five utilities, and it is important to note that savings from efficient lighting comprises a large share of the savings associated with Residential Retrofit (due to the Quick Home Energy Check program), and the vast majority of savings associated with Energy Efficiency Kits.

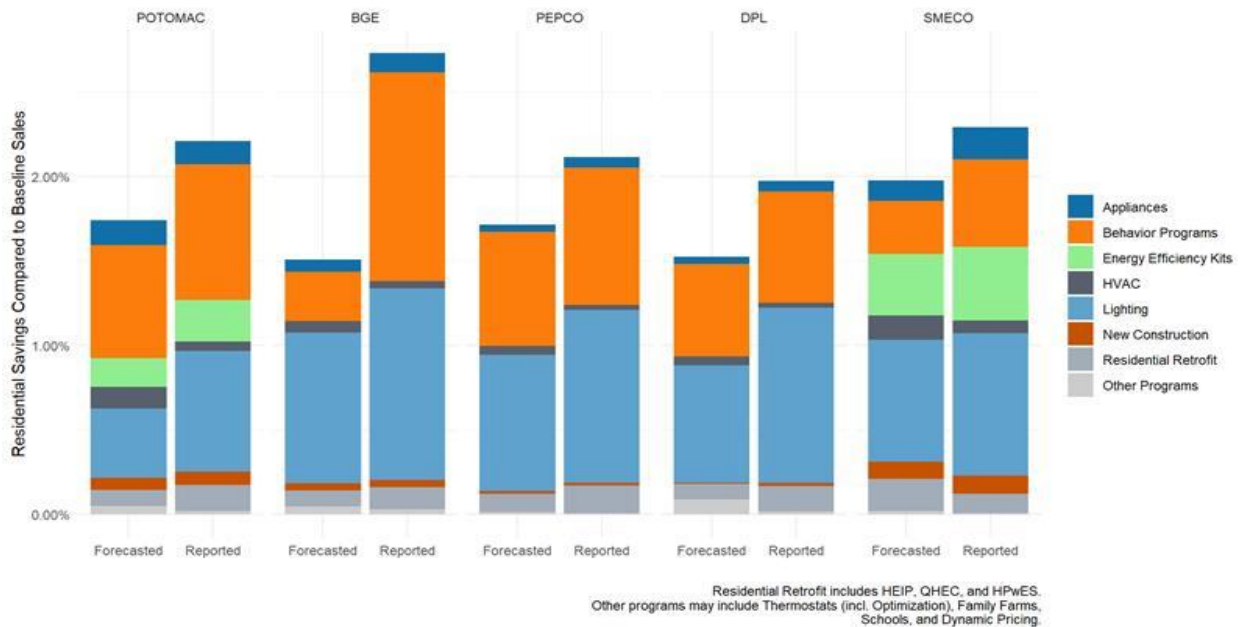


Figure 2: Cycle-to-Date residential program forecasted (left) and reported (right) savings as percentage of baseline sales. Cycle behavior savings are cumulative to ensure consistency among utilities.

While lighting measures continue to provide robust savings and good value to the EmPOWER portfolio, it will be important for the EmPOWER utilities to move aggressively to identify and scale up other sources of residential electric savings as the lighting market transforms.

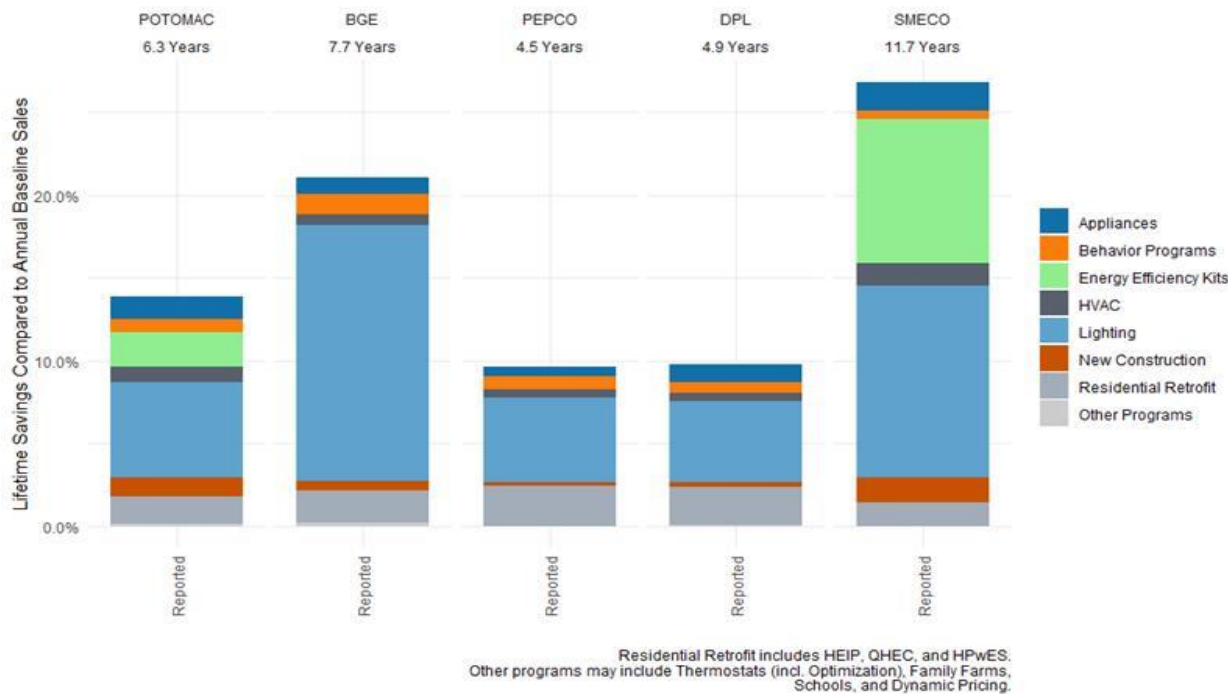


Figure 3: Cycle-to-Date lifecycle residential program savings compared to baseline sales and average measure life in years.

While the behavioral programs contribute a relatively large share of the annualized savings, due to the one-year measure life in this program, lifecycle savings are far lower for Behavior Programs compared to other EmPOWER programs, as illustrated in Figure 3. This figure also shows the average measure life of savings for the entire residential portfolio, which varies across the utilities from 4.5 years for Pepco to 7.7 years for BGE. Note that while SMECO’s average measure life is shown in this chart as 11.7 years, this is influenced by an apparent error in its lifecycle savings reported for its energy efficiency kits program which is roughly double what we would expect it to be at 20 years. SMECO’s average measure life in the last reporting cycle was 7.5 years, which is still longer than most other utilities except for BGE.

Notably, the longer lifecycle of measure savings for BGE and SMECO contributes to a higher percentage of energy savings as a percentage of retail sales.

Summary of Key Program-Specific Recommendations

Overarching Recommendations

- Continue progress on work group assignments and deliverables – These have been helpful forums for program implementers, administrators, and stakeholders to share ideas and information.
- Increase Limited Income participation and savings – Collaboration between DHCD and Utilities is essential to ensuring that limited income customers have access to a broad array of energy saving opportunities.

- Consider impacts of COVID-19 on efficiency programs – and how efficiency programs can support resilience and recovery.
- Share successful approaches and scale up for the next program cycle – there are numerous pilots in place and new programs that are being tested which may be worth incorporating into the Utility program portfolios statewide.

Lighting

- We recommend that the utilities strengthen engagement with retail partners, as well as non-retail partners – notably food banks and non-profits – serving households hardest hit by the COVID-19 pandemic.
- We recommend that utilities continue to balance achieving a diversified mix of LED products through retail and hard-to-reach sales channels, while achieving gains in cost-effectiveness.
- We recommend that Pepco and Delmarva assess incentive levels, product assortments and reported lifetime savings to improve lighting program yield (\$/MWh) in line with other EmPOWER utilities.
- We continue to recommend utilities report CTD lighting sales by retail channel in a common format to identify relative share and key partners – including food bank and other distributions.
- Itron worked with Apex Analytics in the first half of 2018 to assess the Maryland lighting market compared to national averages, looking at point-of-sale data of various lighting products. During the Semiannual Evaluation Planning Meeting in May 2018 evaluators developed plans to conduct additional lighting market analysis through a residential LED saturation study in the 2018-2020 program cycle. Recent drafts of the proposed Saturation Study (October 2019) and timeline for execution will inform program plans in 2020 and the anticipated impacts of EISA backstop provisions. We support the continued strong emphasis on lighting market evaluation, and encourage the utilities to invest in tracking similar metrics to the Saturation Study in Maryland homes as a result of direct installation programs like Quick Home Energy Check-up (QHEC) and Low Income Energy Efficiency Program (LIEEP).

Appliance Rebate

- VEIC strongly recommends the rapid development of new or enhanced strategies to support struggling retailers and households in the coming months to ensure that the EmPOWER programs support economic recovery of businesses, increased employment and improving access to efficient appliances in the State.
- VEIC recommends utilities assess low or no-cost appliance replacement promotions for qualified income households, as well as specifically targeting multifamily building owners, property managers, appliances distributors and maintenance entities serving the housing industry.
- As one of the most significant opportunities for residential energy savings, we recommend utilities reassess current midstream heat pump water heater initiatives and develop a coordinated and aggressive market strategy with Maryland HVAC, plumbing, and electrical distributors to drive adoption.

- VEIC recommends that utilities develop a common reporting format for the midstream programs that includes differentiation between the ESRPP product tiers.
- VEIC recommends evaluating ESRPP participation across different EmPOWER programs, as well as nationally, to assess effectiveness in achieving higher market share of the most efficient models – including top-load clothes washers.
- As advanced power strips represent a sustained significant portion of EmPOWER program savings and participation, VEIC strongly recommends evaluating the energy savings of advanced power strips and assessing the persistence of savings.
- We recommend that the EmPOWER utilities review recent ESRPP evaluations, their findings and recommendations, to guide ESRPP activities and program assessments in Maryland.

Appliance Recycling

- We recommend that utilities assess opportunities for targeted recycling campaigns to support households struggling financially and recycling partnerships with retailers later in 2020.
- All EmPower utilities should work with program implementers to assess program costs, mix of recycled appliances, incentive levels, and effectiveness of special turn-in events and other program design components to increase the number of appliances recycled per participant and achieve improved cost-effectiveness.
- We recommend that utilities continue to explore new strategies, partnerships and cross-promotion of the residential retrofit programs to maximize the value of high customer touch in appliance recycling.

Residential Retrofit (including HVAC)

- New energy saving measures and increased cross marketing activities for the QHEC programs is helping to drive high levels of participation and savings for many of the utilities. We recommend the Utilities continue and expand such activities to leverage the broad reach of QHEC to support improved performance across the residential portfolio.
- With the exception of Potomac Edison, the utilities reported on CTD gas savings as well as electric savings. We request that the Commission direct Potomac Edison to report gas savings data in future reports.
- We recommend that the utilities adopt a consistent reporting methodology to incorporate in the next program cycle which includes a comprehensive reporting of electric and natural gas savings by each electric utility service territory, as they are responsible for implementing the coordinated programs and to enable analysis of program results.
- We recommend that the Work Group reconvene to discuss potential modifications to the Residential Retrofit programs (QHEC, HPwES, and HEIP) which should be incorporated in the 2021-2023 program cycle.
- To reinforce the midstream delivery model as a means for strengthening supply channel relationships, supporting local contractors and distributors, and promoting cost-saving opportunities for homeowners, we recommend that utilities consider the following:
 - Track supply channel participation for improved optics into program performance and impacts.

- Consider increasing the impact of the incentive on purchasing decisions.
- Apply best practices in supply channel engagement and support.
- Seek opportunities to collaborate between utility programs for delivering a more coordinated response to the economic conditions caused by COVID-19.

Smart Thermostats

- The Commission should require consistent smart thermostat reporting across the utilities to enable more effective analysis of the measure’s impact. The utilities should provide a reporting table with current sources of thermostat installations and thermostat optimization program participants, with easily-understood and documented methods or formulas for how those values were determined.
- The utilities should consider any potential cost savings and unified customer experience from combining resources for a standard Maryland online marketplace.
- The utilities should consider how smart thermostat programs evolve and grow into other controllable loads in the home, for example the evolution from direct install to rebate to BYOT to BYOD.
- The utilities should become familiar with the various privacy issues emerging in the connected device market and embrace “Privacy by Design” principles being adopted elsewhere in North America and Europe.
- The Commission and Utilities should revisit the need for a state-specific evaluation of savings using Thermostat telemetry and AMI data.

Smart Home Pilots

The Utilities should convene to share updates and coordinate efforts to:

- Agree upon a framework and reporting template that adequately ensures comparability across pilot evaluations
- Continue to collaborate and continuously improve upon their connected device offerings through emerging smart home programs
- Look for opportunities to further engage pilot participants in the context of current experiences during the pandemic crisis. Self-installed kits and hands-free activities may be appealing to both customers and DSM program providers while isolation measures are in place during a pandemic.

Residential New Construction

- The utilities should be required to report RNC program measures and savings consistently. Specifically, there should be consensus as to whether individual measures such as smart thermostats are counted and reported as Participants or individual Measures. Additionally, in the mini-tables there should be consensus on the time period reported (e.g. either year to date or the current reporting period).
- Washington Gas and the electric utilities should continue to work toward full implementation of a coordinated Residential New Construction program based on the national ENREGY STAR Certified Homes program.
- The utilities should consider additional options to support high-performance new construction that goes beyond ENERGY STAR Certified Homes, such as those

recommended by the Electric and Natural Gas Coordinated Work Group. Recommendations include incentives for individual high-performance products as well as for a higher performing program tier such as DOE's Net Zero Energy Ready Homes or Passive House.

- The electric utilities should consider an EV/PV Ready and/or all-electric home incentive package.
- We continue to recommend that a Work Group be established to consider ways for the EmPOWER Utilities to contribute more robustly to the process of developing updated codes and standards—and to gain savings attribution for doing so given the next code adoption cycle falls within the upcoming program cycle.

Limited Income Programs—LIEEP & MEEHA

- We continue to recommend that DHCD report natural gas and electric savings so that total participant energy savings can be evaluated across the utility service territories. Washington Gas savings should be reported according to the electric utility in order to maintain consistency with other whole-house programs.
- We recommend the Commission approve DHCD's request to remove the requirement to provide reports on all jobs exceeding \$7,500.
- We recommend that DHCD consider offering qualified MEET participants a smart thermostat as an additional energy savings measure.
- We recommend the Work Group work on identifying additional ways to provide energy savings opportunities to limited income customers through both Utility-sponsored and DHCD-sponsored programming.
- The Limited Income Work Group should continue discussions related to goal-setting in an effort to achieve consensus.

Behavior Program Summary of Recommendations

- The utilities should continue to improve and align methods of tracking and reporting quarterly program metrics and provide clear documentation so cross-utility comparisons can be easily made.
- As the Behavior/Advanced M&V 2.0 Pilot continues to roll out in 2020, the Behavior Work Group should meet to define reporting priorities, metrics, and continuous learning or improvement. The pilots should be able to support each other's insights, either by testing different interventions, or boosting sample size across utilities with consistent delivery.
- The utilities should continue to discuss how behavior-based programs can evolve beyond current best practices, taking into consideration new evaluation methodologies and improvements in program delivery and tracking.

Demand Response

- Utilities should maintain and consider expanding their existing demand reduction capabilities.
- Utilities should include devices with year-round capability, such as water heaters and EV chargers.
- We support evolution of demand response programs to include BYOD approaches.

Other Programs

Energy Efficiency Kits

- We recommend SMECO evaluate the savings of its BRC kits compared to direct mail kits to see whether realized savings are notably higher. Other utilities should examine the results of SMECO's kits initiatives for consideration in the 2021-2023 program cycle.

Schools

- Utilities should assess the performance of Potomac Edison's and Delmarva's schools programs and consider whether the results support the incorporation of something similar in their 2021-2023 plans.

Family Farm Program

- Continue exploring different approaches to enroll customers, such as outreach to vendors of farm equipment. Once vendors are on board, the program should see an uptake in participation.

Conservation Voltage Reduction

- Closely monitor CVR contribution to portfolio savings to ensure that front-of-meter programs like CVR do not displace behind-the-meter programs. Results from the Statewide Evaluator should inform 2021-2023 program planning.

Program-Specific Observations and Recommendations

Lighting

The EmPOWER Retail Lighting programs provide instant discounts for light-emitting diode (LED) products sold via retail channels and through partnerships with Maryland Food Banks targeting hard-to-reach customers. All five EmPOWER Electric Utilities were above their annual forecasts for lighting program savings in 2019. This reflects national trends of strengthening customer demand for LEDs, increasing model selection, and decreasing prices. Figure 4 shows the cycle-to-date (CTD) achievements of lighting program participation, spending, and savings compared to forecasts across the EmPOWER electric utilities.

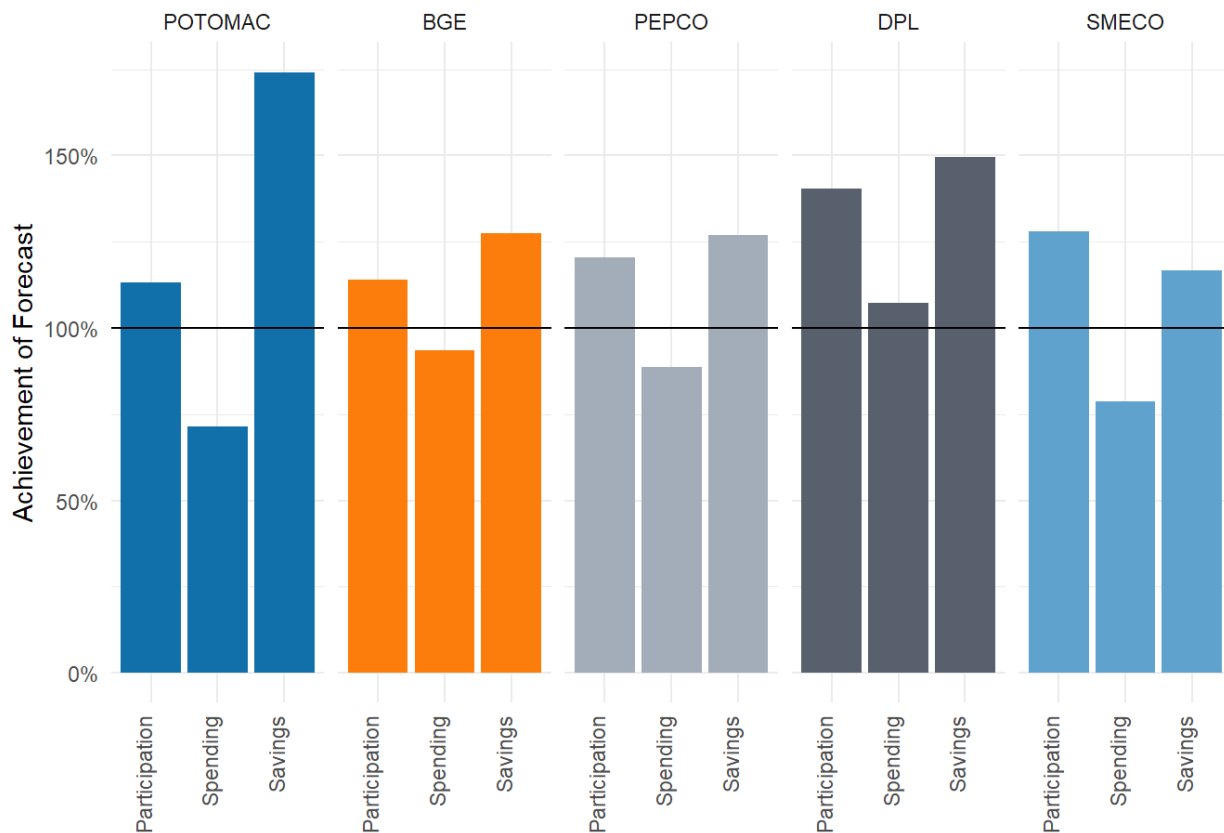
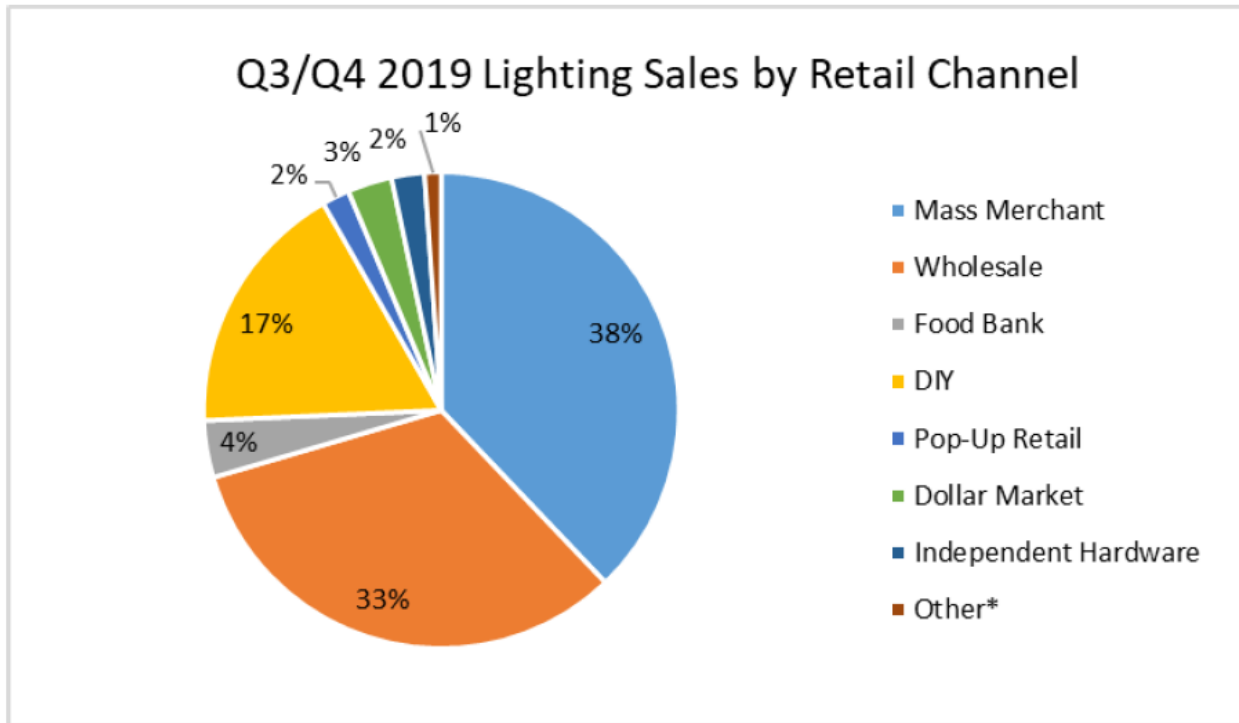


Figure 4: Cycle-to-Date lighting programs achievement of forecasted goals.

Four of the five utilities exceeded their forecasted CTD savings goals while remaining below forecasted budget spending. Increasing customer demand, reduced LED costs, and trends in multi-pack over single-unit sales have allowed utilities to lower program incentive levels while increasing participation and savings levels. Although Delmarva had program spending that exceeded forecasts, its higher participation and savings is in line with other utilities and appropriate for the CTD spending level.

Potomac Edison continues to have a notably higher savings to spending ratio for lighting compared to the other EmPOWER utilities. This discrepancy may in part be due to the lagging participation in Potomac Edison’s food bank initiatives at approximately 1% of total lighting program participation.

Most EmPOWER utilities note in their semi-annual reports that they continue to add new lighting partners (e.g., hardware and grocery stores, pop up retailers, and food banks) and expand the number of retail locations. We continue to recommend utilities report CTD lighting sales by retail channel in a common format to identify relative share and key partners – including food banks and other distribution channels (see Figure 5- SMECO’s Lighting Sales by Retail Channel).



**Other includes Goodwill and Giant Food.*

Figure 5: SMECO Q3-Q4 2019 lighting sales by retail channel.

All five utilities reported making LED lamp donations to food banks in 2019. BGE significantly increased lighting distributions through food banks by 400,000 in the second half of the program year and reported distributions through other non-profits as well. Table 4 below shows the number of LEDs distributed through food banks and other non-profits. BGE and SMECO led EmPOWER utility performance in achieving food bank and non-profit distributions at 12% and 11% respectively of the total reported measure quantity of retail lighting promotions.

Table 4: 2019 Lamps donated by EmPOWER electric utilities.

Utility	Total Donated Lamp Quantity	Food Bank Partner	Non-Profits	% of Total Lighting
PE	10,000	10,000	N/A	1%
BGE	565,000	500,000	65,000	12%
Pepco	37,500	37,500	(Incl.)	2%
Delmarva	14,900	14,900	(Incl.)	2%
SMECO	47,800	47,800	N/A	11%

Pepco, Potomac Edison and Delmarva lagged in reported food bank distributions in 2019, reporting only 1-2% of total lighting sales through food bank distributions. Supporting promotions with food banks, as well as targeted and diverse retailer partnerships (e.g., independent and dollar stores), allow utilities to develop a diverse strategy to serve lower income households. As

highlighted in Table 4, all programs are now reporting donated lamps, but there remains an opportunity to equitably scale individual lamp distributions by the number of households being served. A common metric might be based on:

- percentage of residential customers served through partnering food banks and non-profit partners;
- reported poverty level in the service territory or LIHEAP eligible customers; or
- Maryland households with income levels identified as below the basic cost of living for the state.¹¹

We recommend utilities continue to prioritize access to LEDs to all customers through increased partnerships with food banks and other partnering organizations, and report on progress and actions in this area.

Figure 6 below illustrates the half-year MWh savings contributed by the utilities' lighting programs from 2017 through 2019.

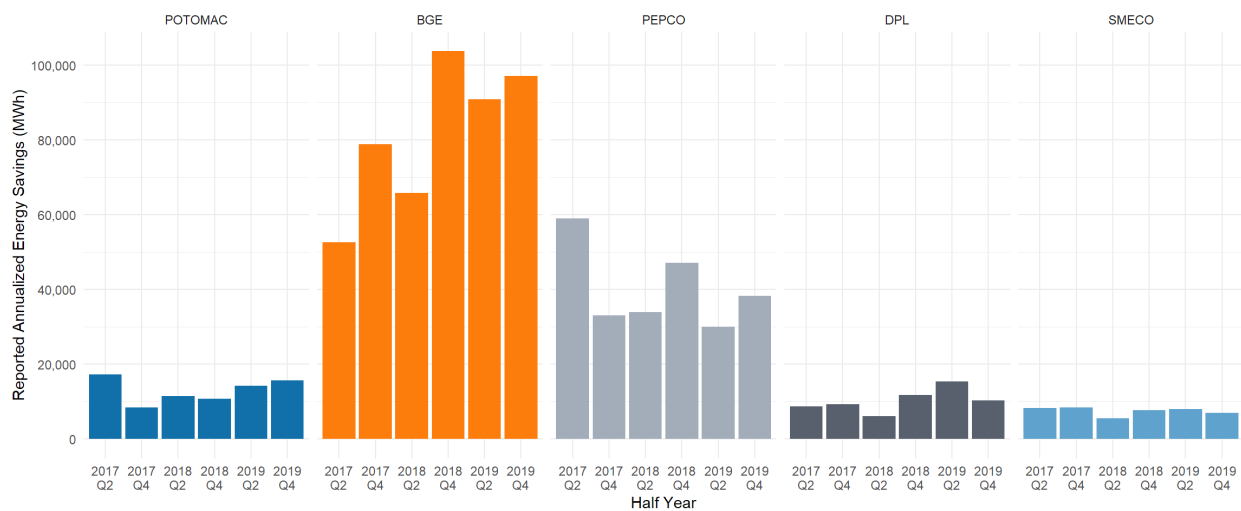


Figure 6: Lighting programs reported annualized savings by half-year.

In addition to continued strong performance of overall MWh savings, the utilities have made progress in promoting a diverse set of ENERGY STAR certified LED lighting products, as shown in Table 5. However, it is unclear if this diversity is reflected equally in food bank promotions. We recommend that utilities assess household needs in food bank promotions and ensure that a diverse set of products are offered to all customers and appropriately reported.

Delmarva continues to lag behind its peers with a higher percentage of standard LEDs incentivized through the lighting program. Notably Potomac Edison has shown continued progress in growing decorative LED sales. Increased confidence by consumers in the superior performance, high quality, and diversity of ENERGY STAR certified LED products will continue to allow utility programs to target specialty reflector and decorative LEDs. However, connected LEDs

¹¹ 2018 ALICE report <https://www.unitedforalice.org/maryland> and Maryland Low-Income Market Characterization Report and Research Database <http://mlrt.opc.maryland.gov/>.

continue to represent a new and underserved product segment—and may require targeted promotions through the pro/builder channel for new construction opportunities.

Table 5: LED type diversity by utility in Q3/Q4 2019.

LED Type	PE	BGE	Pepco	Delmarva	SMECO
Connected LEDs	1%	0%	0%	0%	1%
Specialty Decorative LEDs	16%	11%	10%	11%	13%
Specialty Reflector LEDs	18%	19%	20%	10%	12%
Standard LEDs	66%	69%	71%	79%	73%

A recent lighting market study in the Northwest¹² highlights the difference in market adoption of LEDs based on LED type and suggests a need for greater emphasis on decorative, globe, and 3-way lamp types. The study also highlights the wide variation in LED market share between retail channels (e.g., DIY, Club, and Mass Merchants) and proposes strategies for effectively evaluating retailer sales and stocking.

We recommend that the utilities review recent lighting market studies and assess Maryland retail lighting programs for potential changes to 2020 program strategies, such as targeting of LED types and retailer channels. The Northwest study reflects LED market share gains similar to Maryland in the general service lamps (GSLs), achieving approximately 70% market penetration in Q1 2019 over halogen (~25%) and CFLs (~5%).¹³

¹² “Results of the 2018 Northwest Residential Lighting Long-Term Monitoring and Tracking Study”, APEX Analytics prepared for NEEA. August, 2019.
¹³ <https://www.nema.org/Intelligence/Pages/Lamp-Indices.aspx>

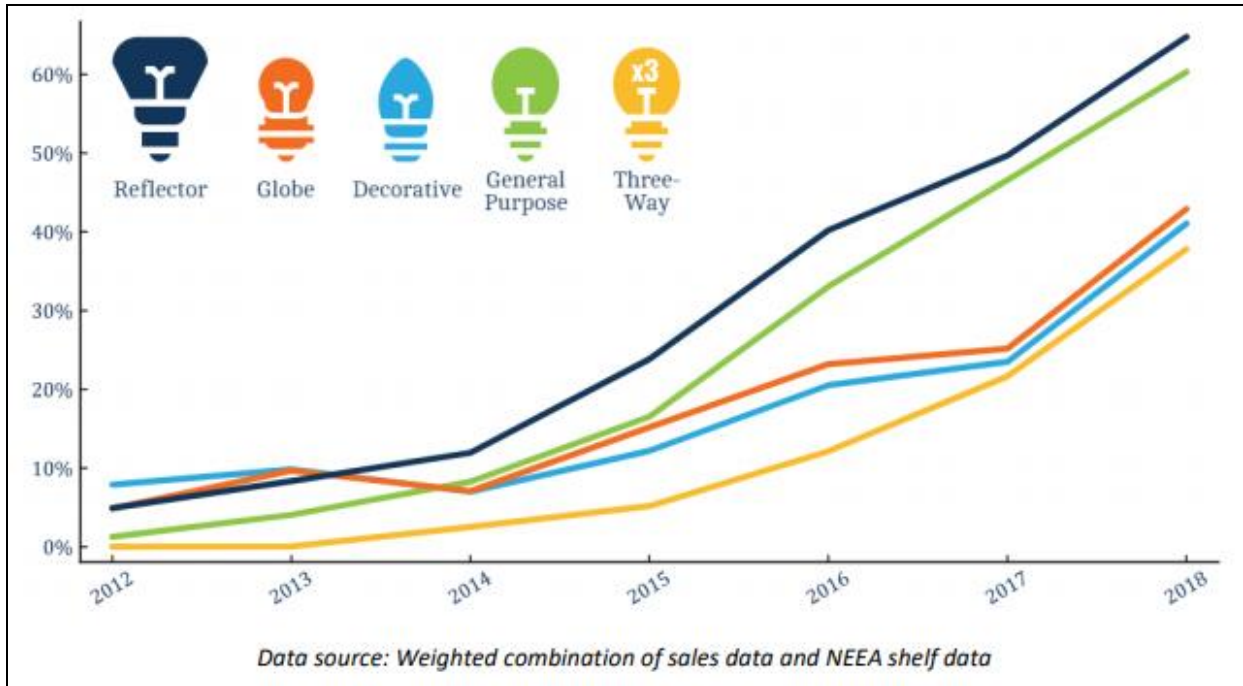


Figure 7: Northwest LED Technology Shares by Application, 2012-2018

The Electric Utilities' 2019 CTD costs per MWh for their lighting programs ranged significantly, from approximately \$5-7/MWh for Potomac Edison, BGE, and SMECO to greater than \$15/MWh for Pepco and Delmarva, as illustrated in Figure 8 below. As the percentage of sales of non-standard LEDs (e.g., connected, decorative, or directional) is relatively consistent across programs, it is unclear why there is a three-fold increase in the cost of lighting savings for Pepco and Delmarva. Utilities should continue to balance achieving a diversified mix of LED products through retail and hard-to-reach sales channels, while achieving gains in cost-effectiveness. We recommend that Pepco and Delmarva assess incentive levels, product assortments, and reported lifetime savings to improve lighting program yield (\$/MWh) in line with other EmPOWER utilities.

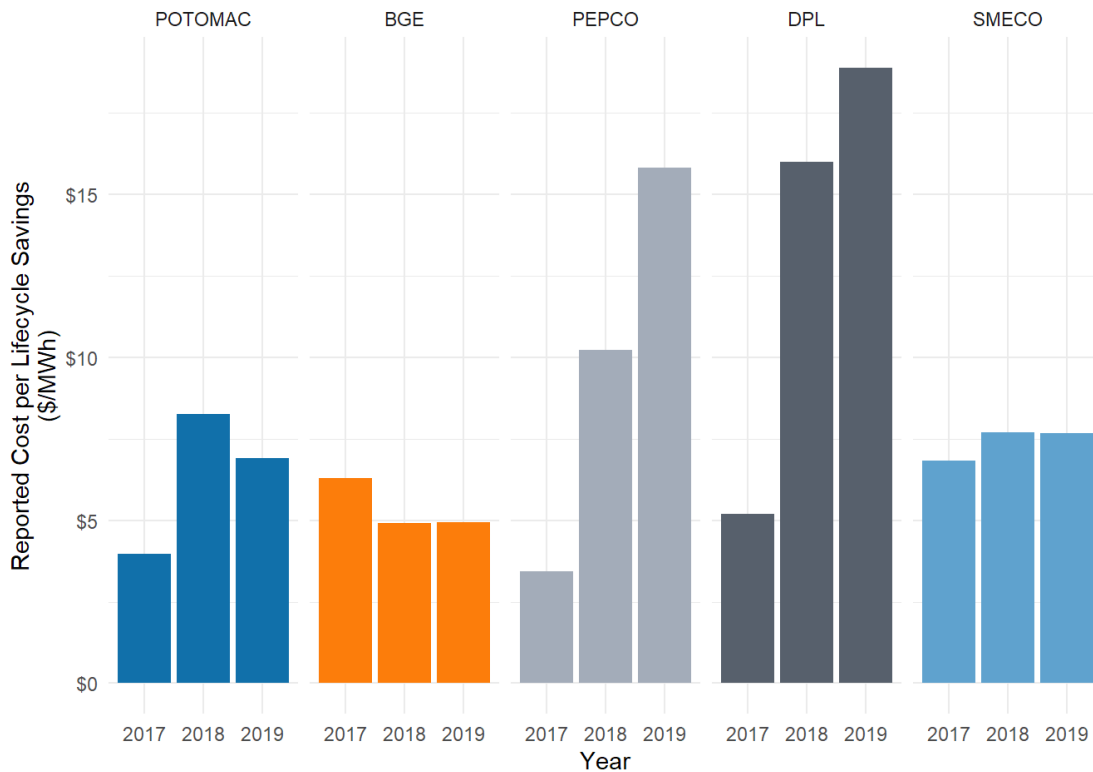


Figure 8: Lighting programs reported cost per lifecycle savings.

EmPOWER Electric Utilities planned for reduced per-unit lighting savings and participation in the triennial period of 2018–2020 to reflect a market transition aligned with federal minimum standards requiring efficacy of general service lamps (GSLs) to achieve performance currently met by LEDs. These most common lamps used in residential homes were to meet a January 2020 backstop provision established in the 2007 EISA legislation—a category expanded in 2017 through DOE rulemaking, broadening the definition of GSLs. However, the most recent DOE rulemaking issued in September 2019¹⁴ invalidates the 2017 changes to the definition of GSLs, as well as making the case that the 43 lpw backstop provision for 2020 has not been triggered. This rulemaking went into effect October 7, 2019 and is facing legal challenges and countered by legislation in a few states. However, it raises an increased level of uncertainty in the lighting market and requires active dialogue among the EmPOWER Electric Utilities to sustain the success of the programs to date.

Recent events with the COVID-19 pandemic will have a significant impact on program participation and savings through retail lighting partners in 2020. Due to high rates of unemployment and reduced household income, customers may be more price sensitive to more expensive, high efficiency LED technologies. It will be important for utilities to strengthen engagement with retail partners, as well as other non-retail partners – notably food banks and non-profits – serving households hardest hit by the COVID-19 pandemic. Utilities should continue and expand their focus on promoting a diversified mix of LEDs and expanding hard-to-reach channels to ensure that all Maryland consumers have access to efficient lighting products.

¹⁴ <https://www.regulations.gov/document?D=EERE-2018-BT-STD-0010-0450>

Lighting Summary of Recommendations

- We recommend that the utilities strengthen engagement with retail partners, as well as non-retail partners – notably food banks and non-profits – serving households hardest hit by the COVID-19 pandemic.
- We recommend that utilities continue to balance achieving a diversified mix of LED products through retail and hard-to-reach sales channels, while achieving gains in cost-effectiveness.
- We recommend that Pepco and Delmarva assess incentive levels, product assortments and reported lifetime savings to improve lighting program yield (\$/MWh) in line with other EmPOWER utilities.
- We continue to recommend utilities report CTD lighting sales by retail channel in a common format to identify relative share and key partners – including food bank and other distributions.
- Itron worked with Apex Analytics in the first half of 2018 to assess the Maryland lighting market compared to national averages, looking at point-of-sale data of various lighting products. During the Semiannual Evaluation Planning Meeting in May 2018 evaluators developed plans to conduct additional lighting market analysis through a residential LED saturation study in the 2018-2020 program cycle. Recent drafts of the proposed Saturation Study (October 2019) and timeline for execution will inform program plans in 2020 and the anticipated impacts of EISA backstop provisions. We support the continued strong emphasis on lighting market evaluation, and encourage the utilities to invest in tracking similar metrics to the Saturation Study in Maryland homes as a result of direct installation programs like Quick Home Energy Check-up (QHEC) and Low Income Energy Efficiency Program (LIEEP).

Appliance Rebate

The EmPOWER Appliance Rebate programs offer instant, online, and paper rebates for select ENERGY STAR products including dehumidifiers, room air purifiers, heat pump water heaters, refrigerators, freezers, clothes washers, clothes dryers, pool pumps, and smart thermostats. The program also provides rebates on qualified advanced power strips.

The EmPOWER Electric Utilities launched the ENERGY STAR Retail Products Platform Program (ESRPP) in 2018, and in April 2019 the Commission issued Order No. 88964 directing the EmPOWER Electric Utilities to include the full suite of ESRPP products within their respective appliance programs. The Utilities' programs expanded to support the full suite of midstream incentives for clothes washers, clothes dryers, refrigerators, freezers, and air conditioners. As of April 1, 2019, the Commission ordered the removal of dehumidifiers, air purifiers and soundbars based on changes in the national ESRPP product assortment. In 2018, the Utilities also launched a midstream heat pump water heater initiative offering incentives through participating distributors and retailers.

In addition to increasing savings and participation rates for the programs, one of the major goals of the ESRPP is to provide a consistent suite of products to participating retailers. Below is the 2019 national list of ESRPP product types and tiers:

Table 6: 2019 ESRPP national list of product types and tiers.

Product	Tier	Level
Air Conditioners	basic	ENERGY STAR
Air Conditioners	advanced	ENERGY STAR + Connected
Elec. Dryers	basic	ENERGY STAR
Elec. Dryers	advanced	2019 Most Efficient
Gas Dryers	basic	ENERGY STAR
Gas Dryers	advanced	2019 Most Efficient
Freezers	basic	ENERGY STAR
Freezers	advanced	ENERGY STAR +5%
Refrigerators	basic	ENERGY STAR+8%
Refrigerators	advanced	2019 Most Efficient
Washers	basic	ENERGY STAR - Top Loaders
Washers	advanced	2019 Most Efficient

While the midstream appliance program offerings are now consistent across utilities, the format for CTD reporting continues to vary, and in the case of BGE and SMECO, does not delineate between appliance tiers. VEIC recommends that the Electric Utilities develop a common reporting format for the midstream programs that includes differentiation between the ESRPP product tiers.

In the first half of 2019, reported appliance participation and savings were primarily led by non-traditional products—e.g., smart thermostats, advanced power strips, and sound bars. In contrast, performance in the second half of 2019 accelerated with the broad adoption of the full suite of ESRPP products and tiers across all EmPOWER utilities.

Despite progress, heat pump water heater participation rates remain extremely low considering utilities are running parallel retail and distributor channel programs. The downstream retail programs continue to outpace the midstream distributor channels, potentially due to a combination of factors including limited enrollment of midstream distributor partners and limited impact of cooperative promotions. As one of the most significant opportunities for residential energy savings, we recommend utilities reassess current midstream heat pump water heater initiatives and develop a coordinated and aggressive market strategy with Maryland HVAC, plumbing, and electrical distributors to drive adoption.

Figure 9 illustrates appliance program performance across the utilities cycle-to-date. Four of the five utilities met or were close to meeting their 2019 CTD savings goals. Potomac Edison was well short of its goal for savings (76%), attributed primarily to high volumes of measures with lower savings per unit in the ESRPP program. In contrast, BGE and SMECO achieved approximately

200% and 300% of forecasted savings, with significant increases in ESRPP in the second half of 2019. Utilities also identified smart thermostats and “instant” rebate offers with select retail partners and products as key factors in their strong second half 2019 performance.

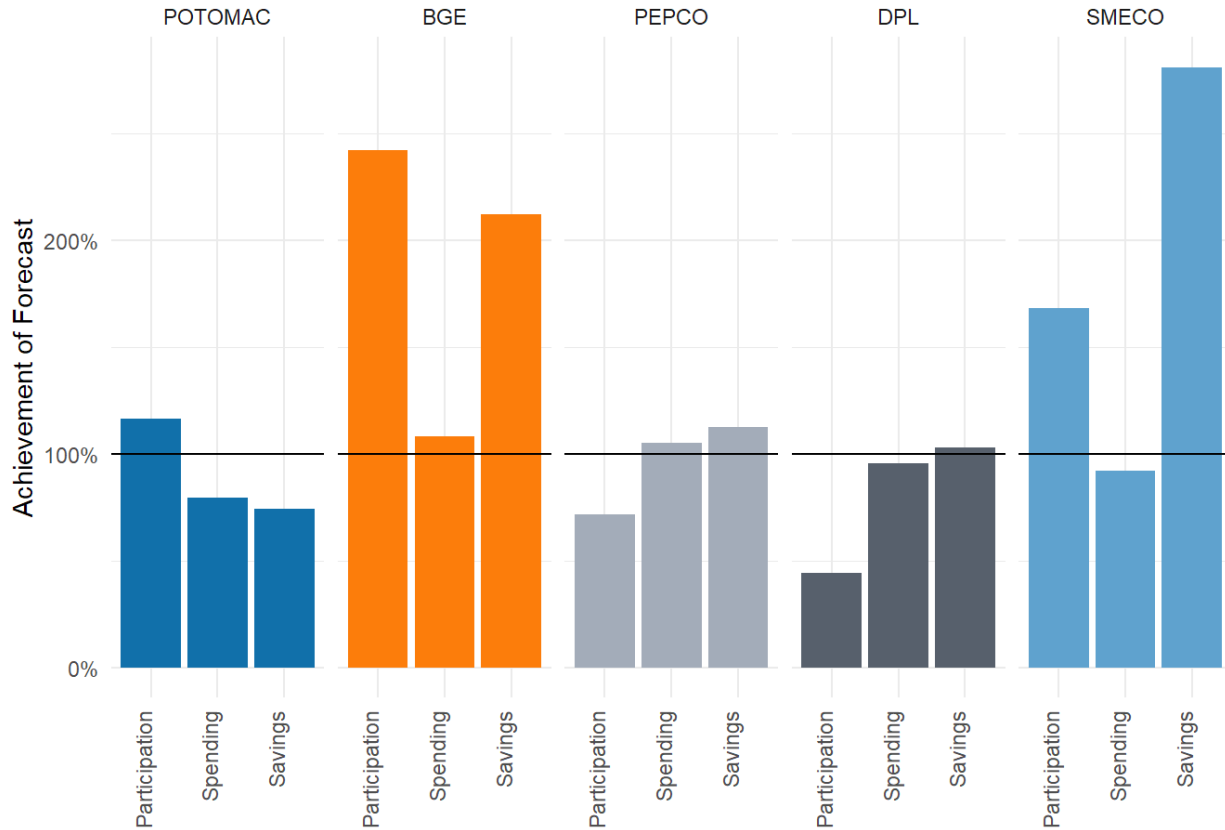


Figure 9: Cycle-to-Date appliance rebate program achievement of forecasted goals.

Note that Washington Gas’s residential prescriptive program targets specific appliance and HVAC measures, and reports through its Existing Homes program.

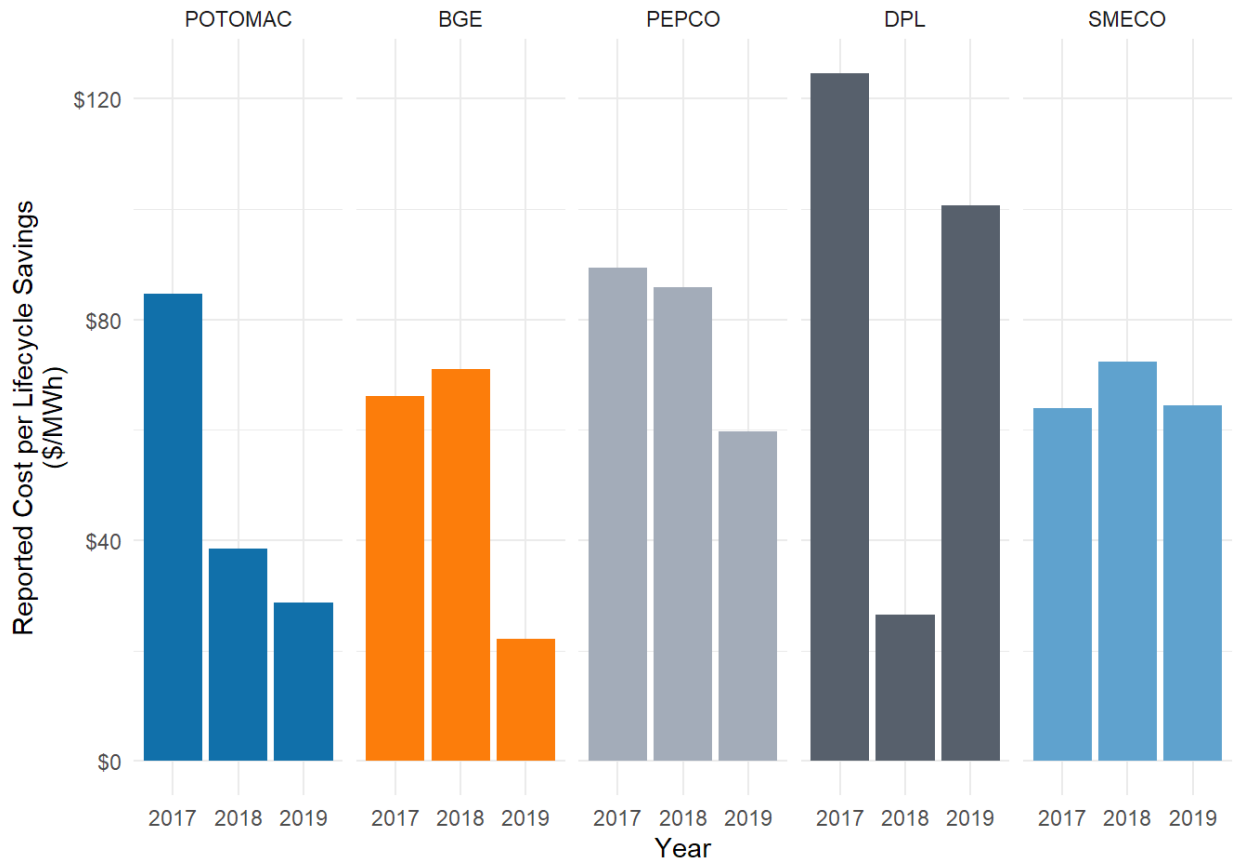


Figure 10: Appliance rebate reported cost per lifecycle savings.

Figure 10 shows appliance rebate program costs per MWh from 2017 through 2019. These cost differentials between utilities may be influenced by the significantly different mix of measures—ranging from low quantity, higher cost downstream rebated products to high quantity, lower cost midstream ESRPP products.

Potomac Edison and BGE maintained very low cost for lifecycle savings, likely attributed to the strong ESRPP participation. Delmarva continued to report the highest cost of lifecycle savings, though it improved in the second half of 2019. The persistence of these higher costs in 2019 would warrant an evaluation by Delmarva as to why its program cost of acquisition is so much higher than other utilities.

Figure 11 shows the change in the half-year reported appliance rebate savings from 2017 to 2019. Except for Potomac Edison, all utilities' Q3-Q4 2019 savings exceeded the first half of the year. However, the notable standout is BGE, which reported a nearly seven-fold increase in annual energy savings, driven by appliances in ESRPP and midstream promotions of advanced power strips. For example, of the approximately 37,000 total reported appliance measures reported by BGE in 2019, advanced power strips represented approximately 30% and ESRPP measures 70% of the reported measures. As advanced power strips represent a sustained and significant portion of EmPOWER program savings and participation, VEIC strongly recommends evaluating the energy savings of advanced power strips and assessing the persistence of savings.

Instant rebates with select partnering retailers and products, new high-demand products like smart thermostats, and higher-savings products like heat pump water heaters and higher tier appliances have increased EmPOWER appliance program savings and participation.

ENERGY STAR appliances have not had any specification revisions since 2018, when ENERGY STAR V8.0 for clothes washers went into effect. Table 7 provides a snapshot of the availability of products meeting and exceeding the new ENERGY STAR specifications for the refrigerator, clothes washer, and dryer appliance categories as of September 2019.¹⁵

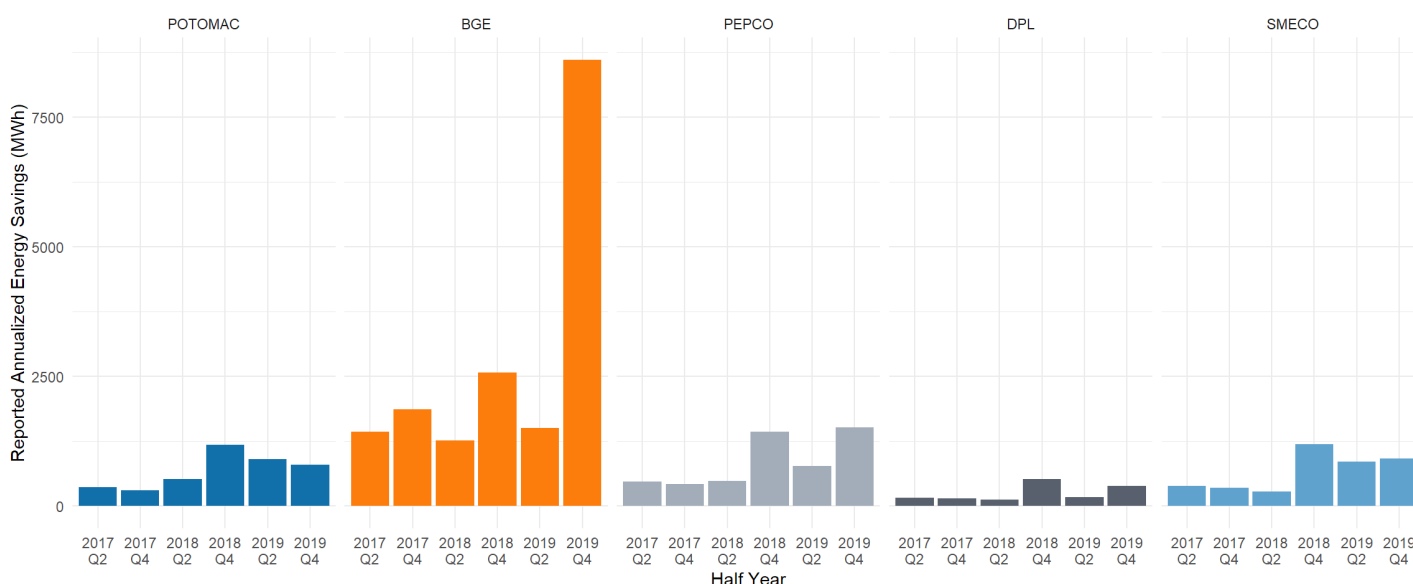


Figure 11: Appliance rebate reported savings by half-year.

¹⁵ Consortium for Energy Efficiency (CEE) Appliance Lists, <http://www.cee1.org/content/cee-program-resources>

Table 7: ENERGY STAR Major Appliances—Model Availability by Tiers

Specification	Refrigerators Available Models*‡ September 2019	Clothes Washers Available Models*§ September 2019	Clothes Dryers Available Models September 2019
ENERGY STAR 2018 Market Share (%)¹⁶	46%	48%	32% (Elec) 46% (Gas)
ENERGY STAR Certified †	1428	246	264 (Elec) 105 (Gas)
ES Most Efficient	442	29	21 (Elec Only)
CEE Tier 2 (ENERGY STAR)	259	69	20 (Elec Only)
CEE Tier 3 (ENERGY STAR)	183	2	10 (Elec Only)

* Non-compact models

† ENERGY STAR Qualified Product Lists

‡ September 2019 CEE Refrigerator Lists

§ September 2019 CEE Clothes Washer Lists

|| September 2019 CEE Clothes Washer Lists

The 2019 ESRPP was revamped to focus on major appliances and air conditioners, as well as adding the Most Efficient criteria as a second tier for dryers, washers, and refrigerators. This is anticipated to impact future retailer stocking and sales for the higher efficiency models. In 2019 CTD reporting, the distribution of appliance rebate program participation across the savings tiers for clothes dryers, washers, and refrigerators continued to reflect a lower percentage of high tier products.

BGE’s transition of clothes washers into the ESRPP in the second half of 2019 serves as a good example of the strength of the midstream program. Table 8 shows the change in program participation from the first half of 2019 through traditional downstream rebates to the second half through the ESRPP.

Table 8: BGE ENERGY STAR Most Efficient Clothes Washer Participation in 2019.

Program	Total
BGE (Q1/Q2 2019 Downstream)	727
BGE (Q3/Q4 2019 ESRPP)	3,570

ESRPP has demonstrated success in increasing sales of advanced tiers for clothes washers and refrigerators by encouraging enhanced stocking and promotional activities at participating retailers. However, reporting of advanced and basic tiers in 2019 makes it unclear if the full suite of ESRPP measures are being uniformly supported across EmPOWER programs. VEIC

¹⁶ ENERGY STAR 2018 Unit Shipment report.

https://www.energystar.gov/ia/partners/downloads/unit_shipment_data/2018/2018%20Unit%20Shipment%20Data%20Summary%20Report%20.pdf?6c1-8a27

recommends evaluating ESRPP participation across the utilities, as well as nationally, to assess effectiveness in achieving higher market share of the most efficient models – including top-load clothes washers.

Evaluations were completed in 2019 for the implementation of ESRPP by the Northwest Energy Efficiency Alliance (NEEA) and Pacific Gas and Electric (PG&E). One specific finding of note from NEEA’s evaluation states: “Midstream incentives are likely to be most effective when efficient options are available across a wide range of product configurations, capacities, feature sets, and price points. For some products, efficient models were not widely available or were concentrated in certain parts of the market, leaving retailers little opportunity to assort and promote efficient products while still meeting consumer demand.”¹⁷

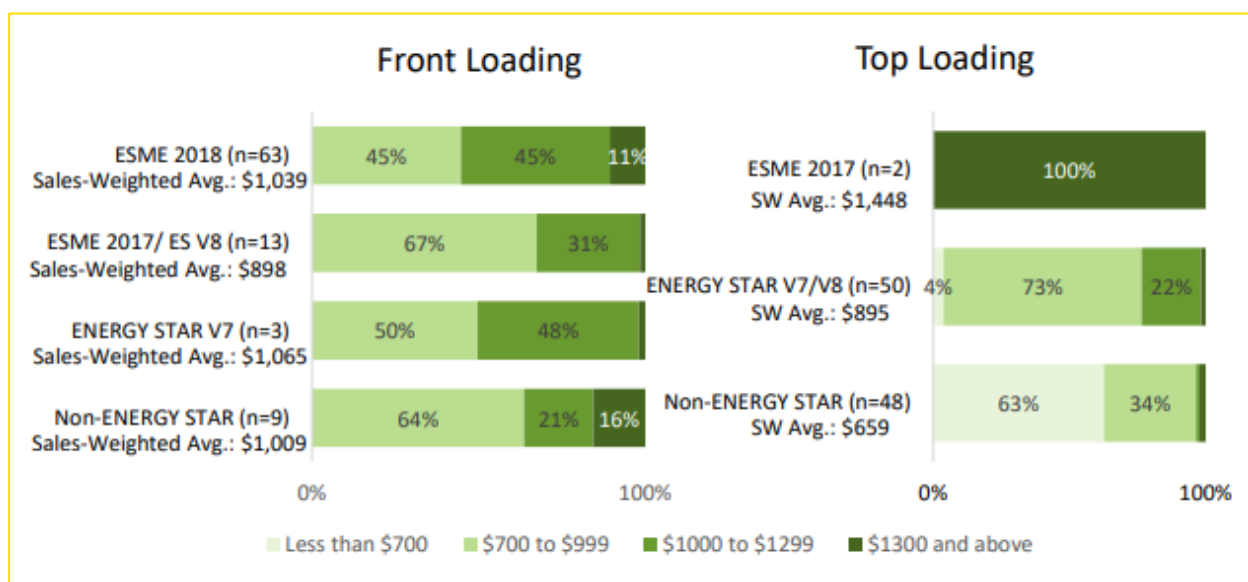


Figure 12: Distribution of Sales-Weighted Washer Pricing by Qualification in 2017/2018 (NEEA 2019)

The 2019 NEEA evaluation included individual product assessment memos that provided greater detail on the market and technical characteristics important to understanding and improving the market share of higher efficiency products for all customers. In the clothes washer memo, the evaluators highlighted that the least expensive models—top loading, non-ENERGY STAR—were also predominantly the lowest efficiency, representing nearly 70% of sales in washers under \$700. This finding emphasizes the need to address a potentially stagnant market share and customer equity issue for ESRPP sponsors in this product category. We recommend that the EmPOWER utilities review the findings and recommendations of these recent ESRPP evaluations to guide ESRPP activities, develop new program strategies and program assessments in Maryland.

As highlighted with lighting, the recent events with the COVID-19 pandemic is anticipated to have a significant impact on program participation and savings through retail appliance partners in 2020. VEIC strongly recommends the rapid development of new or enhanced strategies to support struggling retailers and households in the coming months to ensure that the EmPOWER

¹⁷ “Retail Product Portfolio Evaluation—Final Report”, NEEA. July 2019. <https://neea.org/img/documents/RPP-Evaluation-Final-Report.pdf>

programs support economic recovery of businesses, increased employment, and improving access to efficient appliances in the State.

VEIC also recommends utilities assess low or no-cost appliance replacement promotions for limited income households, as well as specifically targeting multifamily building owners, property managers, appliance distributors, and maintenance entities serving the housing industry.

Appliance Rebate Summary of Recommendations

- VEIC strongly recommends the rapid development of new or enhanced strategies to support struggling retailers and households in the coming months to ensure that the EmPOWER programs support economic recovery of businesses, increased employment and improving access to efficient appliances in the State.
- VEIC recommends utilities assess low or no-cost appliance replacement promotions for qualified income households, as well as specifically targeting multifamily building owners, property managers, appliances distributors and maintenance entities serving the housing industry.
- As one of the most significant opportunities for residential energy savings, we recommend utilities reassess current midstream heat pump water heater initiatives and develop a coordinated and aggressive market strategy with Maryland HVAC, plumbing, and electrical distributors to drive adoption.
- VEIC recommends that utilities develop a common reporting format for the midstream programs that includes differentiation between the ESRPP product tiers.
- VEIC recommends evaluating ESRPP participation across different EmPOWER programs, as well as nationally, to assess effectiveness in achieving higher market share of the most efficient models – including top-load clothes washers.
- As advanced power strips represent a sustained significant portion of EmPOWER program savings and participation, VEIC strongly recommends evaluating the energy savings of advanced power strips and assessing the persistence of savings.
- We recommend that the EmPOWER utilities review recent ESRPP evaluations, their findings and recommendations, to guide ESRPP activities and program assessments in Maryland.

Appliance Recycling

As shown in Figure 13, next page, all Electric Utilities are nearly meeting or exceeding their cycle-to-date appliance recycling targets for savings and participation. Pepco and Delmarva continue to significantly exceed forecasted CTD savings and participation targets, while keeping spending at or below forecasted levels. Although Potomac Edison underperformed in the first half of the year at 31% of forecasted savings, it made significant progress in the second half to achieve the 2019 program cycle forecasted savings.

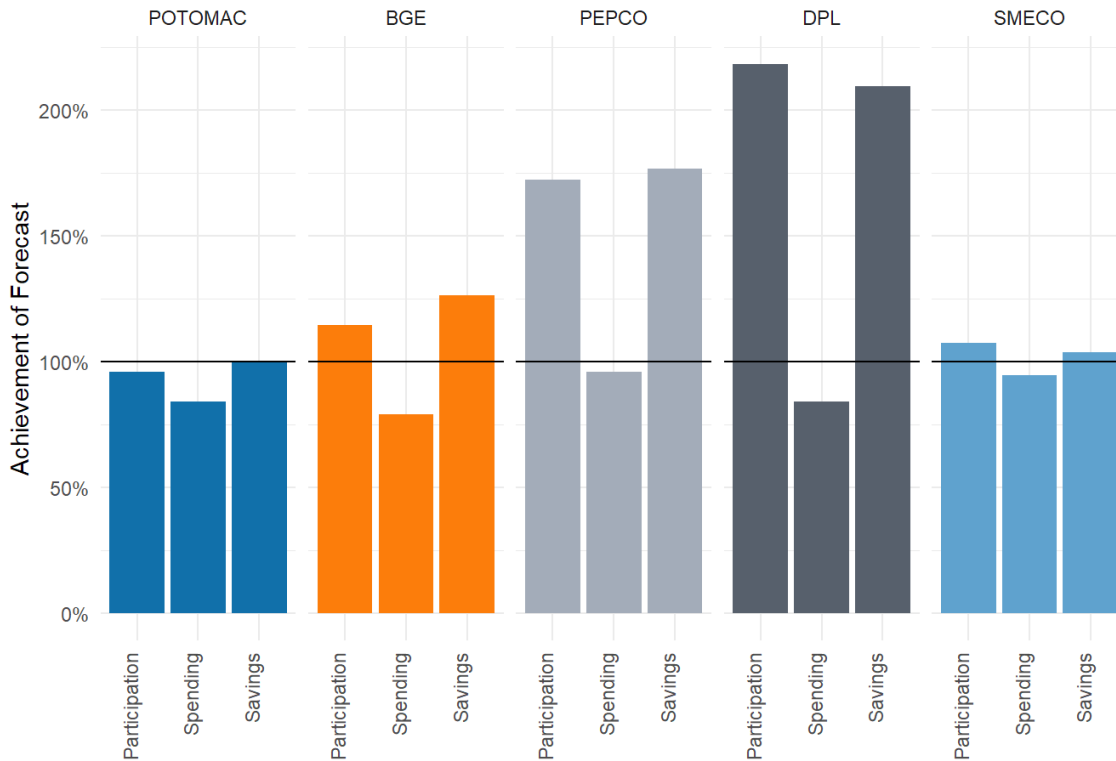


Figure 13: Cycle-to-Date appliance recycling achievement of forecasted goals.

Figure 14 shows costs per MWh for the appliance recycling programs from 2017-2019. The costs per MWh range from approximately \$20/MWh to \$40/MWh for Potomac Edison, BGE, SMECO, and Pepco whereas Delmarva continues to have significantly higher costs of nearly \$60/MWh.

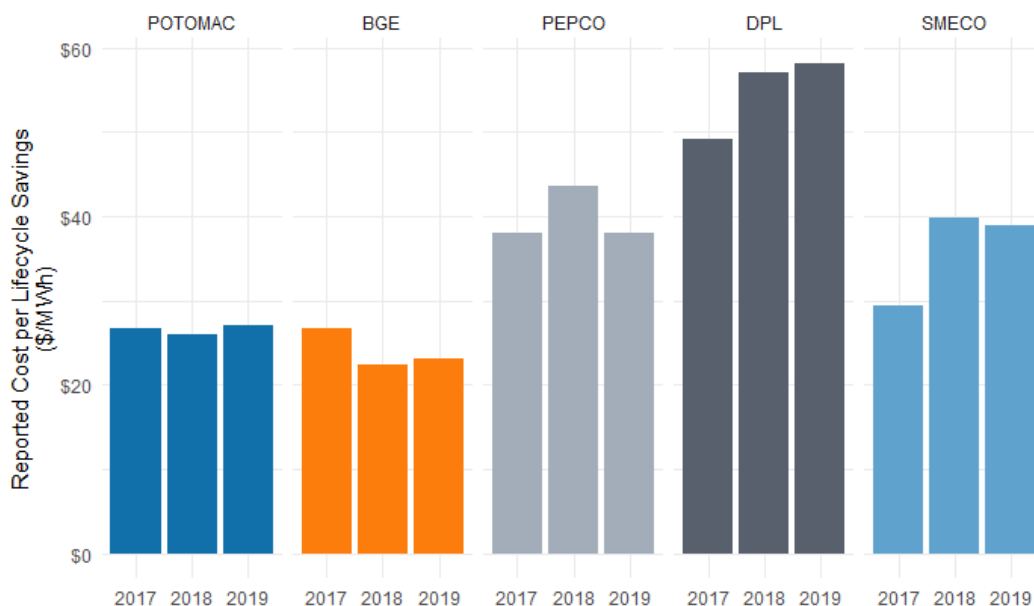


Figure 14: Appliance recycling reported cost per lifecycle savings.

Delmarva, BGE, SMECO, and Pepco reported the same measure quantity as number of participants in 2019, while Potomac Edison reported a higher recycled appliance per participant ratio —reducing the program costs for “ride-along” recycled appliances. All EmPOWER utilities should work with program implementers to assess program costs, mix of recycled appliances, incentive levels, and effectiveness of special turn-in events and other program design components to increase the number of appliances recycled per participant and achieve improved cost-effectiveness.

Table 9: Reported Appliance Recycling by Participant and Measure in 2019.

Program	Participants	Measures	Measure per Participant
Delmarva	684	684	1
BGE	11,296	11,296	1
Potomac Edison	2,544	3,058	1.2
SMECO	691	691	1
Pepco	2,575	2,575	1

Utilities highlighted targeted campaigns – limited time offers, community drop-off events, cross-promotion of the Home Energy Improvement Program (HEIP) and QHEC programs, free LED lighting kits to participants, and partnership with a national retailer as important factors in their program success. We recommend utilities continue to explore new strategies, partnerships, and

cross-promotion opportunities to maximize the value of direct customer engagement in appliance recycling.

Based on limited interviews with retailers, the Covid-19 pandemic has resulted in increased sales of specific appliances – notably freezers and secondary refrigerators – to support the ability to store supplemental food for “stay-at-home” orders. We recommend that utilities assess opportunities for targeted recycling campaigns to support households struggling financially and recycling partnerships with retailers later in 2020.

Appliance Recycling Summary of Recommendations

- We recommend that utilities assess opportunities for targeted recycling campaigns to support households struggling financially and recycling partnerships with retailers later in 2020.
- All EmPOWER utilities should work with program implementers to assess program costs, mix of recycled appliances, incentive levels, and effectiveness of special turn-in events and other program design components to increase the number of appliances recycled per participant and achieve improved cost-effectiveness.
- We recommend that utilities continue to explore new strategies, partnerships and cross-promotion of the residential retrofit programs to maximize the value of high customer touch in appliance recycling.

Residential Retrofit

The Residential Retrofit programs have historically included the Quick Home Energy Check-Up (QHEC) and Home Performance with ENERGY STAR (HPwES) programs. For the 2018-2020 cycle, the EmPOWER Utilities added several new programs to the suite of offerings:

- Pepco, Delmarva and SMECO have incorporated their Residential HVAC and Smart Thermostat Optimization programs under the Residential Retrofit umbrella.
- Potomac Edison includes Residential HVAC under its Residential Retrofit umbrella as well, and also includes its School Education and Energy Efficiency Kits programs.
- SMECO has consolidated its QHEC and HPwES programs into one program called the Home Energy Improvement Program (HEIP).

To maintain some consistency and to compare current program performance with past performance, we focus this review on assessing the QHEC and HPwES program activities along with SMECO’s HEIP. We also have incorporated the HVAC program into this review section. The Schools, Kits, and Thermostat Optimization programs are reviewed separately.

Quick Home Energy Check-Up

All four utilities that still offer QHEC exceeded their savings and participation forecasts in 2019—most by a large margin—as shown in Figure 15.

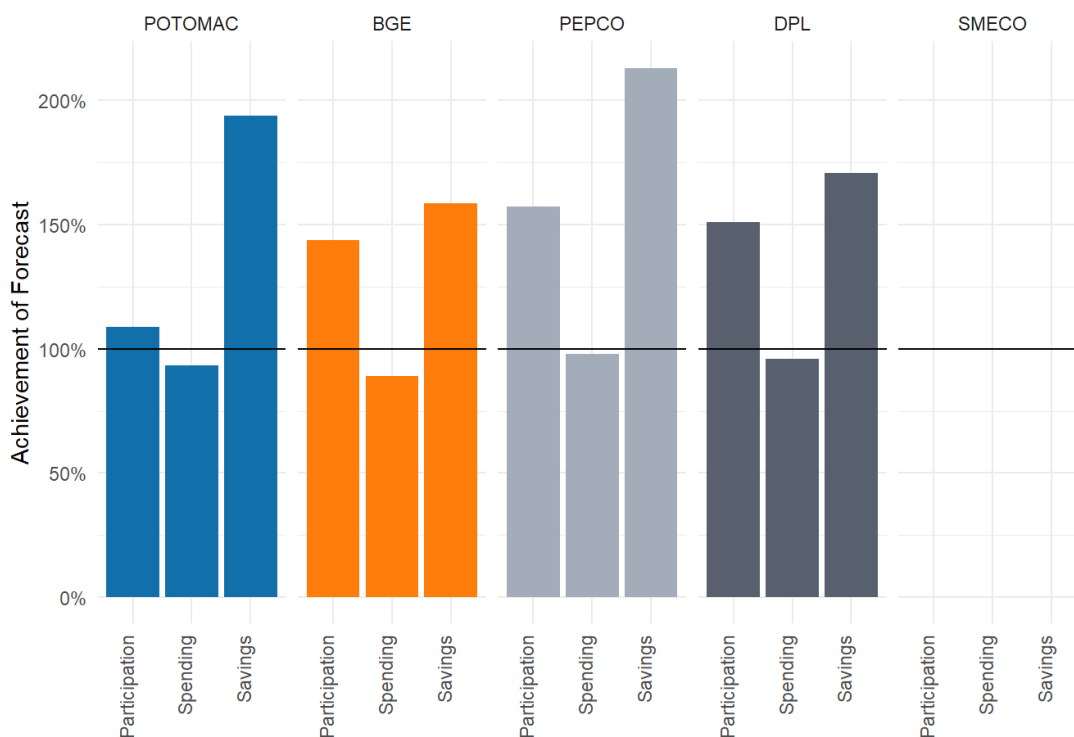


Figure 15: Cycle-to-Date QHEC program achievement of forecasted goals.

Note: SMECO did not forecast any QHEC activity due to the transition to HEIP

Pepco and Delmarva note in their semi-annual reports the integration of Nest E thermostats into their QHEC offerings. In the second half of 2019 Pepco installed 415 Nest E thermostats and Delmarva installed nine. As this is a new measure, both utilities expect those installations to increase in 2020.

Pepco and Delmarva also began cross promoting QHEC through the Appliance Recycling program in the second half of 2019. This resulted in 32 QHEC completions for Pepco and 13 for Delmarva – modest results, but both utilities note they intend to follow up with eligible leads who have not yet taken advantage of QHEC, as well as continue to train call center employees to proactively refer leads from the Appliance Recycling program to QHEC.

BGE has been encouraging QHEC customers to sign up for PeakRewards and offering to install PeakRewards thermostats at the time of the QHEC visit. In 2019, BGE reports 1,390 thermostats were installed as a result of this cross promotion.

These are good examples of utilizing the broad reach of the QHEC program to install additional measures and help customers take advantage of other programs and savings opportunities.

Figure 16 below shows QHEC annualized savings from 2017 to 2019, with the lighter shaded portions of the bars representing multifamily QHEC jobs. Multifamily QHECs continue to be an important contributor to QHEC savings for BGE and Pepco whereas they are a very small portion of QHEC jobs in other service territories. This is likely due to the larger share of multifamily buildings in BGE and Pepco service territories; however, we encourage the other utilities to assess whether they could be serving more multifamily customers through QHEC.

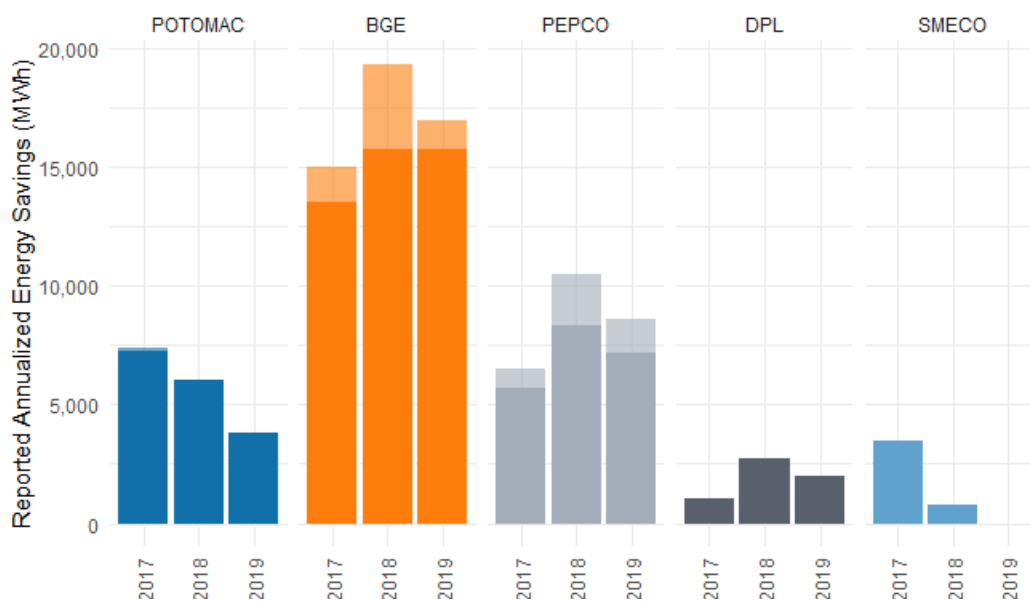


Figure 16: Full Year QHEC savings from multifamily (above, lighter color) and single family (below, darker color)

Home Performance with ENERGY STAR

The utilities transitioned from a cost-based incentive (CBI) structure to a performance-based incentive (PBI) structure in 2018. The goal of this change was to encourage deeper energy savings per project and increase the overall cost effectiveness of the residential retrofit programs. There have been observed benefits to this program design change including increasing average savings per participant and better audit to job conversion rates. All-electric homes continue to drive high savings results for Pepco, Delmarva, and BGE. Each of these utilities also note adding heat pump water heaters to the measures eligible for incentives, which will increase electric savings opportunities.

Washington Gas is reporting improved savings for its Coordinated Programs with each of the electric utilities. During 2019, Washington Gas paid for therm savings associated with the HPwES programs administered by the electric utilities. The next phase of the programs will include incentives paid on natural gas HVAC and water heating measures and is expected to be rolled out during Q1 2020. Given the impacts that Covid-19 is having on the residential retrofit industry, we expect that Q1-Q2 2020 HPwES results will be significantly impacted statewide, so it may not be readily evident in the next reporting cycle the extent to which this next phase is successful in drawing in customers with natural gas HVAC and water heating.

Figure 17 provides the savings, participation, and budget performance relative to targets cycle-to-date. Potomac Edison achieved its savings forecast and Delmarva achieved more than double its anticipated energy savings. BGE and Pepco are falling short of target; however, both have improved their performance significantly in 2019 compared to 2018. In 2019, BGE achieved 90% of its savings target and Pepco exceeded its savings target. None of the utilities achieved their

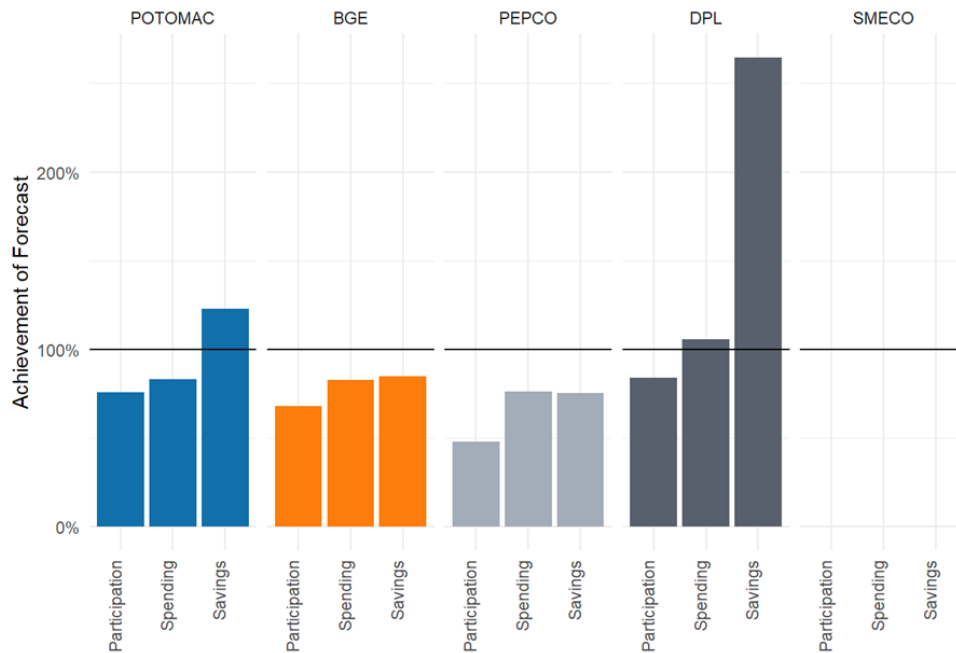


Figure 17: Cycle-to-Date HPwES achievement of forecasted goals.

Note: SMECO has replaced its QHEC and HPwES program with the Home Energy Improvement program

participation forecasts, even though most acknowledge an increase in participation when compared to 2018.

Figure 18, below, shows the costs per MWh for the HPwES programs from 2017 through 2019. HPwES program costs per MWh have been declining, likely driven by the change to the PBI structure which has increased electric savings per project. Note that SMECO does not report HPwES results in 2019 because it has fully rolled out HEIP - which combines QHEC and HPwES approaches under one program.

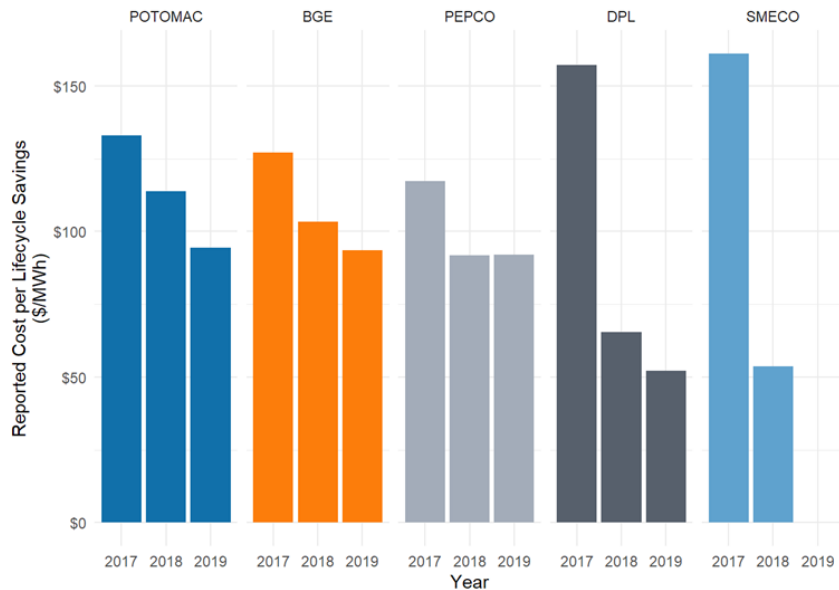
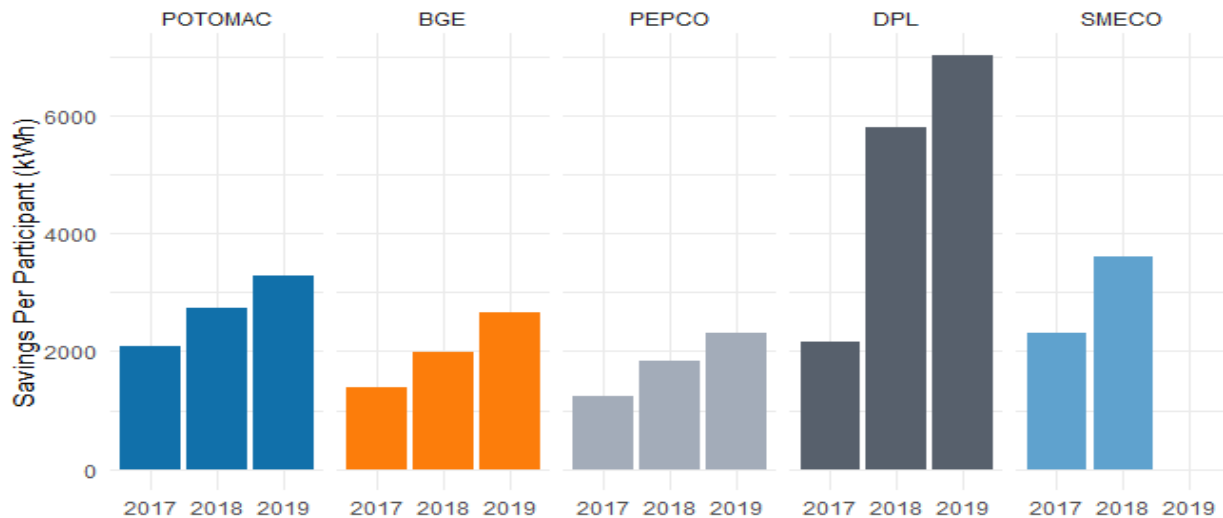


Figure 18: HPwES programs reported cost per lifecycle savings.

Electric savings per completed project continues to trend upwards, as shown in Figure 19, in some cases substantially. As noted above, this is likely due to customers in all-electric homes taking advantage of the program and the higher incentives for electric savings compared to natural gas savings.



SMECO did not report any completed projects in 2019

Figure 19: HPwES completed projects-electric savings per participant.

In Figure 20, below, we show the average therm savings per participant for completed HPwES projects, with therms converted to MMBtu. Figure 20 shows that natural gas savings have declined in BGE, Pepco, and Delmarva service territories.

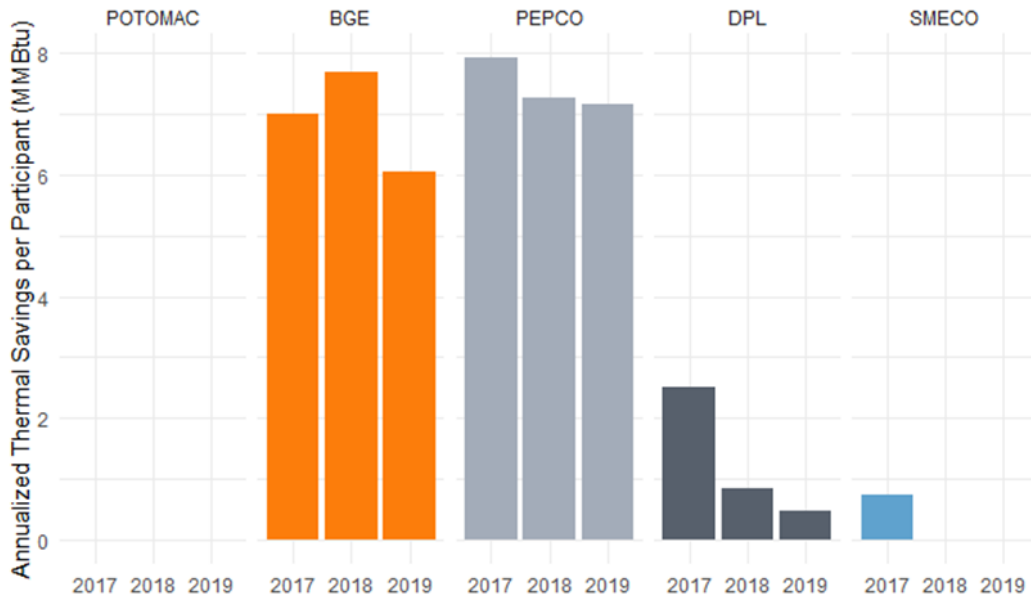


Figure 20: HPwES completed projects-thermal savings per participant by utility.

Note that Potomac Edison continues to be the only utility that does not report therm savings produced by its HPwES program. We request that the Commission direct Potomac Edison to report gas savings data in future reports.

Washington Gas included a table in its semi-annual report which breaks out therm savings by electric utility as a result of their coordination on HPwES. It does not include detail that enables us to look at therm savings on completed projects versus savings associated with audits. We recommend the Utilities work with Commission Staff and stakeholders to update the reporting tables for the 2021-2023 program cycle to enable clearer and more consistent reporting and program evaluation.

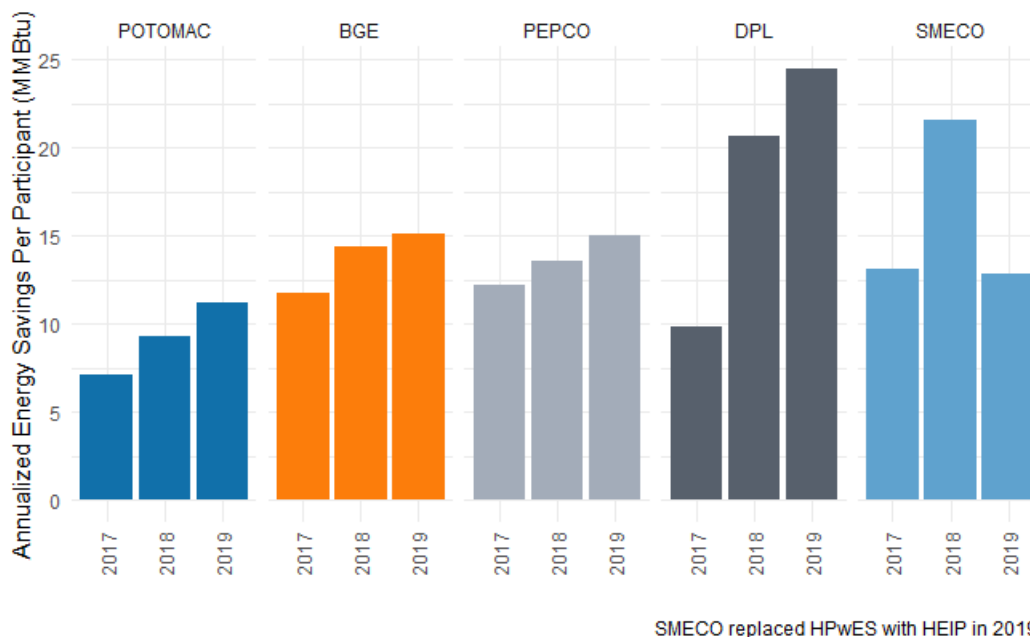


Figure 21: HPwES completed projects-total energy savings per participant by utility.

Even while average therm savings per completed project is declining, total energy savings per completed project is continuing to increase for all utilities except SMECO, as shown in Figure 21 above. We have included SMECO’s completed HEIP projects in this chart as we expect those to be similar to HPwES completed projects.

The PBI model continues to generate strong results overall, with greater uptake of more comprehensive projects. Phase II of the coordinated programs - with full integration of natural gas measures into HPwES program delivery and incentive design - is expected to have happened in Q1 2020. VEIC strongly supports rollout of a coordinated HPwES program that fully integrates natural gas measures and applauds Washington Gas and the electric utilities for the progress made. We are also pleased that the Commission approved in Order No. 89404 the increase in program incentives to \$3-\$6 per MMBtu, which should help address the large discrepancies between electric and gas incentives seen previously.

Looking ahead, we recommend that the Work Group reconvene to discuss potential modifications to the Residential Retrofit programs (QHEC, HPwES, and HEIP) which should be incorporated in the 2021-2023 program cycle. Assessing the effectiveness of various approaches taken and lessons learned, as well as a looking at emerging trends and technologies, would ensure that the programs are designed to achieve maximum impact and customer satisfaction.

Home Energy Improvement

SMECO closed its legacy QHEC and HPwES programs to customers on March 31, 2018. Those results are reported in the figures above. At the same time, it launched the Home Energy Improvement Program (HEIP), which offers customers a single entry point to a no-cost energy audit and direct installation of energy efficiency measures (similar to QHEC), and identification of additional rebated energy efficiency measures that could save more energy (similar to HPwES). SMECO's Q3-Q4 2018 report contained the first reported participants in this new program.

The program continues to build momentum with a 5% increase in participation and a 35% increase in the smart thermostat and HVAC tune-up offering in Q3-Q4 2019 compared to the first half of the year. We would like to see more participants completing weatherization jobs and recommend that SMECO focus on ways to best target those customers in need of whole-home retrofits and contractor training to improve conversion rates.

As noted above, we recommend the Work Group be reconvened to assess whether the HEIP model should be adopted by other utilities in the 2021-2023 cycle. Under the current QHEC and HPwES model used by the other utilities, customers may be confused by the difference between the free QHEC visit and the \$100 HPwES energy audit. Customers often begin with QHEC because it is done at no cost, but don't understand why they have to pay another contractor \$100 for a second energy audit if they are interested in further energy savings improvements. The HEIP design alleviates that issue by offering one streamlined, no-cost audit to single-family homeowners to avoid these issues.

Heating, Ventilation, and Air Conditioning (HVAC)

The current performance period represents the first period in which all utilities have launched the midstream delivery mechanism for the HVAC measures. This report examines the most recently filed Midstream Status Report to consider different aspects of midstream implementation with respect to best practices, as well as to offer recommendations to strengthen program delivery in the face of current economic challenges.

While the combined cycle-to-date savings of the overall residential portfolio exceeded forecasts at the end of 2019, in the HVAC sector the utilities continued to achieve less than 60% of forecasted savings, as shown in Figure 22.

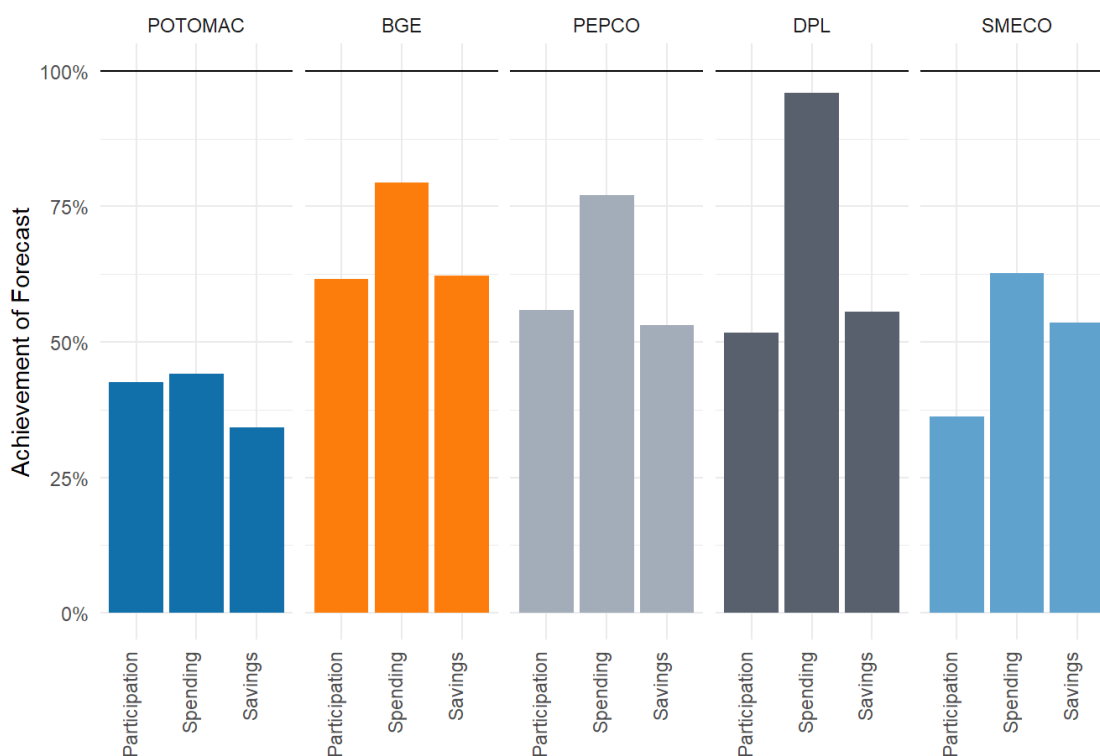


Figure 22: Cycle-to-Date HVAC achievement of forecasted goals.

Current cycle-to-date performance trends were nearly the same as for the previous reporting period, except for the savings of BGE which edged slightly higher as a percent of forecast. Notably, all utilities continue to exhibit higher rates of spending as compared to other performance metrics, likely due to higher program costs associated with the ramp up of the midstream delivery model. The utilities should monitor the spending metric to assess whether adjustments may be needed in the future.

Aside from the delays associated with the rollout of the midstream delivery offering, other factors cited by utilities for falling short of savings targets were the decline of Tier 2 products sales and a reduction in the savings calculations for Electronically Commutated Motors (“ECMs”).

Midstream Status Report

We commend the utilities and Midstream Work Group for again producing this valuable Midstream Status Report¹⁸, providing further insights into this important delivery mechanism and subsector of the residential portfolio. Not only does the report provide the opportunity to examine potential changes that may be needed, it also provides transparency into the development of a process that relies heavily on stakeholder participation and support.

¹⁸ Due to the revised timetable provided by the Commission issued Order No. 88783, the most recently available Midstream Status Report was completed on October 15, 2019, representing roughly half of the time period of the current reporting period.

Building on recommendations we presented for this section in previous reports, below we discuss the details of the current status report within the context of individual best practices:

Tracking supply channel participation: As indicated in Table 10 below, all utilities reported on the number of participating distributors in the program. However, without also understanding the total number of distributors within a given utility territory, we are not able to determine what percentage of distributor participation has been achieved by each program. We appreciate SMECO providing this important indicator of program performance.

Table 10: Reported figures of supply channel participation.¹⁹

Utility	Participating Distributors	Proportion of Distributor Participation	Participating Contractors
PE	8	Not reported	Not reported
BGE	12	Not reported	Not reported
Pepco	13	Not reported	Not reported
Delmarva	14	Not reported	Not reported
SMECO	13	80% of SMECO territory distributors	60

In addition to participating distributors, another essential component of midstream program success is contractors. Throughout the report, the utilities mention contractor licensing requirements, training opportunities, portal access, etc. However, with the exception of SMECO, none of the utilities quantify their level of contractor participation. Especially as we face the challenging economic times presented by the COVID-19 outbreak, during which time demand for program measures may decline, it is essential to track distributor and contractor participation as a means of measuring program impact.

Leveraging incentives: While by design utilities only make payments to distributors within a midstream program, the impact of these incentive payments can be broadened when the payments are passed further through the supply channel and eventually to the consumer. All utilities reported that at least 80% of incentive payments to distributors were passed to contractors. SMECO further reported that 95% of the incentive was passed on to the end-user, which is where incentives have the greatest impact on reducing the cost for the consumer.

Supply channel engagement and support: We commend the utilities on engaging and supporting the supply channel through a variety of efforts as shown in Table 11. All of the utilities reported some form of regular in-store meetings with distributors. Most utilities provided training for branch personnel and organized in-store promotion events, and also called on manufacturers to provide contract training in some cases.

We recommend that all utilities take advantage of these best practices as a part of broadening their support of the supply channel, especially during this period of increased economic need following the COVID-19 outbreak. These practices include seeking feedback from the supply

¹⁹ This data was taken directly from the Q3/Q4 utility filings, not the Midstream Status Report which predates the filings.

channel to identify the support which is viewed as the most valuable. For example, Pepco reported that distributors have expressed the desire for additional marketing and communication materials for promoting program offerings.

Table 11: Supply channel support and engagement opportunities.

Utility	Monthly in-store distributor training events	Regular distributor meetings to review budget, spend, pipeline, feedback	Review of distributor's quarterly performance scorecard	Contractor lunch-and-learn training events
PE*				
BGE	✓			✓
Pepco	✓			✓
Delmarva	✓			✓
SMECO		✓	✓	

* Data for PE was not available upon Midstream Status Report release on October 15, 2019.

Delivering a coordinated response: Within rapidly changing economic circumstances posed by the COVID-19 outbreak, utilities will be most effective by working together to develop common messaging that can be used as a basis for cooperative action. For example, we suggest that the Marketing Work Group might be used as a forum for developing and coordinating a common message for end users and the supply channel.

Residential Retrofit Summary of Recommendations

- New energy saving measures and increased cross marketing activities for the QHEC programs is helping to drive high levels of participation and savings for many of the utilities. We recommend that the Utilities continue and expand such activities to leverage the broad reach of QHEC to support improved performance across the residential portfolio.
- With the exception of Potomac Edison, the utilities reported on CTD gas savings as well as electric savings. We request that the Commission direct Potomac Edison to report gas savings data in future reports.
- We recommend that the utilities adopt a consistent reporting methodology to incorporate in the next program cycle which includes a comprehensive reporting of electric and natural gas savings by each electric utility service territory, as they are responsible for implementing the coordinated programs and to enable analysis of program results.
- We recommend that the Work Group reconvene to discuss potential modifications to the Residential Retrofit programs (QHEC, HPwES, and HEIP) which should be incorporated in the 2021-2023 program cycle.
- To reinforce the midstream delivery model as a means for strengthening supply channel relationships, supporting local contractors and distributors, and promoting cost-saving opportunities for homeowners, we recommend that utilities consider the following:
 - Track supply channel participation for improved optics into program performance and impacts.

- Consider increasing the impact of the incentive on purchasing decisions.
- Apply best practices in supply channel engagement and support.
- Seek opportunities to collaborate between utility programs for delivering a more coordinated response within COVID-19 caused economic conditions.

Smart Thermostats

The EmPOWER Utilities are national leaders in offering broad, multi-channel support for smart thermostats and the energy and cost-saving services they enable. This continues an approach that suits the technology's significant savings potential and product function across multiple program areas.

EmPOWER's smart thermostat program activities support:

1. Electrical cooling and ventilation energy savings
2. Electrical and gas heating energy savings
3. Active demand response (DR) and embedded capacity management features
4. Supplemental services in support of customer engagement, additional savings, and diagnostics (such as thermostat optimization)

With such broad benefits, and a foundation of maturing programs and product experiences in the smart-and-connected products category, it is good to see utility investment in innovation and participation continue. BGE and SMECO report healthy use of alternatives to traditional rebate programs (i.e. instant rebates and online marketplaces) and most utilities report substantial integration with existing programs like RNC.

Table 12 below is a summary of thermostat activities across the residential energy efficiency program areas, as reported in the utility filings. As smart thermostat integration continues to mature, it will be vital that utilities report and track that activity comprehensively *and* consistently. BGE has begun to do so by providing a unified smart thermostat sheet in their data reporting, although the methods to tabulate those summaries are unclear. Utilities should specifically note when reported values refer to quarterly, semi-annual, or year-to-date values for participation and savings. In some cases, it is difficult to discern details about participation rates and make sure there is no double-counting of rebated thermostats and thermostats enrolled in optimization programs.

As more utilities consider offering online marketplaces and alternate channels to sell, rebate, or install smart thermostats (and other connected products such as home energy monitors, smart speakers, and smart plugs), the Commission could direct the utilities to consider opportunities to realize cost savings and other efficiencies (such as clearer communication with customers and trade allies, and more consistent/unified reporting) by coordinating the development of online marketplaces. For example, as noted in our last semi-annual review, they could band together and hire the same marketplace vendor, branded appropriately for each utility. This is certainly relevant to more than smart thermostats: utilities and the Commission should welcome a coordinated effort to facilitate widespread program participation and measure adoption. Given the

substantial amount of thermostats acquired through the online marketplace maintained by BGE, there is evidence that this channel could greatly support a variety of programs.

Table 12: Thermostat Program Participation, units sold/installed by Utility and Program

Utility	EmPOWER Smart Thermostat Programs									2019 Q3-4 Total	2019 Q1-2 Total	2019 Total
	Downstream Rebates	Instant Rebates	Online Store	HEIP	QHEC	HPwES	HVAC	RNC	Small Business			
Potomac	-	-	-	-	-	-	1,615	735	-	2,350	1,138	3,488
BGE	2,427	2,396	12,066	-	1,390	24	-	4,392	135	22,830	9,934	32,764
Pepco	1,325	-	-	-	415	-	351	200	-	2,291	1,517	3,808
Delmarva	221	-	-	-	9	-	46	64	-	340	208	548
SMECO	482	-	142	693	-	-	63	212	-	1,592	1,525	3,117
Q3-4 Total	4,455	2,396	12,208	693	1,814	24	2,075	5,603	135	29,403	-	-
Q1-2	3,309	1,155	6,415	487	6	13	179	1,559	61	-	13,184	
2019 Total	7,764	3,551	18,623	1180	1820	37	2254	7,162	196	-	-	43,725

Most utilities developed and used thermostat optimization program services in 2019. Optimization programs are designed to provide incremental savings and supplemental benefits through software services for enrolled customers. It should be noted that the addressable number of products and program participants grows cumulatively (i.e., a single thermostat can be enrolled by multiple initiatives) and thermostat service program participation may be inflated, which further indicates that clear, consistent rebate and program participation across utilities is vital. The benefit of diverse thermostat programs and pathways for customers’ participation helps “meet customers where they are,” but also creates added complexity in tracking and managing ongoing participation in these programs. Utilities should consider ways to improve how they track participation in these programs as they continue to evolve into Bring Your Own Device (BYOD) services.

There are notable increases across almost every utility in both the number of rebated products and in the number of opt-in participants in smart thermostat-enabled services. These programs are leveraging market innovations and embracing the dynamics and diversity of the product category. Assuming that utilities’ reporting of unit sales in the most recent semi-annual reports was reflective of Q3-Q4 2019 activity (as opposed to 2019 total activity), over 40,000 units sold took advantage of EmPOWER program offerings. BGE has reported notable increases in smart thermostat sales, specifically through its online marketplace and via its PeakRewards program.

However, OPC continues to have concerns about customer privacy due to the use of these connected devices. As is the case with all internet-connected devices, data security also remains an important issue. As the utilities continue to build out AMI-related systems and services, they should articulate or develop mechanisms that protect their customers’ data and privacy. Utilities should already be familiar with many modern privacy issues, but a useful set of recommendations for policy makers was produced in 2012 by the FTC.²⁰ These recommendations suggest taking a principled, “Privacy by Design” approach, simplifying choices for consumers, and embracing transparency; however, there will be a growing tension between maintaining privacy of customer

²⁰ <https://www.ftc.gov/sites/default/files/documents/reports/federal-trade-commission-report-protecting-consumer-privacy-era-rapid-change-recommendations/120326privacyreport.pdf>

behavior while also having the means to accurately measure and validate energy program performance based on smart thermostats and other connected devices.

The Commission should require consistent smart thermostat reporting across the utilities to enable more effective analysis of the measure's impact. The Utilities should provide a reporting table with current sources of thermostat installations and thermostat optimization program participants, with easily-understood and documented methods or formulas for how those values were determined. For example, "Total thermostat installations from BGE in Q3-Q4 is the sum of purchases counted from downstream and instant rebates, sales in the online marketplace, and participation in the HPwES, RNC, or small business programs." Ideally cross-tabulated counts of thermostat manufacturer and optimization program will also help track and improve programs as they evolve. This form of tracking will help ensure the free market of vendors and manufacturers will be incentivized to evolve and maintain a certain level of performance in these evolving optimization programs.

We continue to urge the utilities and EmPOWER evaluators to consider an approach to savings claims that can adapt and incorporate program and product complexities inherent to the broad application of smart thermostats across the EmPOWER portfolio. For example, the Northeast Energy Efficiency Partnerships (NEEP) has issued a guidance document on "Claiming Savings from Smart Thermostats" that is a useful resource.²¹ The document outlines an approach that would leverage the ENERGY STAR metric on field data from thermostats deployed in Maryland to provide insights to inform savings estimates.

It is also worth mentioning the role that AMI data plays in estimating thermostat savings. As mentioned above, the industry continues to make advances in how to calculate savings from various measures associated with smart thermostats. Savings estimates are often more precise and accurate when detailed program tracking can be connected to more granular measures of household energy consumption like hourly or 15-minute metered energy or gas consumption, which can be obtained for utilities with AMI. Additionally, some utilities report savings below target for this point in the program cycle, based on changes in the evaluation reference. As smart thermostats (and other connected devices) grow in popularity, especially in Maryland, the Commission may want to consider engaging in state-specific evaluations of thermostat performance using AMI data and thermostat telemetry rather than depending on the Mid-Atlantic TRM values. In a similar vein, there are other evaluations underway in other jurisdictions (e.g., Illinois) to deepen the understanding and precision of thermostat-based savings.

Smart Thermostat Summary of Recommendations

- The Commission should require consistent smart thermostat reporting across the utilities to enable more effective analysis of the measure's impact. The utilities should provide a reporting table with current sources of thermostat installations and thermostat optimization program participants, with easily-understood and documented methods or formulas for how those values were determined.
- The utilities should consider any potential cost savings and unified customer experience from combining resources for a standard Maryland online marketplace.

²² https://www.energystar.gov/newhomes/energy_star_certified_new_homes_market_share

- The utilities should consider how smart thermostat programs evolve and grow into other controllable loads in the home, for example the evolution from direct install to rebate to BYOT to BYOD.
- The utilities should become familiar with the various privacy issues emerging in the connected device market and embrace “Privacy by Design” principles being adopted elsewhere in North America and Europe.
- The Commission and Utilities should revisit the need for a state-specific evaluation of savings using Thermostat telemetry and AMI data.

Smart Home Pilots

Some utilities are actively building on their smart thermostat experiences (connectivity, customer convenience, and complex challenges) through new pilots with other types of connected products. By bundling multiple products in self-installed “kits” (such as connected lights, plugs, sensors and hubs) that are intended to work well together, four of the EmPOWER Maryland utilities (BGE, Delmarva, PEPCO, and SMECO) are well underway with these pilot programs and provide updates from activities in 2019 and plans for next steps in 2020.

Broadly, these pilots aim to deploy kits composed of off-the-shelf smart home products in order to better understand the customer experience and potential value of a suite of products that can do more than their non-smart alternative baselines. This includes connecting and responding to sophisticated controls in the form of local sensing and computation, automation, internet connectivity, and voice control (for example, BGE has released a smart home Alexa skill for Amazon’s smart speakers and SMECO tested voice assistants in October 2019).

We appreciate the utilities providing more details about their pilots in the most recent filings. Details emerging this period suggest that each utility is testing different aspects of potential smart home benefits, a scenario that will likely benefit all utilities and customers throughout the state and beyond. Each utility’s pilot, assuming each one is set up for rigorous monitoring, documentation, and analysis, will be an opportunity to test some variations of program design or smart home technology. A compilation of updates gathered from the utilities’ filings and review of their pilot promotion websites is reported in Table 13.

Table 13: Smart Home Kit Details

	Utility Launch	BGE Q4 2018	Delmarva Q1/2 2019	PEPCO Q1/2 2019	SMECO Q1/2 2019
	#Target Participants	1000	500	1000	600
Smart Home Kit Details	Gateway	1	1	1	1
	Plug	2	2	2	2
	LED	2	2	0	2
	Entry Sensor	3	3	3	2
	Motion Sensor	3	2	1	2

Utility	BGE	Delmarva	PEPCO	SMECO
Launch	Q4 2018	Q1/2 2019	Q1/2 2019	Q1/2 2019
Temp/Humidity Sensor	3	1	1	0
Tstat	0	0	1	0
Large Load Controller	0	0	1	0
Voice Assistant	Amazon	Amazon	Amazon	?
Advertised Est Value	\$400	\$500	\$700	?

While the additional detail provided by the Utilities is helpful, there are still some areas where we expect that the lack of clarity around pilot design may lead to less clear results. Based on this period’s filings, we note the following differentiating characteristics of each utility pilot:



Figure 23: Promotional materials from PEPCO and Delmarva’s smart home pilot, using similar designs with different smart home features.

- BGE has concluded its pilot and will be evaluating outcomes in 2020. It reports a high rate (86%) of participants which installed devices and were engaged; the utility used the pilot to deploy a tiered experience of support and engagement.
- Delmarva started recruitment in June 2019 and reached its target of 500 participants. It expects to test customer engagement options to encourage increases in energy efficiency at home.
- Pepco had installed 366 of 1000 target kits by the end of 2019, and expected at least 224 more installations in January 2020, with the installation target reached by February 2020. We look forward to learning the results of this pipeline in the next filing. Pepco also plans to test demand response capacity over the summer of 2020 and leverage devices ‘beyond the thermostat’ – this is a promising direction for load flexibility, and we appreciate the utility testing this potential in their pilot design.
- SMECO launched its pilot in May 2018 and had 476 participants in 2019 out of an expected 600. It is deploying a goal-setting campaign called “My Energy Target” and, over the summer of 2019, 35% of participants reached their targets for savings and 44% realized some level of savings. While SMECO reports testing a voice assistant, it was

unclear which one (other utilities are deploying customized Alexa-based voice assistants).

- As each pilot includes a gateway, there is an accompanying voice assistant with these products; this ‘installed user base’ may be an opportunity to further evaluate how customers engage with their smart homes through voice-based activities and may be especially relevant as individuals try to avoid touching surfaces in the home during the pandemic crisis.

Previously, we recommended that utilities embark on customer-centric pilot planning that involves some form of ground-truth with a sample customer population to validate that pilot designs are aligned with customer needs and concerns about smart home technology, and at this point it would be helpful to know if that exercise was part of the planning or not. Additionally, we continue to encourage the utilities to collaborate with each other and decide if there are aspects of their pilots that are consistent enough for the results to be compared and enable cross-pollination of learning between utilities. Valuable insights could be gained through continuous learning during the pilot deployment and after the pilots conclude.

Smart Home Pilot Recommendations

The Utilities should convene to share updates and coordinate efforts to:

- Agree upon a framework and reporting template that adequately ensures comparability across pilot evaluations
- Continue to collaborate and continuously improve upon their connected device offerings through emerging smart home programs
- Look for opportunities to further engage pilot participants in the context of current experiences during the pandemic crisis. Self-installed kits and hands-free activities may be appealing to both customers and DSM program providers while isolation measures are in place during a pandemic.

Residential New Construction

All five EmPOWER Electric Utilities offer a residential new construction (RNC) program based on the national ENERGY STAR Certified Homes Program. These programs engage local builders and homebuyers to promote new home construction that is at least 15% more efficient than existing building codes.

Building to ENERGY STAR standards is often the first step to building to even higher performing standards, including net zero. Maryland continues to rank in the top three for overall ENERGY STAR Certified Homes market share at 39%²². This year all five EmPOWER Maryland electric utilities have again received Partner of the Year awards for Energy Efficiency Program Delivery. Washington Gas has received the Excellence award for ENERGY STAR promotion, which included supporting the construction of over 1,300 ENERGY STAR Certified Homes²³.

²² https://www.energystar.gov/newhomes/energy_star_certified_new_homes_market_share

²³ https://www.energystar.gov/about/awards/2020_energy_star_award_winners

The utilities continue to seek innovative ways to grow the program while maximizing savings and reducing costs such as:

- Successful on-site bilingual training initiative for Spanish speaking contractors and subcontractors;
- Completing the transition to online program registration and Ekotrope energy modeling, enabling more streamlined project registration and data input;
- Implementing new marketing approaches, including high impact and responsive display ads;
- Potomac Edison successfully recruited Ballenger Run, leading to a significant increase in multifamily projects for the utility;
- Washington Gas reported the RNC program as one of the highlights of the utility's program portfolio in 2019 achieving 145% of forecasted savings targets in its second year after program launch.

Washington Gas and four of the five EmPOWER Maryland electric utilities are in Phase I of a Coordinated RNC program. During this program cycle, Washington Gas also launched a prescriptive-based RNC program that provides incentives for high-efficiency gas appliances and mechanical systems.

The Coordinated Program continues to fall short of forecasted goals. Pepco and BGE reported the highest percentage of savings goals at 83% and 73% respectively. While SMECO and BGE reported significantly lower savings goal achievement at 33% and 36% respectively. By contrast, the Washington Gas prescriptive RNC program has far exceeded savings goals at 145% and over 200% of its measure goals.

The electric utilities introduced two additional offerings in the 2018-2020 program cycle, smart thermostats and the concierge program. The concierge program was intended to educate homeowners about the energy efficient features of their new home and provide training on best practices for operating and maintaining their home, as well as to seek additional savings opportunities. The program saw little uptake by customers, and the utilities cited difficulty marketing the program. VEIC supported the utilities' recommendation to sunset the program for the remainder of this cycle. The design of the program was too focused on providing additional measures to already very efficient homes and encouraging enrollment in other EmPOWER programs, which should be common practice and not require a separate service. However, VEIC believes there are opportunities for additional energy savings through a behavioral approach to support homeowner education and engagement on how to operate their new home. We recommend the utilities engage the Behavior Work Group to consider a pilot of such an approach for RNC program participants, which may be tested on a smaller scale in the near term in order to determine whether to expand in the next program cycle.

The Smart Thermostat offering continues to see significant participation across all electric utilities. Over 50% of ENERGY STAR Certified Homes participants are opting to install smart thermostats in their homes. Smart thermostats provide approximately 130 kWh in savings. It should be noted that these values are approximate due to the variance in reporting across utilities. BGE reports

smart thermostat “Measures”, whereas the remaining utilities report “Participants”. Therefore, the unique participation count for BGE customers is unknown.

Figure 24 shows how each utility is performing to date compared to forecasts for the current period within the program cycle for participation, spending, and savings. Only three utilities met their participation goals. It should be noted that BGE reports the same quantity of forecasted participants as measures. When achievement of forecast is viewed on a measure level, BGE is just under target at 90%. Pepco reported that one of its largest participating builders left the service territory and another large builder submitted significantly less homes in 2019 leading to the shortfall in participation. Washington Gas’s cycle-to-date shortfall is largely due to the delayed start in program implementation. For the 2019 program year, participation was 70% of target goals. Washington Gas expects the program to exceed program targets by the end of 2020.

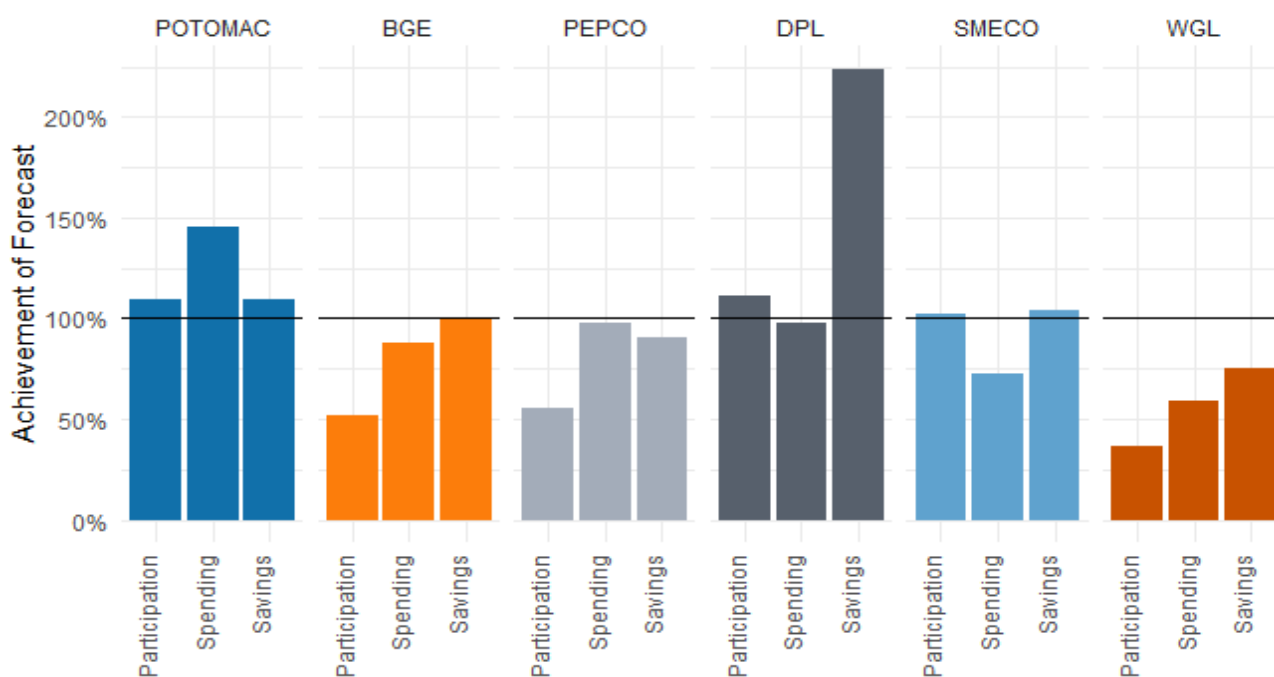


Figure 24: Cycle-to-Date residential new construction achievement of forecasted goals.

All electric utilities very nearly met or surpassed savings goals. Delmarva has historically surpassed savings targets at rates similar to those shown below. This may be due to higher than average kWh/participant savings for single family home participants compared to other utilities. Washington Gas’s CTD shortfall was again due to a late implementation start. For the 2019 program year, Washington Gas surpassed savings goals by nearly 50%.

Not shown in the chart above are achievement of forecasts for the Washington Gas Coordinated RNC program. The utilities have stated the goal is to have a fully operational coordinated program, Phase II, implemented by Q1 2020. As with other EmPOWER programs, this rollout may be adversely impacted by COVID-19, although new home construction may be less severely impacted than the home retrofit industry.

Figure 25 shows the average savings per unique participant for each of the utilities' residential new construction programs for years 2017–2019. Savings for the current program cycle are inclusive of the smart thermostat measure and the 90% LED lighting requirement.

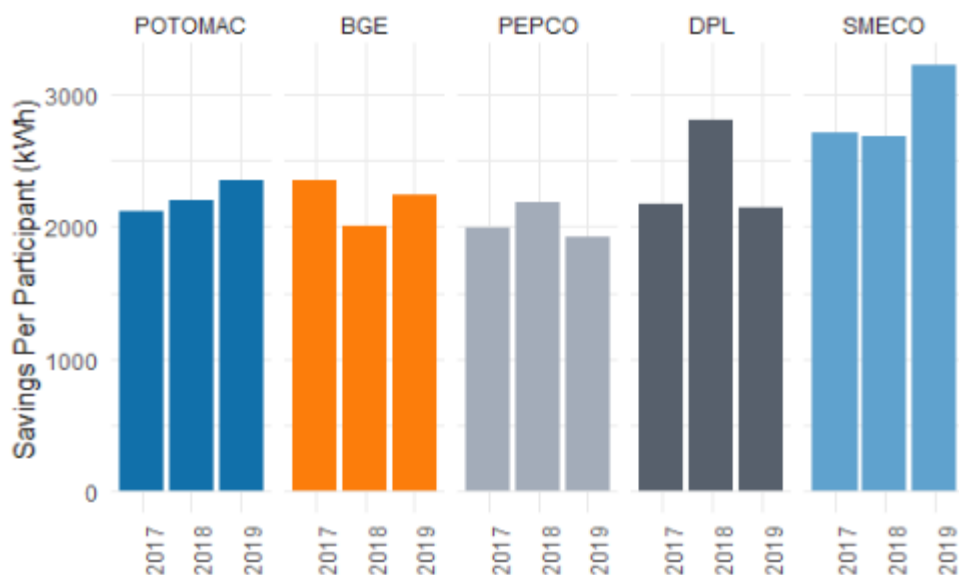


Figure 25: Residential new construction savings per participant.

The program has been able to maintain savings alongside adoption of a new energy code, which became effective in March 2019. The EmPOWER Maryland utilities' strong builder relationships, innovative marketing, and training activities all help to maintain a robust new construction program. Annual fluctuations are due to the makeup of program participants in a given year, with higher participation rates of multifamily and townhomes generally leading to lower overall per participant savings. Not shown in the figure below - Washington Gas is realizing approximately 140 therms per participant for its measure-based RNC program. For comparison, the electric utilities that reported therm savings average approximately 170 therms per participant for the whole-home program approach

To maintain higher level of savings per home, utilities should continue to invest efforts in the planned strategies for the current program cycle, including QA/QC efforts and on-site technical training for builders and contractors. The bi-lingual trainings utilities have begun to offer are key to ensuring high performance construction practices are being implemented correctly and full savings potential realized in each ENERGY STAR home. The utilities may also want to consider whether additional prescriptive measure strategies, such as the new 90% LED lighting requirement, could help boost savings.

Figure 26 below shows the cost per MWh for each of the five utilities' RNC programs. The cost of implementing a new construction program has remained relatively constant for the utilities. Pepco and Delmarva's cost per lifecycle MWh continue to be significantly higher than PE, BGE and SMECO. For the program cycle to date, Washington Gas is reporting a cost of just over \$0.50 per therm to implement both its measure-based and coordinated new construction programs.

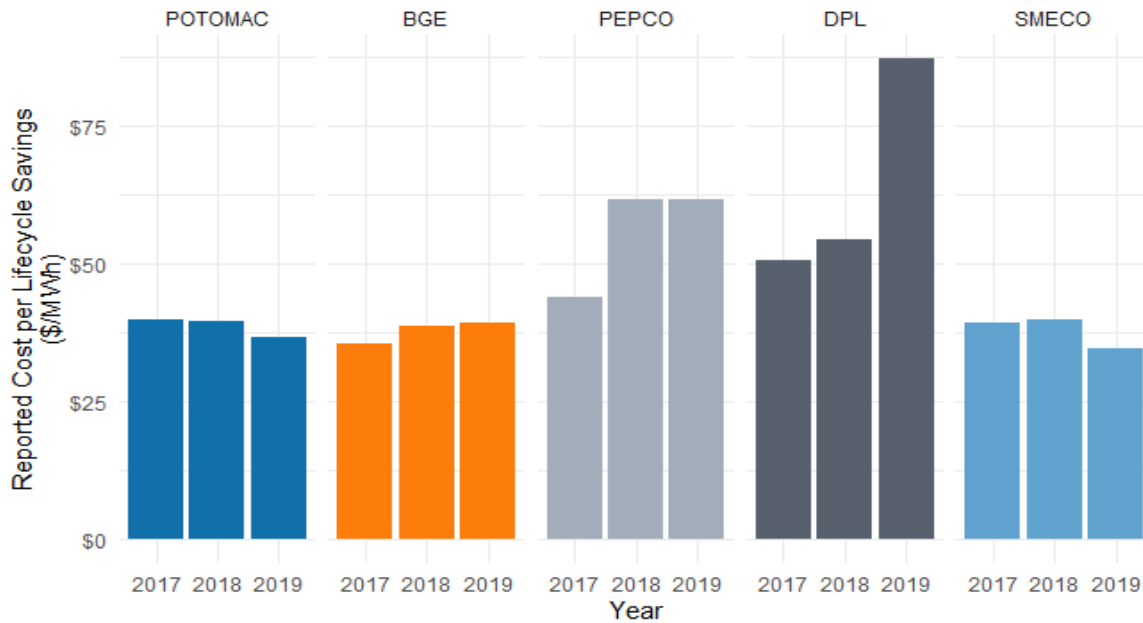


Figure 26: Residential new construction reported cost per lifecycle savings

Figure 27 below shows participation levels for each utility by home type for the current program cycle. Pepco completed a large multifamily project, as indicated in the chart. This project produced less savings than anticipated, contributing to Pepco's lower than anticipated savings compared to goals.

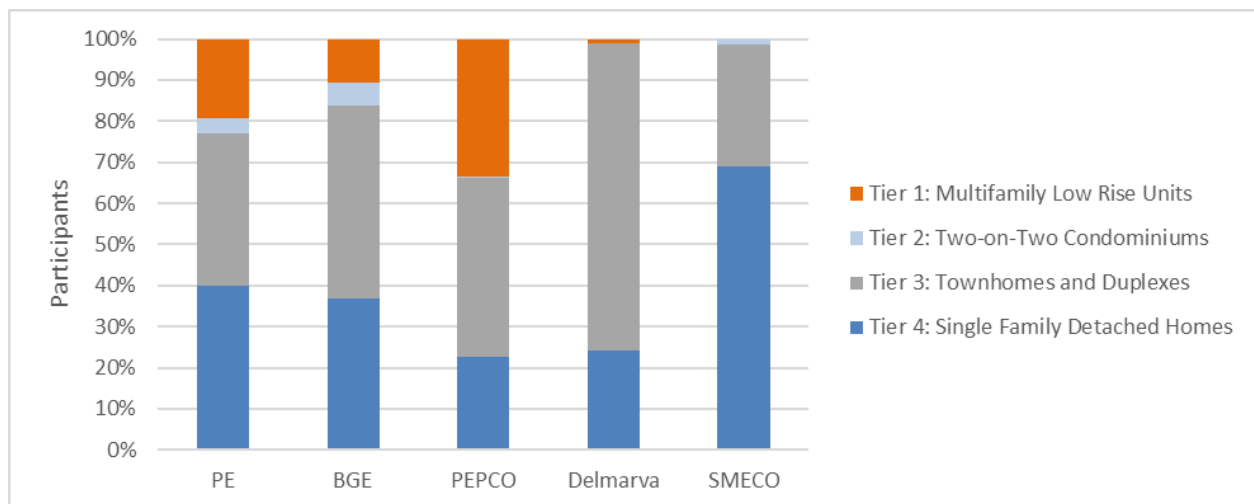


Figure 27: ENERGY STAR Homes participation by home type.

Market penetration is a good indicator of the acceptance of a program or product by the target audience. It can also inform whether potential customers are responsive to marketing tactics and new initiatives being deployed. SMECO was the only EmPOWER electric utility to report a market penetration rate. At 40%, SMECO's market share is in-line with the statewide market share of 39%. Washington Gas did not report the market penetration of its prescriptive or coordinated residential new construction programs but noted the participating builders account represent 45% of the residential new construction market statewide. Washington Gas is actively recruiting builders that, combined with current participating builders, represent 60% of the new construction market. This places Washington Gas and the electric utilities in a good position to increase market share when a coordinated program is fully implemented. Washington Gas reported positive response and participation in the Phase I coordinated program in 2019.

Pursuant to Commission Order No. 88964, the Electric and Natural Gas Coordination Work Group discussions regarding implementation of coordinated new construction programs between Washington Gas and the electric utilities were initiated during a Work Group call in February 2019. The Order directed the Work Group to develop a Coordinated Residential New Construction Program. The final plan for the Coordinated Residential New Construction Program as proposed by the Electric and Natural Gas Coordinated Work Group was approved on December 20, 2019, Order 89404. Per the Order, the Work Group has been directed to consider varying incentives for expanded equipment types and additional home certifications.

The currently approved coordinated RNC program maintains the same program requirements as the electric utilities have been offering for a number of years. ENERGY STAR Certified Homes Version 3.1 is the minimum requirement for program incentives. Utilities have also proposed additional incentives for equipment that exceeds ENERGY STAR minimum requirements. This recommendation is based on the current success of the Washington Gas prescriptive RNC program.

As noted above, offering targeted prescriptive incentives for measures that exceed baseline ENERGY STAR requirements not only helps the utilities achieve additional savings, but also encourages builders to take the next step in implementing high performance construction practices and products. Ideally, the coordinated RNC program will begin offering a comprehensive higher program tier in addition to individual measures. VEIC has previously recommended, and continues to support, that the EmPOWER utilities consider incorporating a high-performance program tier that brings home performance beyond ENERGY STAR.

Given past reticence to this recommendation, VEIC has also recommended implementation of additional high-performance prescriptive measures where savings can be claimed via the modeling software, or prescriptively via the TRM, like the new requirement for 90% LEDs. Additional measure requirements could include lower infiltration targets, drain water heat recovery (DWHR), high efficiency heat pumps, continuous above grade insulation, and heat or energy recovery ventilation systems. In the Potential Enhancements to the Coordinated Residential New Construction Program report, the utilities have brought forth all of these recommendations. Figure 28 below is copied from the report illustrating recommendations for the coming 2021-2023 program cycle.

Residential New Construction Coordination Plan

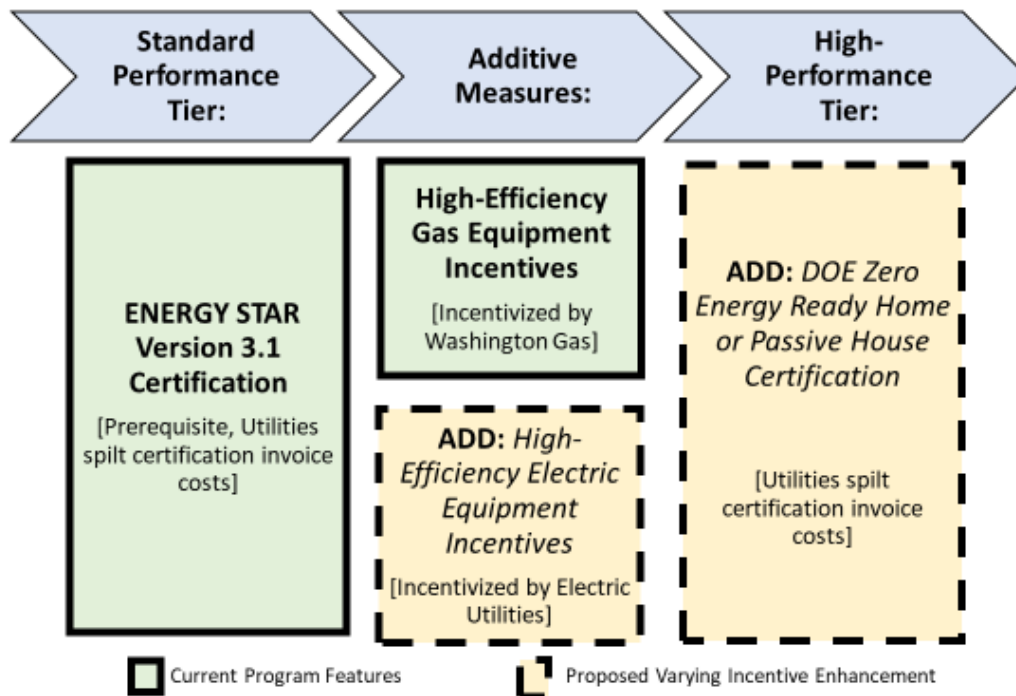


Figure 28: Current and Proposed Residential New Construction Coordinated Plan Features¹

There may also be opportunities to more explicitly link high performance or zero energy program tiers to future adoption of building codes in Maryland, offering the utilities an opportunity to capture savings for supporting energy code adoption through a Codes and Standards program. Given that the next program cycle will fall within a code adoption cycle, the utilities will want to ensure they are able to maintain savings over the more stringent code, and potentially claiming savings for supporting builders to meet the new code. Utility program administrators are well positioned to support the adoption of and compliance with building energy codes. Many Northeast states, including Massachusetts and Rhode Island, currently claim savings for code attribution.²⁴ We continue to recommend that a Work Group be established to consider ways for the EmPOWER utilities to contribute more robustly to the process of developing updated codes and standards—and to gain savings attribution for doing so.

In addition to individual high-performance electric product incentives, VEIC recommends the electric utilities also consider an EV/PV-ready offering and/or an all-electric home incentive. Both offerings could be implemented as a precursor or stepping-stone to a net-zero tier that requires on-site energy production to offset all or most of the homes estimated energy consumption. Incorporating PV and EV infrastructure at the time of construction is significantly less expensive

²⁴ <http://www.energyfuturesgroup.com/wp-content/uploads/2016/01/Energy-Code-Compliance-Options.pdf>

than retrofitting an existing building. Maryland's Zero Emission Vehicles MOU²⁵ and carbon neutrality goals would be served by these offerings. All electric homes combined with smart technologies give homeowners and utilities more control over load management and energy costs, as well as support grid health and stabilization.

While the utilities reported expected achievement of program goals for the 2018-2020 program cycles, VEIC recognizes that the utility filings were completed prior to the COVID-19 pandemic we are currently experiencing. The RNC market, dependent on cash flow to build and purchase new homes, as well as a high level of personal interaction and proximity on the construction site are now severely limited. Both EPA²⁶ and RESNET²⁷ have implemented protocols allowing for remote verification of program requirements to support partners through this time. VEIC hopes that the EmPOWER utilities are able to adopt these temporary procedures to maintain some level of program participation during this time.

Residential New Construction Summary of Recommendations

- The utilities should be required to report RNC program measures and savings consistently. Specifically, there should be consensus as to whether individual measures such as smart thermostats are counted and reported as Participants or individual Measures. Additionally, in the mini-tables there should be consensus on the time period reported (e.g. either year to date or the current reporting period).
- Washington Gas and the electric utilities should continue to work toward full implementation of a coordinated Residential New Construction program based on the national ENREGY STAR Certified Homes program.
- The utilities should consider additional options to support high-performance new construction that goes beyond ENERGY STAR Certified Homes, such as those recommended by the Electric and Natural Gas Coordinated Work Group. Recommendations include incentives for individual high-performance products as well as for a higher performing program tier such as DOE's Net Zero Energy Ready Homes or Passive House.
- The electric utilities should consider an EV/PV Ready and/or all-electric home incentive package.
- We continue to recommend that a Work Group be established to consider ways for the EmPOWER Utilities to contribute more robustly to the process of developing updated codes and standards—and to gain savings attribution for doing so given the next code adoption cycle falls within the upcoming program cycle.

Limited Income Programs

The Maryland Department of Housing and Community Development (DHCD) administers the majority of ratepayer-funded limited income programming on behalf of EmPOWER, including single family (LIEEP) and multifamily (MEEHA) limited income energy efficiency programming, as well as new initiatives—the Maryland Energy Efficiency Tune-up (MEET) and Critical Medical

²⁵ [https://mde.maryland.gov/programs/Air/MobileSources/Documents/zev-mou-8-governors-signed-20131024%20\(1\).pdf](https://mde.maryland.gov/programs/Air/MobileSources/Documents/zev-mou-8-governors-signed-20131024%20(1).pdf)

²⁶ https://www.energystar.gov/partner_resources/residential_new_program_reqs/remot_verification

²⁷ <https://www.resnet.us/articles/new-actions-by-resnet-in-meeting-the-covid-19-pandemic/>

Needs (CMN). These programs are available to owners and renters whose annual household income is at or below 200 percent of the federal poverty level.

The Utilities have also begun to report the number of limited income participants in their EmPOWER residential programs, as identified by those receiving cash assistance to pay for their utility bills. Some of those programs are more accessible to limited income households and therefore see higher participation levels than others. For example, lighting distribution through food banks and QHEC offer ways for limited income households to receive EmPOWER energy savings benefits without additional costs.

The Utilities and DHCD have continued through Work Group discussions to identify and implement ways to collaborate and increase limited income access to and participation in EmPOWER programming. These were reported on in each of the Utilities Semi-Annual reports. While this section focuses primarily on the programs offered by DHCD, we include some discussion of the additional activities reported by the utilities.

Single Family—LIEEP

DHCD offers a three-tiered structure for the single-family program which allows for homes that have health and safety issues beyond the scope of the program to still receive electric energy savings measures (Tier 1), and to be revisited by the program once the health and safety measures have been remediated (Tier 3). Program applicants that can receive the full weatherization treatment, including building shell and HVAC measures, are covered under Tier 2.

Figure 29 depicts DHCD’s participation, spending, and savings against forecasts. While participation continued to increase in the second half of 2019, DHCD is still far behind on program savings compared to forecasts. DHCD attributes the discrepancy to several factors, including an increase in applications that cannot receive the full weatherization treatment due to disrepair, HVAC fuel type, or having already received weatherization services. It reports that 36-40% of

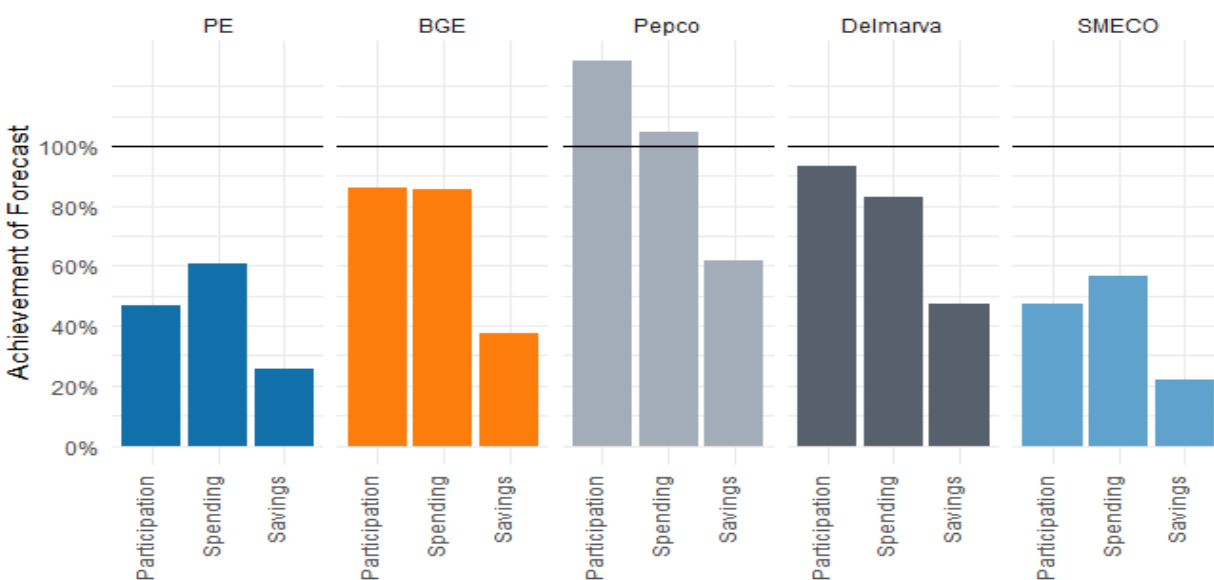


Figure 29: CTD DHCD LIEEP participation, spending and savings compared to forecasts.

participants are at the Tier 1 level, and therefore only receiving electric baseload and some appliance replacements, because of these reasons.

Figure 30 shows the average kWh and MMBtu savings per participant. Note that DHCD does not report the therm savings associated with measures funded by Washington Gas. We continue to recommend that DHCD report these savings so that total participant energy savings can be evaluated across the utility service territories. Washington Gas savings should be reported according to the corresponding electric utility in order to maintain consistency with other whole-house programs.

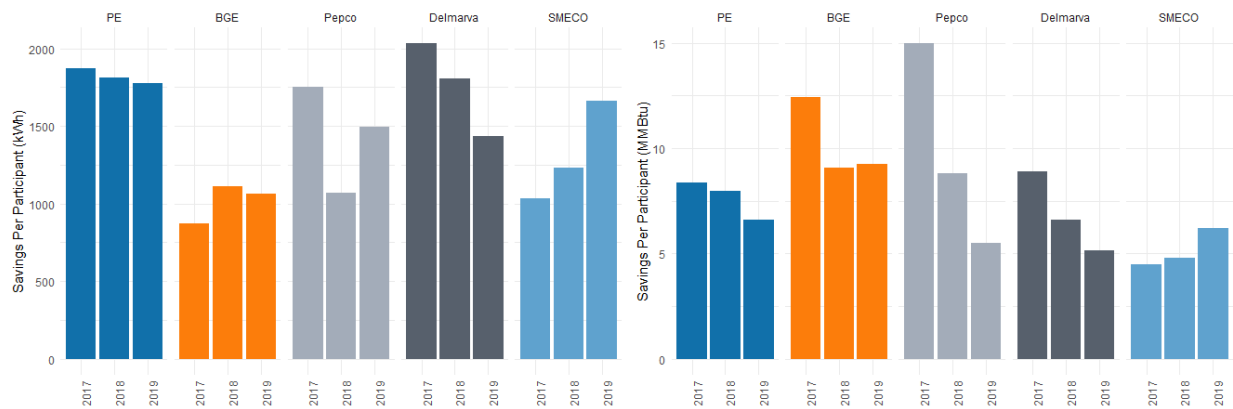


Figure 30: DHCD LIEEP annual averages of savings per participant- kwh(left) and MMBTU (right).

DHCD requests to remove the requirement to provide individual reports for every LIEEP job exceeding \$7,500 in order to reduce administrative burden. These reports are provided in an appendix typically hundreds of pages long. DHCD proposes to continue to keep records of these jobs for reference, but not to include them in semi-annual reporting. We are in support of this request and recommend Commission approval.

Single Family—Maryland Energy Efficiency Tune-up & Critical Medical Needs

DHCD has launched two new initiatives this program cycle: MEET and CMN. The purpose of MEET is to increase energy savings and lengthen this lifetime of measures through behavioral interventions and client education. This pilot is grant funded and focused in BGE service territory and delivered through Baltimore City’s Department of Housing & Community Development. DHCD reports that the program has served 95 households since its launch in January 2019, about 50% of its annual forecast. The program achieved about a third of its savings forecast for the year.

DHCD attributes the low savings and spending to fewer opportunities than anticipated for measures like HVAC clean and tune-ups. DHCD had requested to broaden the pool of eligible clients for MEET and the Commission granted that request in Order No. 89404. DHCD notes that it will be providing additional training to contractors to identify energy savings opportunities. We recommend that DHCD consider offering qualified MEET participants a smart thermostat as an additional energy savings measure.

CMN provides a “fast track” for customers with medical conditions to receive program assistance when their utility services are shut off, are in danger of being shut off, or a heating or cooling

system has failed.²⁸ Other “crisis” measures include refrigeration and hot water. DHCD requested, and the Commission approved in Order No. 89404, the ability to remove the requirement that equipment is non-functional in order to be replaced. DHCD expects this will enable it to serve more customers beginning in the first half of 2020.

Multifamily—MEEHA

DHCD reports that with the number of units reported in Q3-Q4 2019 and the number of units under construction that it will be just below its CTD forecast coming into 2020. With this increase in program completions and a robust pipeline, DHCD expects to meet its participation targets for the program cycle by the end of 2020.

DHCD has also finalized its Memorandum of Understanding with Washington Gas to fund gas saving measures. Washington Gas notes in its semi-annual report that 225 units were supported with Washington Gas funds. It expects another 224 units to be served early in 2020.

As with LIEEP and other coordinated programs supported by Washington Gas, we recommend a Work Group be tasked with determining consistent reporting protocols for gas and electric measures and energy savings associated with EmPOWER programs. These protocols should ensure that participation, energy savings, and costs can be adequately assessed at the program level instead of disaggregated between gas and electric measures.

Limited Income Goals & Utility/DHCD Collaboration

The Commission denied OPC’s request at the last semi-annual review to set a limited income goal given the lack of consensus that has been a barrier among Work Group participants for several years. It has directed the Work Group to continue working towards consensus.

Order No. 89404 also directed the Work Group to focus on increasing participation in limited income programs. The Utilities reported numerous ways they have begun to coordinate with DHCD and cross market limited income programs. Some examples include:

- Using Utility social media postings to raise awareness about DHCD’s programs
- Coordination between DHCD and Utility Demand Response programs to install program-eligible thermostats
- Including program information in Energy Efficiency Kits and materials provided to food banks
- Providing DHCD program information to limited income QHEC participants
- Direct outreach to high usage customers that had disconnections with information about DHCD’s programs

We are encouraged by the increased engagement between DHCD and the Utilities to reach more limited income customers. We also appreciate the Utilities’ continued investments in programs and initiatives that are more accessible to limited income people, such as the food bank initiatives and QHEC. In 2021-2023, we recommend the Utilities and DHCD look for additional ways that

²⁸ This program is in cooperation with the Office of Home Energy Programs, local agencies, and medical navigators.

they can serve more limited income people through both Utility- and DHCD-administered programming.

Limited Income Programs Summary of Recommendations

- We continue to recommend that DHCD report natural gas and electric savings so that total participant energy savings can be evaluated across the utility service territories. Washington Gas savings should be reported according to the electric utility in order to maintain consistency with other whole-house programs.
- We recommend the Commission approve DHCD's request to remove the requirement to provide reports on all jobs exceeding \$7,500.
- We recommend that DHCD consider offering qualified MEET participants a smart thermostat as an additional energy savings measure.
- We recommend the Work Group work on identifying additional ways to provide energy savings opportunities to limited income customers through both Utility-sponsored and DHCD-sponsored programming.
- The Limited Income Work Group should continue discussions related to goal-setting in an effort to achieve consensus.

Behavior Programs

The EmPOWER Behavior-based programs save energy by providing information such as reports, digital tools, and messaging to customers. The change in energy usage resulting from this provision of information is from end-users changing a variety of behaviors. In this context, "behaviors" include several actions relating to products and equipment such as the purchase, installation, and usage of that equipment.

The EmPOWER electric utilities did not report their behavior program savings and participation consistently, both in developing forecasts and reporting savings achieved. Therefore, VEIC adjusted the data as follows to make it comparable across utilities:

- For forecasted participants, Pepco and DPL report CTD participation as three times the single-year participant counts. To account for this difference with other utilities, VEIC divides these utilities' CTD forecast by three.
- For reported energy savings, BGE reports behavior-based electric and gas savings separately as MWh and therms, respectively. WGL reports gas savings as therms, and other utilities report electric savings as MWh. To account for these differences between utilities and measures of energy, VEIC recalculates both reported units as MMBtu for comparison of reported and forecasted savings²⁹. However, BGE provides no forecasts for therms, so this disproportionately influences BGE's achievement of forecasted savings and is noted in VEIC's analysis where appropriate.

We suggest that the evaluators reviewing EmPOWER programs recommend a preferred method for the utilities to report and forecast participation, measures, and savings for the behavior

²⁹ Conversion is as follows: 1 MMBtu = 1 MWh * 3.409511 = 1 Therm*.1

program in each reporting scope (e.g. full year, cycle-to-date, and program-to-date), and require the utilities to be consistent with that directive for future reporting cycles.

Most utilities continue to report successful deployment of programs that provide energy-related information and (now with the more widely-deployed AMI) customized user insights at scale to achieve savings. By measuring program results in terms of energy, engagement, and program participation, utilities are able to run behavior-based programs cost-effectively to nearly the whole population. This level of saturation—excluding the retained control group used to measure how energy use changed as a result of the intervention—has emerged as a program best practice that combines mass-marketing with energy savings.

In 2019, utilities began developing pathways to more diverse and integrated demand-side management programs, as evidenced by the recent use of AMI data to disaggregate end-uses and segment content in Home Energy Reports to promote other efficiency programs. We are encouraged to see this advancement in the utilities’ ability to utilize AMI infrastructure to unlock additional energy savings and demand response opportunities for customers, and look forward to seeing new use cases and value for customers from this investment in AMI.

Based on the utility filings, in 2019 approximately 70% (1.6 million) of Maryland’s 2.2 million households received an EmPOWER behavior program home energy report via physical or electronic mail. The breakout of this aggregate level of program participation by utility is provided in Table 14 and Figure 31.

Table 14: EmPOWER behavior programs participation by utility.

2019 Q3-Q4	EmPOWER behavior programs						Total
	PE	BGE	Pepco	Delmarva	SMECO	WGL*	
Reported Participants	114,673	931,761	342,046	70,257	70,257	44,712	1,558,541
2017 Res. Customer Population	233,375	1,155,397	520,204	177,697	149,170	485,691	2,235,843
% of Res. Customers	49%	81%	66%	56%	47%	9%	70%

**WGL is not factored into total column due to double counting risks.*

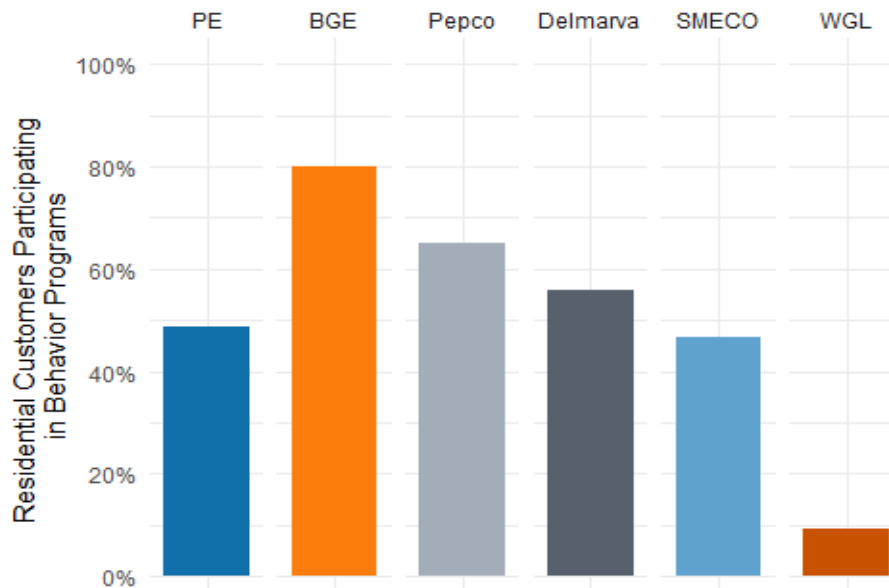


Figure 31: EmPOWER behavior programs percentage of participants by utility.

While nearly three quarters of the customer base has been exposed to a behavior-based program, each utility reports uneven levels of saturation and service. This raises important questions about how and whether behavior-based savings should be “capped” as has been addressed by previous Behavior Work Group activities, or if the savings estimates and claims by each utility will eventually reach some limit as most of the population is served.

Another approach may be to reconsider how savings are attributed to behavior programs. Other statewide behavior-based working groups have focused discussions around the persistence of savings associated with HERs and continue to examine program evaluations to identify a more realistic expected useful life of this measure. Results of these studies suggest that behavior programs’ measure life is more than one year, and in some cases, certain end-users may permanently change their behaviors; however, this requires more investigation.

Behavior-based programs are vital to successful efficiency programs of the future, and the Commission, utilities, and Work Group should continue to innovate beyond current best practices. There are varied approaches to innovation, ranging from methodological advances in the characterization of savings from an evaluation standpoint to advancements in program delivery and participation tracking. These innovations should not be foreign to utilities participating in grid modernization and improvements in customer engagement; they dovetail well with, for example, online marketplaces and services integrating with behind-the-meter connected devices.

Many of the EmPOWER utilities report progress on testing methods to evolve their behavior programs. For example, BGE and SMECO are beginning their behavior disaggregation pilots, which will leverage AMI-based analytics to segment customers who are ideally suited for customized messages about existing programs like HEIP/QHEC, appliance recycling, and thermostat rebates.

Additionally, behavior-based programs are not necessarily isolated to the delivery of energy reports. For example, BGE’s Smart Energy Rewards program is closely aligned with time-based rates and demand response programs, but the program is integrated with Smart Energy Manager, which is BGE’s HER delivery platform. The utilities should continue their successful collaborations and find ways to integrate (and track) behavior-based programs into the broader residential portfolio. Now more than ever, as the current pandemic has shown, behavior-based programs can be valuable for demand-side management as customized energy efficiency guidance without the need for in-person contact.

As illustrated in Figure 32, program performance to date is meeting or exceeding expected savings targets. Every EmPOWER utility is using the “gold standard” randomized-controlled-trial (RCT) design to rigorously measure program savings with either proportionally lower spending, or even lower than targeted expenses, with one exception (Delmarva). The Washington Gas behavior program is on track with its 2019 goals but reports the utility will likely not meet program cycle savings goals due to 2018 performance; they expect reductions in spending to stay cost-effective.

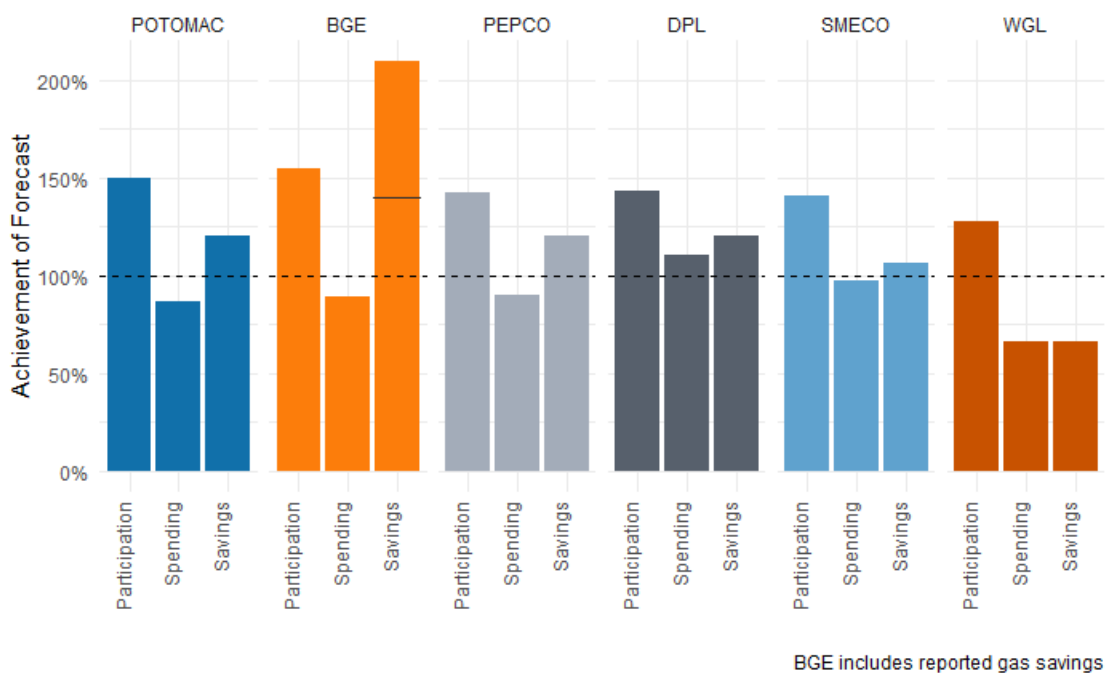


Figure 32: CTD behavioral program achievement of forecasted goals.

All EmPOWER utilities should be pleased with the current level of performance in this program area and continue a focus on successful program delivery with continuous improvement. BGE continues as the leader in behavior program delivery, with program approaches that other utilities could look to replicate. It is likely that BGE’s strong performance is due to both the suite of additional digital program features (e.g., online portal, usage alerts) and elevated participation by BGE customers in complementary technologies and programs (e.g., smart thermostats). BGE’s strong performance is also affected by its reported gas savings. BGE does not provide a gas savings forecast, which influences how achievement of forecast is calculated. In this case, the

additional gas savings for BGE’s program is depicted in Figure 32 as the savings above the solid black line.

Given the effectiveness and scalable, information-based nature of behavior programs, they consistently deliver a large share of the residential portfolio savings (approximately 30-55% for the electric utilities), as seen in Figure 33.

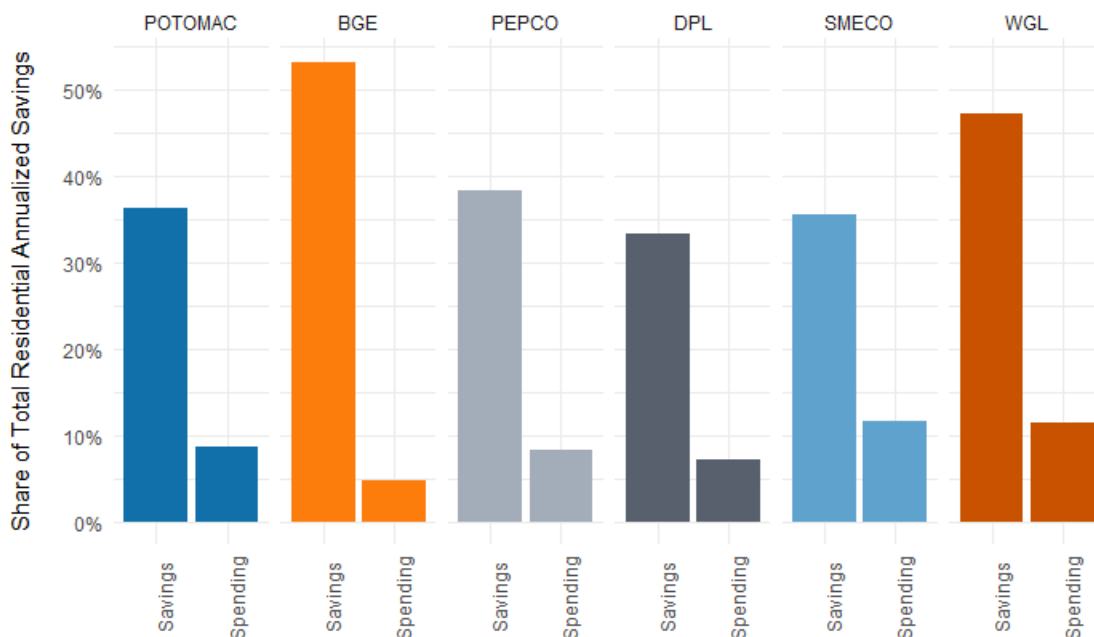


Figure 33: Behavior Programs Share of Total Residential Savings and Spending.

Behavior Program Summary of Recommendations

- The utilities should continue to improve and align methods of tracking and reporting quarterly program metrics and provide clear documentation so cross-utility comparisons can be easily made.
- As the Behavior/Advanced M&V 2.0 Pilot continues to roll out in 2020, the Behavior Work Group should meet to define reporting priorities, metrics, and continuous learning or improvement. The pilots should be able to support each other’s insights, either by testing different interventions, or boosting sample size across utilities with consistent delivery.
- The utilities should continue to discuss how behavior-based programs can evolve beyond current best practices, taking into consideration new evaluation methodologies and improvements in program delivery and tracking.

Demand Response

All efficiency and conservation efforts reduce the need for electricity generation. In addition, reducing peak demand avoids the need to run some of the most expensive and most polluting power plants. As more renewable energy comes online, demand response also offers flexible load to better match demand to supply. This includes calling for more load when there is excess renewable energy available. To be ready to deal with excess solar or wind generation, both of

which are more likely to happen during mild weather, programs should not focus exclusively on thermostats or heating and cooling but maintain year-round capability through devices used throughout the year such as water heaters or controlled charging for electric vehicles. These distributed resources can play a significant role in mitigating grid constraints and improving utilization of renewables and the grid.

BGE, Pepco, Delmarva, and SMECO each utilize event-controlled demand response equipment installed in homes and small commercial customers, such as air conditioning controls, connected thermostats, or water heater controls. Potomac Edison does not have this type of demand response program. Utilities offer some form of cumulative bill credit for participation in these residential programs. For example, BGE offers up to \$100/year to customers who participate in their air conditioning program and up to \$25 in credits for those who participate in their water heater program.

In the second half of this year, utilities moved from primarily testing to deploying their demand response infrastructure. Including test events, during this semi-annual period SMECO used their system for thirteen events between June and September of 2019; BGE called six events; DPL called two residential events and two small commercial events; Pepco called two events for residential and two for small commercial. The ongoing evolution of demand response programs is encouraged, and we recommend utilities continue to fine-tune the operational and customer-facing aspects of these programs. Demand response programming is an important tool for providing savings opportunities to customers while also reducing grid infrastructure costs through demand management. Demand response activities should continue to integrate with energy efficiency programming, leveraging insights gained through AMI data to better personalize and target program engagement. Since demand response programs are related to existing rebate and direct-install programs (e.g. smart thermostat, smart home, and BYOD programs), we encourage utilities to refine their tracking and reporting mechanisms with clear documentation of how reviewers should avoid double-counting.

Pepco, Delmarva, and SMECO all mentioned using AMI data or other QA/QC to remove devices that are not actively responding to calls. This type of maintenance is important to ensure the expected and claimed capability can respond when needed, and we encourage utilities to develop other use cases in which AMI brings value to the utilities and their customers.

BGE's program continues to be unique in including water heater switches as a controllable device. Water heaters are well-known demand response resources with predictable year-round demand and capacity to perform during peak events. Utilities should consider water heaters and controlled EV charging as additional demand response options that are available at times when controlled cool resources may not be available.

BGE continues to evolve its PeakRewards program to a "Bring Your Own Device" (BYOD program) in which customers who purchase qualifying thermostats or other devices can enroll. In 2019 BGE was able to accelerate enrollment in the program during the installation of smart thermostats. Overall, we support this evolution as it is aligned with market trends and the increasing capabilities of connected devices; however, we note that BYOD programs can be complicated to administer effectively and therefore anticipate questions will arise as the program

gets further developed and implemented. We recommend BGE and other utilities continue to collaborate while developing BYOD programs and provide well-documented metrics of program activities in order to properly track and avoid double-counting of measures and program enrollments.

In context of the current COVID-19 pandemic crisis, utilities should consider how potential demand response resources like water heaters, air conditioning/thermostats, EV charging, and other controllable loads may contribute to uncertain residential and commercial load patterns. For example, utilities could examine customer AMI characteristics before, during, and after the crisis to identify households that significantly changed their load patterns; this may help identify customers with additional efficiency opportunities and provide additional motivators to participate in demand response. It is possible that a current practicing of “right-sizing” appliances like water heaters may need to change, i.e., recommending larger (and controllable) water heaters whereby the overall demand savings justify the larger appliance.

Dynamic pricing is another aspect of Demand Response that may be further deployed by utilities. This is a potentially powerful grid-wide measure that can help customers save money and avoid costly upgrades to grid infrastructure; however, we encourage utilities to consider flexible options for both rates and DSM programs during this era of pandemic-related changes. While time-of-use rates may present a risk to customers who have to change their habits of energy consumption while staying safe at home, peak-time rebates (e.g. BGE’s Smart Energy Rewards program) can provide a flexible option for customers to participate without consequence, and these designs are further augmented by participation in existing efficiency programs; these are a feature of integrated demand side management.

Demand Response Summary of Recommendations

- Utilities should maintain and consider expanding their existing demand reduction capabilities.
- Utilities should include devices with year-round capability, such as water heaters and EV chargers.
- We support evolution of demand response programs to include BYOD approaches.

Other Programs

Energy Efficiency Kits and Schools

Potomac Edison and SMECO included Energy Efficiency Kits programs in their 2018–2020 plans. These programs mail packages of energy efficiency products and information about EmPOWER savings opportunities to customers. Delmarva and Potomac Edison included Schools programs in their 2018–2020 plans. These programs send low cost energy efficiency materials and information to schools in their service territory to aid in classroom instruction and to be sent home with students to install in their homes.

Potomac Edison exceeded its energy savings and participation targets for its Kits program in the 2019 by 145% and 153% respectively. Unsurprisingly it also exceeded its budget by 137%.

SMECO exceeded its savings goal by 147% its savings goal and improved its participation to forecast, nearly meeting its annual goal at 91%.

In the 4th quarter of 2019, SMECO sent more than 30k Business Reply Cards (BRC) to its existing customers that indicated an interest in receiving a kit. The BRC enable customers to select which products they are most interested in for their kits. We expect this approach would have a higher install rate and encourage the other utilities and their evaluators to consider such an approach for the 2021-2023 program cycle.

Delmarva offers efficient device kits in combination with in-school visits taught by a professional educator. The program achieved 179% of its energy savings target for the year. Potomac Edison offers educational programs in schools but does not distribute kits to avoid duplicating subprograms. In 2019, the utility reported meeting 107% of its full-year participation target while only meeting 36% of its energy savings target. As described in previous reports, this is likely due to the decision to not offer energy savings kits as part of the school education program to avoid potential duplication. Potomac Edison reports actively promoting its program to schools for spring 2020 enrollment. However, like many other programs, due to COVID-19 we expect many of these programs have needed to be cancelled.

Family Farm Program

Delmarva developed a Family Farm program for farms on the residential class rate. The program offers audits, custom incentive, and education of suppliers of agricultural equipment. Many of these farms are poultry operations. Custom incentives target lighting, livestock waterers, ventilation, pumping, and scroll compressors. Delmarva had no participants in this program, though it does report nine pending applications that it expected would be completed in 2020. However, this may also be in jeopardy due to COVID-19.

Delmarva notes that it has contracted with a consulting company specializing in sustainability for agriculture and rural areas. It was an exhibitor at two agricultural events in the second half of 2019, which may be at least in part responsible for the increase in applications. VEIC supports Delmarva's ongoing efforts to serve residential farms.

Conservation Voltage Reduction

BGE, Pepco, Delmarva, and SMECO operate conservation voltage reduction (CVR) programs that modulate voltage levels to optimize distribution system efficiency. CVR-related spending is not tied to the energy efficiency surcharge, thus no CVR spending is reported.

BGE added 86 CVR circuits in 2019 to bring the total supported by the program to 628. SMECO launched its CVR program in 2018 with 12 eligible circuits and added nine in 2019. Pepco did not provide the number of circuits in operation but noted that one was taken offline in 2019 and was expected to be back online in 2020. Delmarva reported 17 substations and 33 feeders, serving approximately 50,000 customers.

As CVR has become a significant share of program savings, the Commission has ordered the Statewide Evaluator to assess the savings methodology for BGE, Pepco, and Delmarva, as they have had the longest running programs.

Other Programs Summary of Recommendations

Energy Efficiency Kits

- We recommend SMECO evaluate the savings of its BRC kits compared to direct mail kits to see whether realized savings are notably higher. Other utilities should examine the results of SMECO's kits initiatives for consideration in the 2021-2023 program cycle.

Schools

- Utilities should assess the performance of Potomac Edison's and Delmarva's schools programs and consider whether the results support the incorporation of something similar in their 2021-2023 plans.

Family Farm Program

- Continue exploring different approaches to enroll customers, such as outreach to vendors of farm equipment. Once vendors are on board, the program should see an uptake in participation.

Conservation Voltage Reduction

- Closely monitor CVR contribution to portfolio savings to ensure that front-of-meter programs like CVR do not displace behind-the-meter programs. Results from the Statewide Evaluator should inform 2021-2023 program planning.