

Evaluation, Measurement, and Verification Report for Virginia Electric and Power Company (Dominion Energy)

Case No. PUR-2018-00168 (Virginia)
Docket No. E-22 Sub 577 (North Carolina)
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Prepared by DNV GL Energy Insights USA, Inc. (DNV GL)



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1 EXECUTIVE SUMMARY

The purpose of this report is to present performance indicators of Virginia Electric and Power Company's (Dominion Energy Virginia, Dominion Energy North Carolina, or the Company) demand-side management (DSM) programs and to comply with the Virginia State Corporation Commission (SCC) Order to Virginia Electric and Power Company¹ issued on March 24, 2010 ("the Order") in Case No. PUE-2009-00081, as later modified, to provide a detailed evaluation, measurement, and verification (EM&V) report on an annual basis. It is also intended to meet the EM&V reporting requirements as ordered by the SCC in Case No. PUR-2017-00047 (issued on November 9, 2018) for newly approved DSM programs or renewals of existing DSM programs since November 9, 2018.

In addition, this report presents performance indicators of Dominion Energy's North Carolina DSM programs from program launch (mid-2011) through December 31, 2019, in accordance with the North Carolina Utilities Commission's (NCUC) Orders approving DSM and EE programs in North Carolina, as well as the NCUC's subsequent direction regarding the filing of EM&V plans in North Carolina through its Orders issued in Docket No. E-22, Sub 473; and finally the NCUC's instruction to align its EM&V filing schedule with that in Virginia (Docket No. E-22, Sub 524).

This report is being filed on May 15, 2020 pursuant to an extension granted by the SCC in Case No. PUR-2018-00168 on April 30, 2020.

This EM&V report, prepared by DNV GL Energy (DNV GL), focuses on DSM program impacts, and covers program activity through December 31, 2019. It includes Virginia and North Carolina DSM Phases I through VII programs.

¹ Hereinafter, Virginia Electric and Power Company will be referred to as "Dominion Energy" or "Company" and may also include North Carolina operations depending on the context.

This section presents key indicators of progress to date for the following 17 DSM programs:

Table 1-1. Demand-side Management Programs reported in this document.

Residential Energy Efficiency	Non-residential Energy Efficiency	Peak Shaving
<ul style="list-style-type: none"> • Residential Income and Age Qualifying Home Improvement (DSM Phase IV) - Virginia and North Carolina • Residential Retail LED (DSM Phase V) - North Carolina • Residential Appliance Recycling (DSM Phase VII) - Virginia • Residential Efficient Products Marketplace (DSM Phase VII) - Virginia • Residential Home Energy Assessment (DSM Phase VII) - Virginia 	<ul style="list-style-type: none"> • Non-residential Lighting Systems & Controls (DSM Phase III) - Virginia and North Carolina • Non-residential Lighting Systems & Controls (DSM Phase VII) - Virginia • Non-residential Heating and Cooling Efficiency (DSM Phase III) - Virginia and North Carolina • Non-residential Heating and Cooling Efficiency (DSM Phase VII) - Virginia • Non-residential Window Film (DSM Phase III) - Virginia and North Carolina • Non-residential Window Film (DSM Phase VII) - Virginia • Non-residential Small Business Improvement (DSM Phase V) - Virginia and North Carolina • Non-residential Prescriptive (DSM Phase VI) - Virginia and North Carolina • Non-residential Small Manufacturing (DSM Phase VII) - Virginia • Non-residential Office (DSM Phase VII) - Virginia 	<ul style="list-style-type: none"> • Residential Air Conditioner Cycling (DSM Phase I) – Virginia and North Carolina • Non-residential Distributed Generation (DSM Phase II) – Virginia

The key metrics for tracking EM&V indicators of program progress are the following:



Expenditures

Program expenditures include operations and maintenance, capital spending (e.g., control switches in the Smart Cooling Rewards Program), and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document does not include the Company's margins.



Participation

Participation is defined as the total number of participants served through the program.



Net Savings

Net installed annualized energy savings in kilowatt hours per year (kWh/year) or peak demand reductions or savings in kilowatt (kW) is the amount of annual energy savings or peak demand reductions delivered by the program after accounting for annual savings that would have occurred in the absence of the program.

1.1 Summary of Energy Efficiency Programs

Key EM&V performance indicators for EE programs (spending, participation, annualized incremental net energy savings, and net demand reductions) are shown in Table 1-2 for Virginia and Table 1-3 for North Carolina, in addition to the months of participation from program launch through December 31, 2019. The detailed summaries of these results for each program are available in Appendices A and B. Cumulative participation, net energy savings, and net peak demand reductions for each program are provided in Appendices C and D. Those values are used as inputs for the Company's integrated resource planning, lost revenue recovery (if pursued), program performance incentives, and other calculations requiring cumulative net energy savings over time for each program.

Note that this is the last EM&V report where the DSM Phase III programs will be reported in the main sections of the report. In future annual reports, these programs will be reported in the closed programs section because they have retired as designed. They were available to customers in both states for approximately five years.


Highlights of EE programs in Virginia and North Carolina are listed in the following subsections.

1.1.1 Virginia Highlights

Net annualized energy savings, participation, and program spending from inception through the current program reporting year (2019), in Virginia, are shown in Table 1-2. This table only presents these indicators of program progress for the programs that were active and available to Dominion Energy customers in Virginia, in 2019.

Note that the SCC has approved existing DSM program budgets by DSM phases, and by the residential and non-residential program






categories. This allows the Company to allocate spending among the various programs as appropriate, while managing spending against the overall approved total budget.

In 2019, there were four active residential EE programs in Virginia. The Income and Age Qualifying Home Improvement Program was launched in 2015, was dormant for the majority of 2018 until its extension was approved by the SCC in the latter part of the year, then continued through 2019. In 2019, it exceeded participation at 146% and net annualized energy savings targets at 153%. Three programs were launched in the second half of 2019: Residential Appliance Recycling, Residential Efficient Products Marketplace, and Residential Home Energy Assessment. Of the new programs, both the Efficient Products Marketplace and the Appliance Recycling programs exceeded planned net annualized energy savings. The Efficient Products Marketplace program exceeded planned net annualized energy savings at 317%, Appliance Recycling program exceeded planned net annualized energy savings at 117%. With the Home Energy Assessment program, work was completed, but the projects were held by the vendor per Company instruction to ensure invoices would process correctly without quality check exceptions when submitted in the Company business intelligence (BI) system for payment. These projects were processed through the BI system in the first weeks of 2020, despite being completed in 2019, hence they are not present in this 2019 EM&V report.

In the non-residential sector, the DSM Phase III programs—Heating and Cooling Efficiency, Lighting Systems & Controls, and Window Film—closed in the first quarter of 2019 in Virginia. Over the life of the programs, Lighting Systems & Controls achieved the most net annualized energy savings, with over 195 million kWh/year, and enrolled the most participants, with 4,501. Compared to planned targets, it achieved 142% of net annualized energy savings and 64% of participation. This indicates that on a per-participant basis, savings were larger than planned. The Heating and Cooling Efficiency and Window Film programs both did not meet their targets for net energy savings or participation over the life of the programs. Heating and Cooling Efficiency achieved 31% of planned net annualized energy savings, and 12% of planned participation. Window Film achieved 12% of planned net annualized energy savings and 10% of planned participation. Note that Window Film participation is measured by square feet of window film installed. Similar versions of all three of these DSM Phase III programs will also be available to customers in the DSM Phase VII portfolio. In particular, the Window Film program eligibility requirements were modified in the Phase VII version. It has updated Solar Heat Gain Coefficient (and tinting) requirements, that according to the design vendor, is intended to assist in increasing program participation compared to the DSM Phase III version of the program.

Small Business Improvement has exceeded planned net annualized energy savings in each full year the program was offered. In 2019, it saved 10.83 million kWh/year, or 111% of planned net energy savings. Cumulatively, from program inception through 2019, the program has saved 189% of planned net annualized energy while enrolling 79% of planned participants. Similar to the Lighting Systems & Controls Program, the per-participant savings for this program are larger than initially anticipated in the program design. In 2019, the large majority of savings (98%) were from lighting measures (including occupancy sensors).

The Non-residential Prescriptive Program completed its third program year in 2019, or second full year, as the program launched in late 2017. It exceeded participation and net annualized energy savings targets in 2019, at 156% and 224%, respectively. Door gaskets was the most frequently installed measure in 2019, while duct testing and sealing saved the most energy.



The non-residential DSM Phase VII programs began program launch activities at different times during the second half of 2019. These programs did not begin participant enrollment in 2019 because, for several of these programs, EM&V savings calculation methodologies that would be incorporated in the Standard Tracking and Engineering Protocols (STEP) Manual were being reviewed with the Company and their program implementation vendors and the programs' information technology data collection infrastructure were still being finalized.

Table 1-2. Annualized Program Progress for Energy Efficiency Programs (Cumulative from Program Start through December 31, 2019) in Virginia (Active Programs)

Program	Expenditures	Gross Participants	Total Annual Net Annualized Energy Savings (kWh/year)	Cumulative Net Energy Savings (kWh)	Lifetime Net Energy Savings (kWh)
Residential Programs					
Income and Age Qualifying Home Improvement - DSM Phase IV					
Actual	\$18,948,312	22,934	7,114,432	18,869,047	101,123,306
Planned	\$20,125,502	15,756	4,478,008		
Percentage Toward Planned	94%	146%	159%		
Appliance Recycling - DSM Phase VII²					
Actual	\$384,884	1,579	753,308	62,776	5,931,373
Planned	\$1,094,670	5,225	644,850		
Percentage Toward Planned	35%	30%	117%		
Efficient Products Marketplace - DSM Phase VII³					
Actual	\$4,636,049	2,507,265	51,105,293	4,258,774	836,612,694
Planned	\$6,860,889	2,972,475	16,098,286		
Percentage Toward Planned	68%	84%	317%		
Home Energy Assessment					
Actual	\$715,145	0	0	0	0
Planned	\$2,326,635	11,030	1,073,361		
Percentage Toward Planned	31%	0%	0%		
Non-residential Programs					
Lighting Systems and Controls - DSM Phase III					
Actual	\$34,942,609	4,501	195,738,057	537,950,026	1,761,642,509
Planned	\$25,410,941	7,083	137,480,402		
Percentage Toward Planned	138%	64%	142%		
Lighting Systems and Controls - DSM Phase VII					
Actual	\$592,373	0	0	0	0
Planned	\$1,633,867	333	1,445,890		
Percentage Toward Planned	36%	0%	0%		
Heating and Cooling Efficiency - DSM Phase III					
Actual	\$7,308,041	406	32,835,550	98,940,223	492,533,254
Planned	\$9,134,139	3,393	106,207,832		
Percentage Toward Planned	80%	12%	31%		

² Participation is measured by units recycled.

³ Participation is measured by incentivized unit, i.e. lamp, fixture, or appliance.

Program	Expenditures	Gross Participants	Total Annual Net Annualized Energy Savings (kWh/year)	Cumulative Net Energy Savings (kWh)	Lifetime Net Energy Savings (kWh)
Heating and Cooling Efficiency - DSM Phase VII					
Actual	\$342,194	0	0	0	0
Planned	\$1,130,793	350	1,014,615		
Percentage Toward Planned	30%	0%	0%		
Window Film - DSM Phase III					
Actual	\$2,236,675	476,378	5,287,728	21,399,185	52,877,279
Planned	\$7,878,071	4,788,181	43,944,759		
Percentage Toward Planned	28%	10%	12%		
Window Film - DSM Phase VII					
Actual	\$192,146	0	0	0	0
Planned	\$317,588	68,400	170,812		
Percentage Toward Planned	61%	0%	0%		
Small Business Improvement - DSM Phase V					
Actual	\$11,354,171	2,017	39,993,147	65,609,192	559,904,063
Planned	\$21,962,738	2,559	21,114,692		
Percentage Toward Planned	52%	79%	189%		
Prescriptive - DSM Phase VI					
Actual	\$13,370,846	1,535	9,713,643	11,815,917	61,519,741
Planned	\$16,335,545	1,120	34,471,800		
Percentage Toward Planned	82%	137%	28% ⁴		
Small Manufacturing - DSM Phase VII					
Actual	\$367,297	0	0	0	0
Planned	\$862,936	35	351,539		
Percentage Toward Planned	43%	0%	0%		
Office - DSM Phase VII					
Actual	\$405,507	0	0	0	0
Planned	\$832,726	42	594,427		
Percentage Toward Planned	49%	0%	0%		
Portfolio Total⁵					
Actual	\$95,796,251	31,393	342,541,158	758,905,140	3,872,144,219

⁴ The Company is reviewing several aspects of the deemed energy savings used in the EM&V results and going-forward cost-benefit analysis as they relate to the filed program design for specific measures, including the AC Tune-up and Duct Testing & Sealing. The Company is also considering conducting additional EM&V studies.

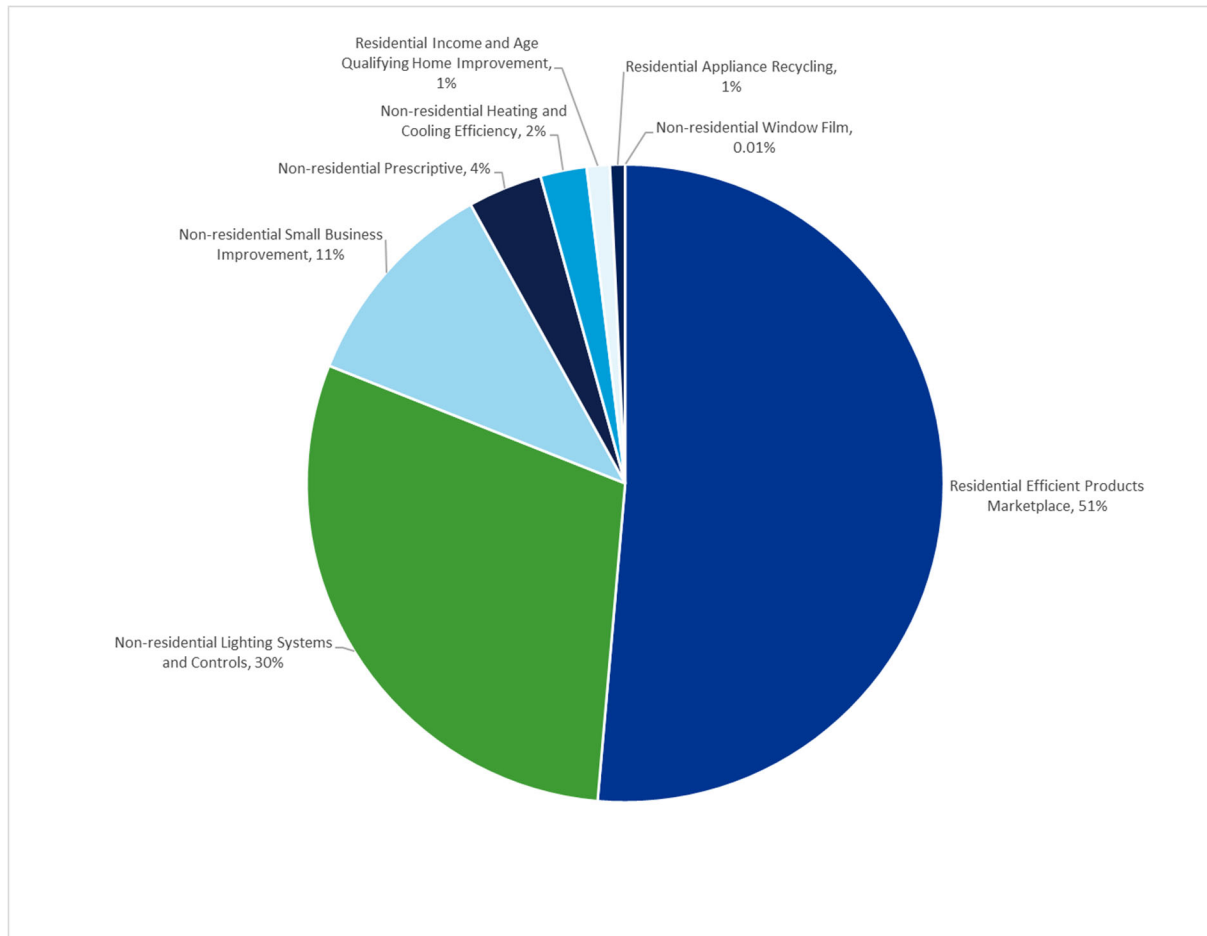
⁵ Gross participants total excludes Appliance Recycling, Efficient Products Marketplace, Window Film (DSM Phase III and VII) because they are measured by units recycled, units incentivized, and square feet installed, respectively, rather than customers enrolled.



Program	Expenditures	Gross Participants	Total Annual Net Annualized Energy Savings (kWh/year)	Cumulative Net Energy Savings (kWh)	Lifetime Net Energy Savings (kWh)
Planned	\$115,907,040	41,701	369,091,272		
Percentage Toward Planned	83%	75%	93%		

Figure 1-1 shows the distribution of net annualized energy savings across the Virginia portfolio in program year 2019. Although it only began enrolling customers in August, the Residential Efficient Products Marketplace Program contributed half of the portfolio's total energy savings in 2019, with lighting measures providing the highest contribution to total savings. It is also noteworthy that the second highest contributing program, Non-residential Lighting Systems & Controls, was only available to customers in Virginia the first quarter of 2019 as the DSM Phase III programs were winding down. The program with the third highest contribution towards energy savings was the Non-residential Small Business Improvement Program. These three programs combined accounted for 92% of net annualized energy savings in 2019.

Figure 1-1. Percent of Installed Net Annualized Energy Savings Across the Virginia Energy Efficiency Program Portfolio in 2019 (Active Programs)



1.1.2 North Carolina Highlights



Net annualized energy savings, participation, and program spending from inception through the current program reporting year (2019), in North Carolina, are shown in Table 1-3. This table only presents indicators of program progress for the programs that were active and available to Dominion Energy customers in North Carolina, in 2019.

When reviewing the North Carolina results, it is helpful to note that the North Carolina programs are operated under a cost allocation formula as a subset of the overall system-level program budget. The allocation is approximately 6% in North Carolina and 94% in Virginia. This necessitates that Dominion Energy manages the North Carolina programs so as to not exceed the cost allocation.

In 2019, the only active residential program was the Income and Age Qualifying Home Improvement Program (DSM Phase IV). Similar to in Virginia, the program was launched in 2016, was dormant for the majority of 2018 until its extension was approved by the SCC and subsequently the NCUC, then continued through 2019. In 2019, it exceeded net annualized energy savings targets at 107%, while enrolling 47% of planned participants.

In the non-residential sector, the DSM Phase III programs – Heating and Cooling Efficiency, Lighting Systems & Controls, and Window Film – closed at the end of 2019. Over the life of the programs, Lighting Systems & Controls achieved the most net annualized energy savings, with over 9.68 million kWh, and enrolled the most participants, with 184. Compared to planned targets, it achieved 102% of net energy savings and 40% of participation. This indicates that on a per-participant basis, savings were larger than planned. The Heating and Cooling Efficiency and Window Film programs both did not meet their targets for net annualized energy savings or participation over the life of the programs. Heating and Cooling Efficiency achieved 8% of planned net energy savings, and 7% of planned participation. Window Film enrolled one customer in the life of the program, whom installed 402 square feet of window film. Note that Window Film participation is measured by square feet of window film installed.

Small Business Improvement achieved 99% of planned net energy savings and 44% of planned participation in 2019. Cumulatively, from program inception through 2019, the program has exceeded planned energy savings at 131% while enrolling 45% of planned participants. Similar to the Non-residential Lighting Systems & Controls Program, the per-participant savings for the Small Business Improvement Program are larger than initially anticipated in the program design. In 2019, almost all of the net annualized energy savings (99.7%) in this program were from the installation of LED lamps. The only other measure performed in 2019 was AC tune-ups.

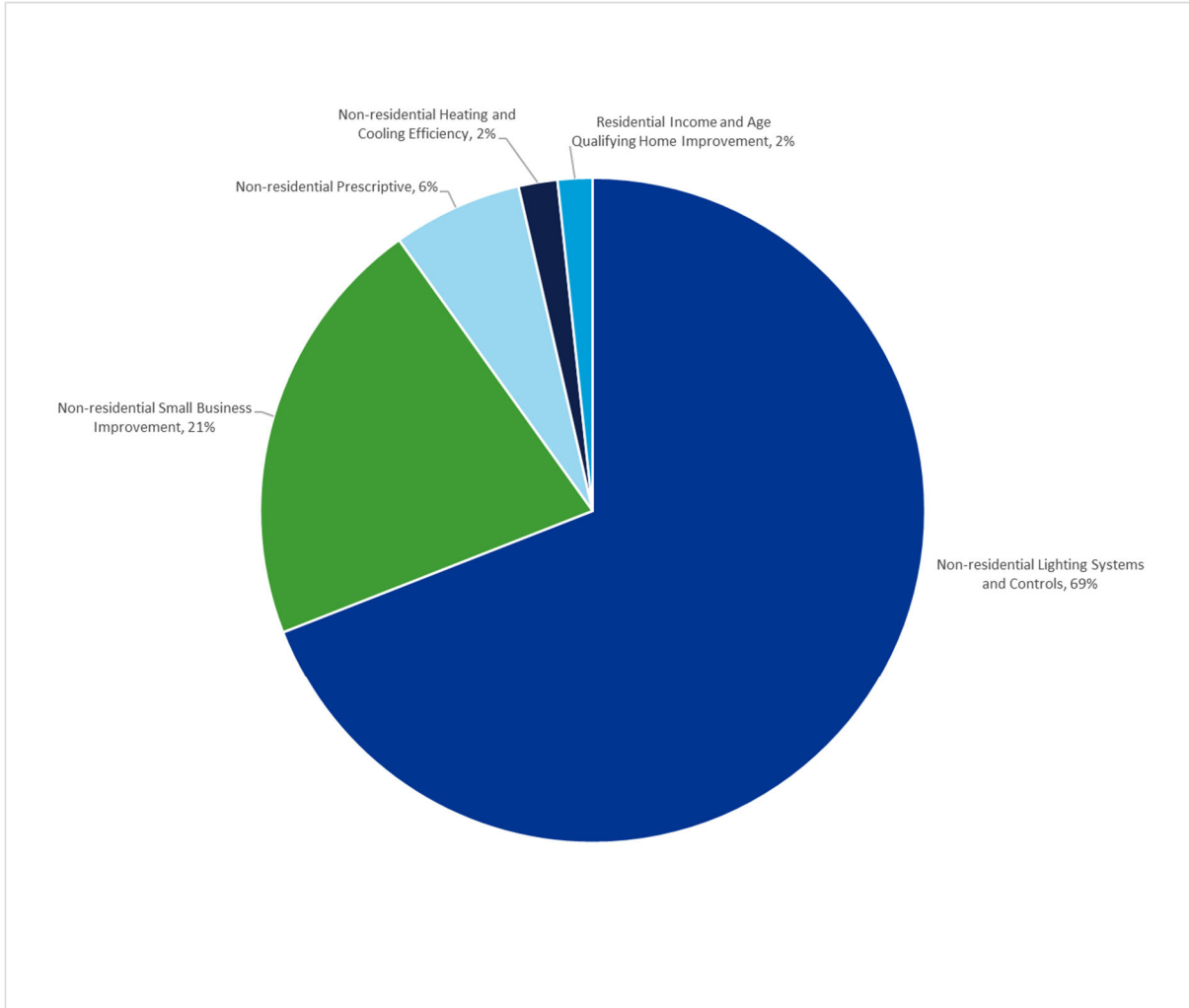
The Non-residential Prescriptive Program completed its second program year in 2019. It exceeded participation and net annualized energy savings targets in 2019, at 124% and 170%, respectively. Door gaskets was the most frequently installed measure in 2019 and saved the most energy.

Table 1-3. Annualized Program Progress for Energy Efficiency Programs (Cumulative from Program Start through December 31, 2019) in North Carolina (Active Programs)

Program	Expenditures	Gross Participants	Total Annual Net Energy Savings (kWh/year)	Cumulative Net Energy Savings (kWh)	Lifetime Net Energy Savings (kWh)
Residential Programs					
Income and Age Qualifying Home Improvement - DSM Phase IV					
Actual	\$863,432	421	225,421	537,525	3,208,374
Planned	\$1,120,216	793	166,930		
Percentage Toward Planned	77%	53%	135%		
Non-residential Programs					
Lighting Systems and Controls - DSM Phase III					
Actual	\$1,431,520	184	9,686,657	19,177,078	87,179,917
Planned	\$1,698,773	464	9,467,302		
Percentage Toward Planned	84%	40%	102%		
Heating and Cooling Efficiency - DSM Phase III					
Actual	\$288,735	16	540,742	1,501,080	8,111,136
Planned	\$597,064	218	7,002,913		
Percentage Toward Planned	48%	7%	8%		
Window Film - DSM Phase III					
Actual	\$97,455	402	3,613	5,118	36,128
Planned	\$472,084	312,301	2,772,773		
Percentage Toward Planned	21%	0%	0%		
Small Business Improvement - DSM Phase V					
Actual	\$435,296	70	1,732,351	2,154,378	24,252,919
Planned	\$1,269,262	157	1,326,175		
Percentage Toward Planned	34%	45%	131%		
Prescriptive - DSM Phase VI					
Actual	\$369,519	57	382,132	385,859	2,420,167
Planned	\$807,438	58	1,936,402		
Percentage Toward Planned	46%	98%	20%		
<u>Portfolio Total</u> [3] [3]					
Actual	\$3,485,955	748	12,570,916	23,761,038	125,208,640
Planned	\$5,964,837	1,690	22,672,497		
Percentage Toward Planned	58%	44%	55%		

Figure 1-2 shows the distribution of net annualized energy savings across the North Carolina portfolio for the 2019 program year. The Lighting Systems & Controls Program contributed 69% of the portfolio's energy savings in North Carolina. It and the Non-residential Heating and Cooling Efficiency Program were both extended in North Carolina for all of 2019 only. The Small Business Improvement Program contributed the next most savings in 2019, at 21%. Combined, the two programs accounted for 90% of the portfolio's energy savings.

Figure 1-2. Percent of Installed Net Annualized Energy Savings Across the North Carolina Energy Efficiency Program Portfolio in 2019 (Active Programs)



1.2 Summary of Peak Shaving Programs

The following sections present key performance indicators of progress to-date for two peak shaving programs, the Residential AC Cycling (or Smart Cooling Rewards) Program offered in Virginia and North Carolina, and the Non-residential Distributed Generation (DG) Program, offered in Virginia only. DNV GL conducted EM&V impact evaluations for both programs (provided in Appendices R-1 and S-1). The key metrics for evaluating performance indicators are:

- Expenditures
- Net participation
- Net peak shaving potential in kilowatts (kW)

Key EM&V performance indicators for peak shaving programs are shown in Table 1-4.

Table 1-4. Portfolio Spending and Net Peak Shaving Potential by Program (Cumulative through December 31, 2019)

Program	Expenditures	Number of Participants	Peak Shaving Potential (kW)
Residential AC Cycling—Virginia			
Actual	\$77,280,866	74,987	46,941
Planned	\$103,949,320	80,765	50,817
Percentage Toward Planned	74%	93%	92%
Residential AC Cycling—North Carolina			
Actual	\$3,165,519	3,061	1,913
Planned	\$5,197,579	4,235	2,664
Percentage Toward Planned	61%	72%	72%
Non-residential Distributed Generation—Virginia			
Actual	\$5,106,245	6.1	6,927
Planned	\$11,049,268	7.6	7,592
Percentage Toward Planned	46%	81%	91%
Total			
Actual	\$85,552,630	78,049	55,781
Planned	\$120,196,167	85,008	61,073
Percentage Toward Planned	71%	92%	91%

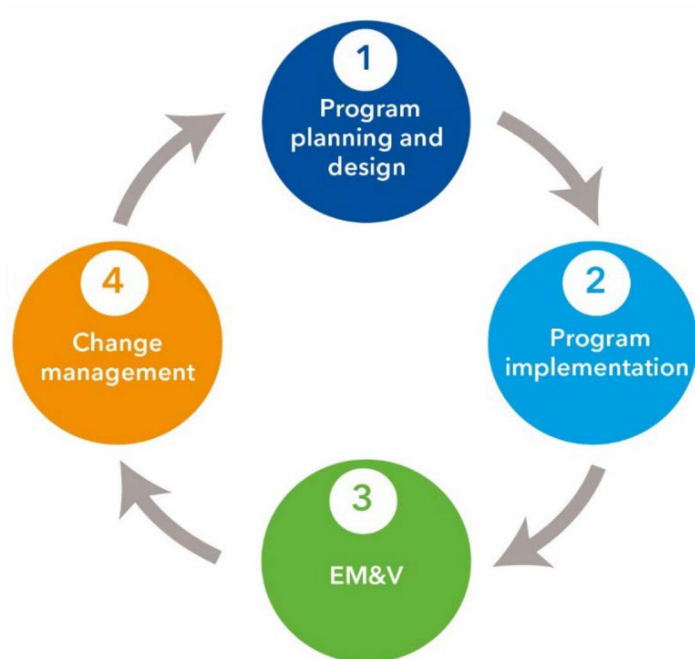
83% of peak shaving potential was expected to be provided by the Residential AC Cycling program in Virginia in 2019, and that planned goal was achieved.

Program expenditures for the Residential AC Cycling program in 2019 were 74% of the plan for Virginia and 61% for North Carolina. Virginia reached 93% of its planned participation and 92% of its peak shaving potential goals. North Carolina reached 72% of its planned participation and peak shaving potential goals. Program expenditures for the Non-residential DG Program in 2019 were 46% of plan for Virginia, 81% for planned participation, and 91% of planned peak shaving potential.

1.3 Study Approach

EM&V is an important part of a program’s cycle because its findings can be utilized during the program planning and design stage and inform continuous improvement activities as the program evolves. This is illustrated in Figure 1-3.

Figure 1-3. Illustration of a Program Cycle



Typically, EM&V reports review and report on available program data that has been collected and validated; collect and report data from secondary or primary research activities; and offer recommendations for improvements to specific program designs where applicable. EM&V direct-measurement data can also be, and has been in previous years, integrated into Dominion Energy’s long-term system planning process through the incorporation of more current data into its future Integrated Resource Plan (IRP) modeling when appropriate.

Appendices A and B show screenshots of the program performance indicator table results for each of Dominion Energy’s Virginia and North Carolina DSM active and closed programs from program inception to the end of this reporting year. Appendix A shows the Virginia performance indicator tables and

Appendix B shows the North Carolina tables. Abbreviated versions of these tables for the current year are also included in the main body of this report, in each program’s report section. They show the year-end program spending, participation, gross and net annualized energy savings and demand reductions compared against planning goals for the year.

Appendices C and D show screenshots of the summary tables used for claiming lost revenue, program performance incentives, IRP modeling, lifetime savings accounting, and other purposes used in both states. Appendix C shows gross energy savings and demand reductions. Appendix D shows net energy savings and demand reductions.

2 INTRODUCTION

This report presents performance indicators of Dominion Energy's DSM programs in Virginia and North Carolina.

In Virginia, it is in compliance with the SCC's Order requiring detailed EM&V reports following DSM program implementation, which states:

Furthermore, we conclude that the DSM Programs approved herein are in the public interest subject to the following requirements ... Third, the Company shall file detailed [Measurement & Verification] M&V reports in this proceeding, with service on Staff and all parties to this case, every six months beginning October 1, 2010.

Finally, Virginia Power shall implement its commitment, as discussed during the hearing, to coordinate with the participants in this case and other interested parties in evaluating the M&V results and in developing further DSM Program proposals. For example, if the M&V data establishes that a program is not performing as expected, the Company and the participants to this case should address modifications to, or removal of, such program. These M&V reports, among other things, will provide significant information for purposes of subsequent evaluations as to whether certain programs warrant continuation thereof. Accordingly, we find that the M&V reports should be filed in this DSM proceeding.⁶

In its April 30, 2012 Order, the SCC approved the Company's request to issue annual EM&V Reports on April 1st, focusing on DSM program impacts from the previous calendar year.⁷ The SCC granted a motion in Case No. PUR-2017-00129 to extend the filing date for the report due in 2018 and all future EM&V reports to May 1st of each year.⁸ On April 30, 2020, the SCC granted a motion in Case No. PUR-2018-00168 to further extend the filing date for the report due in 2020 and all future EM&V reports to May 15th of each year.⁹

The SCC issued its order regarding new rules governing the EM&V of the effects of utility-sponsored DSM programs (Case No. PUR-2017-00047) on November 9, 2017. The new rules apply prospectively to new or renewing DSM programs starting from the order date. The programs that are reported in this document and are affected by this rule include:

- Residential Income and Age Qualifying Home Improvement Program, extended in 2018¹⁰, and
- DSM Phase VII programs¹¹

⁶ *Virginia Electric and Power Company Petition for approval to implement new DSM programs and for approval of two rate adjustment clauses pursuant to 56-585.1 A 5 of the Code of Virginia*, Case No. PUE-2009-00081, Order Approving Demand Side Management Programs at 12 (March 24, 2010).

⁷ *Application of Virginia Electric and Power Company For approval to implement new demand-side management programs and for approval of two updated rate adjustment clauses pursuant to § 56-585.1 A 5 of the Code of Virginia*, Case No. PUE-2011-00093, Order at 14 (April 30, 2012).

⁸ *Petition of Virginia Electric and Power Company For approval to extend an existing demand-side management program and for approval of two updated rate adjustment clauses pursuant to 56-585.1 A 5 of the Code of Virginia*, Case No. PUR-2017-00129, Order Granting Motion (March 8, 2018).

⁹ *Petition of Virginia Electric and Power Company For approval to implement demand-side management programs and for approval of two updated rate adjustment clauses pursuant to 56-585.1 A 5 of the Code of Virginia*, Case No. PUR-2018-00168, Order Granting Motion (April 30, 2020).

¹⁰ *Virginia Electric and Power Company Petition for approval to extend an existing demand-side management program and for approval of two updated rate adjustment clauses pursuant to § 56-585.1 A 5 of the Code of Virginia*, Case No. PUR-2017-00129, Order Granting Motion (May 10, 2018).

¹¹ *Virginia Electric and Power Company Petition for approval to implement demand-side management programs and for approval of two updated rate adjustment clauses pursuant to § 56-585.1 A 5 of the Code of Virginia*, Case No. PUR-2018-00168, Order Granting Motion (May 2, 2019).

On September 1, 2010, Dominion Energy filed an application for the NCUC's approval of six DSM programs. On February 22, 2011, NCUC approved the same five DSM Phase I programs that were approved in Virginia. As a condition of approval, EM&V reports must be filed with the NCUC, which are to include the EM&V reports filed in Virginia, as well as information specific to the Company's North Carolina customers. The NCUC subsequently directed Dominion Energy to revise its annual EM&V reporting cycle to April 1 each year, which was then extended to May 1 consistent with the Virginia deadline.¹²

2.1 Programs Covered in This Report

This report divides the DSM programs into four categories:

1. EE programs – residential with active participation and/or active spending
2. EE programs – non-residential with active participation and/or active spending
3. Peak shaving programs with active participation and/or active spending
4. Closed programs with persisting savings

Sections 2.1.1 through 2.1.4 give brief descriptions of all programs covered in this report. Table 2-1 shows the specific programs included in this report and the SCC's or NCUC's Order Date for approval, suspension, reinstatement, and closure of each of these programs. It also shows updated key program values as a result of EM&V efforts conducted in 2019 and the average annualized kWh/year per participant before and after the update. The change in the average annualized kWh/year per participant values are a function of the following:

1. Updates to adjustment factors or values based on EM&V activities
2. Updates to deemed savings calculation methodology based on regular Standard Tracking and Engineering Protocol Manual (STEP Manual) updates
3. Variation in participant characteristics as inputs to the deemed savings calculations from year to year

Note that changes in deemed savings approaches that also drive changes in average participant values are not detailed here, but rather in Appendix F, STEP Manual.

2.1.1 Energy Efficiency Programs – Residential

Dominion Energy offers five residential EE programs, one of which – the Residential Low Income and Age Qualifying Home Improvement Program – was offered in both Virginia and North Carolina. The Residential Retail LED program was offered in North Carolina only. The DSM Phase VII programs (Residential Appliance Recycling, Residential Efficient Products Marketplace, and Residential Home Energy Assessment) were only available in Virginia in 2019.

1. Residential Income and Age Qualifying Home Improvement: This program is the updated version of the Residential Low-Income Program from DSM Phase I, and an extension of the program approved in DSM

¹² *In the Matter of Application of Virginia Electric and Power Company d/b/a Dominion North Carolina Power, for Approval of Demand Side Management and Energy Efficiency Cost Recovery Rider Pursuant to G.S. 62-133.9 and Commission Rule R8-69, Order Approving DSM/EE Rider and Requiring Customer Notice at 13, Docket No. E-22, Sub 473 (December 13, 2011).*

Phase IV. It provides low-income and age qualifying homeowners with a free energy check-up that identifies and installs energy conservation measures within their residences to help save energy.

2. Residential Retail LED Lighting (North Carolina): This program provides residential customers in the Company's North Carolina service territory with an instant discount for qualifying light-emitting diode (LED) light bulb purchases from a participating retailer. It closed to new participants in 2018, however 2019 still had some program spending due to program close out and reporting activities.
3. Residential Appliance Recycling: This program provides an incentive to residential customers for recycling old, inefficient refrigerators and freezers.
4. Residential Efficient Products Marketplace: This program provides rebates for the purchase and installation of ENERGY STAR® qualified LED lamps, LED fixtures, and appliances.
5. Residential Home Energy Assessment: This program provides owners and occupants of single-family homes and townhomes with a home energy audit. This includes a walk-through audit of customer homes, direct install measures, and recommendations for additional home energy improvements.

2.1.2 Energy Efficiency Programs – Non-residential

The DSM Phase III programs, Small Business Improvement, and the Non-residential Prescriptive Programs are offered in both Virginia and North Carolina. The DSM Phase III programs closed to new participants in 2019. These include the Non-residential Lighting Systems & Controls, Non-residential Heating and Cooling Efficiency, and Non-residential Window Film programs. All projects must have been completed with a participating contractor by December 28, 2018 with rebate applications submitted online or postmarked by February 11, 2019. The DSM Phase VII programs just launched in 2019 and are currently only available in Virginia. These new programs replaced the closing DSM Phase III programs described above, and the Non-residential Small Manufacturing and Non-residential Office programs.

1. Non-residential Lighting Systems & Controls (DSM Phase III): This program provides non-residential customers with an incentive to retrofit their existing inefficient lighting system with a more cost-effective, energy efficient lighting system.
2. Non-residential Lighting Systems & Controls (DSM Phase VII): This program provides non-residential customers with an incentive to retrofit their existing inefficient lighting system with a more cost-effective, energy efficient lighting system.
3. Non-residential Heating and Cooling Efficiency (DSM Phase III): This program provides incentives to non-residential customers to upgrade existing heating or cooling equipment or install new energy efficient technologies.
4. Non-residential Heating and Cooling Efficiency (DSM Phase VII): This program provides incentives to non-residential customers to upgrade existing heating or cooling equipment or install new energy efficient technologies.
5. Non-residential Window Film (DSM Phase III): This program provides incentives to non-residential customers to install window film to reduce energy consumption and demand during the cooling season.
6. Non-residential Window Film (DSM Phase VII): This program provides incentives to non-residential customers to install window film to reduce energy consumption and demand during the cooling season.

7. Non-residential Small Business Improvement: This program provides small business customers with on-site energy assessments of their facilities and incentives for direct install lighting, duct testing and sealing, HVAC upgrades, and prescriptive re-commissioning through participating contractors.
8. Non-residential Prescriptive: This program provides incentives to qualifying non-residential customers for cooking, refrigeration, and HVAC measures installed through participating contractors.
9. Non-residential Small Manufacturing: This program provides qualifying non-residential customers with incentives for the installation of energy efficiency improvements, consisting of compressed air systems measures for small manufacturing facilities.
10. Non-residential Office: This program provides qualifying non-residential customers with incentives for the installation of energy efficiency improvements, consisting of recommissioning measures at smaller office facilities.

2.1.3 Peak Shaving Programs

Dominion Energy operates two peak shaving programs—the Residential AC Cycling Program and the Non-residential DG Program. The Residential AC Cycling program is offered in Virginia and North Carolina. The Non-residential DG Program is offered only in Virginia.

1. Residential AC Cycling: Participants receive an on-bill credit in the December billing cycle in exchange for allowing the Company to reduce the operating cycle of their central air conditioning and heat pumps between June 1–September 30 (excluding weekends and holidays), or for emergency situations that may occur outside of this window when the Company must dispatch this resource. When cycling events are initiated, a paging signal is broadcast by the Company and received by load curtailment switches installed on the central air conditioners and heat pumps of participating customers and reduces the duty cycle of the air conditioning units between 30%–50% while the event is in progress.
2. Non-residential Distributed Generation (Virginia): This program provides qualifying non-residential customers with an incentive to curtail load by operating on-demand backup generation for a limited number of hours per year throughout the year, to include winter periods. Eligible customers are those with at least 200 kW of demand and participant sites are those with an installed generator.

2.1.4 Closed Programs

The following is a list of programs previously offered in Virginia and North Carolina. They are no longer offered to new participants in either state as of 2019, however the savings achieved from some measures installed in these programs continue to persist:

2.1.4.1 Residential

1. Residential Lighting (Virginia and NC. DSM Phase I): During this program’s operation, Dominion Energy partnered with manufacturers and retailers to give residential participants an instant discount for high-efficiency compact fluorescent lamp (CFL) lighting purchases.
2. Residential Low-Income (Virginia and NC. DSM Phase I): This program, marketed as the Income Qualifying Home Improvement Program, provided low-income homeowners and renters with a free energy audit that identified and installed energy conservation measures within their residences to help

save electricity. This program has been replaced with the Residential Income and Age Qualifying Home Improvement Program in both states.

3. Residential Heat Pump Upgrade (Virginia and NC. DSM Phase II): This program provided incentives for residential heat pump (e.g., air and geothermal) upgrades to residential homeowners who were interested in installing a new, higher efficiency, ENERGY STAR®-rated heat pump unit.
4. Residential Heat Pump Tune-Up (Virginia and NC. DSM Phase II): This program provided qualifying residential homeowners with an incentive to have a contractor tune up their existing heat pumps once every five years in order to achieve maximum operating performance.
5. Residential Duct Sealing (Virginia and NC. DSM Phase II): This program promoted the repair of poorly performing duct- and air-distribution systems in residential homes. Qualifying customers with a heat pump received an incentive for having a contractor seal ducts in their homes using program-approved methods and eligibility paths.
6. Residential Home Energy Check-Up (Virginia and NC. DSM Phase II): This program provided owners and occupants of single-family homes and townhomes an easy and low-cost home energy walk-through audit, which included the direct installation of some energy saving measures and recommendations for additional home energy improvements.
7. Residential Appliance Recycling (Virginia only. DSM Phase IV): This program provided qualifying residential customers in the Company's Virginia service territory with an incentive to recycle their existing and operating refrigerators and freezers.

2.1.4.2 Non-residential

1. Commercial HVAC Upgrade (Virginia and NC. DSM Phase I): During its operation, this program provided non-residential customers with an incentive to upgrade inefficient HVAC units or to install new high-efficiency HVAC units and motor controls. High-efficiency HVAC installations helped ensure customers that their heating and cooling systems were running at maximum efficiency while minimizing energy consumption.
2. Commercial Lighting (Virginia and NC. DSM Phase I): During its operation, this program provided non-residential customers with an incentive to retrofit their existing inefficient lighting systems with more cost-effective, energy-efficient lighting equipment or to install new high-efficiency lighting equipment.
3. Non-residential Duct Testing and Sealing (Virginia and NC. DSM Phase II): This program promotes testing and general repair of poorly performing duct and air distribution systems in non-residential facilities. The program provides incentives to qualifying customers who have a contractor seal ducts in existing buildings using program-approved methods.
4. Non-residential Energy Audit (Virginia and NC. DSM Phase II): This program provides qualifying customers with an on-site energy audit by a contractor in Dominion Energy's contractor network in non-residential facilities. Customers receive a rebate once they provide documentation that recommended EE improvements have been made.

Table 2-1. Categories and List of Active 2019 DSM Programs in Report

DSM Phase	Program	State	Date of Order	EM&V Update Description ¹³	Updated Factor/ Value Source	Effective Date	Previous Factor/ Value	Updated Factor/ Value	Updated Participant kWh/Year
Energy Efficiency—Residential									
IV	Residential Appliance Recycling	VA	April 24, 2015	None					
IV	Residential Income and Age Qualifying Home Improvement	VA	April 24, 2015 Extension: May 10, 2018	None					
		NC	October 6, 2015 Extension: June 26, 2018	None					
V	Residential Retail LED Lighting	NC	December 20, 2016	None					
VII	Residential Appliance Recycling	VA	May 2, 2019	N/A					
		NC	November 13, 2019						
	Residential Efficient Products Marketplace	VA	May 2, 2019	N/A					
		NC	November 13, 2019						
	Residential Home Energy Assessment	VA	May 2, 2019	N/A					
		NC	November 13, 2019						
Energy Efficiency—Non-residential									
III	Non-residential Heating & Cooling Efficiency	VA	April 29, 2014	None					
		NC	October 27, 2014						
VII	Non-residential Heating & Cooling Efficiency	VA	May 2, 2019	N/A					
		NC	November 13, 2019						
III	Non-residential Lighting Systems & Controls	VA	April 29, 2014	None					
		NC	October 27, 2014						
VII	Non-residential Lighting Systems & Controls	VA	May 2, 2019	None					
		NC	November 13, 2019	None					
III	Non-residential Window Film	VA	April 29, 2014	None					
		NC	October 27, 2014	None					

¹³ Changes to participant kWh/year are also partially driven by updates to the deemed annualized savings methodology as a result of regular updates made to the STEP Manual. To review those specific updates, refer to Appendix F.

DSM Phase	Program	State	Date of Order	EM&V Update Description ¹³	Updated Factor/ Value Source	Effective Date	Previous Factor/ Value	Updated Factor/ Value	Updated Participant kWh/year
VII	Non-residential Window Film	VA	May 2, 2019						
		NC	November 13, 2019						
V	Non-residential Small Business Improvement	VA	April 19, 2016	None					
		NC	October 26, 2016	None					
VI	Non-residential Prescriptive	VA	June 1, 2017	None					
		NC	October 16, 2017						
VII	Non-residential Small Manufacturing	VA	May 2, 2019						
		NC	November 13, 2019						
	Non-residential office	VA	May 2, 2019						
		NC	November 13, 2019						
Peak Shaving Programs									
	Residential AC Cycling	VA	March 24, 2010		Operability rate	2017		N/A	0.63 kW/ participant
			April 19, 2016		Opt-out rate	2017		0.03%	
					Removal/ deactivation rate	2017		-0.92%	
		NC	February 22, 2011		Operability rate	2017		N/A	
					Opt-out rate	2017		0.03%	
					Removal/ deactivation rate	2017		0.33%	
	Non-residential Distributed Generation	VA	April 30, 2012 Extension: June 1, 2017	None					

2.2 Report Structure

Section 3 of this report provides an overview of the methodology used in 2019 and the planned research activities for 2020. Sections 4 through 7 discuss the EM&V results of the different programs. In particular, Section 4 reviews the residential EE programs, Section 5 the non-residential EE programs, Section 6 the peak shaving programs, and Section 7 the closed programs where savings continue to persist through the program weighted measure lives. For each active program, DNV GL reports on the following:

1. Program description summary
2. Initial program-design planning assumptions
3. Methods used for the current reporting period
4. An assessment of program progress compared to plan, including:
 - cumulative indicators over time compared with planned indicators for program costs, participation, and resource savings (kWh/year and/or kW)
 - average indicators of program costs, participation, and resource savings

This report concludes with the following appendices:

1. Appendix A: Program Performance Indicator Tables for Virginia Programs 2010–2019
5. Appendix B: Program Performance Indicator Tables for North Carolina Programs 2011–2019
6. Appendix C: Program to Date Gross Energy Savings Tables for Virginia and North Carolina Programs 2010–2019
7. Appendix D: Program to Date Net Energy Savings Tables for Virginia and North Carolina Programs 2010–2019
8. Appendix E: Glossary of Terms
9. Appendix F: Standard Tracking and Engineering Protocols (STEP) Manual for Programs Version 10
 - a. Appendix F-1: Standard Tracking and Engineering Protocols (STEP) Manual for Residential Programs Version 10
 - b. Appendix F-2: Standard Tracking and Engineering Protocols (STEP) Manual for Non-residential Programs Version 10
10. Appendix G: Residential Income and Age Qualifying Home Improvement Program EM&V plan
11. Appendix G-1: Residential Income and Age Qualifying Home Improvement Program Manual
12. Appendix H: Residential Appliance Recycling Program EM&V Plan
13. Appendix H-1: Residential Appliance Recycling Program Manual
14. Appendix I: Residential Efficient Products Marketplace Program EM&V Plan

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15. Appendix I-1: Residential Efficient Products Marketplace Program Quality Control Description
 16. Appendix J: Residential Home Energy Assessment Program EM&V Plan
 17. Appendix K: Non-residential Lighting Systems & Controls Program (DSM Phase VII) EM&V Plan
 18. Appendix L: Non-residential Heating and Cooling Efficiency Program (DSM Phase VII) EM&V Plan
 19. Appendix M: Non-residential Window Film Program (DSM Phase VII) EM&V Plan
 20. Appendix N: Non-residential Small Business Improvement Program EM&V Plan
 21. Appendix O: Non-residential Prescriptive Program EM&V Plan
 22. Appendix P: Non-residential Small Manufacturing Program EM&V Plan
 23. Appendix Q: Non-residential Office Program EM&V Plan
 24. Appendix R: Residential Air Conditioner Cycling Program EM&V Plan
 25. Appendix R-1: Residential AC Cycling Program, Impact Evaluation of 2019 Dispatch Events
 26. Appendix S: Non-residential Distributed Generation Program EM&V Plan
 27. Appendix S-1: Distributed Generation Program, Impact Evaluation of 2019 Dispatch Events

3 METHODOLOGIES

3.1 Calculation of the Value of Resources Saved

In the absence of a statewide protocol providing methods for calculating gross and net annual energy savings and demand reduction, Dominion Energy has contracted with DNV GL to develop the STEP Manual (Appendix F). The STEP Manual is a Dominion Energy-specific technical reference manual of engineering protocols for estimating gross annual electric energy savings and demand reductions.

The protocols are limited to calculating per-unit annual energy savings and demand reductions at the measure level. The measure-level savings are aggregated up to the program level and reported through this document. The protocols do not include the calculation for the value of resources saved. To calculate the value of the resource savings for reporting and other purposes, the energy savings reported in this document can then be increased by the amount of the transmission and distribution (T&D) losses to reflect the energy savings at the system level. Energy savings at the system level can be multiplied by the appropriate avoided costs to calculate the value of the benefits.

$$\text{System savings} = \text{Savings at measure} \times \text{T\&D loss factor}$$

$$\text{Value of resources saved} = \text{System savings} \times \text{System avoided costs}$$

The durations of expected savings of installed measures are specified in terms of average expected measure life in years by program. They are discussed in more detail in Section 3.1.2, Measure Life, below.

3.1.1 Transmission and Distribution System Losses

These protocols calculate gross annual energy savings at the measure level, which should be increased by transmission and distribution (T&D) system losses in order to determine gross annual energy savings at the system level. The T&D loss factor multiplied by the savings calculated from the protocols will result in savings at the supply level.

The T&D electric loss factor is approximately 1.05 as a system-wide average (for both energy and demand), to be applied to savings at the customer meter. This loss factor was provided to DNV GL by Dominion Energy. It was developed internally for Dominion Energy's programs as part of its IRP process.

3.1.2 Measure Life

Program-level measure lives are provided in Table 3-1. Measure lives were included in the initial planning assumptions as filed with the SCC and NCUC when each program was considered for approval. Program-level measure lives are a composite estimate of the associated measures that comprise the program.

Table 3-1. Measure Life Assumptions

DSM Phase	Program	Program Weighted Measure Life (years)
Energy Efficiency-Residential Programs		
I	Residential Lighting Program	9.40
I	Residential Low Income Program	13.60
II	Residential Duct Testing and Sealing Program	18.00
II	Residential Heat Pump Tune-Up Program	5.00

II	Residential Heat Pump Upgrade Program	15.00
II	Residential Home Energy Check-up Program	10.00
IV	Residential Appliance Recycling Program	8.00
IV	Residential Income and Age Qualifying Home Improvement Program	14.00
IV	Residential Income and Age Qualifying Home Improvement Program Extension	15.00
V	Residential Retail LED Lighting Program	20.00
VII	Residential Appliance Recycling Program	8.00
VII	Residential Efficient Products Marketplace Program	16.50
VII	Residential Home Energy Assessment Program	12.41
Energy Efficiency-Non-residential Programs		
I	Commercial HVAC Upgrade Program	15.00
I	Commercial Lighting Program	10.00
II	Non-residential Duct Testing and Sealing Program	25.00
II	Non-residential Energy Audit Program	7.00
III	Non-residential Heating and Cooling Efficiency Program	15.00
VII	Non-residential Heating and Cooling Efficiency Program	15.00
III	Non-residential Lighting & Controls Program	9.00
VII	Non-residential Lighting Systems & Controls Program	10.59
III	Non-residential Window Film Program	10.00
VII	Non-residential Window Film Program	10.00
V	Non-residential Small Business Improvement Program	14.00
VI	Non-residential Prescriptive Program	6.30
VII	Non-residential Office Program	7.00
VII	Non-residential Small Manufacturing Program	12.24
Peak-shaving Programs		
I	Residential AC Cycling Program	15.00
II	Non-residential Distributed Generation Program	N/A

3.1.3 Net Savings Estimation

The STEP Manual protocols are designed to estimate gross savings program impacts, or more specifically, the total amount of annual energy savings and demand reductions related to program activity. However, the amount of energy savings and demand reductions that can be attributed to the program is not the same as the estimated gross savings. This is because any given program's design can have intended and unintended outcomes. The amount of energy savings and demand reductions that can be attributed to the program is referred to as net savings, which is the magnitude of the impact of the program's intended outcomes.

The most common unintended outcomes of an energy efficiency (EE) or peak shaving program can be characterized as follows:

1. **Free-ridership:** program participants who consume the incentive, but were not influenced by the program through which the measure is delivered, thereby reducing gross savings.
2. **Participant "Like" Spillover:** past program participants who subsequently install those same program-eligible EE measures, but do not consume the incentive, having been already influenced by the program through which the measure is delivered, thereby increasing gross savings.

3. **Participant “Unlike” Spillover:** past program participants who subsequently install other EE measures not offered through the program, but who have been influenced by the original program, thereby increasing gross savings.
4. **Non-participant Spillover:** program non-participants who were influenced by the program through which the measure is delivered and implement the measure without consuming the program incentive, potentially increasing gross savings. The influence may happen upstream at the design or specification stage without the customer’s input or knowledge. This is also commonly referred to as “free drivers.”
5. **Leakage:** program non-participants who receive the measure and consume the incentive but install the measure outside of Dominion Energy’s service territory, thereby reducing gross savings.
6. **Snapback:** program participants who receive the measure and consume the incentive but alter behavior in such a way that the participants’ or non-participants’ energy and demand are higher than the baseline for the given measure.

Table 3-2 summarizes unintended outcomes that are considered in DNV GL’s impact evaluations.

Table 3-2. Status of Unintended Outcomes Considered in DNV GL Impact Evaluations

Unintended Outcome Category	Status of Impact Evaluations
Free ridership	Included in all previous impact evaluations
Participant “Like” Spillover	Included only in the previous Non-residential Energy Audit program impact evaluation
Participant “Unlike” Spillover	Not included at this time
Non-participant Spillover	Not included at this time
Leakage	Not included at this time
Snapback	Not included at this time

The combination of all adjustments described above is typically referred to as the net-to-gross (NTG) factor. The NTG factor is summarized by program in Table 3-3. In this report, default NTG ratios are the ex ante values specified by Dominion Energy. These values will be updated over time as NTG is measured for each program. NTG factors typically change as programs mature and extend beyond the early adopters to the mass market.

NTG factors may be estimated a number of ways. The energy efficiency evaluation industry discussions around various approaches are described in Chapter 21, Estimating Net Savings – Common Practices of the Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures.¹⁴ produced for the U.S. Department of Energy and the general public. It also references the Energy Efficiency Program Impact Evaluation Guide, which provides additional details.

Table 3-3. Net-to-Gross Factors and Sources by Program

DSM Phase	Program	Net-to-Gross Factor	Source
Energy Efficiency-Residential Programs			


¹⁴ Chapter 21: Estimating Net Savings – Common Practices. The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures. October 2017. <https://www.nrel.gov/docs/fy17osti/68578.pdf>. Accessed March 26, 2019.

DSM Phase	Program	Net-to-Gross Factor	Source
I	Residential Lighting	65%	Dominion Energy program design assumption
I	Residential Low Income	94%	KEMA, April 2011 for Dominion Virginia Power
II	Residential Duct Sealing	80%	Dominion Energy program design assumption
II	Residential Heat Pump Tune-Up	90%	Dominion Energy program design assumption
II	Residential Heat Pump Upgrade	45%	DNV GL, April 2016 for Dominion Virginia Power
II	Residential Home Energy Check-up	82%	DNV GL, April 2016 for Dominion Virginia Power
IV	Residential Appliance Recycling	77%	Dominion Energy program design assumption
IV	Residential Income and Age Qualifying Home Improvement	80%	DNV GL, April 2015 for Dominion Virginia Power
V	Residential Retail LED Lighting	85%	Dominion Energy program design assumption
VII	Residential Appliance Recycling	60%	Dominion Energy program design assumption
VII	Residential Efficient Products Marketplace	70%	Dominion Energy program design assumption
VII	Residential Home Energy Assessment	80%	Dominion Energy program design assumption
Energy Efficiency-Non-residential Programs			
I	Commercial Lighting	50%	KEMA, October 2011 Commercial Lighting Program: Load Shape and Net Savings Analysis Evaluation Report
I	Commercial HVAC	45%	KEMA, April 2012 Commercial HVAC Program: Load Shape and Net Savings Analysis Evaluation Report
II	Non-residential Duct Testing and Sealing	97%	DNV GL, April 2015 for Dominion Virginia Power
II	Non-residential Energy Audit	98%	DNV GL, April 2015 for Dominion Virginia Power
III	Non-residential Heating and Cooling	70%	Dominion Energy program design assumption
III	Non-residential Lighting Systems & Controls	70%	Dominion Energy program design assumption
III	Non-residential Window Film	80%	Dominion Energy Program design assumption
V	Non-residential Small Business Improvement	93%	Dominion Energy Program design assumption
VI	Non-residential Prescriptive	85%	Dominion Energy program design assumption
VII	Non-residential Heating and Cooling	70%	Dominion Energy program design assumption
VII	Non-residential Lighting Systems & Controls	70%	Dominion Energy program design assumption
VII	Non-residential Window Film	80%	Dominion Energy program design assumption
VII	Non-residential Small Manufacturing	90%	Dominion Energy program design assumption
VII	Non-residential Office	90%	Dominion Energy program design assumption
Peak Shaving Programs			
I	Residential AC Cycling	100%	KEMA, October 2011 Operability Study replaced net-to-gross. Required by PJM and not applicable in 2019
II	Non-residential DG	100%	

3.2 Data Quality and Validation

3.2.1 Methodologies

In cooperation with Dominion Energy, DNV GL has developed data quality and validation procedures to help ensure program data are consistent and accurate. Importantly, participant counts, gross annualized energy



savings, and demand reduction result from engineering equations that use these validated data from the Company as inputs.

Program data used to calculate gross annualized energy savings must meet predefined data requirements as agreed upon by DNV GL, the Company, and the program implementation vendor. Historically, the data requirements are developed after a program is approved by the SCC or NCUC and before the program is launched. The program implementation vendor is responsible for program data collection and data entry. This data is then transferred to the Company's Business Intelligence (BI) database for quality control and verification. The Company then transfers EM&V-specific data to DNV GL. The data requirements define:

1. Variable name
2. Variable description
3. Data type (e.g., numeric, character, and date)
4. Maximum field length
5. Validation range (where appropriate)
6. Necessity of variable to compute savings

The validation range comes in the form of a structured list of acceptable text variables or a range for numeric variables. If the data contain a text variable that does not match the values defined in the structured list, then that record will not be processed. If the data contain a numeric variable that does not fall within the validation range, then that data is removed by the Company. The validation ranges were carefully constructed to exclude unrealistic records while not excluding unusual records.

Each month the data is reviewed for the following:

- **Are the correct data being collected for EM&V purposes?** This would include the data containing the requisite database fields for calculations using the STEP Manual (Appendix F) and for future sampling needs for data analysis, modeling, and survey research.
- **Are the data well populated?** Large databases are rarely completely populated, but some data are critical and cannot be overlooked.
- **Are the data generally consistent with expectations according to range and consistency checks?** Any exceptionally large or small values are noted and verified where appropriate.

At least annually, DNV GL conducts two types of quality checks on the code and the results to confirm that they are consistent with engineering expectations and the STEP Manual protocols. These activities check for outliers in the data at a macro level and individual record level results for consistency with the intentions of the protocols.

Additionally, DNV GL and the Company review the DSM program participant data on a monthly basis. DNV GL also has all of the Company's historic DSM program data and results since program inception, which are further utilized to check and audit historic calculations annually when the STEP Manual is updated and make corrections as necessary in the year-end reporting to ensure data integrity.

3.2.2 Adjustments and/or Corrections to Prior Year Calculations

DNV GL made adjustments and corrected calculations for the Residential Appliance Recycling (DSM Phase IV). These adjustments did not result in any changes to savings calculations for any programs but were substantial and warranted correcting the 2018 program data retroactively. These corrections were resubmitted to Commissions in Virginia and in North Carolina in 2020 and summarized in Table 3-4. Explanation of

Table 3-4. Explanation of adjustments

Appendix Section and Title in May 1, 2019 EM&V Report ¹⁵	Location of Correction	Reason for Correction
1. Adjustments to the Residential Appliance Recycling Program, "Program Performance" calculations.		
Appendix A.15. Virginia Residential Appliance Recycling Program 2015 - 2018	<p>" Program Performance"</p> <ul style="list-style-type: none"> • Annual \$Admin. per Participant (Gross) • Annual \$ Admin. per kWh/year (Gross) • Annual \$EM&V per \$ Total • Annual \$Rebate per Participant (Gross) 	<p>Error correcting for incorrect formulas in the "Program Performance" section of the appendix, where the following 2018 calculations were including historic 2017 values, but should not have:</p> <ul style="list-style-type: none"> • Annual \$Admin. per Participant (Gross) • Annual \$ Admin. per kWh/year (Gross) • Annual \$EM&V per \$ Total • Annual \$Rebate per Participant (Gross)
2. Assigned savings for refrigerant charge adjustment in the Non-residential Prescriptive Program Air Conditioner, Heat Pump, and Chiller Tune-up measure, for program year 2018, where it was previously unassigned.		
Section 5.5. Non-residential Prescriptive – Virginia and North Carolina, of the EM&V Report	<p>Adjusted the following values, and all other values that are derived from them, in Tables 5-18, VA Non-residential Prescriptive Program Performance Indicators (2017-2018)</p> <ul style="list-style-type: none"> • Installed Energy Savings (kWh/year), Total Gross Deemed Savings • Installed Demand Reduction (kW), Total Gross Deemed Savings 	<p>According to Appendix F, the Standard Tracking and Engineering Protocol (STEP) Manual, version 9, section 8.1.2 Unitary / Split Air Conditioning, Heat Pump, and Chiller Tune-up, Table 8-5. Input Variables for AC/HP/Chiller Tune-up Measure, the TUF variable for the Commercial Non-residential Prescriptive Program should assign 0.05 for AC, HP, and chiller units if RCA was completed. They were previously not being assigned this value in the calculations and reflected in the results reported in the May 1, 2018 EM&V report for the Non-residential Prescriptive program.</p>

¹⁵ PUR-2017-00129

Table 3-5. Impact of adjustments

Program	State and Appendix Number in May 1, 2019 Report and This Report	Category	May 1, 2019 Reported Year-End Gross Value	Adjusted 2018 Gross Year-End Value in This Report (Should match 2018 Gross Year-End Value)	Difference	Difference in %, from May 1 2019 Reported Value
Non-residential Prescriptive program 2018	Virginia Appendix A.6., Virginia Non-residential Prescriptive Program 2017-2018	Installed Energy Savings (kWh/year), Total Gross Deemed Savings	6,750,166 kWh/year	7,023,169 kWh/year	273,003 kWh/year	19%
		Installed Demand Reduction (kW), Total Gross Deemed Savings	3,083.6 kW	3,385.2 kW	764.7 kW	10%

3.3 Research Activities through 2019

The EM&V approach incorporates deemed annualized energy savings and demand reduction calculations outlined in the STEP Manual (Appendix F), customer surveys, billing analyses using customer data, and on-site evaluations at customer homes and businesses. Each year, as scheduled in the EM&V plans, DNV GL undertakes various research activities across the Company's DSM programs to evaluate each program through impact evaluations. The following research activities are used to evaluate the DSM programs:

- **Data Quality Review:** DNV GL reviews the program tracking data to ensure they have all the necessary information to compute savings and to feed into potential future evaluation research data requirements. DNV GL performs data quality review on a monthly basis throughout the year for all programs and performs an in-depth data quality check at least twice a year for all programs. Section 3.2 provides more details about the data quality reviews that DNV GL conducts.
- **Deemed Savings Calculations:** DNV GL estimates energy savings and demand reductions across programs with standardized calculations and assumptions outlined in the STEP Manual. DNV GL tracks deemed estimates for all programs on a monthly basis throughout the year and reports draft deemed estimates to Dominion Energy each month.
- **Satisfaction Surveys:** Satisfaction survey questions help the Company determine how satisfied its customers are with the programs it offers. These questions generally cover satisfaction with the program as a whole, the rebate application and payments, and, if applicable, the contractors used. This survey is often combined with an NTG estimation or verification survey (sometimes both) to reduce the number of interactions with, and burden on the participant.
- **Billing Analysis:** This approach applies Company-specific customer usage data to actual participating households or facilities to quantify annualized energy savings and demand reductions for a program. DNV GL analyzes monthly billing data from households or facilities for at least a 12-month period before and after the audit/install date of a program measure. The savings calculated from this method allow DNV GL to create an adjustment factor to the engineering algorithms known as a realization rate. This realization rate is then applied to future deemed calculations for savings.
- **NTG Estimation Surveys:** Depending on the program design and the evaluation methodology used, survey research methods can be used to estimate the NTG factor, which is the percentage of savings that are attributable to the program because participants would not have performed the program measures in the absence of the program. This survey is often combined with the satisfaction and verification surveys and conducted during a single interaction with the participant and/or contractor.
- **Verification Surveys:** Survey verification questions help verify the customer did participate in the program and install any or all measures as recorded in the tracking data. The survey results are used to calculate a verification rate that is applied to the deemed savings. This survey is often combined with the satisfaction survey and NTG-estimation survey and conducted during a single interaction with the participant.
- **On-site Verification:** This occurs when a member of the evaluation team visits a random selection of sites and verifies that the measures are actually installed. This may be used in conjunction with or in place of verification surveys to help the Company verify program participation and measure installation.

The savings calculated from this method, in combination with other activities, allow DNV GL to create an adjustment factor to the engineering algorithms known as a realization rate. This realization rate is then applied to future deemed calculations for savings.

- **On-site Measurement:** This is physical verification of an installed measure’s power load and energy usage through the use of metering equipment. The measurement results help make deemed savings calculations more accurate and precise. The savings calculated from this method, in combination with other activities, allow DNV GL to create an adjustment factor to the engineering algorithms known as a realization rate. This realization rate is then applied to future deemed calculations for savings.
- **Building Simulation Modeling:** When on-site measurement is not available at the measure-level, or where interactive effects of multiple installed measures cannot be determined, modeling is used to more accurately determine measured power load and energy usage of multiple measures installed at a single site. Like on-site measurement, the results of modeling help the Company to adjust its deemed savings calculations through a realization rate adjustment.
- **Load-Shape Analysis:** The Company conducts a load-shape analysis using data from a combination of data inputs (e.g., on-site verification, on-site measurement, and modeling) to determine each program’s annual power load profile for the Company-specific system peak and for PJM-defined performance periods.¹⁶

Table 3-6 provides an overview of the research activities conducted for each program through the end of 2019. The years listed in the table represent the year that the EM&V study report was published. All programs undergo data quality review and evaluation using deemed calculations.

¹⁶ PJM is the Company’s regional transmission organization (www.pjm.com).

Table 3-6. EM&V Research Activities Conducted Through 2019 by Program

DSM Phase	Program	Data Quality Review	Deemed Savings Calculations	Billing Analysis	Satisfaction Survey	Verification Survey	NTG Studies	On-Site Verification	On-Site Measurement	Building Simulation Modeling	Load-Shape Analysis	Other
Energy Efficiency-Residential Programs												
IV	Residential Income and Age Qualifying Home Improvement	2016-present	2016-present								2016-present	
V	Residential Retail LED Lighting	2017-present	2017-present								2017-present	
VII	Residential Appliance Recycling	2019	2019								2019	
VII	Residential Efficient Products Marketplace	2019	2019								2019	
VII	Residential Home Energy Assessment	2019	2019								2019	
Energy Efficiency-Non-Residential Programs												
III	Non-residential Heating & Cooling	2015-present	2015-present								2015-present	
III	Non-residential Lighting Systems & Controls	2015-present	2015-present								2015-present	
III	Non-residential Window Film	2015-present	2015-present								2015-present	
V	Non-residential Small Business Improvement	2016-present	2016-present								2016-present	
VI	Non-residential Prescriptive	2017	2017								2017-present	
VII	Non-residential Heating & Cooling	2019	2019								2019	
VII	Non-residential Lighting Systems & Controls	2019	2019								2019	
VII	Non-residential Window Film	2019	2019								2019	
VII	Non-residential Small Manufacturing	2019	2019								2019	
VII	Non-residential Office	2019	2019								2019	
Peak Shaving Programs												
I	Residential AC Cycling	2010-present	2010-present	2012-present				10/2011			2015-present	
II	Non-residential Distributed Generation	2013-present	2013-present	2013-present							2015-present	
Closed Programs												
I	Commercial HVAC (Closed)	2010-2013, 2015	2010-2013, 2015				4/2012	4/2012	4/2012			
I	Commercial Lighting (Closed)	2010-2013, 2015	2010-2013, 2015				4/2012	4/2012	4/2012			

DSM Phase	Program	Data Quality Review	Deemed Savings Calculations	Billing Analysis	Satisfaction Survey	Verification Survey	NTG Studies	On-Site Verification	On-Site Measurement	Building Simulation Modeling	Load-Shape Analysis	Other
I	Residential Lighting (Closed)	2010-2012	2010-2012									Retail sales survey (4/2011)
I	Residential Low Income (Closed)	2010-2016	2010-2016	4/2012-2014	4/2011		4/2011					
II	Residential Duct Sealing (Closed)	2012-2017	2012-2017		2015	2015					2015-2017	
II	Residential Heat Pump Tune-Up (Closed)	2012-2017	2012-2017		2015	2015					2015-2017	
II	Residential Heat Pump Upgrade (Closed)	2012-2017	2012-2017		2015, 2016	2015, 2016	2015, 2016	2015, 2016	2015, 2016		2015-2017	
II	Residential Home Energy Check-Up (Closed)	2012-2017	2012-2017	2015-2016	2015, 2016	2015, 2016	2016				2015-2017	
II	Non-residential Duct Testing and Sealing (Closed)	2012-2017	2012-2017		2015	2015	2015	2015			2015-2017	
II	Non-residential Energy Audit (Closed)	2012-2017	2012-2017		2015	2015	2015	2015	2015		2015-2017	
IV	Residential Appliance Recycling (Closed)	2016-2018	2016-2018						2015		2016-2018	



3.4 Planned Research Activities in 2020

In 2020, DNV GL will begin a new cycle of EM&V activities for all of Dominion Energy’s active programs. Those activities will be the same as the activities conducted for 2019, as shown above in Table 3-6. An in-depth description of the planned activities for each program is provided in Appendices G through V of this report.

The SCC issued its order regarding new rules governing the EM&V of the effects of utility-sponsored DSM programs (Case No. PUR-2017-00047) on November 9, 2017. The new rules apply prospectively to new or renewing DSM programs starting from the order date. As of this EM&V report, the DSM Phase IV Residential Income and Age Qualifying Home Improvement Program and all of the DSM Phase VII programs are affected by this new rule.

4 ENERGY EFFICIENCY PROGRAMS – RESIDENTIAL

This section reports on the 2019 progress of four residential energy efficiency programs.

1. Residential Income and Age Qualifying Home Improvement Program (DSM Phase IV) - Virginia and North Carolina
2. Residential Appliance Recycling (DSM VII) – Virginia
3. Residential Efficiency Products Marketplace (DSM VII) - Virginia
4. Residential Home Energy Assessment (DSM VII) - Virginia

Residential programs active in 2019 accounted for:

- 81% of new participants for all programs both residential and non-residential (Excluding participants in the Energy Efficiency Market Place program, because participation is measured in units sold).
- 54% of gross annualized energy savings for all programs both residential and non-residential, and
- 40% of spending in 2019.

Figure 4-1 and Figure 4-2 show the cumulative count of residential energy efficiency program participation and gross annualized energy savings in the two states, for the active programs, at the county level, through December 2019. The deeper the color, the greater the participation and gross annualized energy savings.

The top three jurisdictions in Virginia with the highest participation in 2019 in descending order were Fairfax, Newport News City and Henrico. In North Carolina there were only two jurisdictions with participants: Halifax and Hertford.

Regarding energy savings, the top three jurisdictions in Virginia for kWh savings, in descending order, were Fairfax, Chesterfield, and Henrico. For North Carolina, the three jurisdictions with the highest kWh savings, in descending order were, Halifax and Hertford.

Figure 4-1. Virginia and North Carolina Residential Energy Efficiency Program Participation Map by County

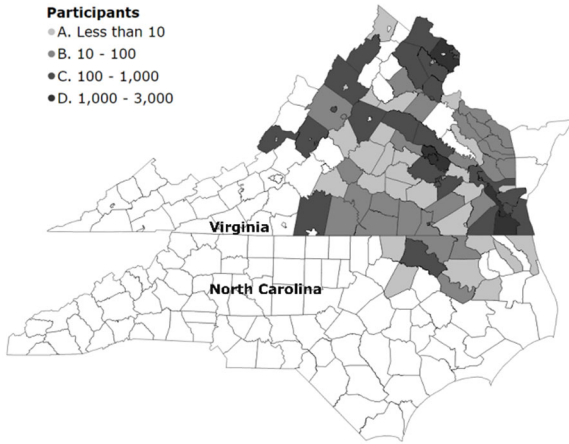
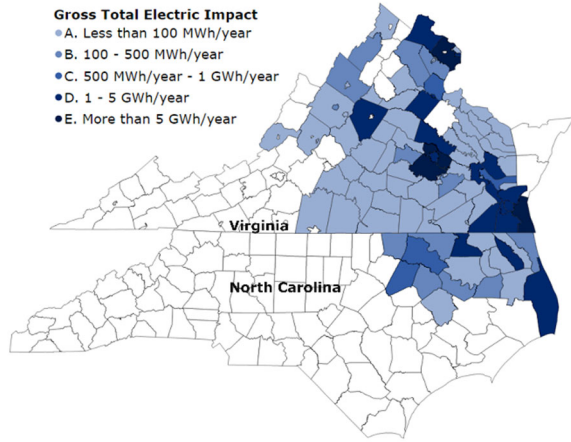


Figure 4-2. Virginia and North Carolina Residential Energy Efficiency Program Gross Annualized Energy Savings Map by County



4.1 Residential Income and Age Qualifying Home Improvement – Virginia and North Carolina

Virginia
Case #: PUE-2017-00129

RESIDENTIAL INCOME & AGE QUALIFYING HOME IMPROVEMENT

2015-PRESENT
310 kWh/yr in Average Net Savings Per Participant

Eligibility

- Income qualifying customers must have an income \leq 60% of Virginia median income
- Age qualifying residential customers must be \geq 60 years of age and have an income \leq 120% of Virginia median income
- Qualified individuals must live in single-family homes, multifamily homes, or mobile homes

Measures

- LED lamps
- Energy-saving showerheads
- Faucet aerators
- Pipe wrap insulation
- Added attic insulation



Enrolled **22,934** customers through 2019, **146%** of planned participation



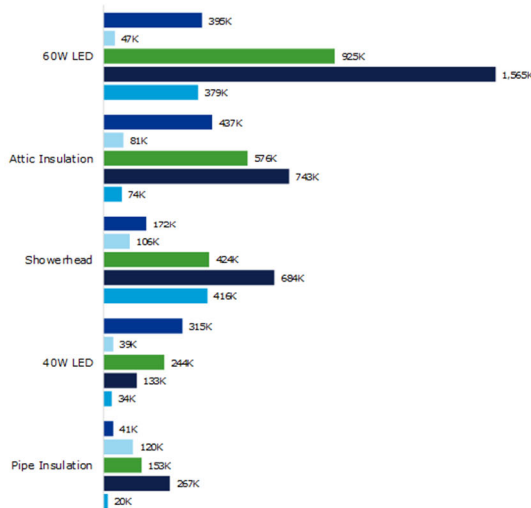
Achieved net annual energy savings of **7,114 MWh/year** through 2019, **159%** of planned energy savings



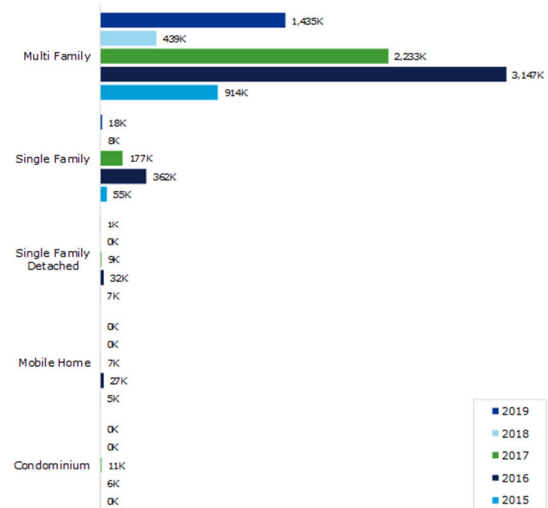
Spent **94%** of planned expenditures through 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	2,069,822	6,315,785	5,079,529	1,432,463	4,050,714	18,948,312
Total Program Participants (#)	1,523	8,403	5,970	1,141	5,897	22,934
Total Gross Incremental Savings (kWh/yr)	984,230	3,575,492	2,431,737	447,775	1,453,805	-
Total Net Incremental Savings (kWh/yr)	787,384	2,860,394	1,945,390	358,220	1,163,044	-
Average Gross Incremental Demand Reduction (kW)	80	398	228	35	229	-
Average Net Incremental Demand Reduction (kW)	64	318	182	28	183	-
Total Net Lifetime Savings (kWh)	112,372	2,084,602	6,852,940	12,503,869	18,869,047	101,123,306
Average Lifetime Demand Reduction (kW)	64	383	565	593	776	776

TOTAL SAVINGS BY MEASURE TYPE
TOP 5 IN KWH



TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH



North Carolina

Docket #: E-22 Sub 523

RESIDENTIAL INCOME & AGE QUALIFYING HOME IMPROVEMENT

2016-PRESENT
537 kWh/yr in Average Net Savings Per Participant

Eligibility

- Income qualifying customers must have an income ≤ 200% of the federal poverty level
- Age qualifying residential customers must be ≥ 60 years of age and have an income ≤ 250% of the federal poverty level
- Qualified individuals must live in single-family homes, multifamily homes, or mobile homes

Measures

- LED lamps
- Energy-saving showerheads
- Faucet aerators
- Pipe wrap insulation
- Added attic insulation



Enrolled **420** customers through 2019, **53%** of planned participation



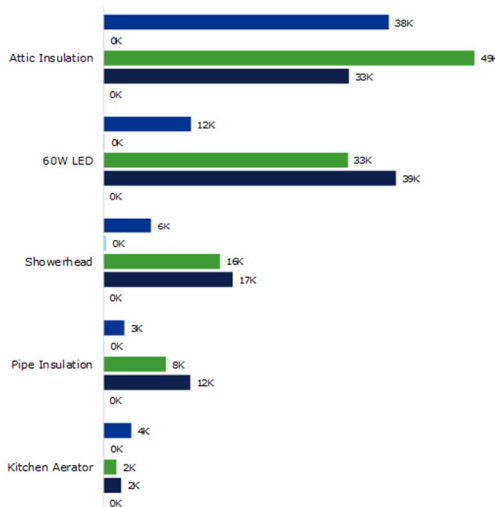
Achieved net annual energy savings of **225 MWh/year** through 2019, **135%** of planned energy savings



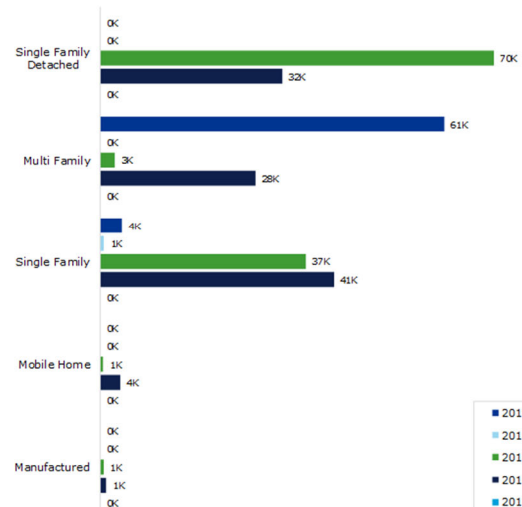
Spent **77%** of planned expenditures through 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	296,086	327,806	34,521	205,018	863,432
Total Program Participants (#)	-	157	130	1	132	420
Total Gross Incremental Savings (kWh/yr)	-	106,379	109,794	723	64,879	-
Total Net Incremental Savings (kWh/yr)	-	85,103	87,835	579	51,903	-
Average Gross Incremental Demand Reduction (kW)	-	11	9	0	19	-
Average Net Incremental Demand Reduction (kW)	-	8	7	0	15	-
Total Net Lifetime Savings (kWh)	-	18,652	165,075	338,592	537,525	3,208,374
Average Lifetime Demand Reduction (kW)	-	8	16	16	31	31

TOTAL SAVINGS BY MEASURE TYPE
TOP 5 IN KWH



TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH



4.1.1 Program Description

The Residential Income and Age Qualifying Home Improvement Program provides direct-install EE improvements to eligible age- and income-qualifying homeowners to reduce electric usage in Dominion Energy's service territory. To qualify for the Program in the Company's Virginia service territory, a customer must meet the following eligibility requirements:

- Customer must be a current Dominion Energy or a new service customer intending to receive electric services on a residential rate schedule; and either
- Customer must have a total household income that does not exceed 60% of the Virginia Median Income; or
- Customer is 60 years or older with a total household income that does not exceed 120% of the Virginia Median Income.



To qualify for the Program in the Company's North Carolina service territory, a customer must meet the following eligibility requirements, which also conforms to the North Carolina State Energy Office qualification guidelines:

- Customer must have a total household income of 200% of the Federal poverty level.
- Customer must be 60 years of age or older and have income at or below 250% of the federal poverty level.
- Individuals living in single family homes, multifamily homes, and mobile homes are all eligible.

Both owner-occupied and renter-occupied households are eligible to participate in the Program. Eligible customers must be responsible for the electric bill and either own the home or be able to secure permission from the owner to perform the Program-qualifying installations or improvements.

Customer measures receiving incentives through this Program are not eligible to receive incentives through any other programs offered by Dominion Energy. In addition, only one application may be submitted per household. Eligible customers must be living in single family residences, townhomes, mobile homes, and separately-metered multi-family dwellings (apartments and condominiums) with electric or non-electric heating and electric cooling. Multi-family facilities owned by local housing authorities are not eligible under the Program.

To participate in the Program, Dominion Energy customers can contact Dominion Energy-approved weatherization service providers. These weatherization service providers also go door-to-door in some areas of the Dominion Energy service territory to promote the Program. The energy-saving products may include:

- Maximum of 6 ENERGY STAR® qualified LED light bulbs (screw base) replacing incandescent lamps (CFL's are not eligible)
 - LED replacement of 60-Watt incandescent lamps
 - LED replacement of 40-Watt incandescent lamps

- Energy-saving showerhead(s)
- High-efficiency faucet aerators
- Pipe wrap insulation for hot water pipes
- Adding attic insulation

The official program start dates were May 1, 2015 for the Virginia Program and January 1, 2016 for the North Carolina Program. The first instances of participation did not begin until July of each state’s program start year because the time between enrollment and becoming a tracked participant in the EM&V data can lag several months. This program was designed to expire in early 2018 for Virginia. On May 10, 2018, the Virginia State Corporation Commission approved the extension of this program for three years (Case No. PUR-2017-00129), and the program received approval in North Carolina to restart on July 1, 2018 (Docket No. E-22, Sub 523). The assessment of this program used the algorithms and assumptions specified in the STEP Manual (Appendix F).

This DSM program must meet reporting requirements outlined in the “EM&V Rule”¹⁷ in Virginia, which also applied to the May 1, 2019 EM&V Report.¹⁸ Table 4-1 denotes the applicable report sections to reporting requirements listed in the EM&V Rule section 50, “Standard Requirements for Evaluation, Measurement, and Verification Reporting”.

Table 4-1. Residential Income and Age Qualifying Home Improvement Program Compliance with EM&V Rule Section 50

Subsection within 20 VAC 5-318-50	Location and Description
A. EM&V Plan	Appendix G. EM&V Plan
B. Utilizing utility-specific data or other data	<p>Per 20 VAC 5-318-40 A and B</p> <ol style="list-style-type: none"> 1. See Appendix F. STEP Manual v 9 for a description of all data or estimates used as inputs for this program and the measures within it. 2. See the Methodologies section (section 3) of this report for a description of the overarching EM&V methodologies used to produce results in this report. <p>Per 20 VAC 5-318-40 C</p> <ol style="list-style-type: none"> 3. See subsections of this report section, and Table 4-5. for measure-level estimates of kilowatt and kilowatt-hour, before and after adjustments for free-ridership, as appropriate.
C. Changes to measure-level inputs and assumptions, and inputs to cost/benefit estimates	<ol style="list-style-type: none"> 1. See Table 4-2. for program planning assumptions 2. See documents filed with the Virginia State Corporation Commission Docket PUR-2017-00129 for approved measure-level inputs and assumptions, and the impact of such changes on original cost/benefit estimates for DSM programs or measures.
D. Measure-level data collection methodology	See response to A. and B. above.
E. Explanation of eligibility requirements for each rate schedule that program is offered	See program description above.

¹⁷ 20 VAC 5-318-50

¹⁸ PUR-2017-00129

Subsection within 20 VAC 5-318-50	Location and Description
F. Comparison of measured annual measure or program savings estimates to the annual usage of the average rate schedule usage, and eligible customer in each rate schedule	See section 4.1.3.5, Comparison of Savings with Usage in Virginia
G. Explanation of controls undertaken by utility	See Appendix G-1, "Dominion Energy Income and Age Qualifying Home Improvement Program Manual"

4.1.2 Methods for the Current Reporting Period

DNV GL developed an EM&V Plan for this program, which appears in Appendix G.

For the current period, the approach included reviewing the tracking data and then estimating net energy savings and demand reductions using STEP Manual calculations. Table 4-2 outlines Dominion Energy's initial program planning assumptions used to design the program in its first iteration and the design in the recent extension.

Table 4-2. Residential Income and Age Qualifying Home Improvement Program Planning Assumptions System-wide

Assumption	Value (2015–2017)	Value (Extension 2018 forward)
Target Market	Income and age-qualifying residential customers	
NTG Factor	80%	80%
Measure Life (years)	14	15
Average Annual Energy Savings per Participant (kWh/year)	873	464
Average Coincident Peak Demand Reduction per Participant (kW)	0.21	0.09
Average Rebate per Participant (US\$)	n/a	n/a

4.1.3 Assessment of Program Progress Towards Plan

The next section describes the Program's progress towards planned participants, energy savings, and demand reduction.

4.1.3.1 Key Virginia Program Data

Key data highlights for 2019 participation or enrollment, energy savings, demand reduction, and program costs for Virginia appear below. Following this summary, Table 4-3 provides performance indicator data from 2015 through December 31, 2019 and shaded cells are considered extraordinarily sensitive information. Detailed program indicator tables by year and month can be found in Appendix A.1. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.1, and cumulative net savings are in Appendix D.1.

For 2019 the annual participation, the annual net energy savings (kWh/year), and the annual net demand reduction (kW) all exceeded planned values. A highlight of the extended program's second year performance is that the year's net demand reduction (kW) surpassed the planned goal by the largest percentage.



- For 2019 there were 5,897 participants, and the program achieved 140% of the participation goal.
- From 2015 through 2019, total program participation is 22,934 and the program has achieved 146% of the participation goal.
- From 2018 through 2019, total program participation is 7,038 and the program has achieved 113% of the participation goal.

The following describes the Program's progress from its inception in 2015 through the end of 2019.

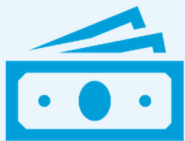
- The annual net energy savings in 2019 were 1,163,044 kWh/year, which exceeded planned net savings by 160%. Annual net demand reduction was 183.4 kW, which also exceeded planned net demand reductions by 243%.
- The total annual net energy savings from 2015 through 2019 were 7,114,432 kWh/year, which continues to exceed planned values by 159%. Total annual net demand reduction over the same period was 776.3 kW, which accounts for 88% of planned net demand reduction.
- The total program average annual gross energy savings and demand reduction per participant were 388 kWh/year and 0.04 kW, respectively, from 2015 through 2019.
- The 2019 average annual net savings per participant was 197 kWh/year and the average demand reduction per participant was 0.03 kW. Net savings are calculated by applying the 100% realization rate and the 80% NTG ratio to the gross savings, and the realization rate and NTG ratio are from planning assumptions.



- The majority of Virginia participants and their associated gross energy savings and demand reduction are from multi-family buildings. Popular measures in 2019 included LED replacement of 60 W and 40 W incandescent lamps and attic insulation.

The following describes the extended Program's progress from 2018 through the end of 2019.

- The total annual net energy savings from 2018 through 2019 were 1,521,264 kWh/year, which continues to exceed planned values by 168%. Total annual net demand reduction over the same period was 211.3 kW, which accounts for 280% of planned net demand reduction.
- The total program average annual gross energy savings and demand reduction per participant were 270 kWh/year and 0.04 kW, respectively, from 2018 through 2019.
- The total program average annual net savings per participant from 2018 through 2019 was 216 kWh/year. Average demand reduction per participant over the same period was 0.03 kW. Both values are less than the planning assumptions.



- 2019 program spending was 97% of planned values.
- Total cumulative spending for 2015 through 2019 was 94% of planned spending.
- Total cumulative spending for 2018 through 2019 was 84% of planned spending.
- The 2019 annual rebate per participant was \$518, which is less spending per participant relative to 2018. Since the Program does not charge participants directly, the rebate represents annual installation cost.
- On a per participant basis, administrative and EM&V costs decreased in 2019 compared to the relaunch year of 2018.

Table 4-3. Virginia Residential Income and Age Qualifying Home Improvement Program Performance Indicators (2015-2019)

Category	Item	2015	2016	2017 ¹⁹	2018	2019	Extension Total (2018-2019)	Program Total (2015-2019)
Operations and Management Costs (\$)	Direct Rebate							
	Direct Implementation							
	Direct EM&V							
	Indirect Other (Administrative)	\$48,256	\$191,950	\$199,872	\$80,889	\$166,845	\$247,733	\$687,812
Total Costs (\$)	Total ²⁰	\$2,069,822	\$6,315,785	\$5,079,529	\$1,432,463	\$4,050,714	\$5,483,177	\$18,948,312
	Planned	\$3,056,782	\$5,856,409	\$4,648,601	\$2,371,260	\$4,192,450	\$6,563,710	\$20,125,502
	Variance	-\$986,960	\$459,376	\$430,927	-\$938,797	-\$141,736	-\$1,080,533	-\$1,177,190
	Annual % of Planned	68%	108%	109%	60%	97%	84%	94%
Participants	Total (Gross)	1,523	8,403	5,970	1,141	5,897	7,038	22,934
	Planned (Gross)	1,849	3,843	3,846	2,000	4,218	6,218	15,756
	Variance	-326	4,560	2,124	-859	1,679	820	7,178
	Annual % of Planned (Gross)	82%	219%	155%	57%	140%	113%	146%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	984,230	3,575,492	2,431,737	447,775	1,453,805	1,901,580	8,893,039
	Realization Rate Adjustment (100%)	0	0	0	0	0	0	0
	Adjusted Gross Savings	984,230	3,575,492	2,431,737	447,775	1,453,805	1,901,580	8,893,039
	Net-to-Gross Adjustment (80%)	-196,846	-715,098	-486,347	-89,555	-290,761	-380,316	-1,778,608

¹⁹ The 2017 total gross deemed savings values reported in this table include adjustments of -12,182.94 kWh/year and -1.10 kW made to the January 2017 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017. Specifically, the correction was in section 2.1.5 for "Low-Flow Showerhead" measures, to the "ΔT" variable, which is a measure of the change in temperature of the water used for shower and temperature entering the house ($\Delta T = T_{shower} - T_{inhouse}$). STEP Manual 7.0.0 reported the value as 44.9°F, but has been corrected to 44.1°F. This correction is reflected in STEP Manual version 8.0.0 in this EM&V report.

²⁰ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2015-2019					2019	2018	2017 ¹⁹	Extension Total (2018-2019)	Program Total (2015-2019)
		2015	2016	2018	2019	2019					
	Net Adjusted Savings	787,384	2,860,394	358,220	1,163,044	1,163,044	1,521,264	7,114,432			
	Planned Savings (Net)	1,810,380	998,136	175,247	728,300	728,300	903,547	4,478,008			
	Annual % Toward Planned Savings (Net)	43%	287%	204%	160%	160%	168%	159%			
	Avg. Savings per Participant (Gross)	646	426	392	247	247	270	388			
	Avg. Savings per Participant (Net)	517	340	314	197	197	216	310			
Installed Demand Reduction (kW)	Total Gross Deemed Demand	80.2	398.0	34.9	229.3	228.1	264.2	970.4			
	Realization Rate Adjustment (100%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	Adjusted Gross Demand	80.2	398.0	34.9	229.3	228.1	264.2	970.4			
	Net-to-Gross Adjustment (80%)	-16.0	-79.6	-7.0	-45.9	-45.6	-52.8	-194.1			
	Net Adjusted Demand	64.1	318.4	27.9	183.4	182.5	211.3	776.3			
	Planned Demand (Net)	415.0	217.7	0.0	75.6	170.2	75.6	878.5			
	Annual % Toward Planned Demand (Net)	15%	146%	N/A	243%	107%	280%	88%			
	Avg. Peak Demand per Participant (Gross)	0.05	0.05	0.03	0.04	0.04	0.04	0.04	0.04		
	Avg. Demand per Participant (Net)	0.04	0.04	0.02	0.03	0.03	0.03	0.03	0.03		
	Program Performance	Annual \$Admin. per Participant (Gross)	\$32	\$23	\$71	\$28	\$33	\$35	\$30		
Annual \$Admin. per kWh/year (Gross)		\$0.05	\$0.05	\$0.18	\$0.11	\$0.08	\$0.13	\$0.08			
Annual \$Admin. per kW (Gross)		\$602	\$482	\$2,318	\$728	\$876	\$938	\$709			

Category	Item	2015	2016	2017 ¹⁹	2018	2019	Extension Total (2018-2019)	Program Total (2015-2019)
	Annual \$EM&V per Total Costs (\$)	0.6%	1.4%	2.3%	6.8%	2.4%	3.5%	2.2%
	Annual \$Rebate per Participant (Gross)	\$582	\$612	\$644	\$626	\$518	\$536	\$595

Table 4-4 provides gross and net annualized energy savings and demand reduction for the extended program years 2018–2019 in Virginia by measure type.

Table 4-4. Virginia Residential Income and Age Qualifying Home Improvement Program Measure-Level Performance Indicators (2018–2019)

Program	Realization Rate		Net-to-Gross Ratio	
	kWh/year	kW	kWh/year	kW
Residential Income and Age Qualifying Home Improvement – Virginia (DSM IV)	100%	100%	80%	80%
	Measure	kWh/year		kW/year
	Gross	Net	Gross	Net
40 W Incandescent Replacement with LED Lamp	354,610	283,688	32.9	26.3
60 W Incandescent Replacement with LED Lamp	441,954	353,563	40.9	32.8
Attic Insulation	517,654	414,124	146.3	117.0
Bathroom Aerator	50,659	40,527	5.4	4.3
Kitchen Aerator	97,220	77,776	4.1	3.3
Pipe Insulation	161,454	129,163	18.4	14.7
Showerhead	278,029	222,423	16.2	12.9
Total	1,901,580	1,521,264	264.2	211.3

4.1.3.2 Key North Carolina Program Data

Key data highlights for 2019 participation or enrollment, energy savings, demand reduction and program costs for North Carolina appear below. Following this summary, Table 4-5 provides performance indicator data from January 1, 2016 through December 31, 2019 and shaded cells are considered extraordinarily sensitive information. Detailed program indicator tables by year and month are provided in Appendix B.1. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.1, and cumulative net savings are in Appendix D.1.

For 2019 the annual net energy savings (kWh/year) and the annual net demand reduction (kW) exceeded planned values. A highlight of the extended program’s second year performance is that the year’s net demand reduction (kW) surpassed the planned goal by the largest percentage.



- For 2019 there were 132 participants, and the program achieved 47% of the participation goal.
- From 2016 through 2019, total program participation is 420 and the program has achieved 53% of the participation goal.
- From 2018 through 2019, total program participation is 133 and the program has achieved 47% of the participation goal.

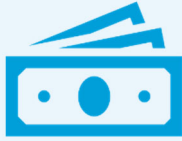
The following describes the Program's progress from its inception in 2016 through the end of 2019.



- The annual net energy savings in 2019 were 51,903 kWh/year, which exceeded planned net savings by 107%. The annual net demand reduction was 15.1 kW, which also exceeded planned net demand reduction by 299%.
- Total annual net energy savings from 2016 through 2019 were 225,421 kWh/year, which continues to exceed planned values by 135%. Total annual net demand reduction over the same period was 31.0 kW, which accounts for 99% of planned net demand reduction.
- The total program average annual gross energy savings and demand reduction per participant were 671 kWh/year and 0.09 kW, respectively, from 2016 through 2019.
- The 2019 average annual net savings per participant was 393 kWh/year and the average demand reduction per participant was 0.11 kW. Net savings are calculated by applying the 100% realization rate and the 80% NTG ratio to the gross savings, and the realization rate and NTG ratio are from planning assumptions.
- The majority of North Carolina participants and their associated gross energy savings and demand reduction are from multi-family buildings this year, which is a first for this state. This may be an effect of contractors in Virginia marketing the program to multi-family residents there, and therefore promoting to the same types of customers in North Carolina. Popular measures in 2019 included LED replacement of 60 W incandescent lamps, attic insulation, and showerheads.

The following describes the extended Program's progress from 2018 through the end of 2019.

- Total annual net energy savings from 2018 through 2019 were 52,482 kWh/year, which continues to exceed planned values by 108%. Total annual net demand reduction over the same period was 15.2 kW, which accounts for 300% of planned net demand reduction.
- The total program average annual gross energy savings and demand reduction per participant were 493 kWh/year and 0.14 kW, respectively, from 2018 through 2019.
- The total program average annual net savings per participant from 2018 through 2019 was 395 kWh/year, which was lower than planning assumptions. Average demand reduction per participant over the same period was 0.11 kW, which exceeded planning assumptions.



- 2019 program spending was 76% of planned values.
- Total cumulative spending for 2016 to 2019 was 77% of planned spending.
- Total cumulative spending for 2018 to 2019 was 57% of planned spending.
- The 2019 average rebate amount per participant was \$1,161. Since the Program does not charge participants directly, the rebate represents annual installation cost.
- On a per participant basis, administrative and EM&V costs decreased in 2019 compared to the relaunch year of 2018. The increase in 2019 activity likely affected these metrics.

Table 4-5. North Carolina Residential Income and Age Qualifying Home Improvement Program Performance Indicators (2016–2019)

Category	Item	2016	2017 ²¹	2018	2019	Extension Total (2018–2019)	Program Total (2016–2019)
		Operations and Management Costs (\$)					
	Direct Rebate						
	Direct Implementation						
	Direct EM&V						
	Indirect Other (Administrative)	\$8,999	\$12,899	\$1,949	\$8,131	\$10,080	\$31,978
Total Costs (\$)	Total ²⁰	\$296,086	\$327,806	\$34,521	\$205,018	\$239,540	\$863,432
	Planned	\$393,347	\$306,440	\$152,200	\$268,230	\$420,430	\$1,120,216
	Variance	-\$97,261	\$21,366	-\$117,679	-\$63,211	-\$180,890	-\$256,785
	Annual % of Planned	75%	107%	23%	76%	57%	77%
Participants	Total (Gross)	157	130	1	132	133	420
	Planned (Gross)	257	254	0	282	282	793
	Variance	-100	-124	1	-150	-149	-373
	Annual % of Planned (Gross)	61%	51%	N/A	47%	47%	53%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	106,379	109,794	723	64,879	65,602	281,776
	Realization Rate Adjustment (100%)	0	0	0	0	0	0
	Adjusted Gross Savings	106,379	109,794	723	64,879	65,602	281,776
	Net-to-Gross Adjustment (80%)	-21,276	-21,959	-145	-12,976	-13,120	-56,355
	Net Adjusted Savings	85,103	87,835	579	51,903	52,482	225,421
	Planned Savings (Net)	67,040	51,199	0	48,691	48,691	166,930

²¹ The 2017 total gross deemed savings values reported in this table include adjustments of -306.89 kWh/year and -0.03 kW made to the January 2017 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017. Specifically, the correction was in section 2.1.5 for "Low-Flow Showerhead" measures, to the "ΔT" variable, which is a measure of the change in temperature of the water used for shower and temperature entering the house ($\Delta T = T_{\text{shower}} - T_{\text{in house}}$). STEP Manual 7.0.0 reported the value as 44.9°F, but has been corrected to 44.1°F. This correction is reflected in STEP Manual version 8.0.0 in this EM&V report.

Category	Item	2016	2017 ²¹	2018	2019	Extension Total (2018-2019)	Program Total (2016-2019)
	Annual % Toward Planned Savings (Net)	127%	172%	N/A	107%	108%	135%
	Avg. Savings per Participant (Gross)	678	845	723	492	493	671
	Avg. Savings per Participant (Net)	542	676	579	393	395	537
Installed Demand Reduction (kW)	Total Gross Deemed Demand	10.6	9.1	0.1	18.9	19.0	38.7
	Realization Rate Adjustment (1.00%)	0.0	0.0	0.0	0.0	0.0	0.0
	Adjusted Gross Demand	10.6	9.1	0.1	18.9	19.0	38.7
	Net-to-Gross Adjustment (80%)	-2.1	-1.8	0.0	-3.8	-3.8	-7.7
	Net Adjusted Demand	8.5	7.3	0.0	15.1	15.2	31.0
	Planned Demand (Net)	15.0	11.4	0.0	5.1	5.1	31.4
	Annual % Toward Planned Demand (Net)	57%	64%	N/A	299%	300%	99%
	Avg. Peak Demand per Participant (Gross)	0.07	0.07	0.06	0.14	0.14	0.09
	Avg. Demand per Participant (Net)	0.05	0.06	0.05	0.11	0.11	0.07
Program Performance	Annual \$Admin. per Participant (Gross)	\$57	\$99	\$1,949	\$62	\$76	\$76
	Annual \$Admin. per kWh/year (Gross)	\$0.08	\$0.12	\$2.70	\$0.13	\$0.15	\$0.11
	Annual \$Admin. per kW (Gross)	\$847	\$1,415	\$31,929	\$430	\$532	\$826
	Annual \$EM&V per Total Costs (\$)	2.0%	2.3%	18.2%	3.0%	5.2%	3.0%
	Annual \$Rebate per Participant (Gross)	\$1,442	\$1,939	\$1,763	\$1,161	\$1,165	\$1,508

The following table (Table 4-6) provides gross and net annualized energy savings and demand reduction for the extended program years 2018–2019, in North Carolina, by measure type.

Table 4-6. North Carolina Residential Income and Age Qualifying Home Improvement Program Measure-Level Performance Indicators (2018–2019)

Program	Realization Rate		Net-to-Gross Ratio	
	kWh/year	kW	kWh/year	kW
Residential Income and Age Qualifying Home Improvement – North Carolina (DSM IV)	100%	100%	80%	80%
	Measure	kWh/year		kW/year
	Gross	Net	Gross	Net
40 W Incandescent Replacement with LED Lamp	1,713	1,370	0.2	0.1
60 W Incandescent Replacement with LED Lamp	11,823	9,459	1.1	0.9
Attic Insulation	38,035	30,428	16.7	13.4
Bathroom Aerator	684	547	0.1	0.1
Kitchen Aerator	3,779	3,023	0.2	0.1
Pipe Insulation	2,875	2,300	0.3	0.3
Showerhead	6,694	5,355	0.4	0.3
Total	65,602	52,482	19.0	15.2

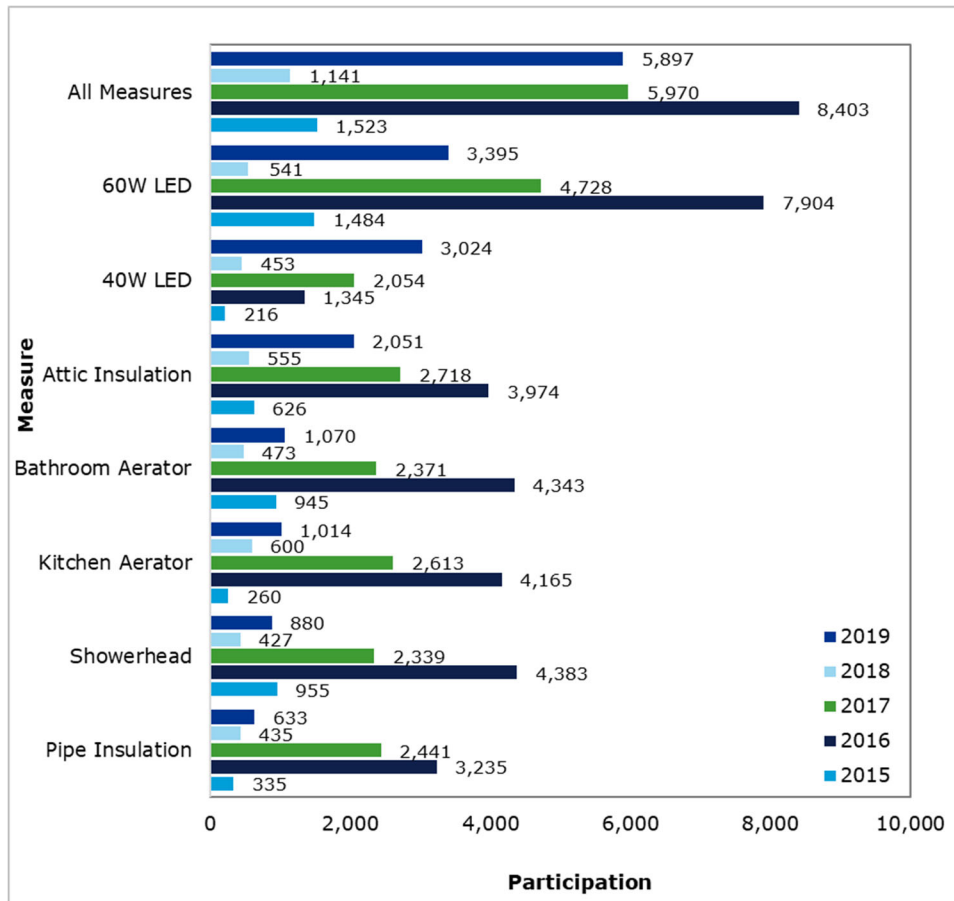
4.1.3.3 Additional Virginia Program Data

Figure 4-3 through Figure 4-5 show the Virginia program’s participation, gross annualized energy savings, and average gross annualized energy savings per participant (for participants who installed the measure in the respective years) by measure type.

Note participation in these charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

In 2019, participant levels neared historic 2017 levels resulting in the program’s third largest enrollment year. According to the Company, this was a result of activities related to re-engaging the local providers and the addition of contractor focus. Participation is a metric of the number of customers who had a measure installed. The most frequently installed measures, in decreasing order, were LED replacements of 60 W incandescent lamps, LED replacements of 40 W incandescent lamps, and attic insulation. The popularity of both lighting measures varies from historical trends where the most frequently installed measures were LED replacements of 60 W incandescent lamps, showerheads, and bathroom aerators (Figure 4-3).

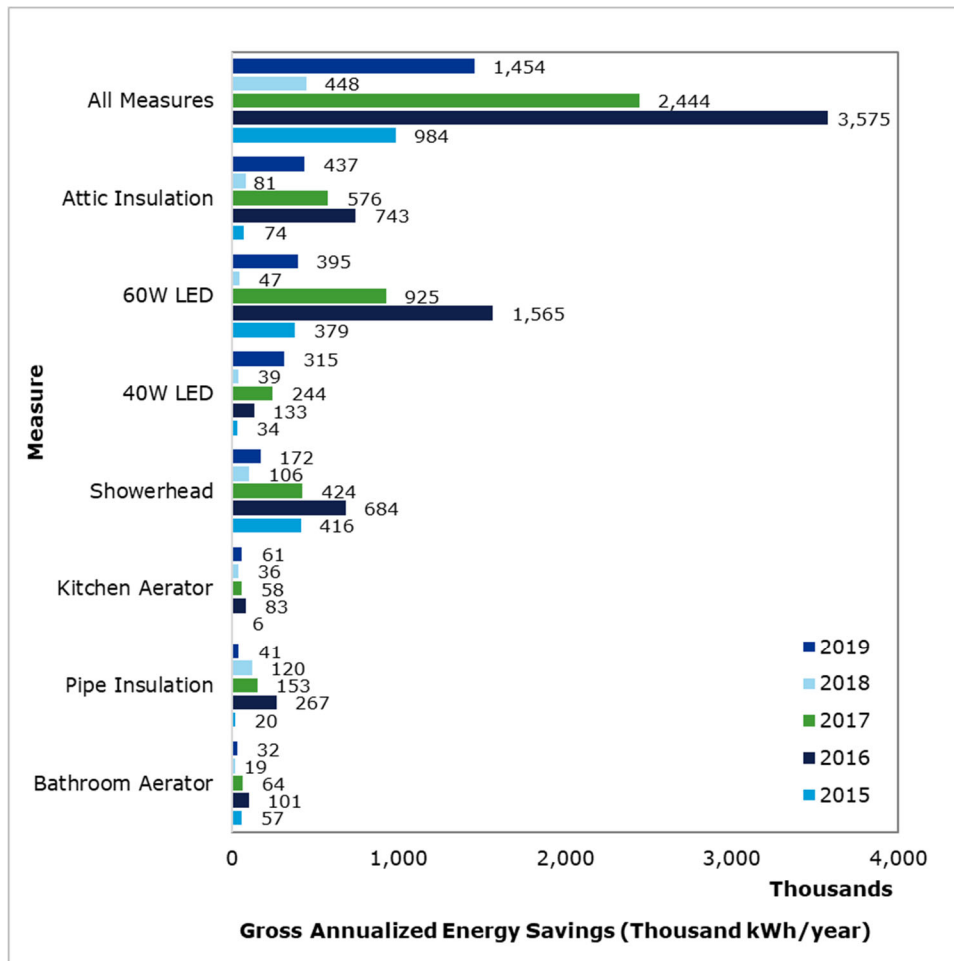
Figure 4-3. Virginia Residential Income and Age Qualifying Home Improvement Program Participation by Measure and Year



Total gross energy savings grew from the 2015 start year (cyan) and peaked in 2016 and 2017 of the originally approved three-year program life. In 2018, activity slowed until the Commission approved the program extension and relaunch activity increased at the end of the year (light blue). 2019 (sea blue) is the first full year of the extended program and total gross energy savings surpassed original program start and wind-down levels.

The measures with the most gross energy savings in 2019, in decreasing order, were attic insulation (437 MWh/year), LED replacement of 60 W incandescent lamps (395 MWh/year), and LED replacement of 40 W incandescent lamps (315 MWh/year) (Figure 4-4). Historically the measure LED replacement of 60 W incandescent lamps often produced the most energy savings within a given year and other measures have yet to surpass this level of savings achieved in 2016. Attic insulation and showerheads are the next largest gross energy saving measures (Figure 4-4).

Figure 4-4. Virginia Residential Income and Age Qualifying Home Improvement Program Gross Annualized Energy Savings by Measure and Year (MWh/year)²²



In the program’s lifetime from 2015 to 2019 (yellow), the low-flow showerheads and attic insulation were the measures with the largest gross annualized savings per participant values, followed closely by LED

²² Note that the data reported here for 2017 differs slightly to Table 4-3, due to changes made to the January 2017 reported savings. For additional information, see that table’s footnote.

replacement of 60 W incandescent lamps (Figure 4-5). In 2019 (sea blue), the energy savings per participant from eligible measures are comparable to previous years' values.

Figure 4-5. Virginia Residential Income and Age Qualifying Home Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year per participant) by Measure and Year²³

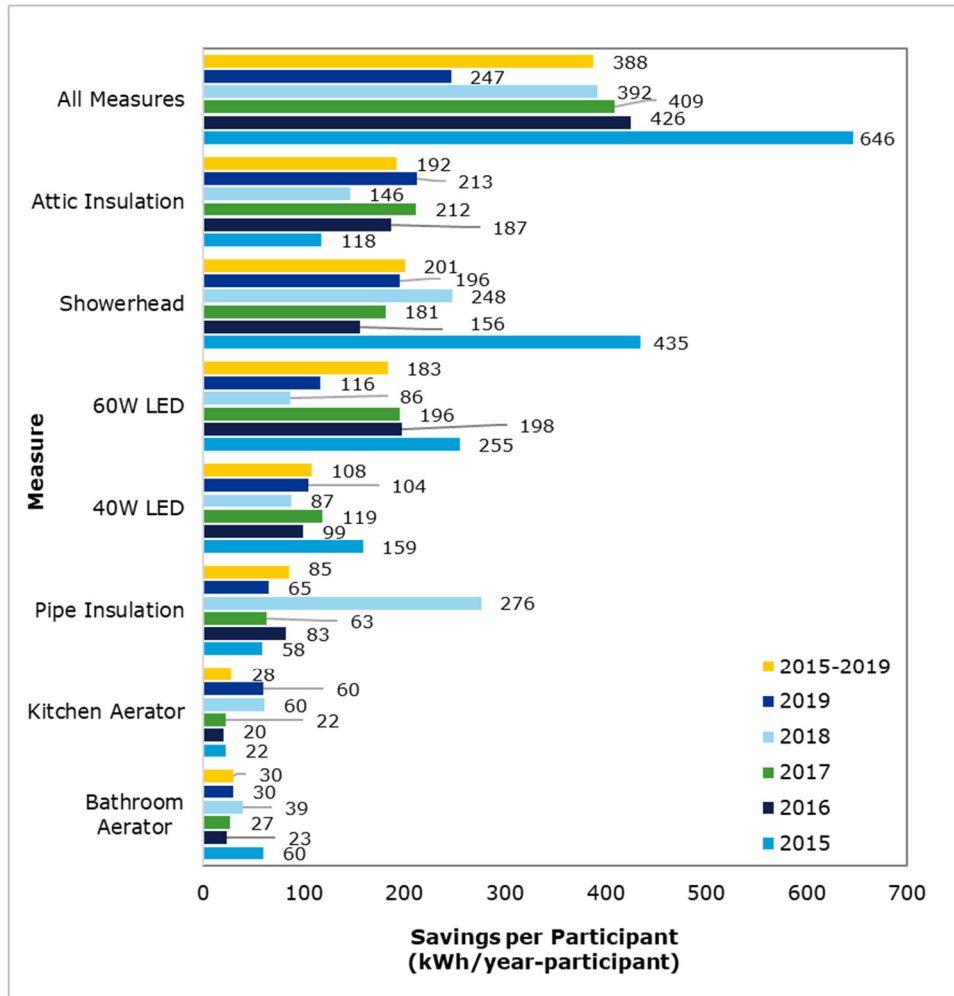


Figure 4-6 through Figure 4-8 show participation, gross annualized energy savings, and average annualized energy savings per participant by building type and program year. Consistent with historical building type trends, the majority of program participants live in multi-family buildings (Figure 4-6), and this is also

²³ Note that the data reported here for 2017 differs slightly to Table 4-3, due to changes made to the January 2017 reported savings. For additional information, see that table's footnote.

reflected as the building type that generated the majority of the gross annualized energy savings (Figure 4-6) in 2019.

A participant in these charts is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

Figure 4-6. Virginia Residential Income and Age Qualifying Home Improvement Program Participation by Building Type and Year

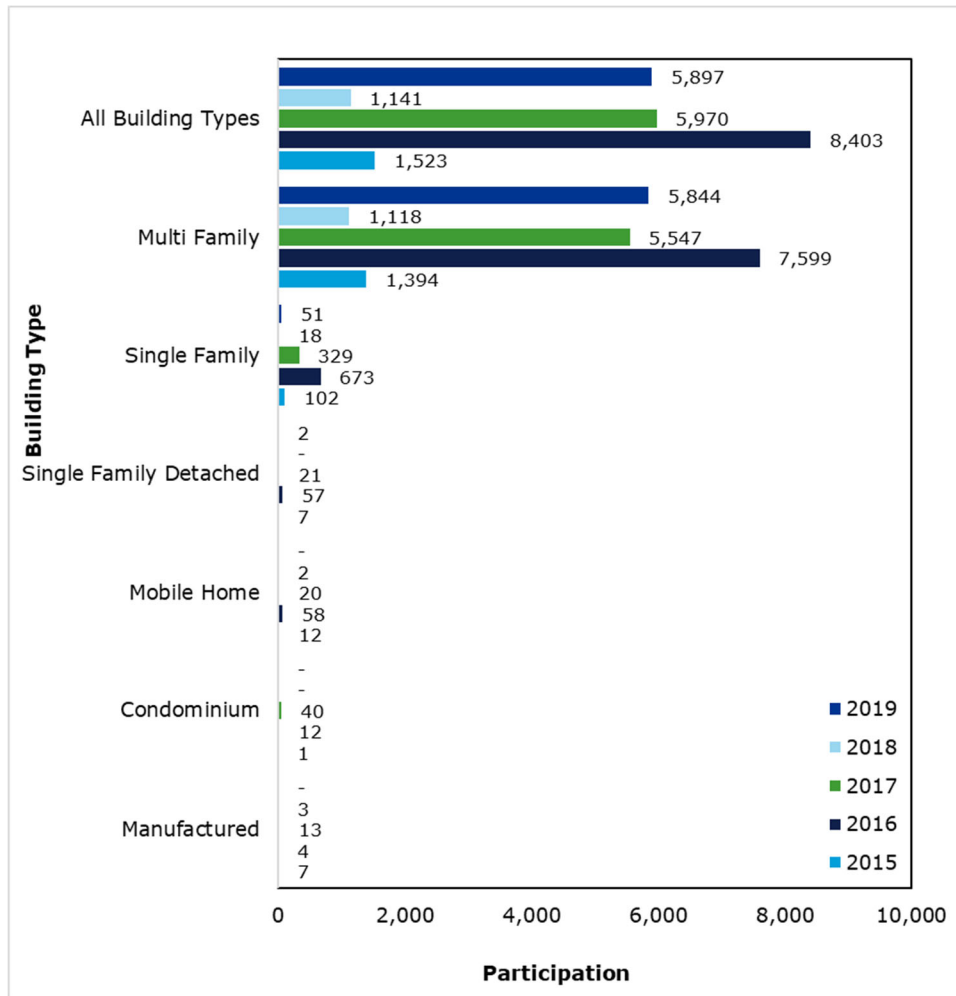


Figure 4-7. Virginia Residential Income and Age Qualifying Home Improvement Program Gross Annualized Energy Savings by Building Type and Year (MWh/year)²⁴

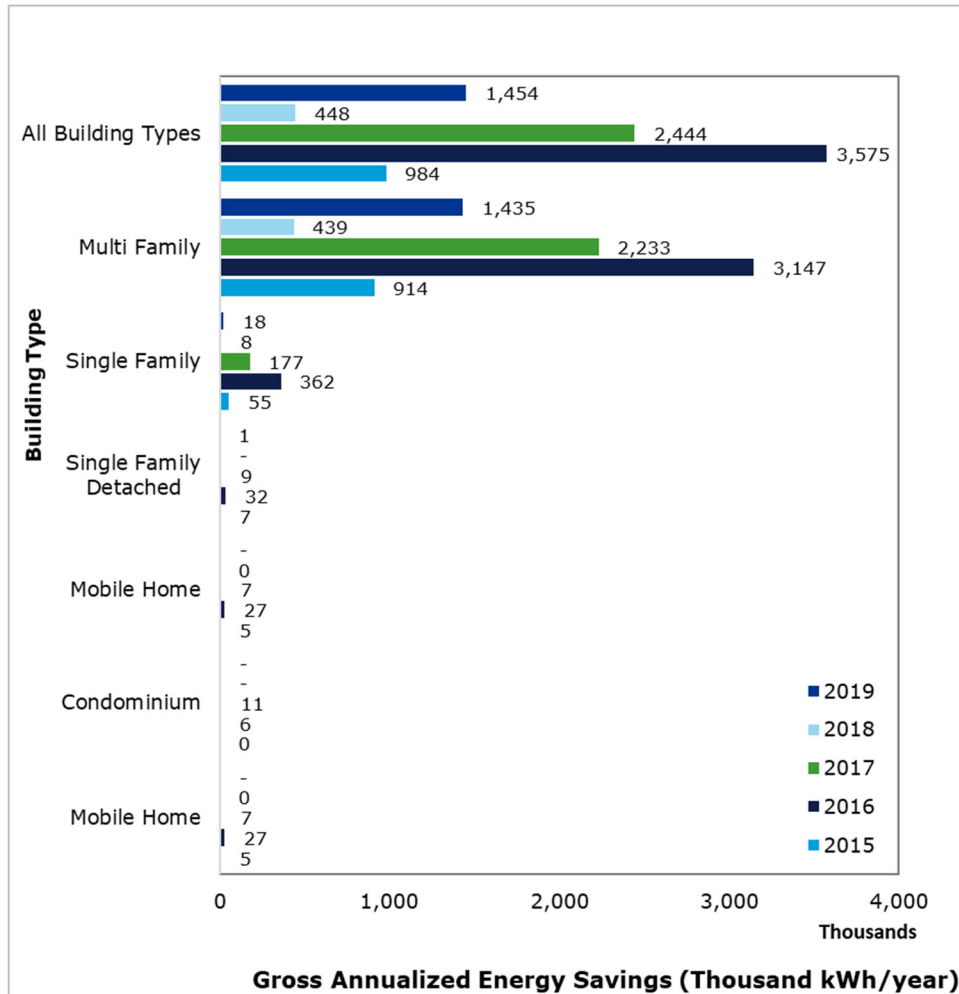
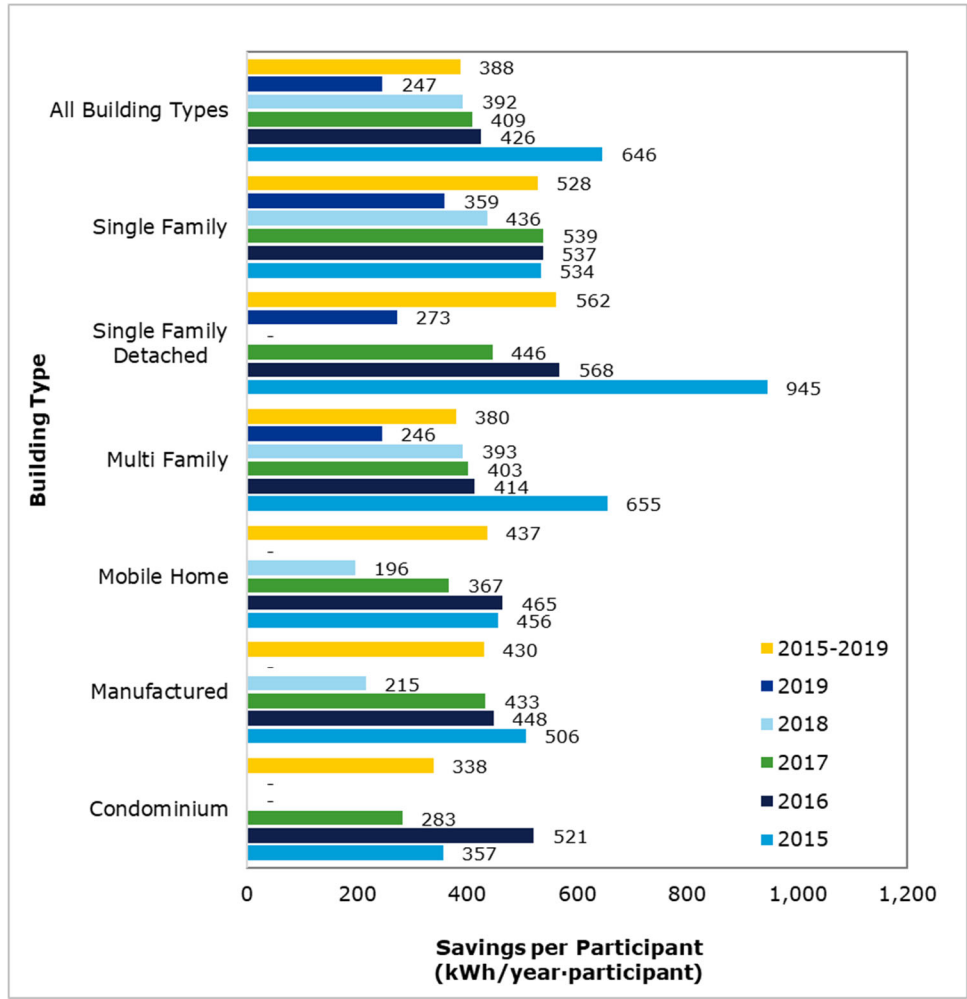


Figure 4-8 shows the average gross annualized savings per participant for all years combined (2015-2019) by building type and per individual year. Single family detached and single-family homes have the largest average gross annualized savings per participant values with over 500 kWh/year per participant. The higher average savings per participant for single family homes, compared to other building types, may be attributed to a difference in square footage. Single family buildings generally having larger areas relative to other building types and this may result in more savings opportunities. Mobile, condos, manufactured, and multi-family buildings average savings per participant values range from nearly 440 to 340 kWh/year per participant.

²⁴ Note that the data reported here for 2017 differs slightly to Table 4-3, due to changes made to the January 2017 reported savings. For additional information, see that table’s footnote.

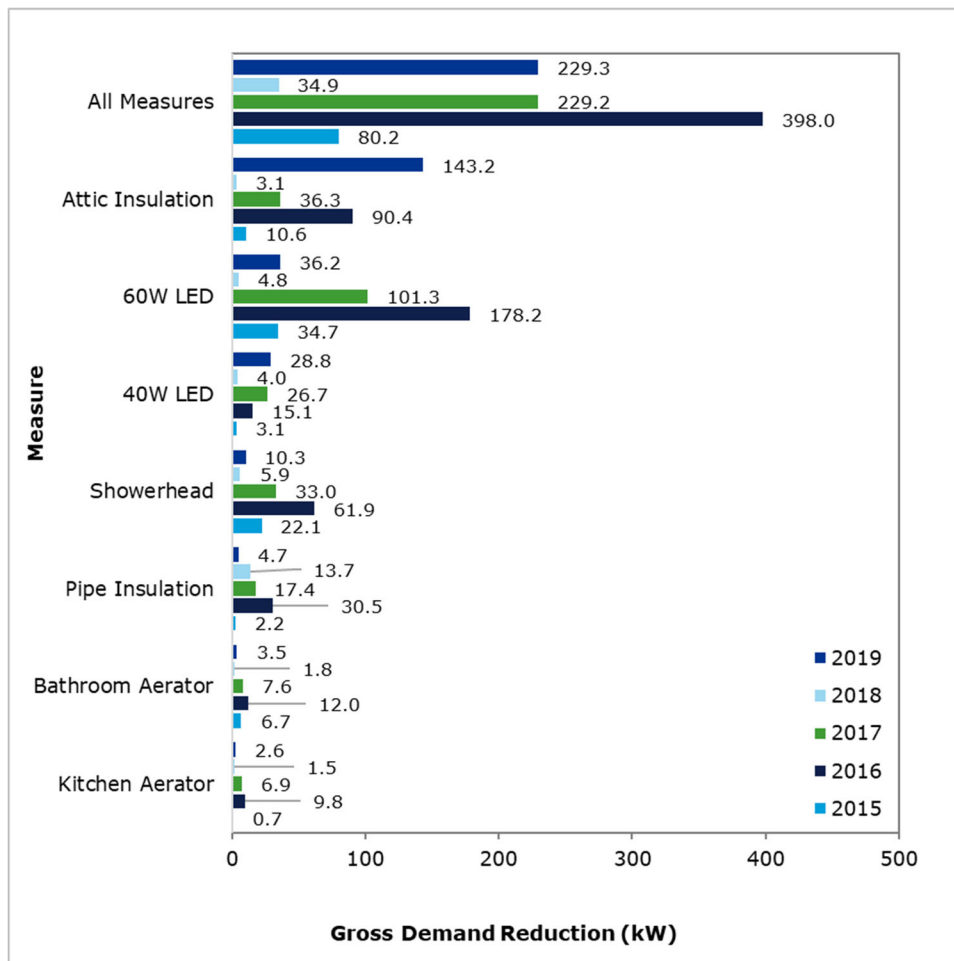
Figure 4-8. Virginia Residential Income and Age Qualifying Home Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year per participant) by Building Type and Year²⁵



²⁵ Note that the data reported here for 2017 differs slightly to Table 4-3, due to changes made to the January 2017 reported savings. For additional information, see that table's footnote.

Figure 4-9 through Figure 4-12 show the gross demand reduction and average demand reduction per participant (for participants who installed the measure in the respective years) by measure type and building type. Similar to gross annualized energy savings values, the top three measures that produced the highest gross demand reduction are attic insulation, LED replacement of 60 W incandescent lamps, and LED replacement of 40 W incandescent lamps (Figure 4-9). In 2019 (sea blue) the gross demand reduction from attic insulation was the largest in program history for this measure. This likely was impacted by updates to the STEP manual deemed savings calculations that utilized updated cooling degree hours.

Figure 4-9. Virginia Residential Income and Age Qualifying Home Improvement Program Gross Demand Reduction (kW) by Measure and Year²⁶



²⁶ Note that the data reported here for 2017 differs slightly to Table 4-3, due to changes made to the January 2017 reported savings. For additional information, see that table's footnote.

2019 average gross demand reduction per participant values are consistent with historic trends where attic insulation provides the most average demand reduction per participant followed by LED replacement of 60 W incandescent lamps and showerheads (Figure 4-10).

Figure 4-10. Virginia Residential Income and Age Qualifying Home Improvement Program Average Gross Demand Reduction per Participant (kW/ participant) by Measure and Year

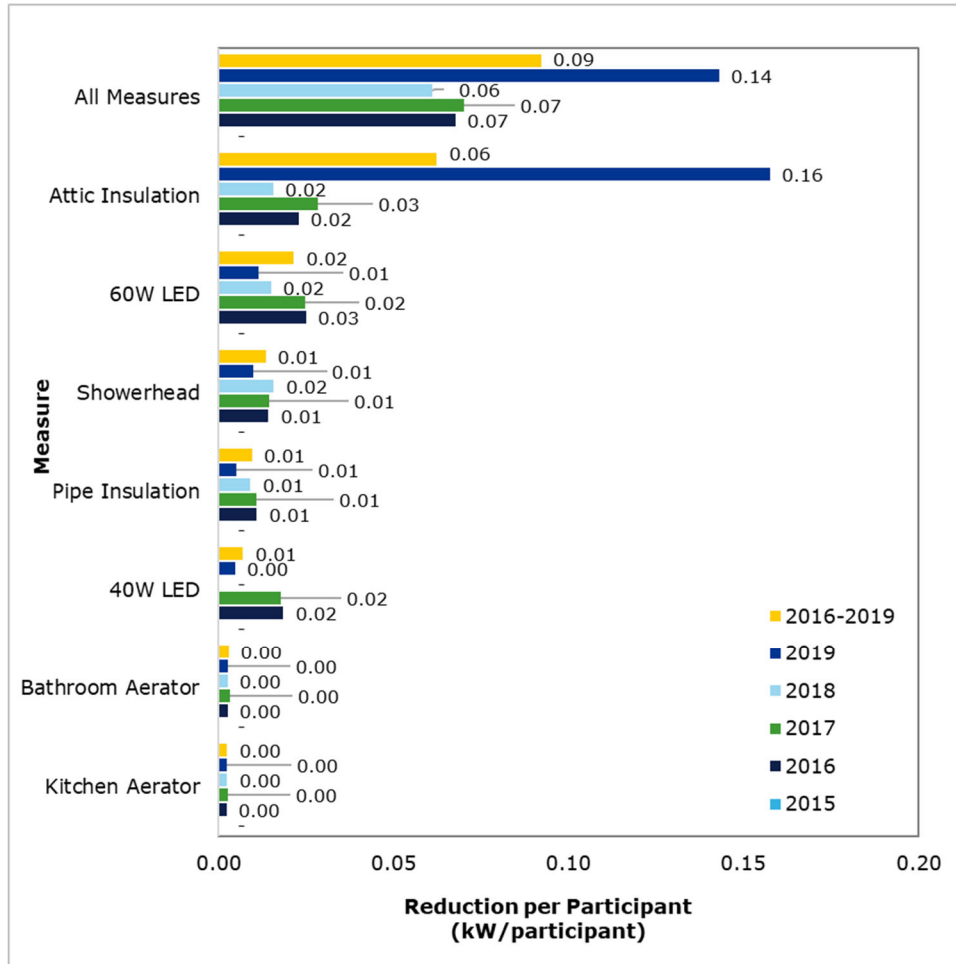
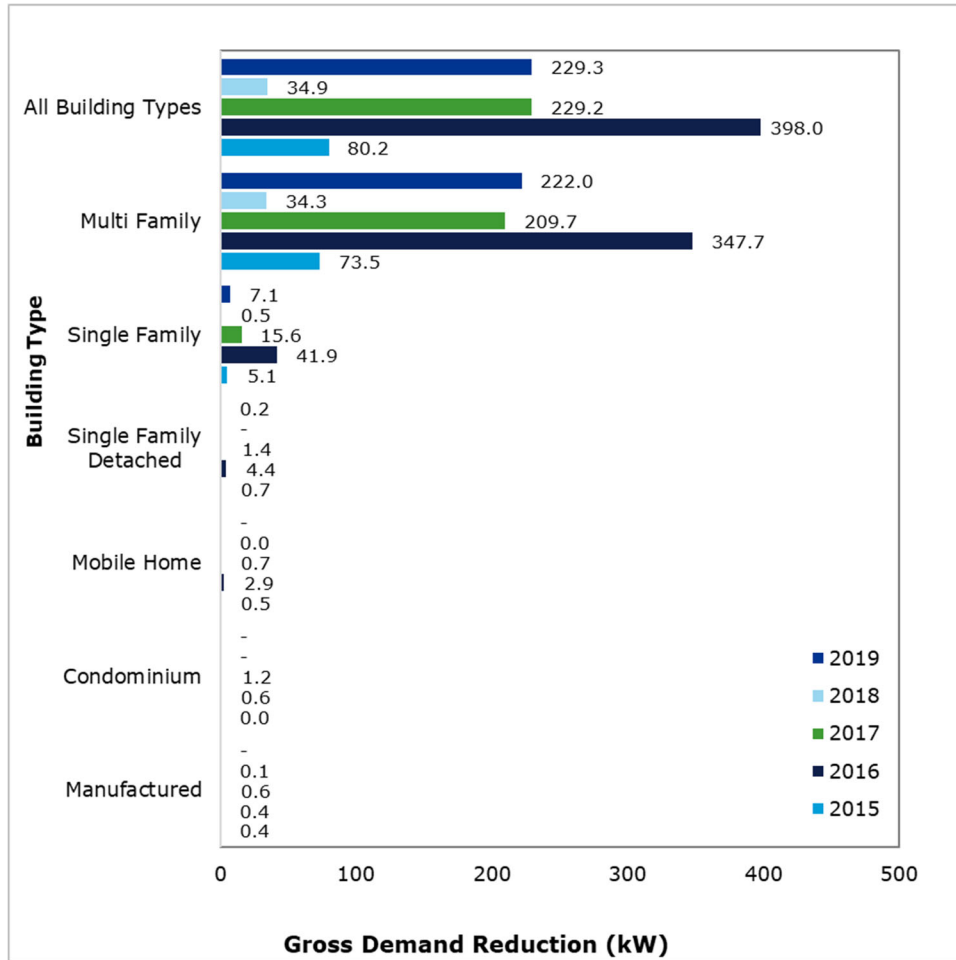


Figure 4-11 and Figure 4-12 show gross demand reduction and average gross demand reduction per participant, respectively. Multifamily buildings have the largest gross demand reduction and single-family buildings have the largest average gross demand reduction per participant in 2019 (sea blue), which is consistent with trends related to gross annualized energy savings.

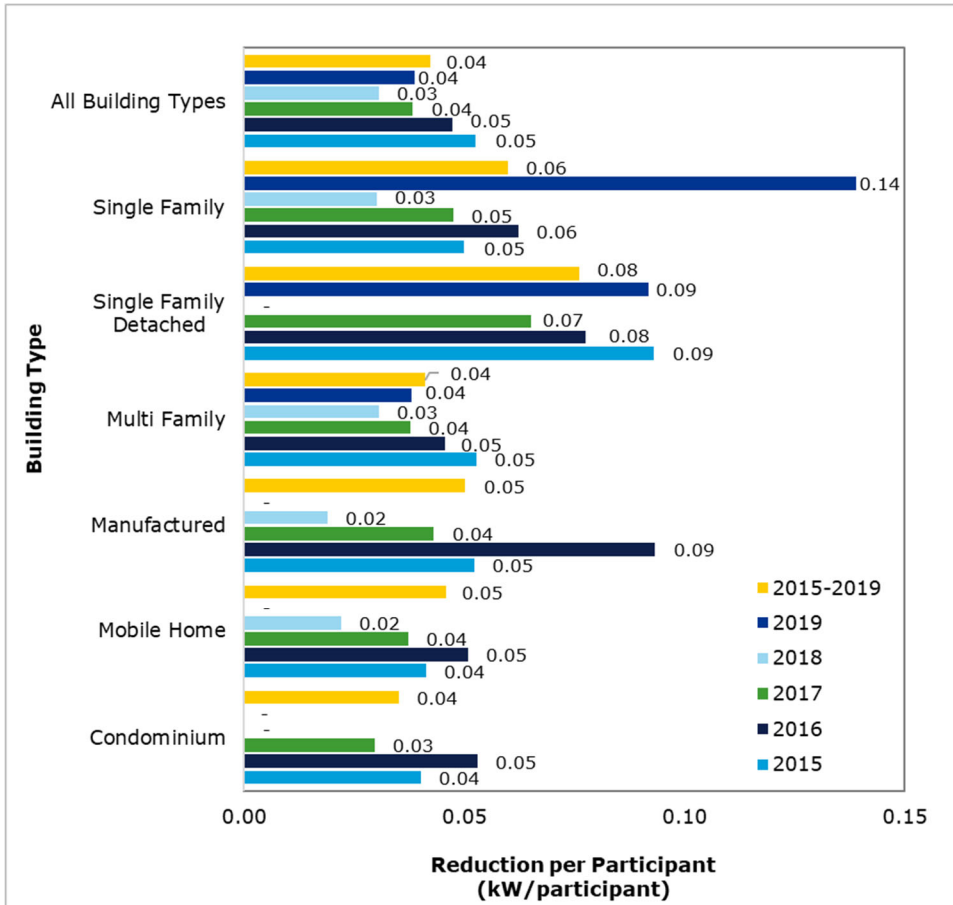
Figure 4-11. Virginia Residential Income and Age Qualifying Home Improvement Program Gross Demand Reduction (kW) by Building Type and Year²⁷



²⁷ Note that the data reported here for 2017 differs slightly to Table 4-3, due to changes made to the January 2017 reported savings. For additional information, see that table's footnote.

Total program 2015 to 2019 (yellow) average gross demand reduction per participant for each building type ranges from 0.08 to 0.04 kW/participant. In 2019 (sea blue) the average gross reduction per participant for single family buildings surpassed previous average gross demand reduction per participant values.

Figure 4-12. Virginia Residential Income and Age Qualifying Home Improvement Program Average Gross Demand Reduction per Participant (kW/participant) by Building Type and Year



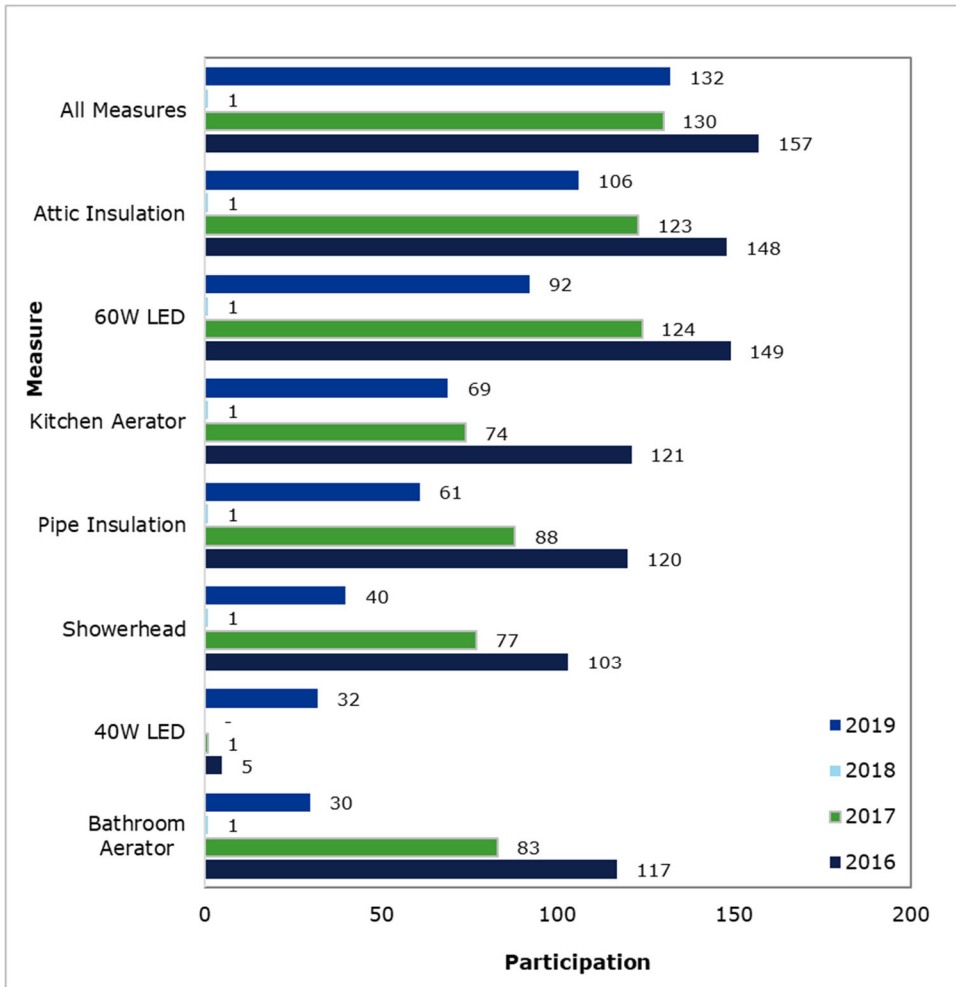
4.1.3.4 Additional North Carolina Program Data

Figure 4-13 through Figure 4-22 show gross annualized energy savings, participation, and average annualized energy savings per participant (for participants who installed the measure in that year) by measure and by building type in North Carolina.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above and from the “by building type” charts below, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

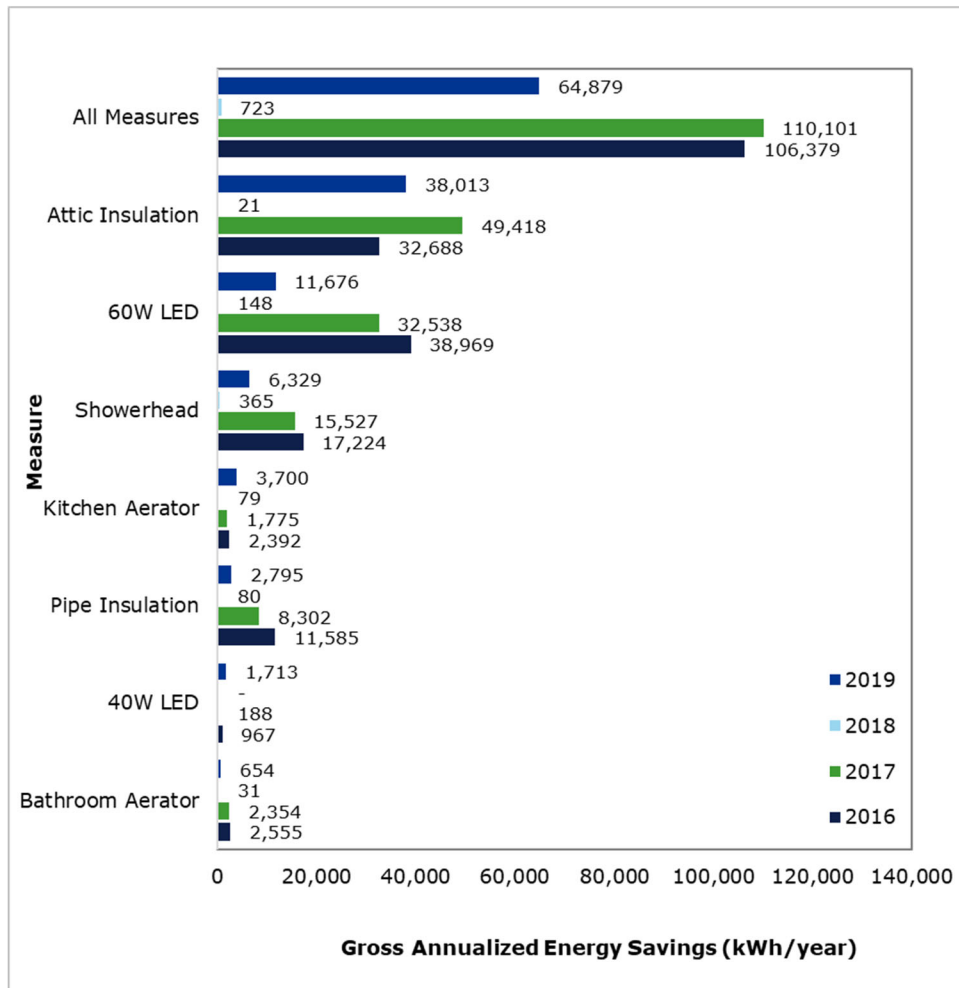
When comparing 2019 results to previous years and cumulative for the program life, note in 2018 there was a single program participant because the program was winding down in North Carolina in 2018 and did not restart until 2019 after its extension was approved in both states. Most measures were adopted by the majority of participants every year the program has been active, with the exception of the measure LED replacement of 40 W incandescent lamps. 2019 (sea blue) participation is the second largest in the programs’ history. Participation by measure is slightly lower compared to previous years and may be a result of the program continuing wind-up activity after the approved extension (Figure 4-13).

Figure 4-13. North Carolina Residential Income and Age Qualifying Home Improvement Program Participation by Measure and Year



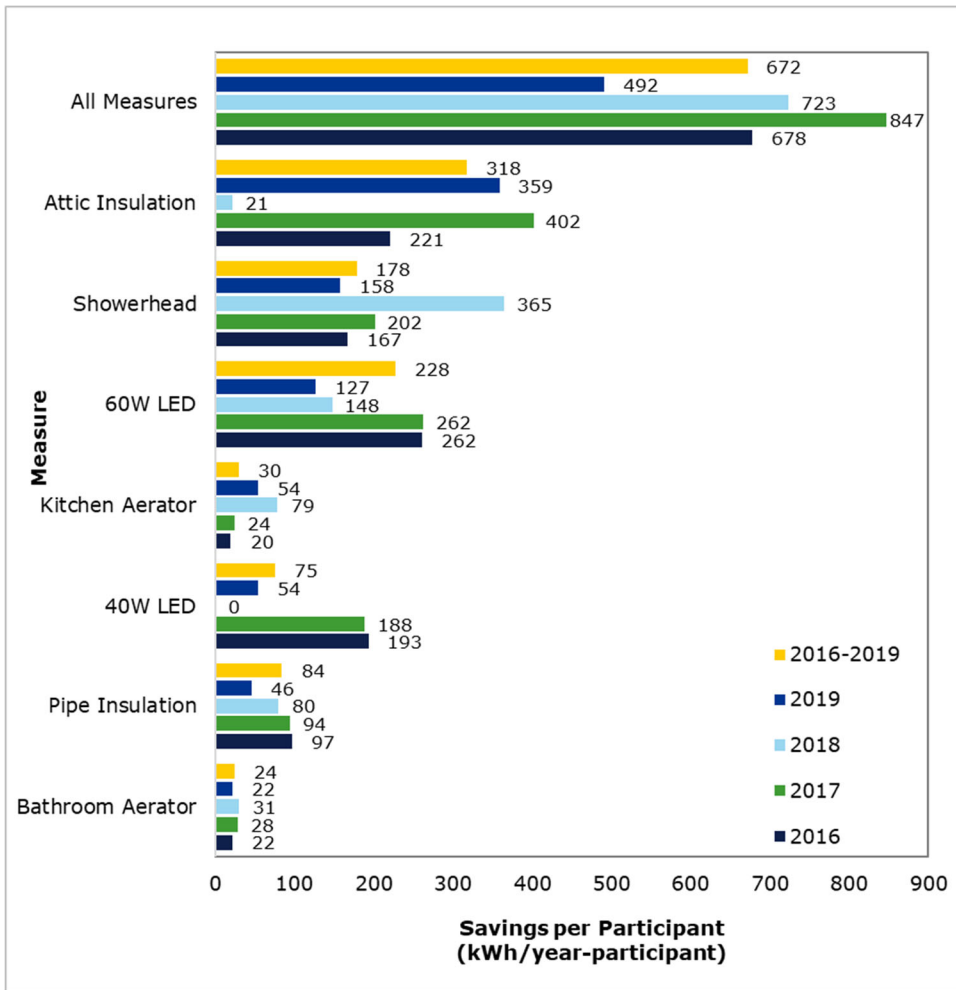
Attic insulation, LED replacement of 60 W incandescent lamps, and showerheads were the measures with the greatest contributions to program gross annualized savings in 2019 (sea blue). This aligns with the measures that were installed the most by participants, except kitchen aerators were more frequently installed relative to showerheads (Figure 4-14). Attic insulation has consistently produced the largest average savings per participant values historically (Figure 4-15).

Figure 4-14. North Carolina Residential Income and Age Qualifying Home Improvement Program Gross Annualized Energy Savings by Measure and Year (kWh/year)²⁸



²⁸ Note that the data reported here for 2017 differs slightly to Table 4-5, due to changes made to the January 2017 reported savings. For additional information, see that table's footnote.

Figure 4-15. North Carolina Residential Income and Age Qualifying Home Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year per participant) by Measure and Year²⁹



²⁹ Note that the data reported here for 2017 differs slightly to Table 4-5, due to changes made to the January 2017 reported savings. For additional information, see that table's footnote.

The majority of 2019 participants resided in multi-family buildings, which differs from historical trends where the majority of participants resided in single family or single-family detached buildings (Figure 4-16). This trend is also evident in the 2019 gross annualized energy savings where multi-family buildings represent the majority of savings and also surpassed historical savings for this building type (Figure 4-17).

Figure 4-16. North Carolina Residential Income and Age Qualifying Home Improvement Program Participation by Building Type and Year

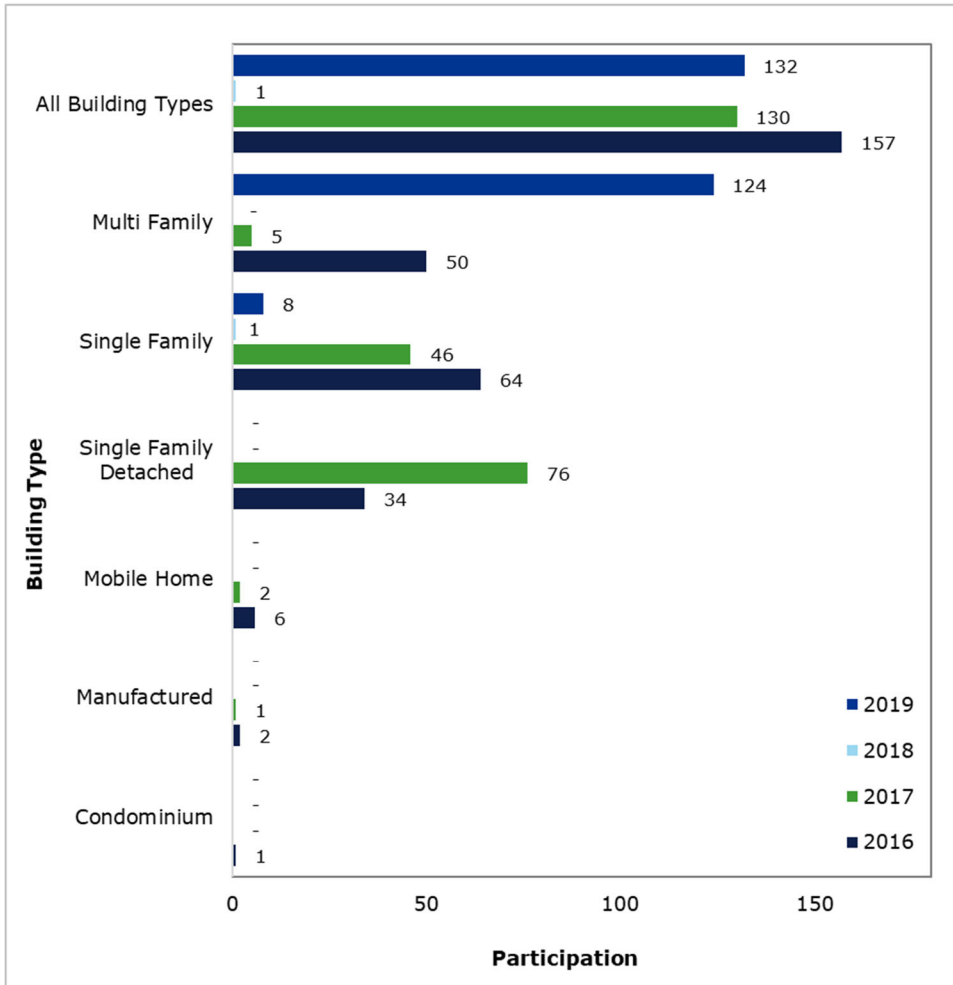
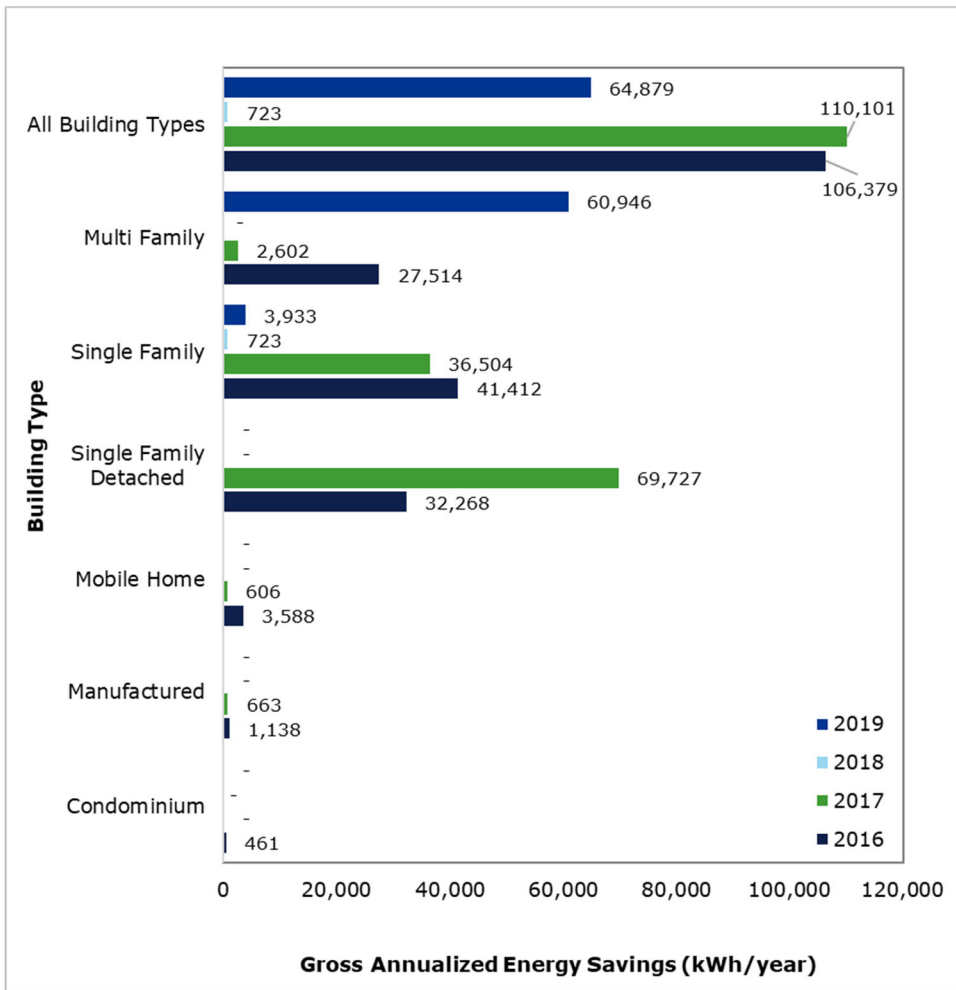


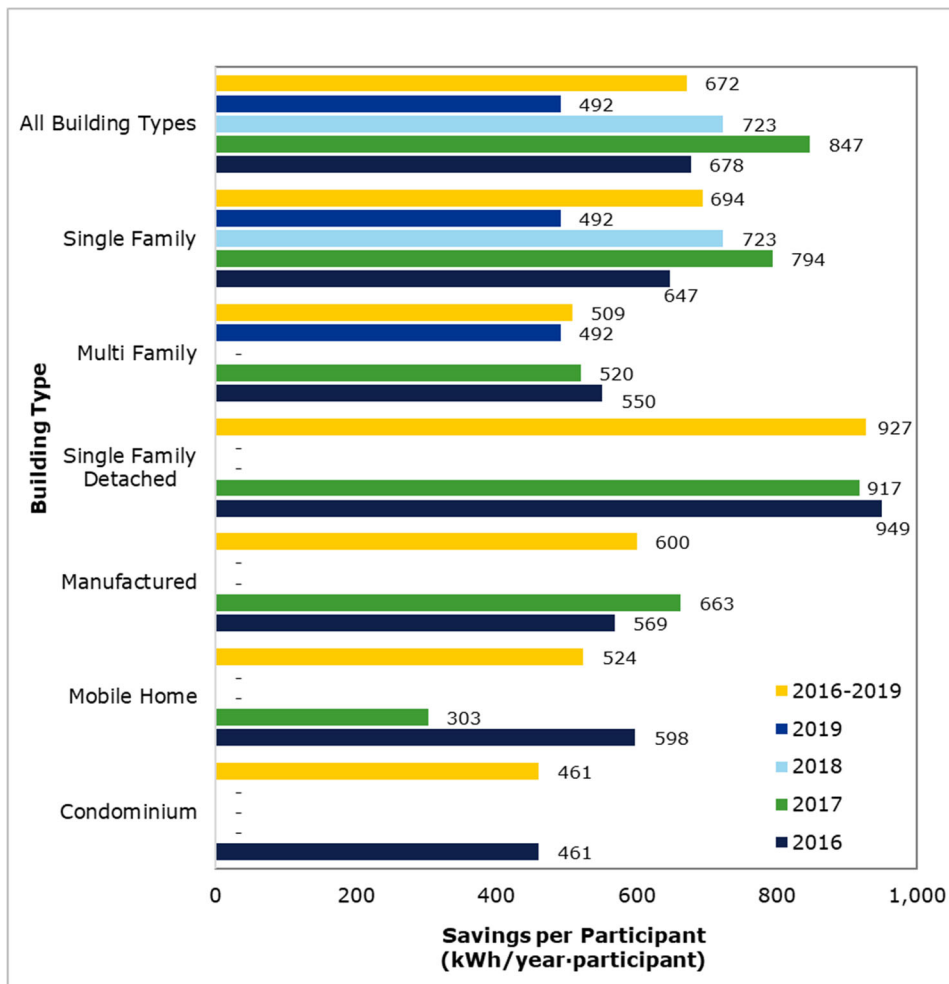
Figure 4-17. North Carolina Residential Income and Age Qualifying Home Improvement Program Gross Annualized Energy Savings by Building Type and Year (kWh/year)³⁰



³⁰ Note that the data reported here for 2017 differs slightly to Table 4-5, due to changes made to the January 2017 reported savings. For additional information, see that table's footnote.

Historically, single family and single-family detached buildings with the largest gross average savings per participant values across all program years from 2016 to 2019 (yellow) dominated with values nearly greater than or equal to 700 kWh/year per participant. The remaining building types had average per participant savings less than or equal to 600 kWh/year per participant (Figure 4-18). In 2019, single-family detached buildings were absent from the building type mix, which deviates from historic trends and the presence of multifamily buildings increased to near historic levels after being absent in 2018. Perhaps the focus on multifamily buildings accounts for the absence of manufactured, mobile homes, and condominium building types.

Figure 4-18. North Carolina Residential Income and Age Qualifying Home Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year per participant) by Building Type and Year³¹



³¹ Note that the data reported here for 2017 differs slightly to Table 4-5, due to changes made to the January 2017 reported savings. For additional information, see that table's footnote.

Figure 4-19 through Figure 4-22 show the North Carolina program’s gross demand reduction and average demand reduction per participant (for participants who installed the measure in the respective years) by measure type and building type. Similar to energy savings, the measures that produced the largest gross demand reduction and largest average gross demand reduction per participant were attic insulation and LED replacement of 60W incandescent lamps in 2019 and also in the historical 2016 to 2019 range (Figure 4-19, Figure 4-20).

Figure 4-19. North Carolina Residential Income and Age Qualifying Home Improvement Program Gross Demand Reduction (kW) by Measure and Year

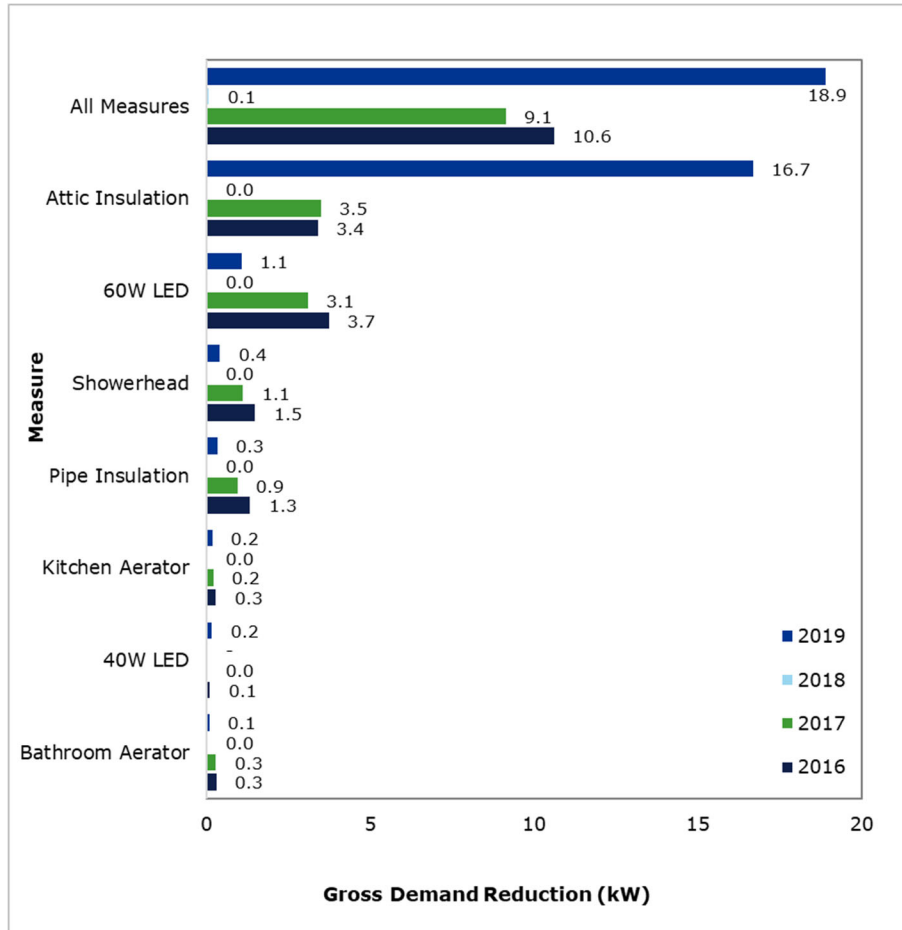
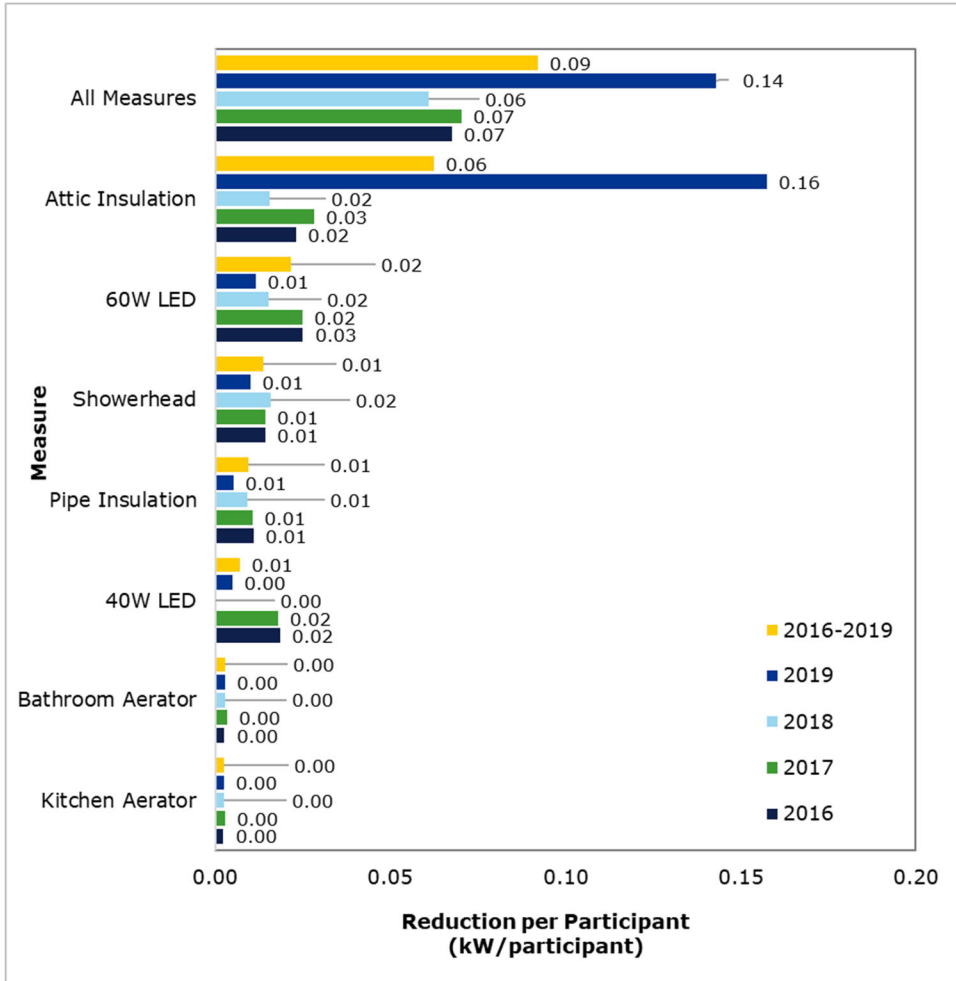


Figure 4-20. North Carolina Residential Income and Age Qualifying Home Improvement Program Average Gross Demand Reduction per Participant (kW/participant) by Measure and Year



The building type trends seen in the North Carolina gross annualized energy savings charts are similar to Figure 4-21 and Figure 4-22 for gross demand reduction. Although historically more North Carolina program participants lived in single-family buildings, the majority of 2019 program participants resided in multifamily buildings. The 2019 average gross demand reduction per participant for single-family buildings is greater than the average for multifamily buildings which is 0.17 and 0.14 kW/participant respectively. The difference may still be attributable that there are greater opportunities for both energy savings and demand reduction in single-family buildings with larger square footage (Figure 4-21).

Figure 4-21. North Carolina Residential Income and Age Qualifying Home Improvement Program Gross Demand Reduction (kW) by Building Type and Year

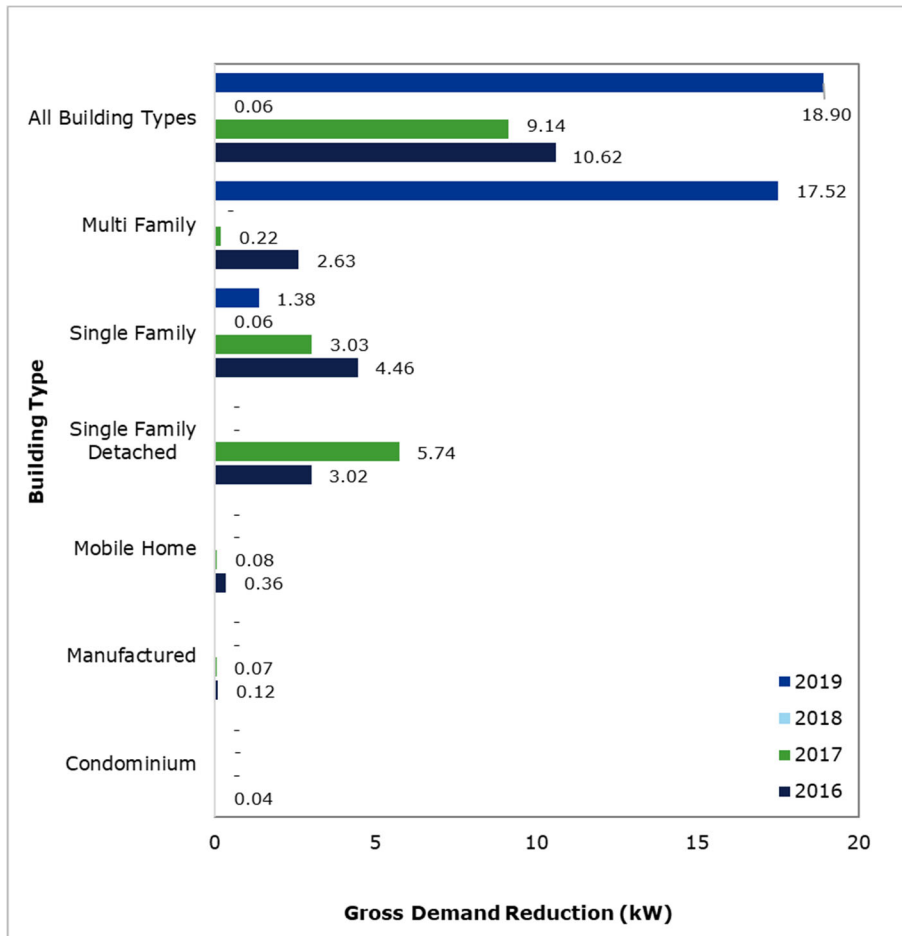
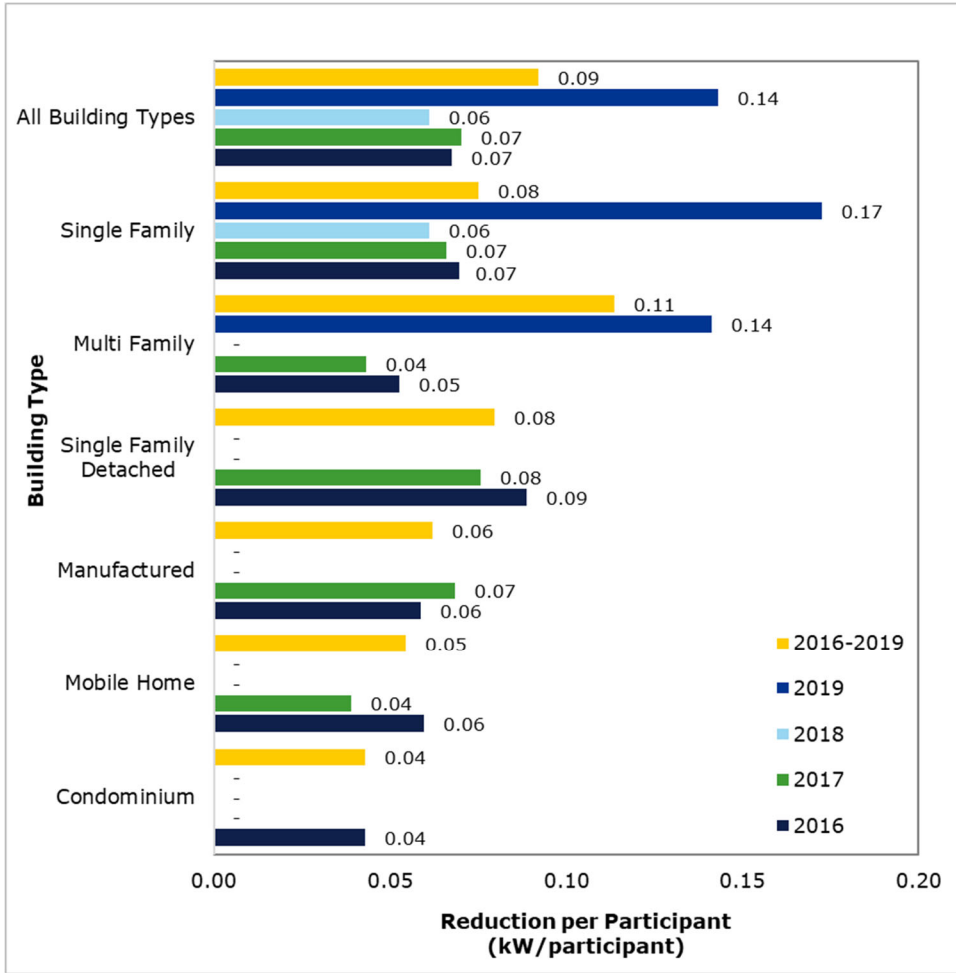


Figure 4-22. North Carolina Residential Income and Age Qualifying Home Improvement Program Average Gross Demand Reduction per Participant (kW/participant) by Building Type and Year



4.1.3.5 Comparison of Savings with Usage in Virginia

See Table 4-7 for a comparison of the 2019 program net adjusted savings in Virginia with the system-wide planned savings for the program, the annual usage for an average rate schedule, and the annual usage for eligible customers in the rate schedule. The program target rate schedule is Schedule 1, and eligible customers in the rate schedule are also assumed to be all customers in Schedule 1.

Table 4-7. Virginia Residential Income and Age Qualifying Home Improvement Program Comparison of Savings with Usage by Rate Schedule (2018–2019)

Comparisons	Item	Value
Schedule 1		
Comparison of Savings	Systemwide Planned Savings	464 kWh/year per participant
	Net Adjusted Savings	216 kWh/year per participant
	Net Adjusted Savings as Percent of Planned Savings	46.6%
Comparison to Average Annual Usage for Rate Schedule	Average Annual Usage	13,831 kWh/participant ³²
	Net Adjusted Savings as Percent of Average Annual Usage	1.6%
Comparison to Annual Usage of Eligible Customers in Rate Schedule	Average Annual Usage	See "Comparison to Average Annual Usage for Rate Schedule"
	Net Adjusted Savings as Percent of Average Annual Usage	

³² FERC FINANCIAL REPORT FERC FORM No. 1: Annual Report of Major Electric Utilities, Licensees and Others and Supplemental Form 3-Q: Quarterly Financial Report." For Virginia Electric and Power Company. Year/Period of Report End of 2018/Q4. Filed 3/26/2019. Page 301, Line 2, Column D (Annual Usage); Page 301, Line 2, Column F (Average No Customers).

4.2 Residential Retail LED – North Carolina

North Carolina

Docket #: E-22 Sub 539

RESIDENTIAL RETAIL LED

2017-2019

21 kWh/yr in Average Net Savings Per LED

Eligibility

- A customer may not purchase more than 12 packages of LEDs

Measures

- LED lamps



Incentivized sales of **334,497** LEDs, **87%** of planned LEDs



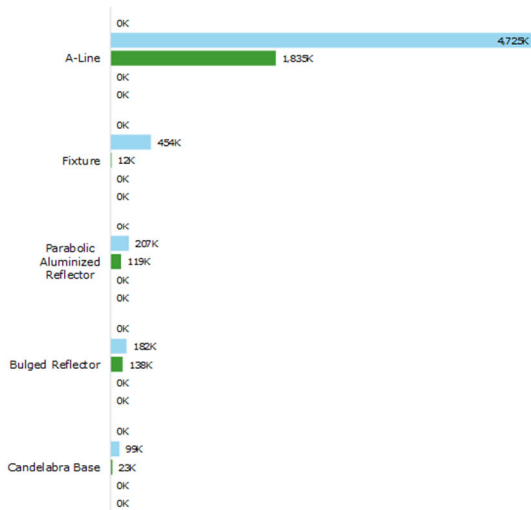
Achieved net annual energy savings of **6,913 MWh/year**, **113%** of planned energy savings



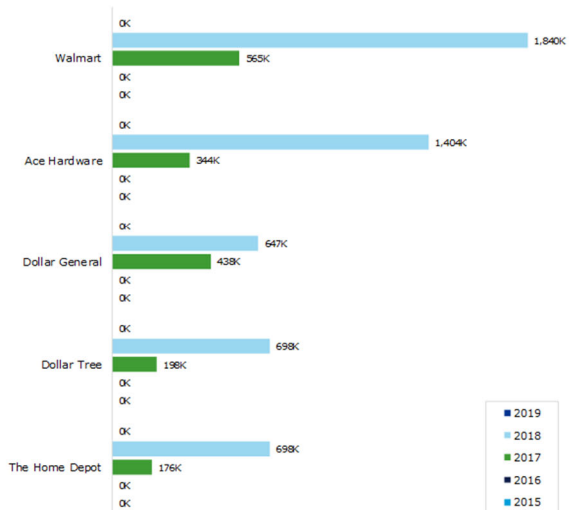
Spent **91%** of planned expenditures

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	664,838	1,295,830	190,393	2,151,061
Total Program Participants (#)	-	-	70,261	264,236	0	334,497
Total Gross Incremental Savings (kWh/yr)	-	-	2,215,073	5,918,263	0	-
Total Net Incremental Savings (kWh/yr)	-	-	1,882,812	5,030,524	0	-
Average Gross Incremental Demand Reduction (kW)	-	-	242	606	0	-
Average Net Incremental Demand Reduction (kW)	-	-	206	515	0	-
Total Net Lifetime Savings (kWh)	-	-	406,822	4,709,339	11,622,674	138,266,711
Average Lifetime Demand Reduction (kW)	-	-	721	721	721	721

TOTAL SAVINGS BY LAMP TYPE TOP 5 IN KWH



TOTAL SAVINGS BY RETAILER TOP 5 IN KWH



4.2.1 Program Description



This program provided residential customers in the Company's North Carolina service territory with an instant discount for qualifying light-emitting diode (LED) light bulb purchases from a participating retailer. Qualifying bulbs will be those types that are commonly used, including general service (A-line) bulbs, specialty bulbs (candelabra base, globe, reflector) and small fixtures meeting ENERGY STAR® and Underwriters Laboratories standards. The instant rebates were marketed using a combination of in-store point-of-purchase, direct mail, social media, and online communications.

The program limited customers to purchasing no more than 12 packages of participating LED light bulbs. 2017 was the first year of this two-year program, approved by the North Carolina Commission in Docket E-22, Sub 539 issued on December 20, 2016. 2018 was the second and final year that this program was available. This program has been included in this 2019 report as there was still program spending in 2019, although there are no savings for 2019.

4.2.2 Methods for the Current Reporting Period

The next section describes the program's achievements towards planned participants, energy savings, and demand reduction.

Table 4-8. Residential Retail LED Program Planning Assumptions System-wide

Assumption	Value
Target Market	Residential customers
NTG Factor	85%
Measure Life (years)	20
Average Annual Energy Savings per Participant (kWh/year)	27.9
Average Coincident Peak Demand Reduction per Participant (kW)	0.01
Average Rebate per Participant (US\$)	\$2.86

4.2.3 Assessment of Program Progress Towards Plan

The next section describes the program's progress towards planned participants, energy savings, and demand reduction.

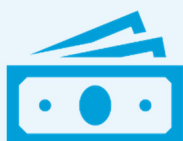
4.2.3.1 Key North Carolina Program Data

Key data highlights for 2019 participation or enrollment, energy savings, demand reduction and program costs for North Carolina appear below. Following this summary, Table 4-9 provides performance indicator data from January 1, 2017 through December 31, 2019, and shaded cells are considered sensitive information. Detailed program indicator tables by year and month are provided in Appendix B.2. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.2, and cumulative net savings are in Appendix D.2.



- For this program, a participant is counted as an individual LED lamp.
- Over its two-year program life (2017-2018), the program achieved 87% of its two-year participation goal.

- Over its two-year program life, the average lamp in the program saved 24 kWh/year of gross annualized energy and 21 kWh/year of net annualized energy.
- Compared to program design assumptions, on average, each lamp is saving approximately 25% less net annualized energy than initially anticipated.



- The initial program design anticipated an average incentive of \$2.86.
- The EM&V results over the program life (2017-2019) show the rebate per participant was \$2.76, which is approximately 3% less than initially assumed.

Table 4-9. North Carolina Residential Retail LED Program Performance Indicators (2017–2019)

Category	Item	2017 ³³	2018	2019	Program Total (2017–2019)
		Operations and Management Costs (\$)	Direct Rebate		
	Direct Implementation				
	Direct EM&V				
	Indirect Other (Administrative)	\$26,160	\$73,173	\$11,032	\$110,366

³³ Values in the 2017 Installed Energy Savings (kWh/year) rows differ from those reported in the May 1, 2018 EM&V report in response to requests by the North Carolina Public Staff Utilities Commission Re: 2018 NC DSM Case – Docket No. E-22 Sub 545 and Sub 556 Data Request No. 05 (on September 28, 2018). The resulting two adjustments that were made affected the 2017 Purchased Energy Savings (kWh/year) calculations. First, an adjustment was made to Appendix F. Section 17, Residential Retail LED Lighting Program, Table 128. Input Parameter for LED Lighting Savings. The hours of use per year (HOU) value of 1,059 hours/year (Opinion Dynamics “Evaluation of the PH2015 Duke Energy Progress Energy Efficient Lighting Program” report, Dec. 5, 2016) was reduced to 920 hours/year (Northeast Energy Efficiency Partnership Mid-Atlantic Technical Reference Manual Version 7.0, May 2017). Second, there was a correction for the misapplication of the Non-residential Small Business Improvement NTG factor of 93% to the Residential Retail LED Lighting Program. The NTG rate was reduced to 85%, per program initial design assumptions, as documented in Table 3-3 Net-to-Gross Factors and Sources by Program, and Table 4-8 Residential LED Lighting Program Planning Assumptions in North Carolina.

Category	Item	2017 ³³	2018	2019	Program Total (2017–2019)
Total Costs (\$)	Total ³⁴	\$664,838	\$1,295,830	\$190,393	\$2,151,061
	Planned	\$1,088,516	\$1,171,147	\$92,757	\$2,352,420
	Variance	-\$423,678	\$124,683	\$97,636	-\$201,359
	Annual % of Planned	61.1%	110.6%	205.3%	91.4%
Participants	Total (Gross)	70,261	264,236	0	334,497
	Planned (Gross)	165,000	220,000	0	385,000
	Variance	-94,739	44,236	0	-50,503
	Annual % of Planned (Gross)	42.6%	120.1%	N/A	86.9%
Purchased Energy Savings (kWh/year)	Total Gross Deemed Savings	2,215,073	5,918,263	0	8,133,336
	Realization Rate Adjustment (100%)	0	0	0	0
	Adjusted Gross Savings	2,215,073	5,918,263	0	8,133,336
	Net-to-Gross Adjustment (85%)	-332,261	-887,739	0	-1,220,000
	Net Adjusted Savings	1,882,812	5,030,524	0	6,913,336
	Planned Savings (Net)	2,250,789	3,874,754	0	6,125,543
	Annual % Toward Planned Savings (Net)	83.7%	129.8%	N/A	112.9%
	Avg. Savings per Participant (Gross)	32	22	N/A	24
	Avg. Savings per Participant (Net)	27	19	N/A	21
Purchased Demand Reduction (kW)	Total Gross Deemed Demand	242.4	606.0	0.0	848.5
	Realization Rate Adjustment (100%)	0.0	0.0	0.0	0.0
	Adjusted Gross Demand	242.4	606.0	0.0	848.5
	Net-to-Gross Adjustment (85%)	-36.4	-90.9	0.0	-127.3
	Net Adjusted Demand	206.1	515.1	0.0	721.2
	Planned Demand (Net)	331.1	433.0	0.0	764.1
	Annual % Toward Planned Demand (Net)	62.2%	119.0%	N/A	94.4%
	Avg. Peak Demand per Participant (Gross)	0.0	0.0	N/A	0.0
	Avg. Demand per Participant (Net)	0.0	0.0	N/A	0.0

³⁴ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2017 ³³	2018	2019	Program Total (2017–2019)
		Program Performance	Annual \$Admin. per Participant (Gross)	\$0.37	\$0.28
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.01	N/A	\$0.01
	Annual \$Admin. per kW (Gross)	\$108	\$121	N/A	\$130
	Annual \$EM&V per Total Costs (\$)	6.8%	6.6%	17.7%	7.7%
	Annual \$Rebate per Participant (Gross)	\$1.87	\$2.68	N/A	\$2.76

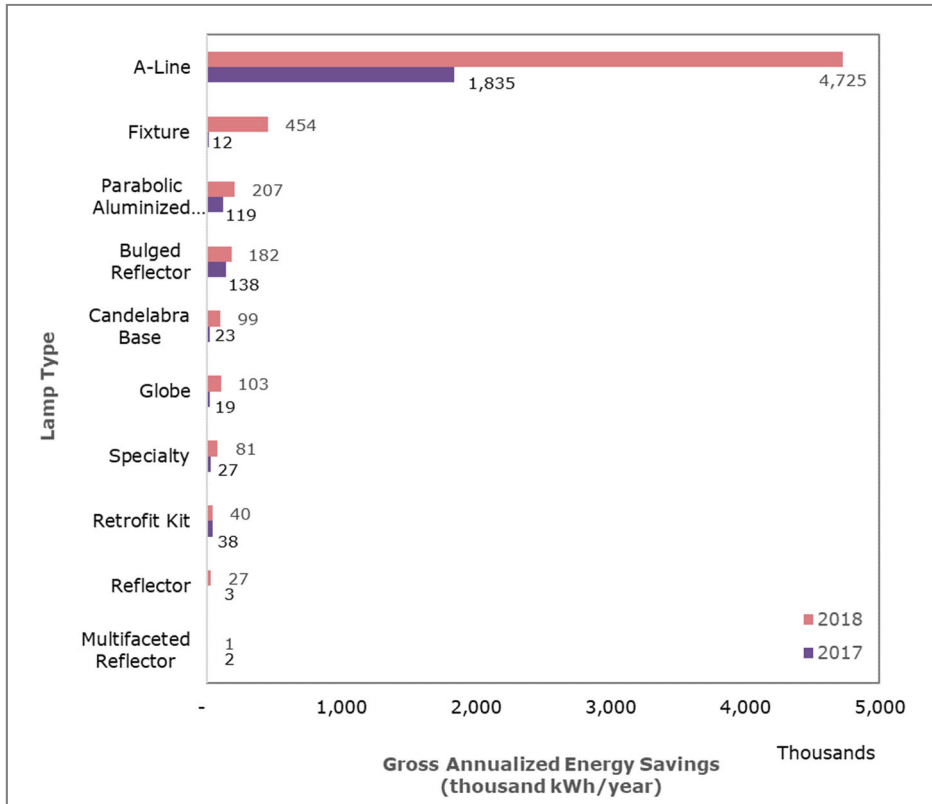
4.2.4 Additional North Carolina Program Data

The figures in this section (Figure 4-23 through Figure 4-25) show that this program offered a variety of LED lighting options, and by a number of manufacturers and retailers.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

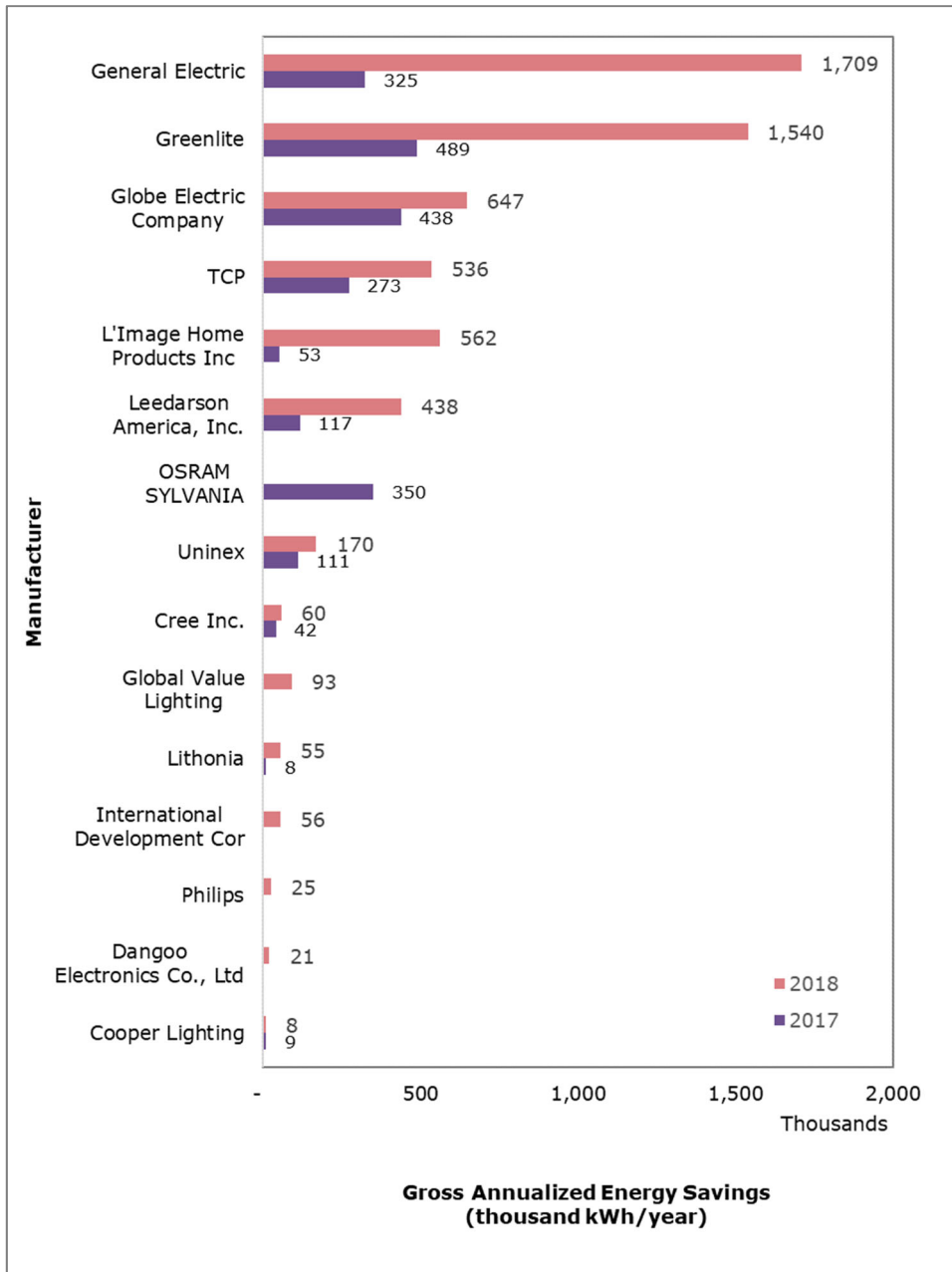
In 2017 and 2018, the LED A-line lamp produced the highest savings for this program. Over the life of the program, A-line LED lamps produced 6,559,903 kWh of gross annualized energy savings and 81% of all program savings. The measure type that yielded the second-highest gross annualized savings was fixtures, which accounted for 6% of all program savings over both years.

Figure 4-23. North Carolina Residential LED Lighting Program Gross Annualized Energy Savings (MWh/year) by Lamp Type



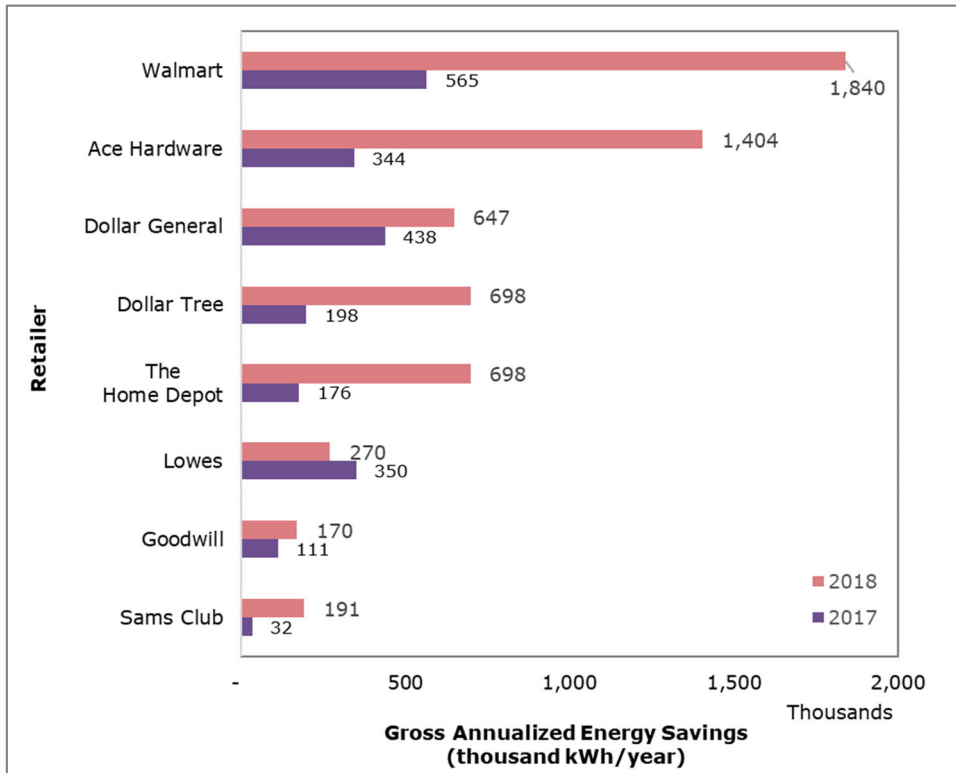
In 2018, customers purchased incentivized LED lamps made by 15 manufacturers as shown in Figure 4-24. Four of these manufacturers were new to the program in 2018. In terms of total program savings for 2017 and 2018, the top five manufacturers were General Electric, Greenlite, Globe Electric Company, TCP, and L'Image Home Products, Inc. Purchased LED lamps from these manufacturers produced 6,571,671 kWh of savings per year, which translates to approximately 81% of total program savings.

Figure 4-24. North Carolina Residential LED Lighting Program Gross Annualized Energy Savings (MWh/year) by Lamp Manufacturer

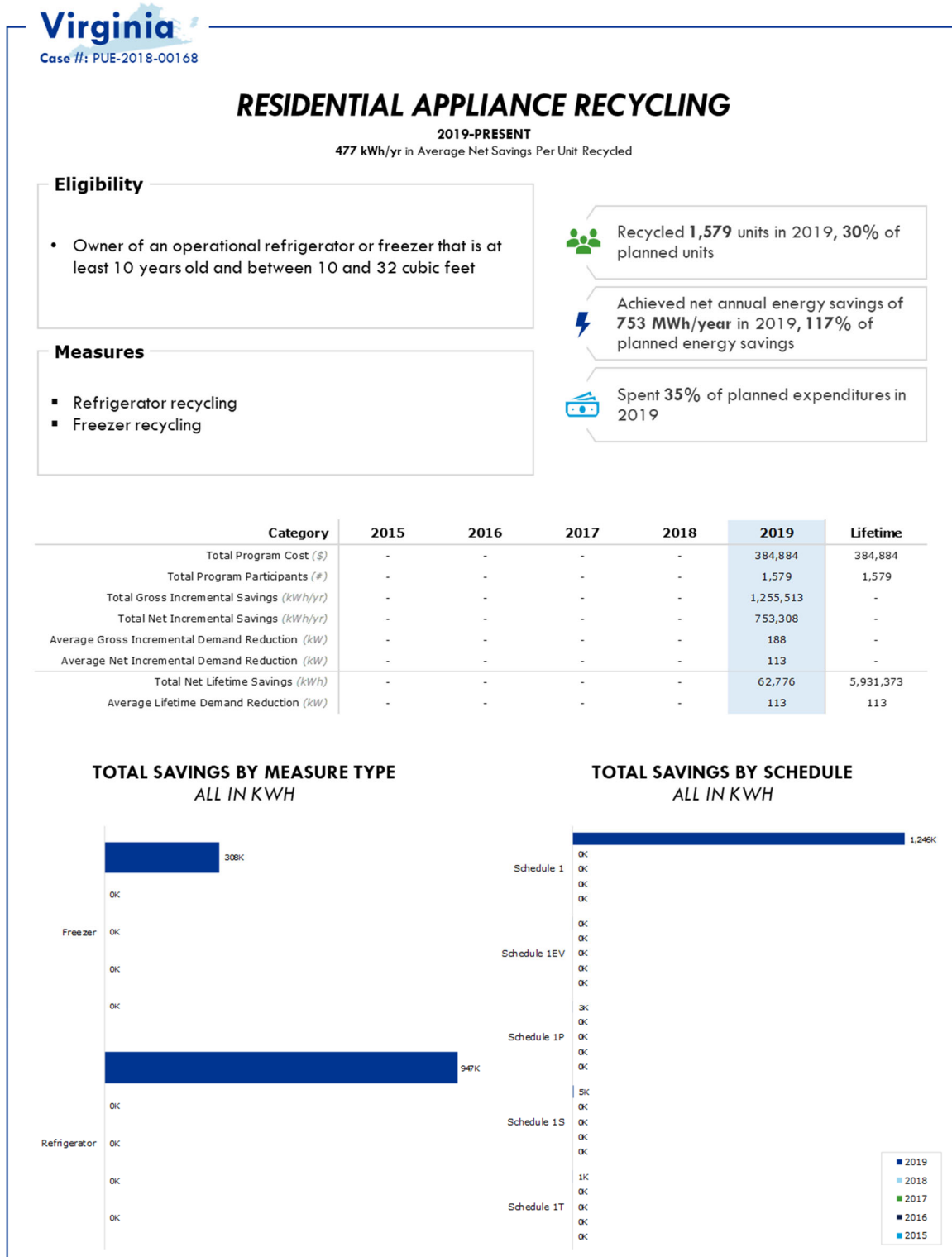


Customers purchased program incentivized LED lamps from eight different retailers, as shown in Figure 4-25. The top four of them (Walmart, Ace Hardware, Dollar General, and Dollar Tree) accounted for approximately 75% of the total program savings in 2017 and 2018, combined.

Figure 4-25. North Carolina Residential LED Lighting Program Gross Annualized Energy Savings (MWh/year) by Retailer



4.3 Residential Appliance Recycling – Virginia



4.3.1 Program Description

The Residential Appliance Recycling Program provides an incentive to residential customers for recycling old, inefficient refrigerators and freezers. A multimedia campaign (printed materials, digital ads) creates program



awareness and elicits participation from eligible customers. The program offers an incentive payment of \$20.00 per eligible appliance coupled with a convenient and environmentally optimal removal and disposal service. To qualify for the program, Dominion Energy customers must currently receive Electric Supply Service and Electric Delivery Service in accordance with a residential rate schedule, be the party that is responsible for the electric bill, and also be the owner of the refrigerator or freezer. Also, the refrigerator or freezer must be at least ten years old, between 10 and 32 cubic feet, and in working condition and in use.

Dominion Energy customers are eligible to recycle two units through the program. To participate in the program, customers may contact and submit an application through ReCleim, the appliance recycling implementation contractor. The Virginia SCC approved this program, as part of the DSM Phase VII programs,

on May 2, 2019 (Case No. PUR-2018-00168) for a five-year period of July 1, 2019, through June 30, 2024. The North Carolina Utilities Commission approved this program on November 13, 2019 (Docket No. E-22, SUB 569). Upon approval, the Company worked to finalize data systems, determine program logistics with program implementers, and finalize implementation details.

Participation tracking in Virginia began in September 2019 with the approval of the first rebates. The assessment of this program used the algorithms and assumptions specified in the STEP Manual (Appendix F).

Table 4-10 maps the applicable sections in this report to reporting requirements listed in the EM&V Rule section 50, "Standard Requirements for Evaluation, Measurement, and Verification Reporting."³⁵

Table 4-10. Residential Appliance Recycling Program Compliance with EM&V Rule Section 50

Subsection within 20 VAC 5-318-50	Location and Description
A. EM&V Plan	Appendix H. EM&V Plan
B. Utilizing utility-specific data or other data	<p>Per 20 VAC 5-318-40 A and B</p> <ol style="list-style-type: none"> See Appendix F. STEP Manual v10 for a description of all data or estimates used as inputs for this program and the measures within it. See the Methodologies section (Section 3) of this report for a description of the overarching EM&V methodologies used to produce results in this report. <p>Per 20 VAC 5-318-40 C</p> <ol style="list-style-type: none"> See subsections of this report section, and Table 4-13. for measure-level estimates of kilowatt and kilowatt-hour, before and after adjustments for free-ridership, as appropriate.
C. Changes to measure-level inputs and assumptions, and inputs to cost/benefit estimates	<ol style="list-style-type: none"> See Table 4-11 for program planning assumptions See documents filed with the Virginia State Corporation Commission Docket PUR-2018-00168 for approved measure-

³⁵ 20 VAC 5-318-50

Subsection within 20 VAC 5-318-50	Location and Description
	level inputs and assumptions, and the impact of such changes on original cost/benefit estimates for DSM programs or measures.
D. Measure-level data collection methodology	See response to A. and B. above.
E. Explanation of eligibility requirements for each rate schedule that program is offered	See program description above.
F. Comparison of measured annual measure or program savings estimates to the annual usage of the average rate schedule usage, and eligible customer in each rate schedule	See section 4.3.3.3 Comparison of Savings with Usage in Virginia
G. Explanation of controls undertaken by utility	See Appendix H-1, Residential Appliance Recycling Program Quality Control Description

4.3.2 Methods for the Current Reporting Period

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

DNV GL developed an EM&V Plan for this program, which is included in Appendix H. For the current period, the approach included reviewing the tracking data and then estimating net energy savings and demand reduction using STEP Manual calculations. Table 4-11 outlines Dominion Energy’s initial program planning assumptions that were used to design the program.

Table 4-11. Residential Appliance Recycling Program Planning Assumptions System-wide

Assumption	Value
Target Market	Residential customers
NTG Factor	60%
Measure Life (years)	8
Gross Average Annual Energy Savings per Participant (kWh/year)	784.2
Gross Average Coincident Peak Demand Reduction per Participant (kW)	0.09
Net Average Annual Energy Savings (per Participant (kWh/year)	470.5
Average Rebate per Participant (US\$)	\$20

4.3.3 Assessment of Program Progress Towards Plan

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

4.3.3.1 Key Virginia Program Data

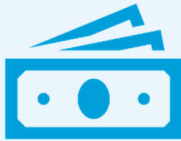
Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 4-12 provides performance indicator data from September 2019 through December 31, 2019, and green shaded cells are considered sensitive information. Detailed program indicators by year and month are provided in Appendix A.2. Cumulative gross savings

(kWh and kW) by year and month can be found in Appendix C.3, and cumulative net savings are in Appendix D.3.



- In its four months of operation, the program recycled a total of 1,205 refrigerators and 374 freezers.

- Total annual net energy savings in 2019 was 753,308 kWh/year, which was 117% of planned. Total annual net demand reduction was 113 kW.
- Average annual gross energy savings and demand reduction per participants were 795 kWh/year and 0.12 kW.



- Total 2019 program spending was at 35% of planned primarily because the program did not launch until the second half of 2019.
- The rebate for recycling a refrigerator or freezer was \$20.

Table 4-12. Residential Appliance Recycling Indicators (2019)

Category	Item	2019
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	
	Direct EM&V	
	Indirect Other (Administrative)	\$13,009
Total Costs (\$)	Total ³⁶	\$384,884
	Planned	\$1,094,670
	Variance	-\$709,785
	Annual % of Planned	35%
Participants	Total (Gross)	1,579
	Planned (Gross)	5,225
	Variance	-3,646
	Annual % of Planned (Gross)	30%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	1,255,513
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	1,255,513
	Net-to-Gross Adjustment (60%)	-502,205
	Net Adjusted Savings	753,308
	Planned Savings (Net)	644,850
	Annual % Toward Planned Savings (Net)	117%
	Avg. Savings per Participant (Gross)	795
	Avg. Savings per Participant (Net)	477
Installed Demand Reduction (kW)	Total Gross Deemed Demand	188
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand	188
	Net-to-Gross Adjustment (60%)	-75
	Net Adjusted Demand	113
	Planned Demand (Net)	0.0
	Annual % Toward Planned Demand (Net)	N/A
	Avg. Peak Demand per Participant (Gross)	0.12
	Avg. Demand per Participant (Net)	0.07
Program Performance	Annual \$Admin. per Participant (Gross)	\$8
	Annual \$Admin. per kWh/year (Gross)	\$0

³⁶ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2019
	Annual \$Admin. per kW (Gross)	\$69
	Annual \$EM&V per Total Costs (\$)	7%
	Annual \$Rebate per Participant (Gross)	\$20

The following table (Table 4-13) provides gross and net annualized energy savings and demand reduction for program year 2019, in Virginia, by measure type.

Table 4-13. Virginia Residential Appliance Recycling Program Measure-Level Performance Indicators (2019)

Program	Realization Rate		Net to Gross	
	kWh/year	kW	kWh/year	kW
Residential Appliance Recycling Program – Virginia (DSM VII)	100%	100%	60%	60%
Measure	kWh/year		kW/year	
	Gross	Net	Gross	Net
Refrigerator	947,137	568,282	142	85
Freezer	308,376	185,025	46	28
Total	1,255,513	753,308	188	113

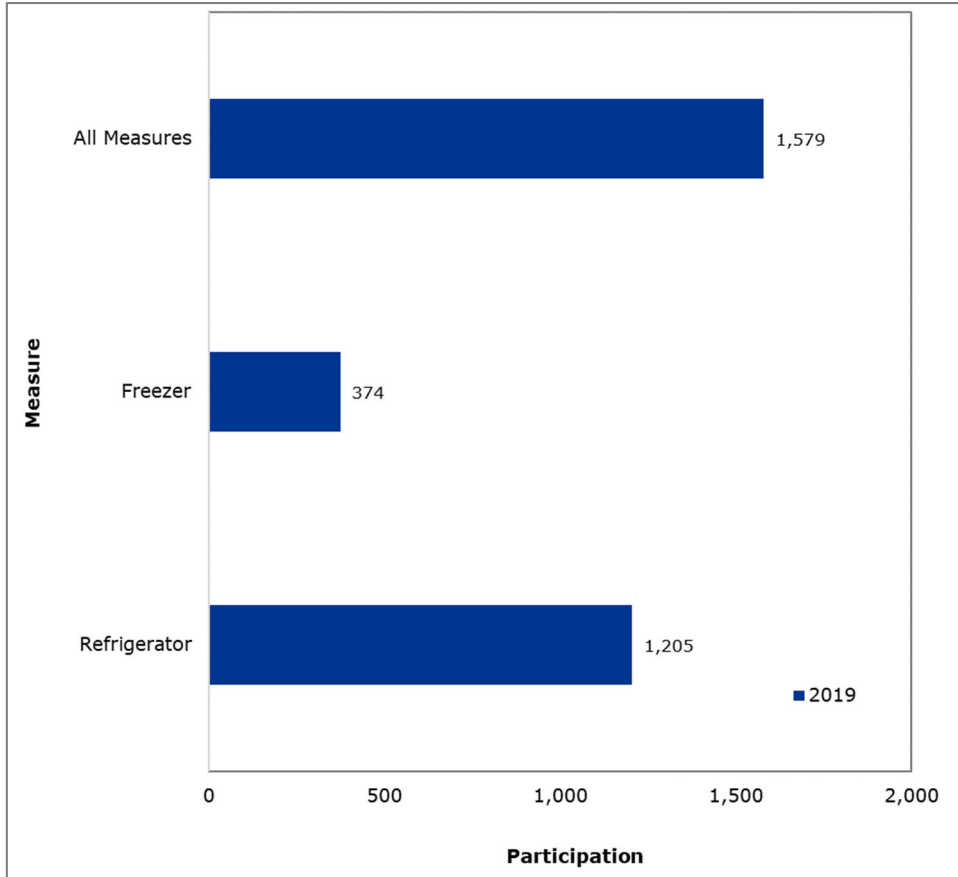
4.3.3.2 Additional Virginia Program Data

Figure 4-26 through Figure 4-28 show the Virginia program’s participation, gross annualized energy savings, and average gross annualized energy savings per participant (for participants who installed the measure in the respective years) by measure type. Note that the definition of participants for Residential Appliance Recycling Program is the number of refrigerators and freezers recycled.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

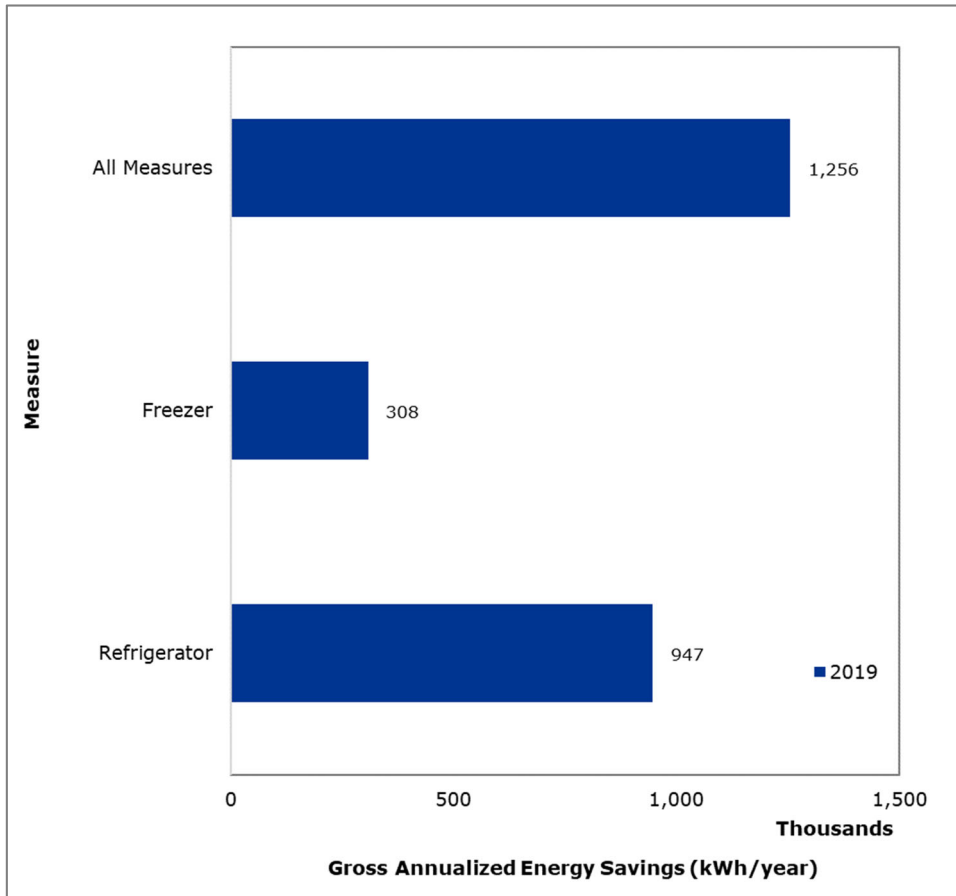
In 2019, there were a total of 1,579 appliances recycled through the program (Figure 4-26). Approximately three-quarters of the recycled units were refrigerators (1,205) and one-quarter were freezers (374).

Figure 4-26. Virginia Residential Appliance Recycling Program Participation by Measure and Year



In 2019, the Residential Appliance Recycling program had 1,255,513 kWh in gross annualized energy savings. Of that, 75% of the gross annualized savings resulted from refrigerators and 25% resulted from freezers.

Figure 4-27. Virginia Residential Appliance Recycling Program Gross Annualized Energy Savings by Measure and Year (MWh/year)



Although most of the participation and savings comes from the recycling of refrigerators, the recycling of freezers had greater savings per participant than refrigerators (825 kWh per freezer as compared to 786 kWh per refrigerator).

Figure 4-28. Virginia Residential Appliance Recycling Program Average Gross Annualized Energy Savings per Participant (kWh/year per participant) by Measure and Year

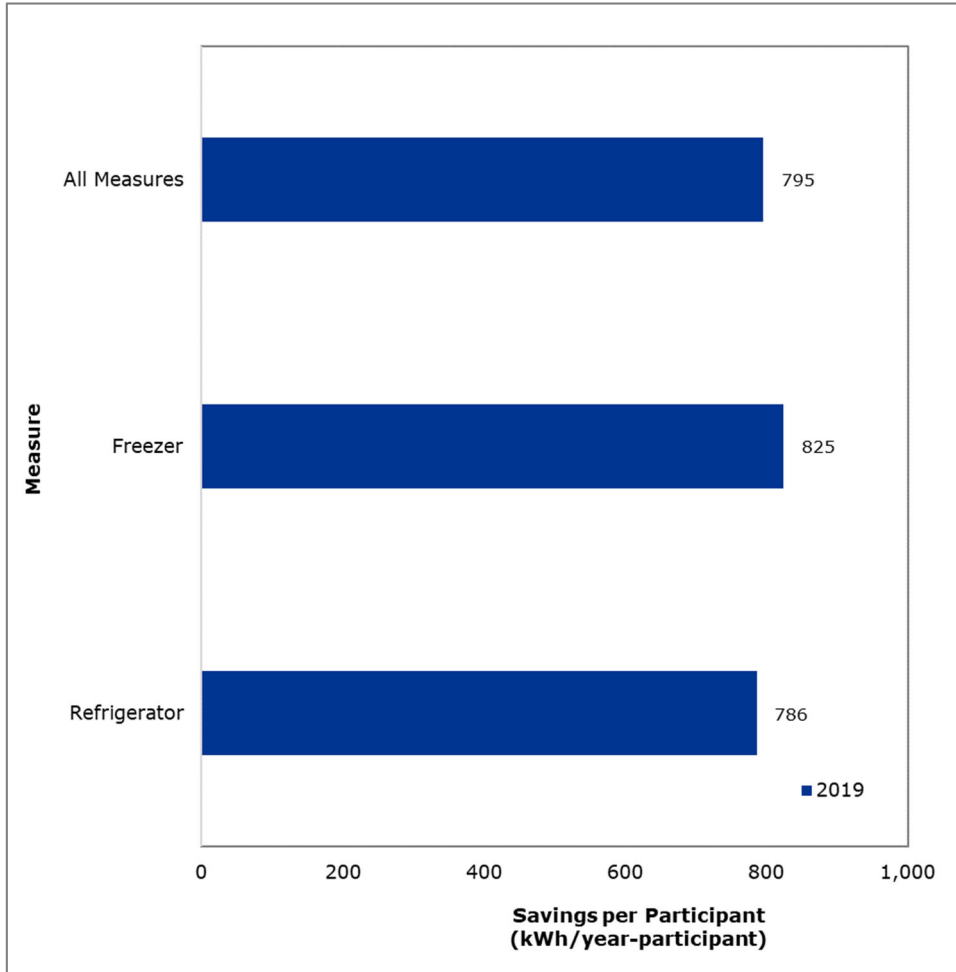


Figure 4-29 through Figure 4-30 show the Virginia program’s gross demand reduction and average demand reduction per participant by measure type. The removal of refrigerators and freezers resulted in a gross demand reduction of 188 kW during 2019, with 142 kW coming from refrigerator removals and 46 kW from freezers removals. However, on a per participant basis, the removal of refrigerators and freezers resulted in a similar demand reduction impact (0.118 kW per refrigerator compared to 0.123 kW per freezer removed).

Figure 4-29. Virginia Residential Appliance Recycling Program Gross Demand Reduction (kW) by Measure and Year

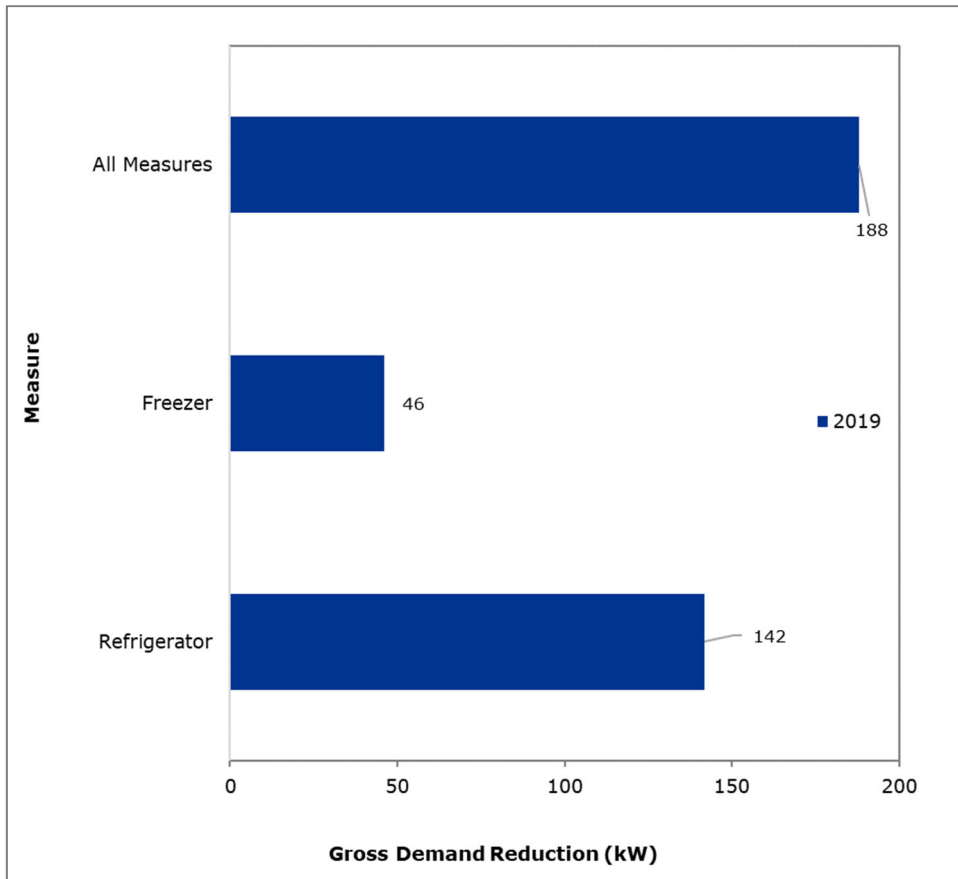


Figure 4-30. Virginia Residential Appliance Recycling Program Average Gross Demand Reduction per Participant (kW/ participant) by Measure and Year

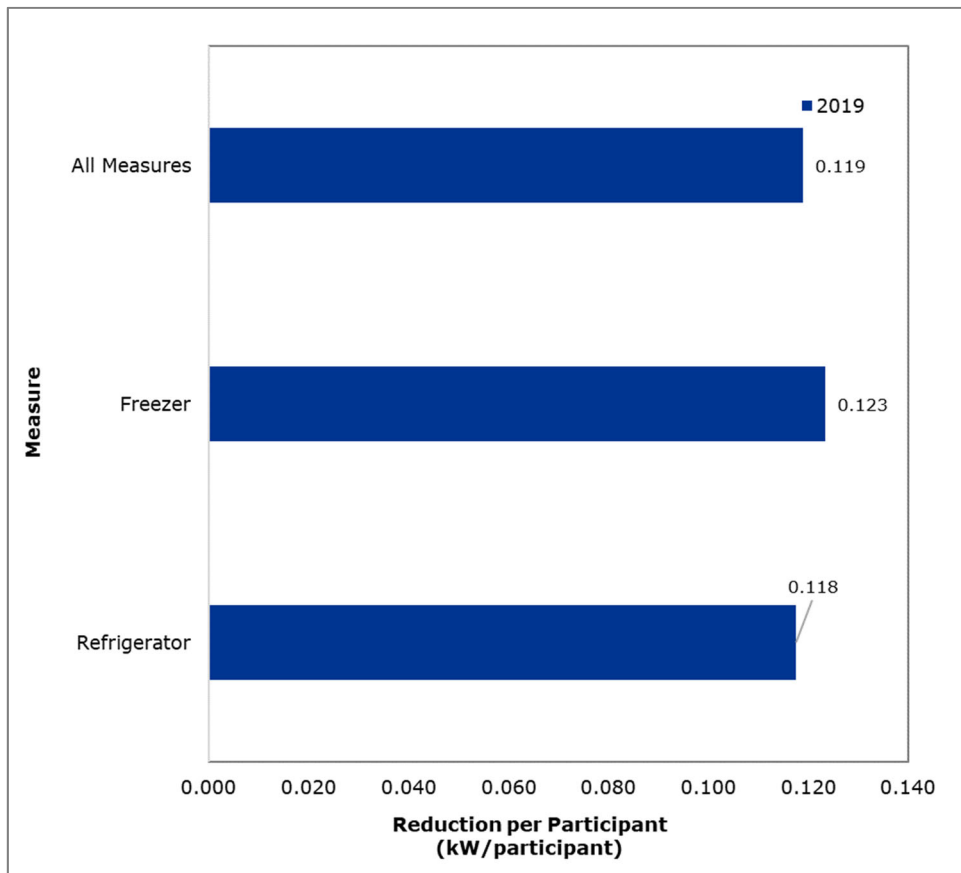


Table 4-14 shows participation, gross annualized energy savings and peak demand reductions, and average annualized energy savings and peak demand reductions per participant (for participants who installed the measure in that year) by rate schedule. Nearly all program participants and gross annualized energy savings resulted from units recycled by Schedule 1 rate customers.

Table 4-14. Virginia Residential Appliance Recycling Program Rate Schedule Performance Indicators (2019)

Program	Participation	Gross Annualized Energy Savings (kWh/year)	Average Gross Annualized Energy Savings per Participant (kWh/year)	Gross Peak Demand Reduction (kW)	Gross Peak Demand Reductions per Participant (kW)
Schedule 1	1,568	1,245,917	795	186	0.12
Schedule 1T	1	1,478	1,478	0.22	0.22
Schedule 1S	7	4,534	648	0.68	0.10
Schedule 1P	2	3,241	1,620	0.49	0.24
Schedule 1EV	1	343	343	0.05	0.05
Total	1,579	1,255,513	795	188	0.12

4.3.3.3 Comparison of Savings with Usage in Virginia

See Table 4-15 for a comparison of the 2019 program net adjusted savings in Virginia with the system-wide planned savings for the program, the annual usage for an average rate schedule, and the annual usage for eligible customers in the rate schedule. The program target rate schedule is Schedule 1, and eligible customers in the rate schedule are also assumed to be all customers in Schedule 1.

Table 4-15. Virginia Residential Appliance Recycling Program Comparison of Savings with Usage by Rate Schedule

Comparisons	Item	Value
Schedule 1		
Comparison of Savings	Gross Systemwide Planned Savings	470.5 kWh/year per participant
	Net Adjusted Savings	477 kWh/year per participant
	Net Adjusted Savings as Percent of Planned Savings	101%
Comparison to Average Annual Usage for Rate Schedule	Average Annual Usage	13,831 kWh/participant ³⁷
	Net Adjusted Savings as Percent of Average Annual Usage	3%
Comparison to Annual Usage of Eligible Customers in Rate Schedule	Average Annual Usage	See "Comparison to Average Annual Usage for Rate Schedule"
	Net Adjusted Savings as Percent of Average Annual Usage	

³⁷ FERC FINANCIAL REPORT FERC FORM No. 1: Annual Report of Major Electric Utilities, Licensees and Others and Supplemental Form 3-Q: Quarterly Financial Report." For Virginia Electric and Power Company. Year/Period of Report End of 2018/Q4. Filed 3/26/2019. Page 301, Line 2, Column D (Annual Usage); Page 301, Line 2, Column F (Average No Customers).

4.4 Residential Efficient Products Marketplace – Virginia

Virginia
Case #: PUE-2018-00168

RESIDENTIAL EFFICIENT PRODUCTS MARKETPLACE

2019-PRESENT
20 kWh/yr in Average Net Savings Per Unit

Eligibility

- Active residential customer in the Commonwealth of Virginia
- Customer must be the party that is responsible for electric bill and either own the home or otherwise able to secure permission and authorization to complete the rebate submission
- Product must be a new ENERGY STAR® certified /labeled and operate with electricity

Measures

- LEDs
- Refrigerator
- Freezer
- Clothes washer
- Electric clothes dryer
- Dehumidifier
- Room air purifier
- Dishwasher



Incentivized **2,507,265** units in 2019, **84%** of planned units



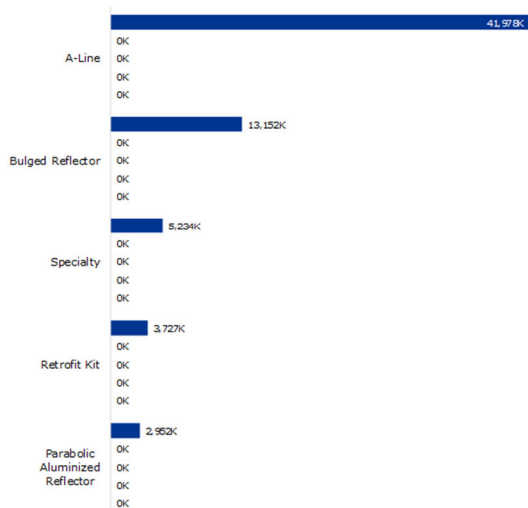
Achieved net annual energy savings of **51,105 MWh/year** in 2019, **317%** of planned energy savings



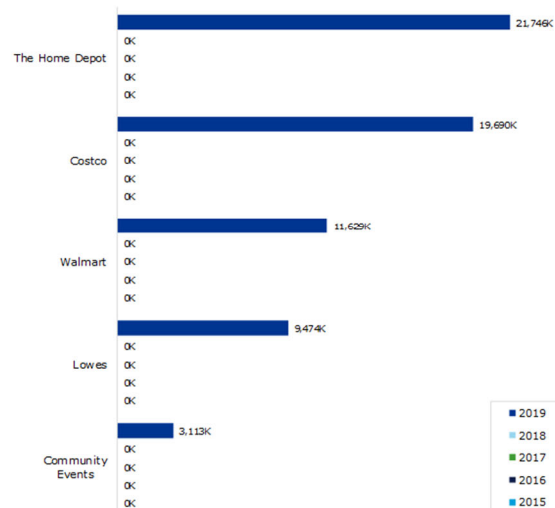
Spent **68%** of planned expenditures in 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	-	-	4,636,049	4,636,049
Total Program Participants (#)	-	-	-	-	2,507,265	2,507,265
Total Gross Incremental Savings (kWh/yr)	-	-	-	-	73,007,561	-
Total Net Incremental Savings (kWh/yr)	-	-	-	-	51,105,293	-
Average Gross Incremental Demand Reduction (kW)	-	-	-	-	6,679	-
Average Net Incremental Demand Reduction (kW)	-	-	-	-	4,675	-
Total Net Lifetime Savings (kWh)	-	-	-	-	4,258,774	836,612,694
Average Lifetime Demand Reduction (kW)	-	-	-	-	4,675	4,675

TOTAL SAVINGS BY LAMP TYPE
TOP 5 IN KWH



TOTAL SAVINGS BY RETAILER
TOP 5 IN KWH



4.4.1 Program Description

The Residential Efficient Products Marketplace Program provides rebates for the purchase and installation of ENERGY STAR® qualified LED lamps and fixtures, and appliances. The Program has the following eligibility requirements:

A Customer must receive electric supply service and electric delivery service on a residential rate schedule, be the party that is responsible for the electric bill, and either own the home or otherwise be able to secure permission and authorization to participate.



The Product must be purchased new, ENERGY STAR® qualified/labeled, and installed and functional at customer premises receiving electric services from Dominion. A list of ENERGY STAR® qualified/labeled products is located at <https://dominion.myrebateportal.com/>.

There are two delivery channels for this program: 1) lighting discounts are delivered at the point of sale; and 2) appliance rebates

for qualifying equipment are processed through the Dominion rebate portal. For the online rebate portal, customers must provide a legible copy of the entire sales receipt of the product. Customers are eligible for two rebates for dishwashers, clothes washers, refrigerators, and freezers, and up to four rebates for dehumidifiers and air purifiers.

The Virginia SCC approved this program as part of the DSM Phase VII programs on May 2, 2019 (Case No. PUR-2018-00168) for five years from July 1, 2019, through June 30, 2024. The North Carolina Utilities Commission approved this program on November 13, 2019 (Docket No. E-22, SUB 568). Upon approval, the Company immediately began building the necessary data infrastructure and rebate portal, determining

appropriate store locations with program implementers, and implementing the program. Program activity and EM&V tracking started in August 2019 for Virginia.



Table 4-16 cross references the applicable sections in this report to reporting requirements of EM&V Rule section 50, "Standard Requirements for Evaluation, Measurement, and Verification Reporting."³⁸

³⁸ 20 VAC 5-318-50

Table 4-16. Residential Efficient Products Marketplace Program Compliance with EM&V Rule Section 50

Subsection within 20 VAC 5-318-50	Location and Description
A. EM&V Plan	Appendix I. EM&V Plan Residential Efficient Products Marketplace Program
B. Utilizing utility-specific data or other data	<p>Per 20 VAC 5-318-40 A and B</p> <ol style="list-style-type: none"> See the Methodologies section (section 3) of this report for a description of the overarching EM&V methodologies used to report results in this report. See Appendix F. STEP Manual v10 for a description of all data or estimates used as inputs for this program and the measures within it. <p>Per 20 VAC 5-318-40 C</p> <ol style="list-style-type: none"> See subsections of this report section, and Figure 4-20. For measure-level estimates of kilowatt and kilowatt-hour, before and after adjustments for free-ridership, as appropriate.
C. Changes to measure-level inputs and assumptions, and inputs to cost/benefit estimates	<ol style="list-style-type: none"> See Figure 4-18 for program planning assumptions See documents filed with the Virginia State Corporation Commission Docket PUR-2018-00168 for approved measure-level inputs and assumptions, and the impact of such changes on original cost/benefit estimates for DSM programs or measures.
D. Measure-level data collection methodology	See response to A. and B. above.
E. Explanation of eligibility requirements for each rate schedule that program is offered.	See program description above
F. Comparison of measured annual measure or program savings estimates to the annual usage of the average rate schedule usage, and eligible customer in each rate schedule	See section 4.4.3.3, Comparing Savings with Usage
G. Explanation of controls undertaken by utility	See Appendix I, Residential Efficient Products Marketplace Program Manual

4.4.2 Methods for the Current Reporting Period

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction. DNV GL developed an EM&V Plan for this program, which is included in Appendix I. For the current period, the approach included reviewing the tracking data and then estimating net energy savings and demand reduction using STEP Manual calculations. Table 4-17 outlines Dominion Energy’s initial program planning assumptions that were used to design the program in the first iteration of the program, and in the most recent program extension.

Table 4-17. Residential Efficient Products Marketplace Program Planning Assumptions System-wide

Assumption	2019 Value	2020 and After Value
Target Market	Residential customers	Residential customers
NTG Factor	70%	70%
Measure Life (years)	16.5	16.5
Gross Average Annual Savings per Participant (kWh/year)	32.55	37.68
Gross Average Demand Reduction Per Participant (kW)	0.004	0.004
Net Average Annual Coincident Peak Demand Reduction (kW) per Participant	22.79	26.38
Average Rebate per Participant (US\$)	\$1.56	\$2.01

4.4.3 Assessment of Program Progress Towards Plan

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

4.4.3.1 Key Virginia Program Data

Key highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 4-18. provides performance indicator data from August 1, 2019, through December 31, 2019. Shaded cells contain sensitive information. Detailed program indicators by year and month are provided in Appendix A.3. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.4, and cumulative net savings are in Appendix D.4.

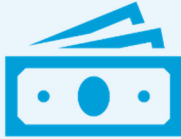
Participation in the point of sale lighting channel of the program began August 2019. Annual participation rates were 84% of planned, but net annualized energy savings (kWh/year) was 317% of planned in 2019. Note that participation in this program is defined as the number of measures installed.



- During 2019, there were 2,507,265 measures installed through the program, representing 84% of its participation goal.

- Total annual net energy savings in 2019 was 51,105,293 kWh/year, which was 317% of plans. Total annual net demand reduction was 4,675 kW.
- Average annual gross energy savings per participant was 29 kWh/year.





- Total 2019 program spending was at 68% of plan.
- Average rebate per unit in 2019 was \$1.24.

Table 4-18. Residential Efficient Products Marketplace Indicators (2019)

Category	Item	2019
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	
	Direct EM&V	
	Indirect Other (Administrative)	\$156,691
Total Costs (\$)	Total ³⁹	\$4,636,049
	Planned	\$6,860,889
	Variance	-\$2,224,840
	Annual % of Planned	68%
Participants	Total (Gross)	2,507,265
	Planned (Gross)	2,972,475
	Variance	-465,210
	Annual % of Planned (Gross)	84%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	73,007,561
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	73,007,561
	Net-to-Gross Adjustment (70%)	-21,902,268
	Net Adjusted Savings	51,105,293
	Planned Savings (Net)	16,098,286
	Annual Percent Toward Planned Savings (Net)	317%
	Avg. Savings per Participant (Gross)	29
Avg. Savings per Participant (Net)	20	
Installed Demand Reduction (kW)	Total Gross Demand Reduction	6,679
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand Reduction	6,679
	Net-to-Gross Adjustment (70%)	-2,004
	Net Adjusted Demand Reduction	4,675
	Planned Demand (Net)	0.00
	Annual % Toward Planned Demand (Net)	N/A

³⁹ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2019
	Avg. Peak Demand per Participant (Gross)	0.00
	Avg. Demand per Participant (Net)	0.00
Program Performance	Annual \$Admin. per Participant (Gross)	\$0.06
	Annual \$Admin. per kWh/year (Gross)	\$0.00
	Annual \$Admin. per kW (Gross)	\$23
	Annual \$EM&V per Total Costs (\$)	1.9%
	Annual \$Rebate per Participant (Gross)	\$1.24

Table 4-19 provides 2019 Virginia gross and net annualized energy savings and demand reduction by measure type.

Table 4-19. 2019 Residential Efficient Products Marketplace Program Measure-Level Performance Indicators (Virginia)

Program	Realization Rate		Net to Gross	
	kWh/year	kW	kWh/year	kW
Residential Efficient Products Marketplace Virginia (DSM VII)	100%	100%	70%	70%
Measure	kWh/year		kW/year	
	Gross	Net	Gross	Net
Lighting	73,007,561	51,105,293	6,679	4,675

4.4.3.2 Additional Virginia Program Data

Figure 4-31 through Figure 4-33 show the Virginia 2019 gross annualized energy savings, and average gross annualized energy savings by lamp type, manufacturer, and retailer.

Note participation in these charts is the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

A-Line LED bulbs represented 58% of gross annualized kWh savings followed by bulged reflectors (18%) and specialty bulbs (7%) (Figure 4-31). In 2019, customers purchased incentivized LED lamps and fixtures made by 19 manufacturers as shown in Figure 4-32. In terms of gross annualized kWh savings and kW reduction, the top five manufacturers were Feit Electric, General Electric, Leedarsen America, Inc, TCP, and Dangoo Electronics, Ltd. Lamps and fixtures from these manufacturers produced approximately 80% of total program savings. Customers purchased program incentivized LED lamps from 13 retailers in 2019 (Figure 4-33). The top four retailers (Home Depot, Costco, Walmart, and Lowe's) accounted for approximately 86% of the total program savings in 2019.

Figure 4-31. Virginia 2019 Residential Efficient Products Marketplace Program Participation by Lighting Measure and Year

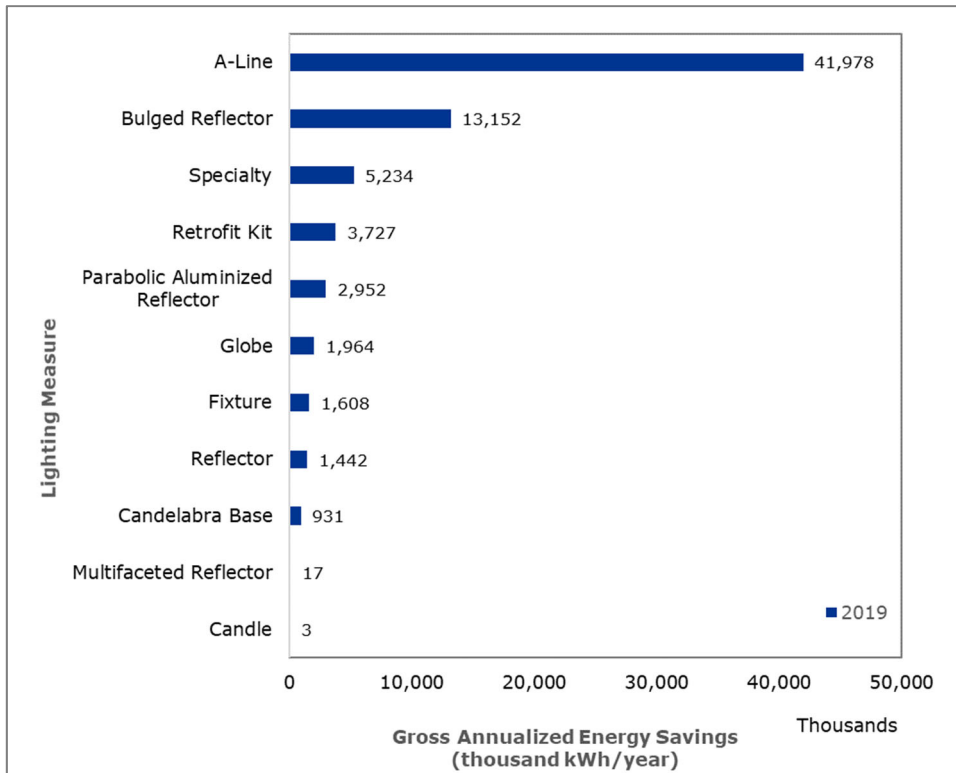


Figure 4-32. Virginia 2019 Residential Efficient Products Marketplace Program Gross Annualized Energy Savings by Manufacturer and Year (MWh/year)

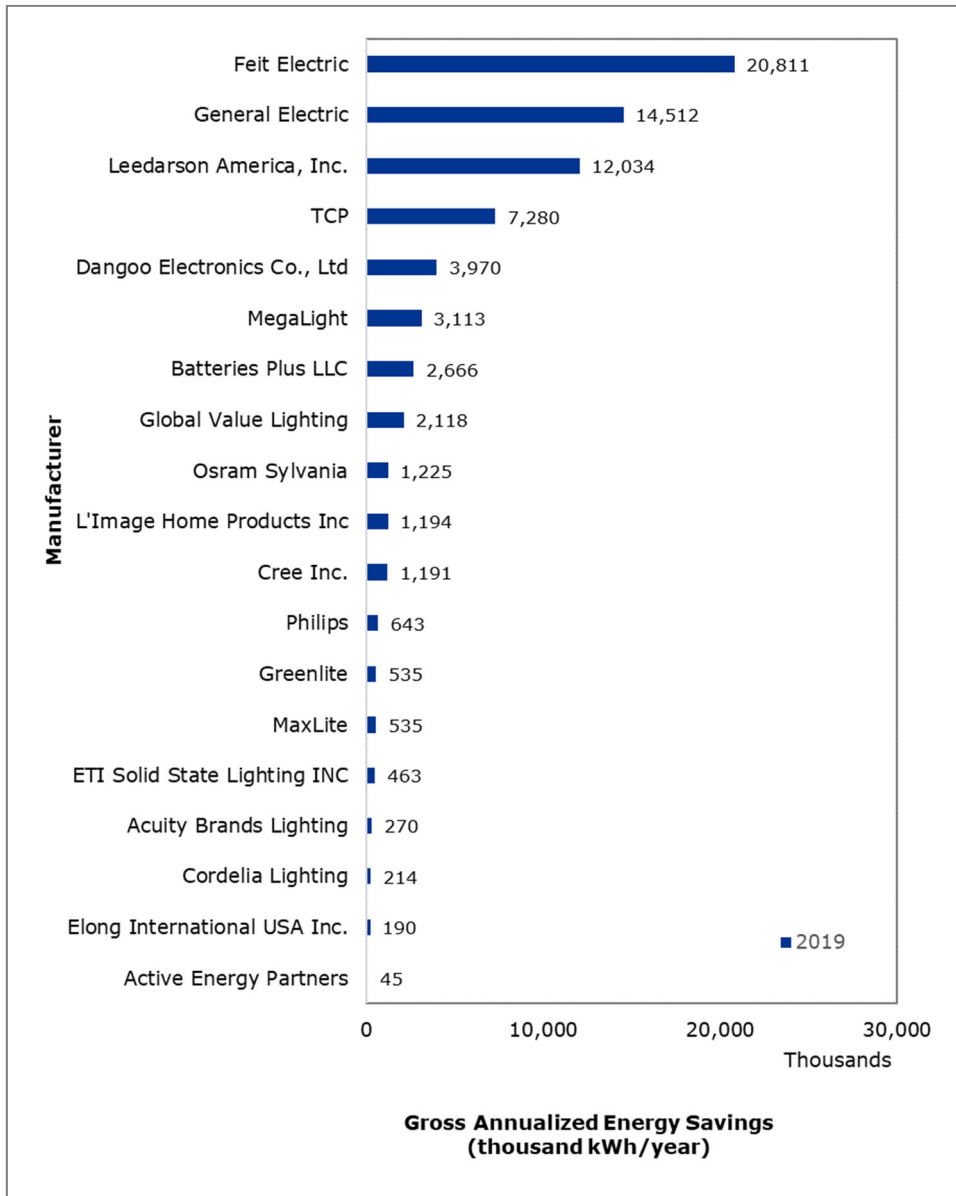


Figure 4-33. Virginia 2019 Residential Efficient Products Marketplace Program Average Gross Annualized Energy Savings (MWh/year) by Retailer and Year

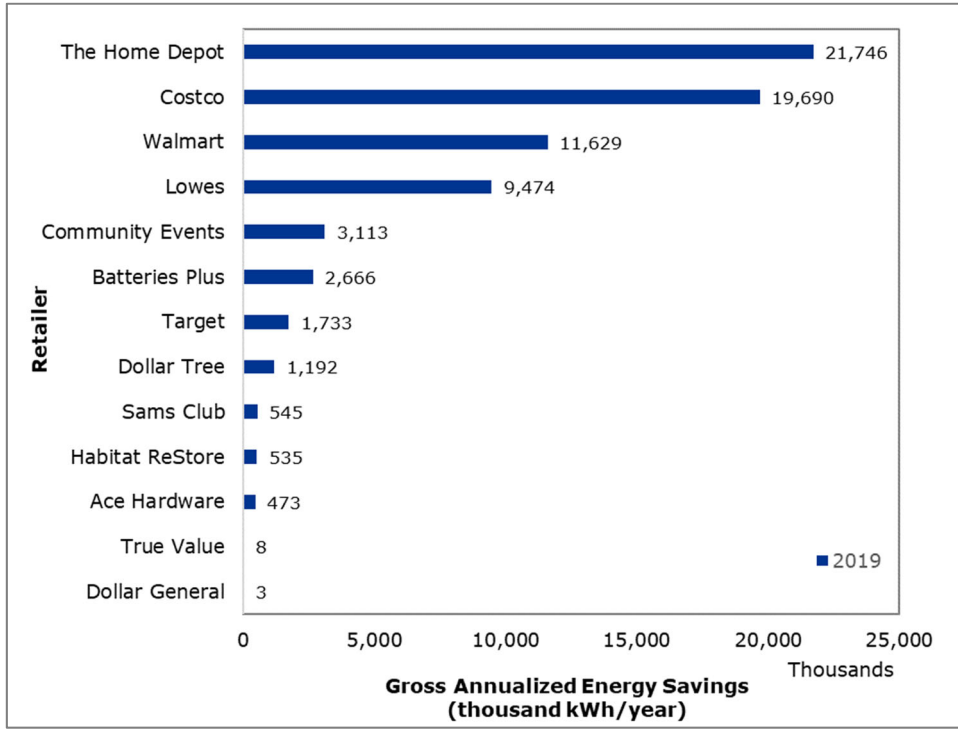


Figure 4-34. Virginia Residential Efficient Products Marketplace Program Gross Demand Reduction by Lighting Measure and Year (kW)

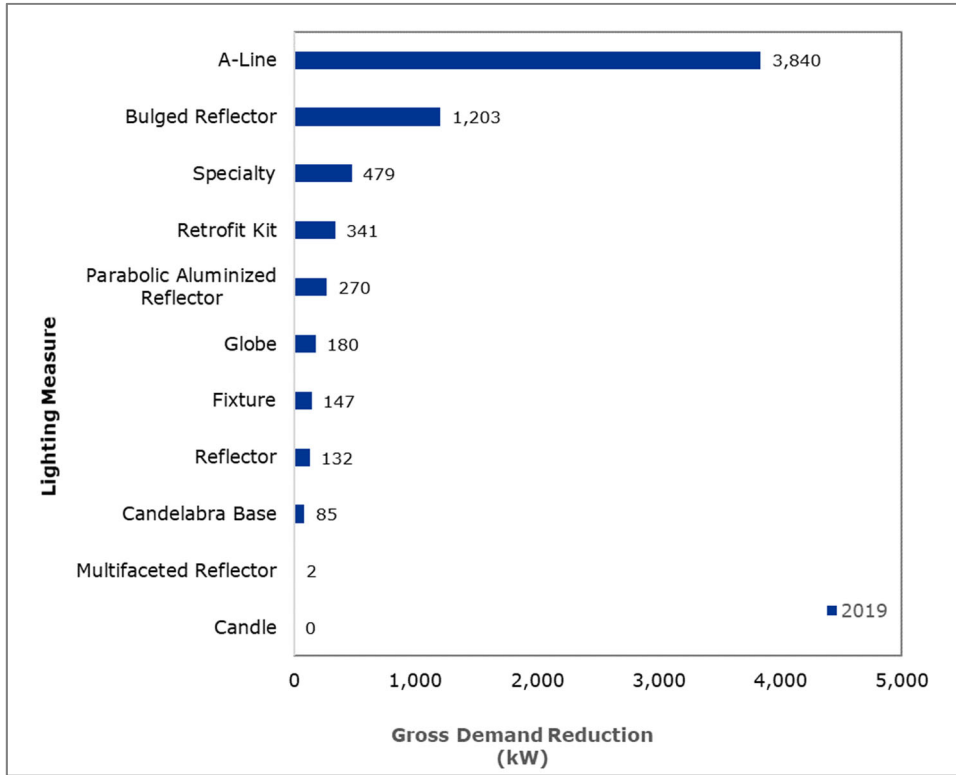


Figure 4-35. Virginia 2019 Residential Efficient Products Marketplace Program Gross Demand Reduction by Manufacturer and Year (kw)

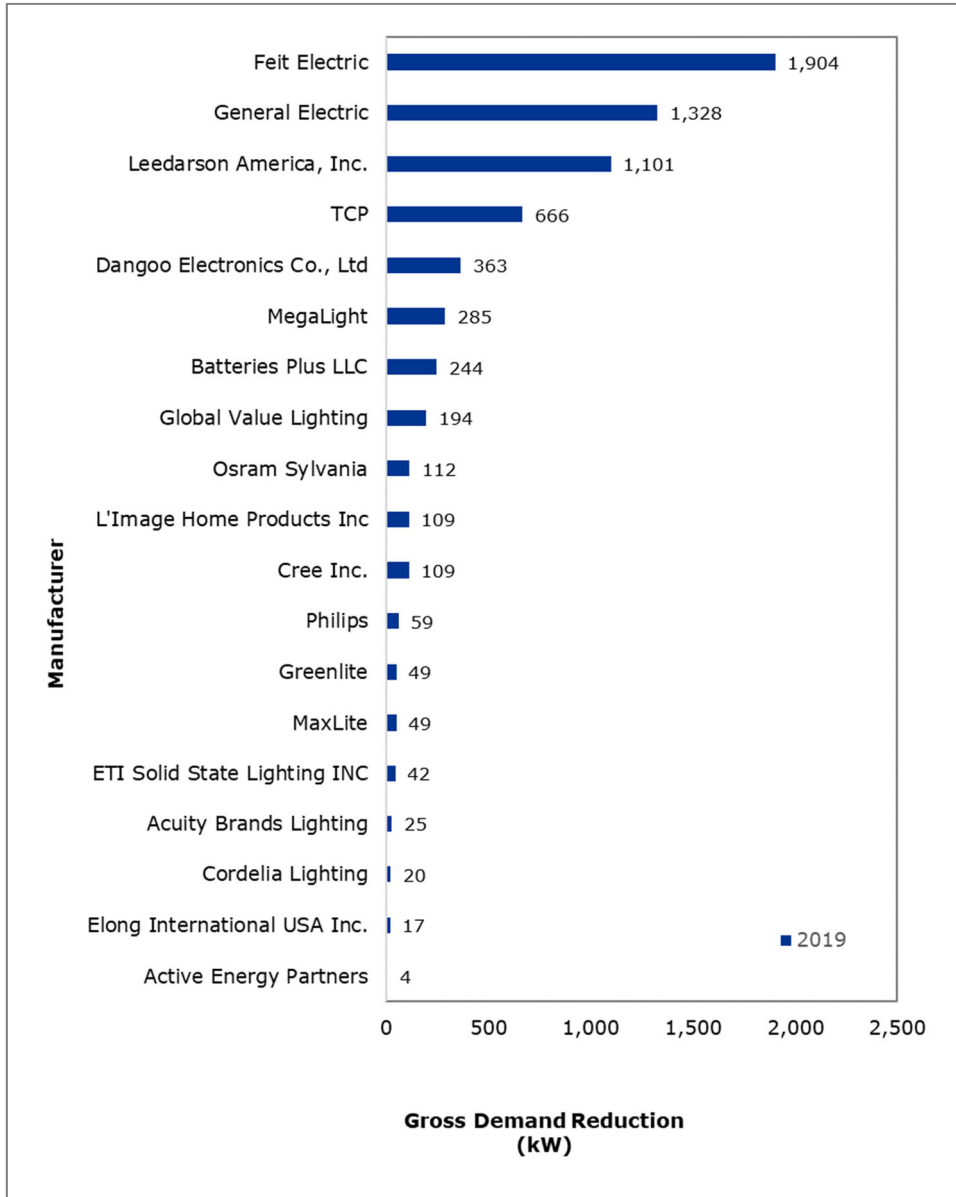
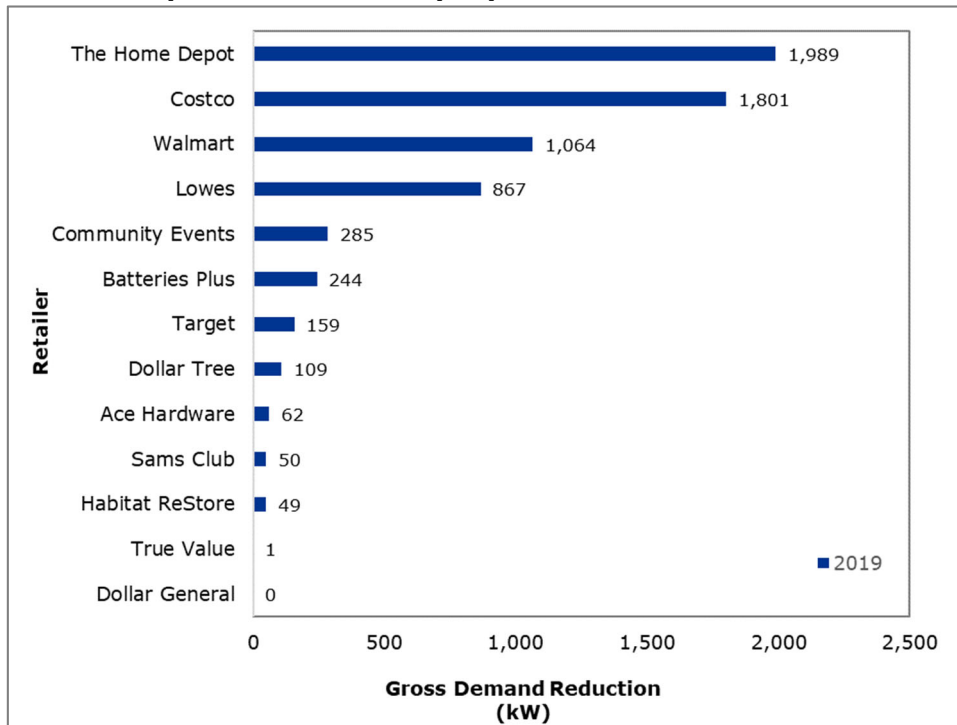


Figure 4-36. Virginia 2019 Residential Efficient Products Marketplace Program Gross Demand Reduction by Retailer and Year (kW)



4.4.3.3 Comparing Savings with Usage

See Table 4-20 for a comparison of the 2019 program net adjusted savings in Virginia with the system-wide planned savings for the program, the annual usage for an average rate schedule, and the annual usage for eligible customers in the rate schedule. The program target rate schedule is Schedule 1, and eligible customers in the rate schedule are also assumed to be all customers in Schedule 1.

Table 4-20. Virginia 2019 Residential Efficient Products Marketplace Comparison of Savings with Usage by Rate Schedule

Comparisons	Item	Value
Schedule 1		
Comparison of Savings	Net Systemwide Planned Savings per Participant	22.79 kWh/year
	Net Adjusted Savings per Participant	20 kWh/year
	Net Adjusted Savings as Percent of Planned Savings	88%
Comparison to Average Annual Usage for Rate Schedule	Average Annual Usage	13,831 kWh/participant ⁴⁰
	Net Adjusted Savings as Percent of Average Annual Usage	0.1%

⁴⁰ FERC FINANCIAL REPORT FERC FORM No. 1: Annual Report of Major Electric Utilities, Licensees and Others and Supplemental Form 3-Q: Quarterly Financial Report." For Virginia Electric and Power Company. Year/Period of Report End of 2018/Q4. Filed 3/26/2019. Page 301, Line 2, Column D (Annual Usage); Page 301, Line 2, Column F (Average No Customers).

Comparisons	Item	Value
Comparison to Annual Usage of Eligible Customers in Rate Schedule	Average Annual Usage	See "Comparison to Average Annual Usage for Rate Schedule"
	Net Adjusted Savings as Percent of Average Annual Usage	

4.5 Residential Home Energy Assessment – Virginia



Case #: PUE-2018-00168

RESIDENTIAL HOME ENERGY ASSESSMENT

2019-PRESENT

- kWh/yr in Average Net Savings Per Participant

Eligibility

- Active residential customer in the Commonwealth of Virginia and live in a single-family detached or attached residence
- Customer must be the party that is responsible for electric bill and either own the home or otherwise able to secure permission to complete measures
- Work must be completed by a participating contractor

Measures

- Direct install lighting upgrade
- Hot water appliances
- Faucets aerators
- Low flow showerheads
- Heat pump tune-up and
- Duct sealing and duct insulation
- Cool roof



Enrolled 0 customers in 2019



Achieved net annual energy savings of 0 MWh/year in 2019



Spent 31% of planned expenditures in 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	-	-	715,145	715,145
Total Program Participants (#)	-	-	-	-	0	0
Total Gross Incremental Savings (kWh/yr)	-	-	-	-	0	-
Total Net Incremental Savings (kWh/yr)	-	-	-	-	0	-
Average Gross Incremental Demand Reduction (kW)	-	-	-	-	0	-
Average Net Incremental Demand Reduction (kW)	-	-	-	-	0	-
Total Net Lifetime Savings (kWh)	-	-	-	-	0	0
Average Lifetime Demand Reduction (kW)	-	-	-	-	0	0

TOTAL SAVINGS BY MEASURE TYPE
IN KWH

TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH

4.5.1 Program Description

The Residential Home Energy Assessment Program provides owners and occupants of single-family homes and townhomes with a home energy audit. This includes a walk-through audit of customer homes, direct install measures, and recommendations for additional home energy improvements. Customers receive the recommendations in a personalized report showing the projected energy and cost savings from implementing the options identified during the check-up.



Residential customers living in single-family residences or townhomes with Dominion electric service are eligible for this program. To be eligible, the audit and installation of measures must have been performed after October 1, 2019.⁴¹

Customers must contact a participating contractor to receive the home energy audit. Customers are not considered to have fully participated in the program until a completed application form is processed and a rebate is issued. This process can take several months, as customers have 45 days to submit their rebate application, and the Company has 90 days to process it.

The eligible improvements are primarily energy efficiency measures that impact electricity consumption, and include:

- Direct install lighting
- Hot water appliances
- Efficient faucets and aerators
- Heat pump tune-up and upgrade
- Duct sealing and duct insulation
- Cool roof

The Virginia SCC approved this program, as part of the DSM Phase VII programs, on May 2, 2019 (Case No. PUR-2018-00168) for a five-year period of July 1, 2019, through June 30, 2024. The North Carolina Utilities Commission approved this program on November 13, 2019 (Docket No. E-22, SUB 567). Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details. The program officially launched on October 1, 2019. Work was completed in 2019, but the projects were held by the vendor per Company instruction to ensure invoices would process correctly without quality check exceptions when submitted in the Company business intelligence (BI) system for payment. These projects were processed through the BI system in the first weeks of 2020, despite being completed in 2019, hence they are not present in this 2019 EM&V report.

⁴¹ Per Residential Home Energy Assessment Program Rebate Application form, accessed February 24, 2020.
<https://www.dominionenergy.com/library/domcom/media/home-and-small-business/energy-conservation-programs/home-energy-assessment/virginia/rhea-7-all-measures.pdf?modified=20191016195801&la=en>

Table 4-21 maps the applicable sections in this report to reporting requirements listed in the EM&V Rule section 50, "Standard Requirements for Evaluation, Measurement, and Verification Reporting."⁴²

Table 4-21. Residential Home Assessment Program Compliance with EM&V Rule Section 50

Subsection within 20 VAC 5-318-50	Location and Description
A. EM&V Plan	Appendix IJ. EM&V Plan
B. Utilizing utility-specific data or other data	<p>Per 20 VAC 5-318-40 A and B</p> <ol style="list-style-type: none"> See Appendix F. STEP Manual v10 for a description of all data or estimates used as inputs for this program and the measures within it. See the Methodologies section (section 3) of this report for a description of the overarching EM&V methodologies used to produce results in this report. <p>Per 20 VAC 5-318-40 C</p> <ol style="list-style-type: none"> There were no program participants in this program in 2019.
C. Changes to measure-level inputs and assumptions, and inputs to cost/benefit estimates	<ol style="list-style-type: none"> See Table 4-22 for program planning assumptions See documents filed with the Virginia State Corporation Commission Docket PUR-2018-00168 for approved measure-level inputs and assumptions, and the impact of such changes on original cost/benefit estimates for DSM programs or measures.
D. Measure-level data collection methodology	See response to A. and B. above.
E. Explanation of eligibility requirements for each rate schedule that program is offered	See program description above.
F. Comparison of measured annual measure or program savings estimates to the annual usage of the average rate schedule usage, and eligible customer in each rate schedule	There were no program participants in this program in 2019.
G. Explanation of controls undertaken by utility	There were no program participants in this program in 2019.

4.5.2 Methods for the Current Reporting Period

DNV GL developed an EM&V Plan for this program, which is included in Appendix J. For the current period, the approach included reviewing the tracking data.

Table 4-22 outlines Dominion Energy's initial program planning assumptions that were used to design the program. DNV GL uses the planned NTG factor in its net savings calculations until it can be verified through EM&V.

Table 4-22. Residential Home Energy Assessment Program Planning Assumptions System-wide

Assumption	Description
Target Market	Residential customers
NTG Factor	80%

⁴² 20 VAC 5-318-50

Assumption	Description
Measure Life (years)	12.4
Gross Average Annual Energy Savings per Participant (kWh/year)	447.28
Gross Average Coincident Peak Demand Reduction per Participant (kW)	0.10
Net Average Annual Energy Savings per Participant (kWh/year)	357.8
Average Rebate (US\$) per Participant	\$82

4.5.3 Assessment of Program Progress Towards Plan

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

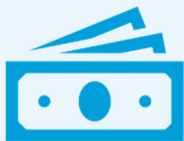
4.5.3.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 4-23 provides performance indicator data for the year and shaded cells are considered sensitive information. Detailed program indicators by month are provided in Appendix A.4.



- There were no participants in 2019.

- There were no annual kWh or kW savings because there were no participants in 2019.



- Annual program costs in 2019 were 31% of planned costs.
- All costs were related to program implementation, EM&V and other administrative activities to launch the program.

Table 4-23. Residential Home Energy Assessment Indicators (2019)

Category	Item	2019
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	

Category	Item	2019
	Direct EM&V	
	Indirect Other (Administrative)	\$24,171
Total Costs (\$)	Total ⁴³	\$715,145
	Planned	\$2,326,635
	Variance	-\$1,611,489
	Annual % of Planned	31%
Participants	Total (Gross)	0
	Planned (Gross)	11,030
	Variance	-11,030
	Annual % of Planned (Gross)	0%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	0
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	0
	Net-to-Gross Adjustment (80%)	0
	Net Adjusted Savings	0
	Planned Savings (Net)	1,073,361
	Annual % Toward Planned Savings (Net)	0%
	Avg. Savings per Participant (Gross)	N/A
	Avg. Savings per Participant (Net)	N/A
Installed Demand Reduction (kW)	Total Gross Deemed Demand	0.0
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand	0.0
	Net-to-Gross Adjustment (80%)	0.0
	Net Adjusted Demand	0.0
	Planned Demand (Net)	0.0
	Annual % Toward Planned Demand (Net)	N/A
	Avg. Peak Demand per Participant (Gross)	N/A
	Avg. Demand per Participant (Net)	N/A
Program Performance	Annual \$Admin. per Participant (Gross)	N/A
	Annual \$Admin. per kWh/year (Gross)	N/A
	Annual \$Admin. per kW (Gross)	N/A
	Annual \$EM&V per Total Costs (\$)	14%
	Annual \$Rebate per Participant (Gross)	N/A

⁴³ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.



4.5.3.2 Additional Virginia Program Data

No Virginia customers participated in the program through 2019.

4.5.3.3 Comparison of Savings with Usage

No Virginia customers participated in the program through 2019.

5 ENERGY EFFICIENCY PROGRAMS – NON-RESIDENTIAL

This section reports on the 2019 progress of ten non-residential energy efficiency programs.

1. Non-residential Lighting Systems & Controls (DSM Phase III) – Virginia and North Carolina
2. Non-residential Lighting Systems & Controls (DSM Phase VII) – Virginia
3. Non-residential Heating and Cooling Efficiency (DSM Phase III) – Virginia and North Carolina
4. Non-residential Heating and Cooling Efficiency (DSM Phase VII) – Virginia
5. Non-residential Window Film (DSM Phase III) – Virginia and North Carolina
6. Non-residential Window Film (DSM Phase VII) – Virginia
7. Non-residential Small Business Improvement (DSM Phase V) – Virginia and North Carolina
8. Non-residential Prescriptive (DSM Phase VI) – Virginia and North Carolina
9. Non-residential Small Manufacturing (DSM Phase VII) - Virginia
10. Non-residential Office (DSM Phase VII) - Virginia

Active 2019 non-residential programs accounted for:

- 19% of total participants for both active residential and non-residential programs,
- 46% of gross annual energy savings, and
- 60% of spending for both active residential and non-residential programs.

Figure 5-1 and Figure 5-2 show the cumulative count of non-residential energy efficiency program participation and gross annualized energy savings in the two states, at the county level, for all active programs, through December 2019. The deeper the color, the greater the participation and gross annualized energy savings.

The top three Jurisdictions in Virginia with the highest participation in 2019 in descending order were Fairfax, Henrico and Chesterfield. In North Carolina the three jurisdictions that had the highest participants in 2019 in descending order were Dare, Currituck, and Halifax.

In reference to energy savings, the top three jurisdictions in Virginia for kWh savings, in descending order, were Fairfax, Loudoun, and Chesterfield. For North Carolina the three jurisdictions with the highest kWh savings, in descending order, were Dare, Martin, and Nash.

Figure 5-1. Virginia and North Carolina Non-residential Energy Efficiency Program Participation Map, by county, Inception to December 31, 2019

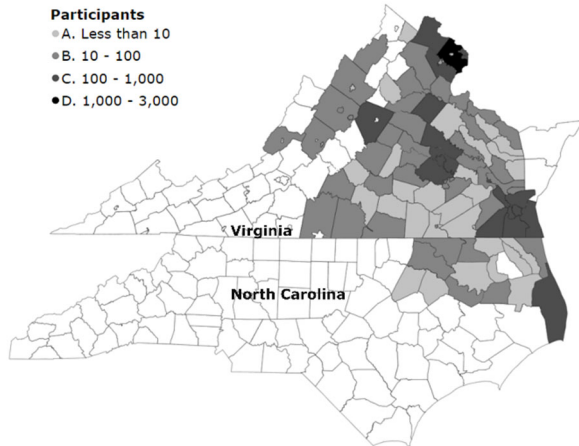
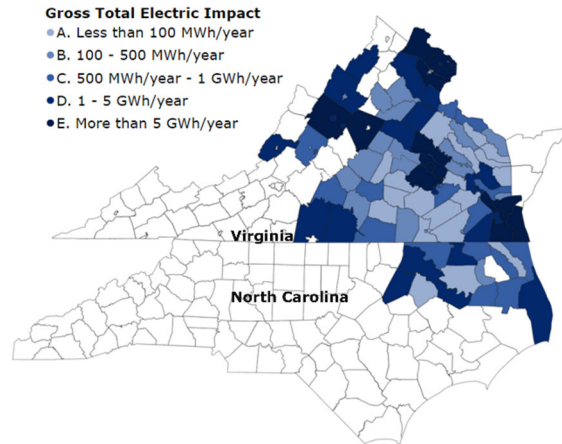


Figure 5-2. Virginia and North Carolina Non-residential Energy Efficiency Program Gross Annualized Energy Savings Map, by County, Inception to December 31, 2019



5.1 Non-residential Lighting Systems & Controls (DSM Phase III) – Virginia and North Carolina

Virginia
Case #: PUE-2013-00072

NON-RESIDENTIAL LIGHTING SYSTEM & CONTROLS

2014-2019

43,488 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- T8s with electronic ballast
- High-performance T8s
- T5s with electronic ballast
- CFLs
- LEDs
- Occupancy sensors



Enrolled **4,501** customers, **64%** of planned participation



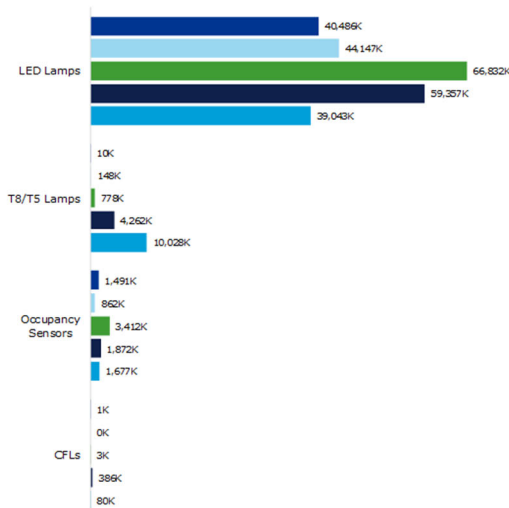
Achieved net annual energy savings of **195,738 MWh/year**, **142%** of planned energy savings



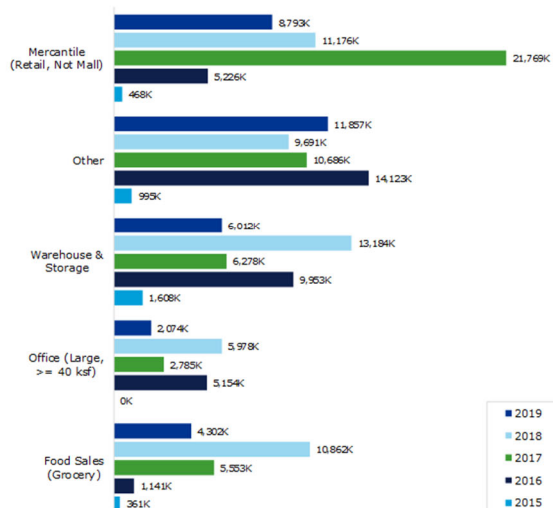
Spent **138%** of planned expenditures

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	6,608,836	7,070,615	8,931,669	6,229,352	4,806,213	34,942,609
Total Program Participants (#)	1,241	1,203	868	649	422	4,501
Total Gross Incremental Savings (kWh/yr)	50,828,062	65,876,985	71,024,607	45,157,541	41,988,907	-
Total Net Incremental Savings (kWh/yr)	35,579,643	46,113,890	49,717,225	31,610,279	29,392,235	-
Average Gross Incremental Demand Reduction (kW)	10,674	15,380	11,958	7,222	5,638	-
Average Net Incremental Demand Reduction (kW)	7,472	10,766	8,371	5,056	3,946	-
Total Net Lifetime Savings (kWh)	21,457,518	83,852,758	195,451,936	344,518,050	537,950,026	1,761,642,509
Average Lifetime Demand Reduction (kW)	8,171	18,937	27,308	32,363	36,309	36,309

TOTAL SAVINGS BY MEASURE TYPE
ALL IN KWH



TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH



North Carolina

Docket #: E-22 Sub 508

NON-RESIDENTIAL LIGHTING SYSTEM & CONTROLS

2015-2019

52,645 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- T8s with electronic ballast
- High-performance T8s
- T5s with electronic ballast
- CFLs
- LEDs
- Occupancy sensors



Enrolled **184** customers, **40%** of planned participation



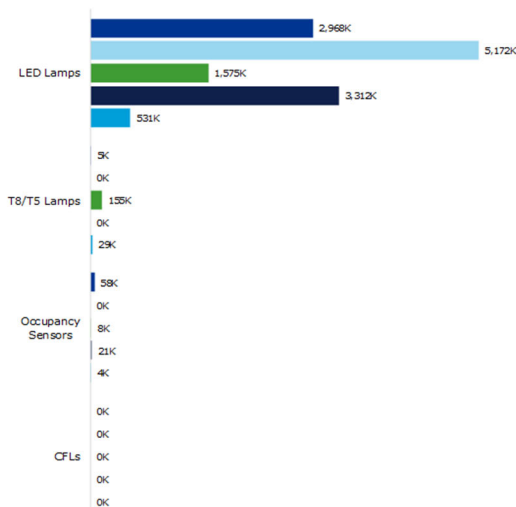
Achieved net annual energy savings of **9,687 MWh/year**, **102%** of planned energy savings



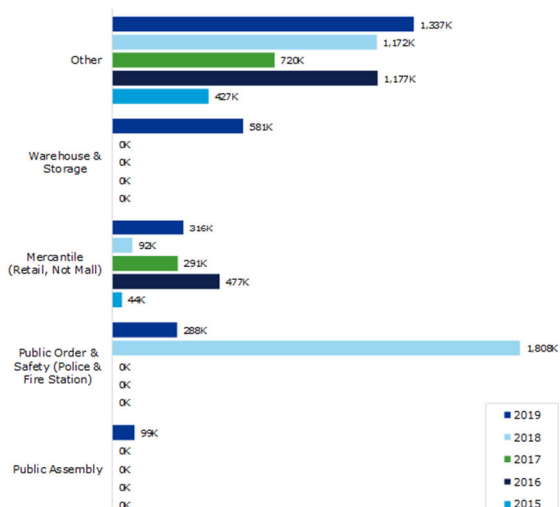
Spent **84%** of planned expenditures

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	122,739	393,406	252,605	249,209	413,562	1,431,520
Total Program Participants (#)	13	43	23	43	62	184
Total Gross Incremental Savings (kWh/yr)	564,326	3,333,527	1,738,121	5,172,076	3,030,032	-
Total Net Incremental Savings (kWh/yr)	395,028	2,333,469	1,216,685	3,620,453	2,121,023	-
Average Gross Incremental Demand Reduction (kW)	105	743	335	1,110	594	-
Average Net Incremental Demand Reduction (kW)	73	520	234	777	416	-
Total Net Lifetime Savings (kWh)	111,408	1,699,056	5,150,948	10,123,170	19,177,078	87,179,917
Average Lifetime Demand Reduction (kW)	73	593	828	1,605	2,021	2,021

TOTAL SAVINGS BY MEASURE TYPE
ALL IN KWH



TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH



5.1.1 Program Description

The Non-residential Lighting Systems & Controls Program offers non-residential customers rebate incentives to retrofit their existing lighting system with a more energy-efficient and cost-effective lighting system. The program provides rebates for the following types of measures:

- T8 with electronic ballast
- High-performance T8
- T5 with electronic ballast
- CFLs
- LEDs
- Occupancy sensors

This program is implemented through a contractor network, so customers must contact a participating contractor to be eligible for the rebate. All Dominion Energy non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out. Customers are not considered participants until a completed application form is processed and a rebate is issued. This process can take several months, as customers have 45 days to submit their rebate application and Dominion Energy has 90 days to process it.

The Virginia SCC approved this program, as part of the DSM Phase III programs, on April 29, 2014 (Case No. PUE-2013-00072) for a five-year period of May 1, 2014 through April 30, 2019. The North Carolina Utilities Commission approved this program on October 27, 2014 (Docket No. E-22, Sub 508). When the Virginia program expired in April 2019, which triggered the systemwide version of this program to close, the NCUC ordered (on October 16, 2018, Docket No. E-22, Sub 508) for this program to continue implementation only in North Carolina starting in January 1, 2019 until the DSM Phase VII version of the program was available. Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details in both states.

5.1.2 Methods for the Current Reporting Period

For the current period, the approach included reviewing the tracking data, then estimating gross energy and demand savings using STEP Manual calculations.

Table 5-1 outlines Dominion Energy’s initial program planning assumptions used to design the program. DNV GL uses the planned NTG factor in its net savings calculations for the program measures that have not yet been verified through EM&V.

Table 5-1. Non-residential Lighting Systems and Controls Program (Phase III) Planning Assumptions System-wide

Assumption	Value
Target Market	Non-residential
NTG Factor	70%
Measure Life (years)	9
Average Annual Energy Savings per Participant (kWh/year)	18,259
Average Peak Demand Reduction (kW) per Participant	5.10
Average Rebate (US\$) per Participant	\$2,957

5.1.3 Assessment of Program Progress Towards Plan

The next subsections describe the program's progress towards planned participants, energy savings, and demand reduction.

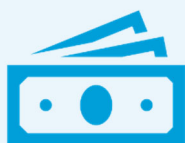
5.1.3.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs in Virginia from program launch in May 2014 through program close in April 2019 appear below. Following this summary, Table 5-2 provides performance indicator data by year and shaded cells are considered sensitive information. Detailed program indicators by year and month are provided in Appendix A.5. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.5, and cumulative net savings are in Appendix D.5.



- From program inception through close, 4,501 customers participated in the program, approximately 64% of planned participation.
- Participation peaked in 2015 (1,241 participants), the first full year the program was offered.

- From program inception through close, the program achieved net energy savings of 195,738,057 kWh/year, approximately 142% of its planned target.
- The average net energy savings per participant was 43,488 kWh, approximately 151% of planned savings per participant from Table 5-1.
- From program inception through close, the program achieved a net demand reduction of 36,309 kW, approximately 131% of its planned target.
- The average net demand reduction per participant was 8.1 kW, approximately 208% of planned demand reduction per participant from Table 5-1.



- From program inception through close, the program spent approximately 138% of planned program costs.

Table 5-2. Virginia Non-residential Lighting Systems & Controls Program Performance Indicators (2014-2019)

Category	Item	2014	2015	2016 ⁴⁴	2017	2018	2019	Program Total (2014-2019)
		Operations and Management Costs (\$)						
	Direct Rebate							
	Direct Implementation							
	Direct EM&V							
	Indirect Other (Administrative)	\$39,157	\$191,137	\$214,891	\$351,449	\$351,760	\$289,158	\$1,437,553
Total Costs (\$)	Total ⁴⁵	\$1,295,925	\$6,608,836	\$7,070,615	\$8,931,669	\$6,229,352	\$4,806,213	\$34,942,609
	Planned	\$3,048,223	\$5,355,067	\$5,349,167	\$5,268,411	\$6,289,779	\$100,294	\$25,410,941
	Variance	-\$1,752,298	\$1,253,769	\$1,721,448	\$3,663,258	-\$60,427	\$4,705,918	\$9,531,668
	Cumulative % of Planned	43%	123%	132%	170%	99%	4792%	138%
Participants	Total (Gross)	118	1,241	1,203	868	649	422	4,501
	Planned (Gross)	688	1,504	1,531	1,553	1,807	0	7,083
	Variance	-570	-263	-328	-685	-1,158	422	-2,582
	Cumulative % of planned (Gross)	17%	83%	79%	56%	36%	N/A	64%
Installed Energy	Total Gross Deemed Savings	4,749,693	50,828,062	65,876,985	71,024,607	45,157,541	41,988,907	279,625,795

⁴⁴ The 2016 total gross deemed savings values reported in this table differs from values in the May 1, 2017 EM&V report and have been reflled with the Commission. The adjustments totaled 14,862,478 kWh/year and 168 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 9.1.1. The adjustment was to waste heat factors (WHF) applied to lighting fixtures installed in 2016, where the program participant building HVAC systems was assumed to be heat pump heating and cooling systems, rather than the previous assumption of AC cool and non-electric heat systems. This adjustment was made in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. It is reflected in STEP Manual version 8.0.0 in this EM&V report.

⁴⁵ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2014	2015	2016 ⁴⁴	2017	2018	2019	Program Total (2014-2019)	
Savings (kWh/year)	Realization Rate Adjustment (100%)	0	0	0	0	0	0	0	
	Adjusted Gross Savings	4,749,693	50,828,062	65,876,985	71,024,607	45,157,541	41,988,907	279,625,795	
	Net-to-Gross Adjustment (70%) ⁴⁶	-1,424,908	-15,248,419	-19,763,096	-21,307,382	-13,547,262	-12,596,672	-83,887,739	
	Net Adjusted Savings	3,324,785	35,579,643	46,113,890	49,717,225	31,610,279	29,392,235	195,738,057	
	Planned Savings (Net)	12,317,239	27,461,536	24,119,220	33,214,031	40,368,376	0	137,480,402	
	% Toward Planned Savings (Net)	27%	130%	191%	150%	78%	N/A	142%	
	Avg. Savings per Participant (Gross)	40,252	40,957	54,761	81,826	69,580	99,500	62,125	
	Avg. Savings per Participant (Net)	28,176	28,670	38,332	57,278	48,706	69,650	43,488	
	Installed Demand Reduction (kW)	Total Gross Deemed Demand	998.5	10,674.2	15,380.0	11,958.2	7,222.3	5,637.5	51,870.7
		Realization Rate Adjustment (100%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adjusted Gross Demand		998.5	10,674.2	15,380.0	11,958.2	7,222.3	5,637.5	51,870.7	

⁴⁶ On the rebate application form the program implementation vendor included the question, "Did the rebate incentive offered by Dominion Energy have any influence in your decision to have the work performed?" Of all participants who responded (from program inception to the end of this reporting period), the implementation vendor has calculated that 97% answered yes at the time they filled out the rebate application. This is not a substitute for a net-to-gross analysis conducted by an independent evaluator. See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation approaches.

Category	Item	2014	2015	2016 ⁴⁴	2017	2018	2019	Program Total (2014-2019)
	Net-to-Gross Adjustment (70%) ⁴⁷	-299.5	-3,202.3	-4,614.0	-3,587.5	-2,166.7	-1,691.3	-15,561.2
	Net Adjusted Demand	698.9	7,472.0	10,766.0	8,370.8	5,055.6	3,946.3	36,309.5
	Planned Demand (Net)	3,228.9	7,670.4	4,089.4	5,486.3	7,269.0	0.0	27,744.0
	% Toward Planned Demand (Net)	22%	97%	263%	153%	70%	N/A	131%
	Avg. Demand per Participant (Gross)	8.5	8.6	12.8	13.8	11.1	13.4	11.5
	Avg. Demand per Participant (Net)	5.9	6.0	8.9	9.6	7.8	9.4	8.1
Program Performance	\$Admin. per Participant (Gross)	\$332	\$154	\$179	\$405	\$542	\$685	\$319
	\$Admin. per kWh/year (Gross)	\$0.01	\$0.00	\$0.00	\$0.00	\$0.01	\$0.01	\$0.01
	\$Admin. per kW (Gross)	\$39	\$18	\$14	\$29	\$49	\$51	\$28
	\$EM&V per Total Costs (\$)	5.1%	1.8%	1.5%	1.1%	1.6%	1.3%	1.6%
	\$Rebate per Participant (Gross)	\$4,355	\$4,487	\$5,025	\$8,725	\$7,668	\$9,892	\$6,410

⁴⁷ Ibid.

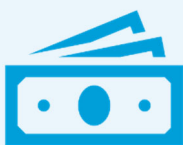
5.1.3.2 Key North Carolina Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for North Carolina in 2019 appear below. Following this summary, Table 5-3 provides performance indicator data from 2015 through December 31, 2019 and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix B.3. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.5, and cumulative net savings are in Appendix D.5.



- In 2019, 62 customers participated in the program, approximately 144% of planned participation.
- Participation increased 44% from 2018, when 43 customers enrolled in the program, and marks a program high.

- In 2019, the program achieved net energy savings of 2,121,023 kWh/year, approximately 175% of planned savings.
- The average net energy savings per participant was 34,210 kWh, approximately 119% of planned savings per participant from Table 5-1.
- In 2019, the program achieved net demand reduction of 416 kW, approximately 190% of planned reduction.
- The average net energy demand reduction per participant was 6.7 kW, approximately 172% of planned demand reduction per participant from Table 5-1.



- In 2019, the program spent approximately 179% of planned program costs.
- Cumulatively the program has spent 84% of its planned lifetime costs.

Table 5-3. North Carolina Lighting Systems & Controls Program Performance Indicators (2015-2019)

Category	Item	2015	2016 ⁴⁸	2017	2018	2019	Program Total (2015-2019)
Operations and Management Costs (\$)	Direct Rebate						
	Direct Implementation						
	Direct EM&V						
	Indirect Other (Administrative)	\$3,511	\$11,956	\$9,940	\$14,072	\$22,295	\$61,775
Total Costs (\$)	Total ⁴⁵	\$122,739	\$393,406	\$252,605	\$249,209	\$413,562	\$1,431,520
	Planned	\$357,955	\$359,278	\$347,298	\$403,711	\$230,531	\$1,698,773
	Variance	-\$235,216	\$34,128	-\$94,693	-\$154,502	\$183,030	-\$267,254
	Annual % of Planned	34%	109%	73%	62%	179%	84%
Participants	Total (Gross)	13	43	23	43	62	184
	Planned (Gross)	96	102	104	119	43	464
	Variance	-83	-59	-81	-76	62	-237
	Annual % of Planned (Gross)	14%	42%	22%	36%	144%	40%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	564,326	3,333,527	1,738,121	5,172,076	3,030,032	13,838,082
	Realization Rate Adjustment (100%)	0	0	0	0	0	0
	Adjusted Gross Savings	564,326	3,333,527	1,738,121	5,172,076	3,030,032	13,838,082
	Net-to-Gross Adjustment (70%)	-169,298	-1,000,058	-521,436	-1,551,623	-909,010	-4,151,425
	Net Adjusted Savings	395,028	2,333,469	1,216,685	3,620,453	2,121,023	9,686,657
	Planned Savings (Net)	1,752,864	1,619,973	2,220,165	2,661,116	1,213,184	9,467,302
	Annual % Toward Planned Savings (Net)	23%	144%	55%	136%	175%	102%

⁴⁸ The 2016 total gross deemed savings values reported in this table differs from values in the May 1, 2017 EM&V report and have been reflled with the Commission. The adjustments totaled -481,137 kWh/year and 26 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 9.1.1. The adjustment was to waste heat factors (WHFe and WHFd) applied to lighting fixtures installed in 2016, where the program participant building HVAC systems was assumed to be heat pump heating and cooling systems, rather than the previous assumption of AC cool and non-electric heat systems. This adjustment was made in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. It is reflected in STEP Manual version 8.0.0 in this EM&V report.

Category	Item	2015	2016 ⁴⁸	2017	2018	2019	Program Total (2015-2019)
		Avg. Savings per Participant (Gross)	43,410	77,524	75,570	120,281	48,871
Avg. Savings per Participant (Net)	30,387	54,267	52,899	84,197	34,210	52,645	
Installed Demand Reduction (kW)	Total Gross Deemed Demand	104.6	743.2	334.5	1,109.9	594.3	2,886.6
	Realization Rate Adjustment (100%)	0.0	0.0	0.0	0.0	0.0	0.0
	Adjusted Gross Demand	104.6	743.2	334.5	1,109.9	594.3	2,886.6
	Net-to-Gross Adjustment (70%)	-31.4	-223.0	-100.4	-333.0	-178.3	-866.0
	Net Adjusted Demand	73.2	520.2	234.2	777.0	416.0	2,020.6
	Planned Demand (Net)	490.2	274.7	366.7	479.0	218.5	1,829.1
	Annual % Toward Planned Demand (Net)	15%	189%	64%	162%	190%	110%
	Avg. Demand per Participant (Gross)	8.0	17.3	14.5	25.8	9.6	15.7
	Avg. Demand per Participant (Net)	5.6	12.1	10.2	18.1	6.7	11.0
	Program Performance	Annual \$Admin. per Participant (Gross)	\$270	\$278	\$432	\$327	\$360
Annual \$Admin. per kWh/year (Gross)		\$0.01	\$0.00	\$0.01	\$0.00	\$0.01	\$0.00
Annual \$Admin. per kW (Gross)		\$34	\$16	\$30	\$12.68	\$38	\$21
Annual \$EM&V per Total Costs (\$)		6.4%	1.8%	2.6%	2.5%	0.9%	2.2%
Annual \$Rebate per Participant (Gross)		\$5,260	\$7,742	\$8,251	\$4,310	\$5,205	\$3,6%

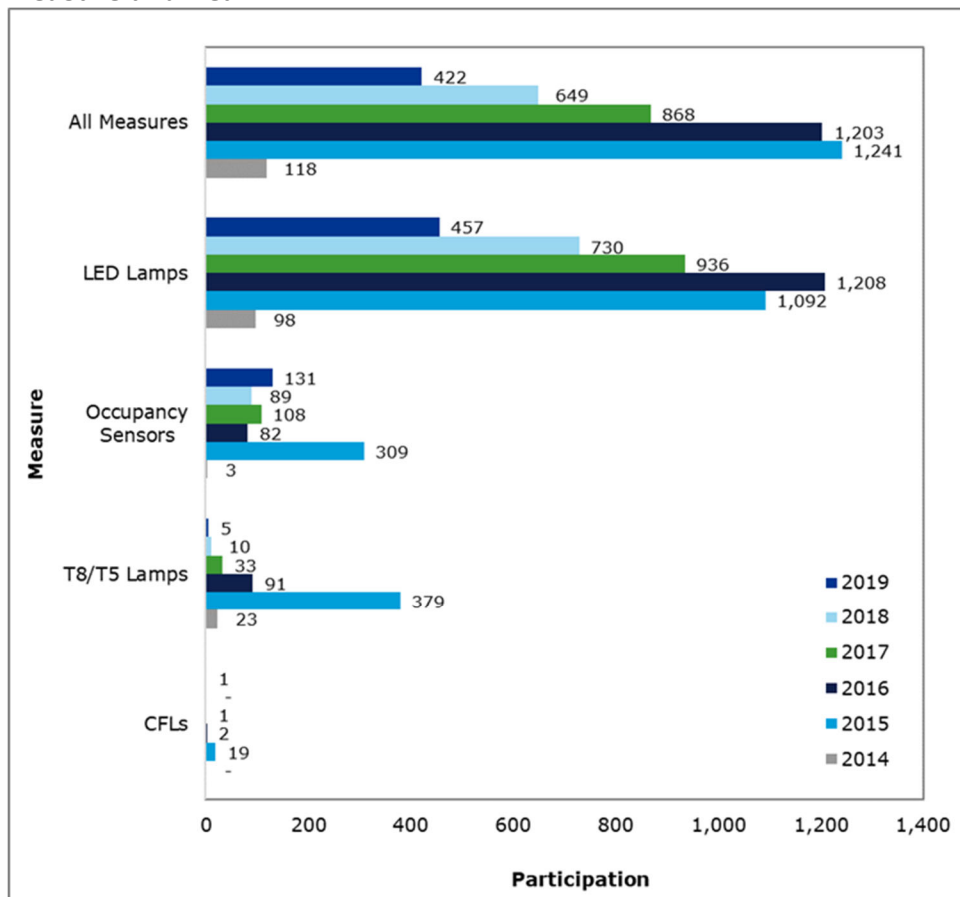
5.1.3.3 Additional Virginia Program Data

Figure 5-3 through Figure 5-5 show the program’s participation, gross annualized energy savings, and average annualized energy savings per participant (for participants who installed the measure in the respective year) by measure type and program year.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above and the “by building” charts below, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

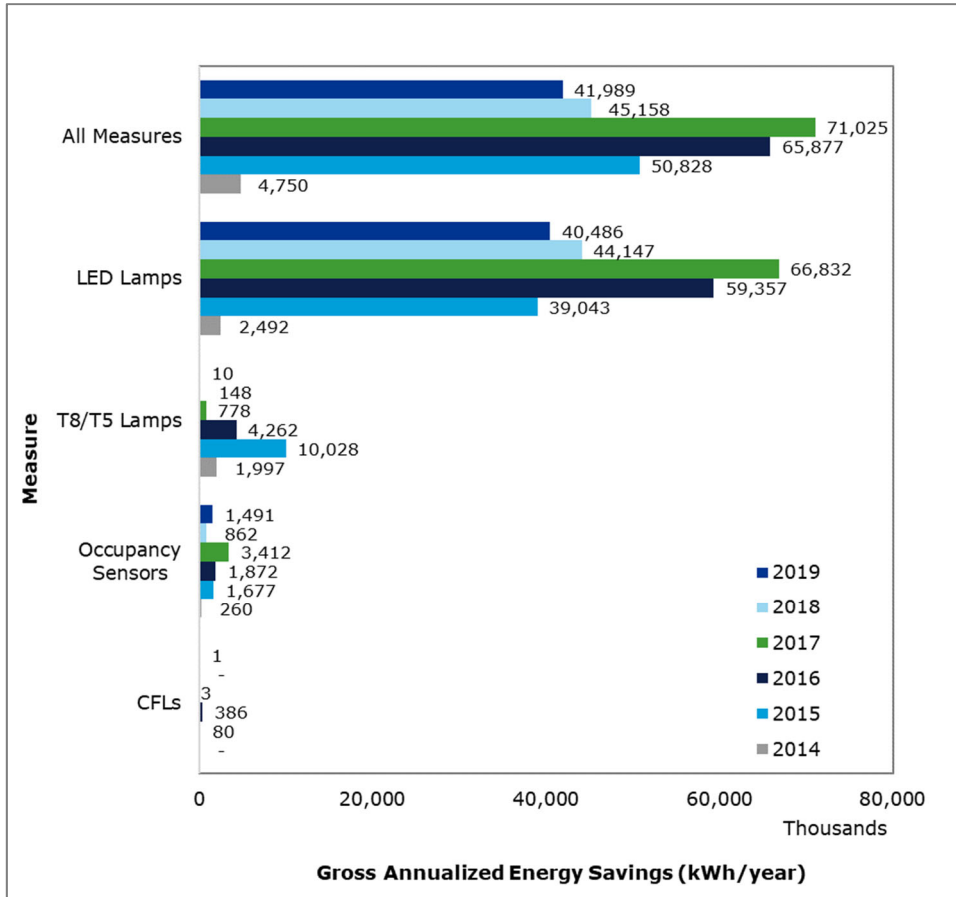
Each year from program inception through close, the most frequently-adopted measure has been the installation of LED lamps, as shown in Figure 5-3. This is likely due to the fact that they are the latest technology available in the market and the price has decreased significantly over the past few years. Note that T8s in the T8/T5 category refer to T8s with electronic ballasts and high performance T8s. T8s became the baseline lighting option in 2014, as required by the Energy Independence and Security Act (EISA) of 2007.

Figure 5-3. Virginia Non-residential Lighting Systems & Controls Program Participation by Measure and Year



In addition to being the most frequently adopted measure, LEDs accounted for the most gross annualized energy savings each year of the program, as shown in Figure 5-4.

Figure 5-4. Virginia Non-residential Lighting Systems & Controls Program Gross Annualized Energy Savings by Measure and Year (MWh/year)



Cumulatively, from program inception through close, LED installations have produced the highest gross annualized savings per participant, as shown in Figure 5-5.

Figure 5-5. Virginia Non-residential Lighting Systems & Controls Program Average Gross Annualized Energy Savings per Participant (MWh/year per participant) by Measure and Year

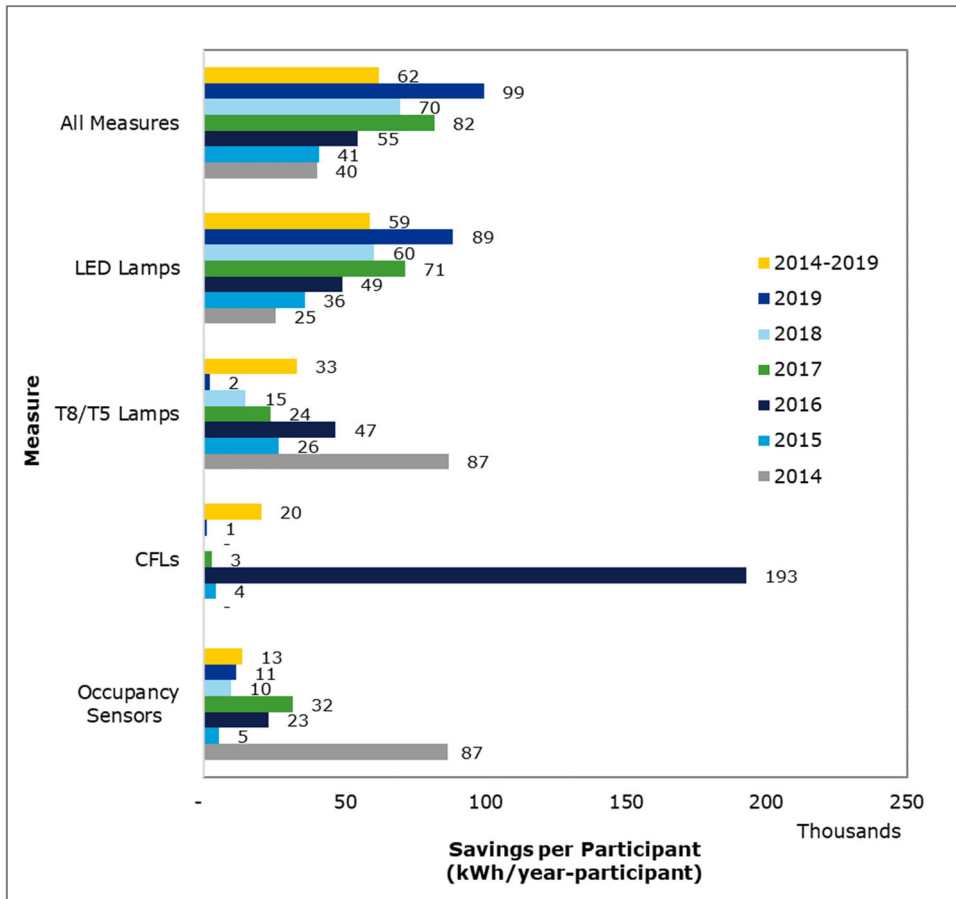


Figure 5-6 through Figure 5-8 show the program’s participation, gross annualized energy savings, and average annualized energy savings per participant by building type and program year.

A participant is only counted once in these “by building” charts, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

In 2019, mercantile (retail, not mall) buildings had the most program participants (Figure 5-6), followed by “other” building types. Likewise, the gross annualized energy savings (Figure 5-7) were highest in mercantile (retail, not mall) buildings followed by “other” building types.

Figure 5-6. Virginia Non-residential Lighting Systems & Controls Program Participation by Building Type and Year

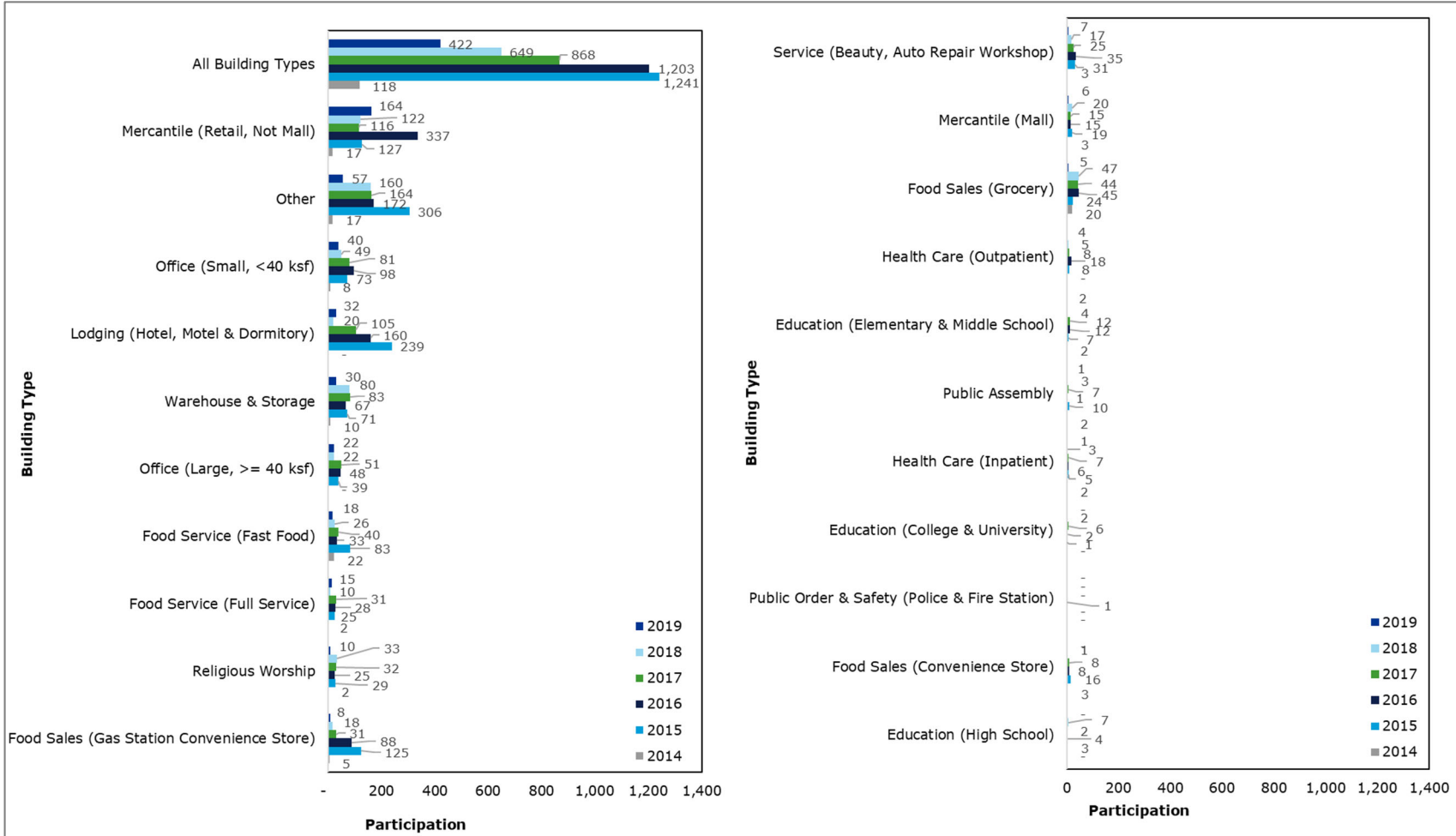
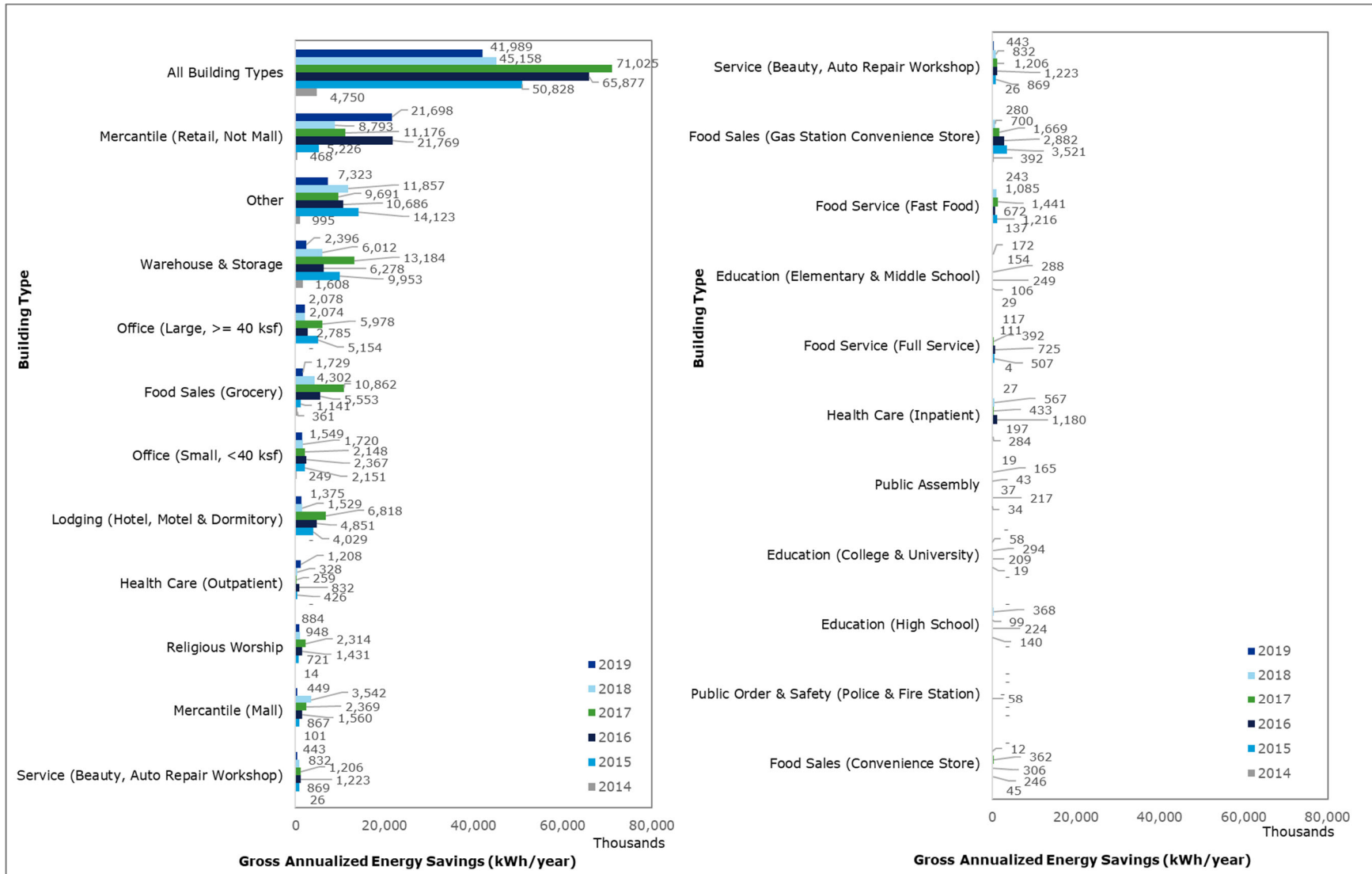
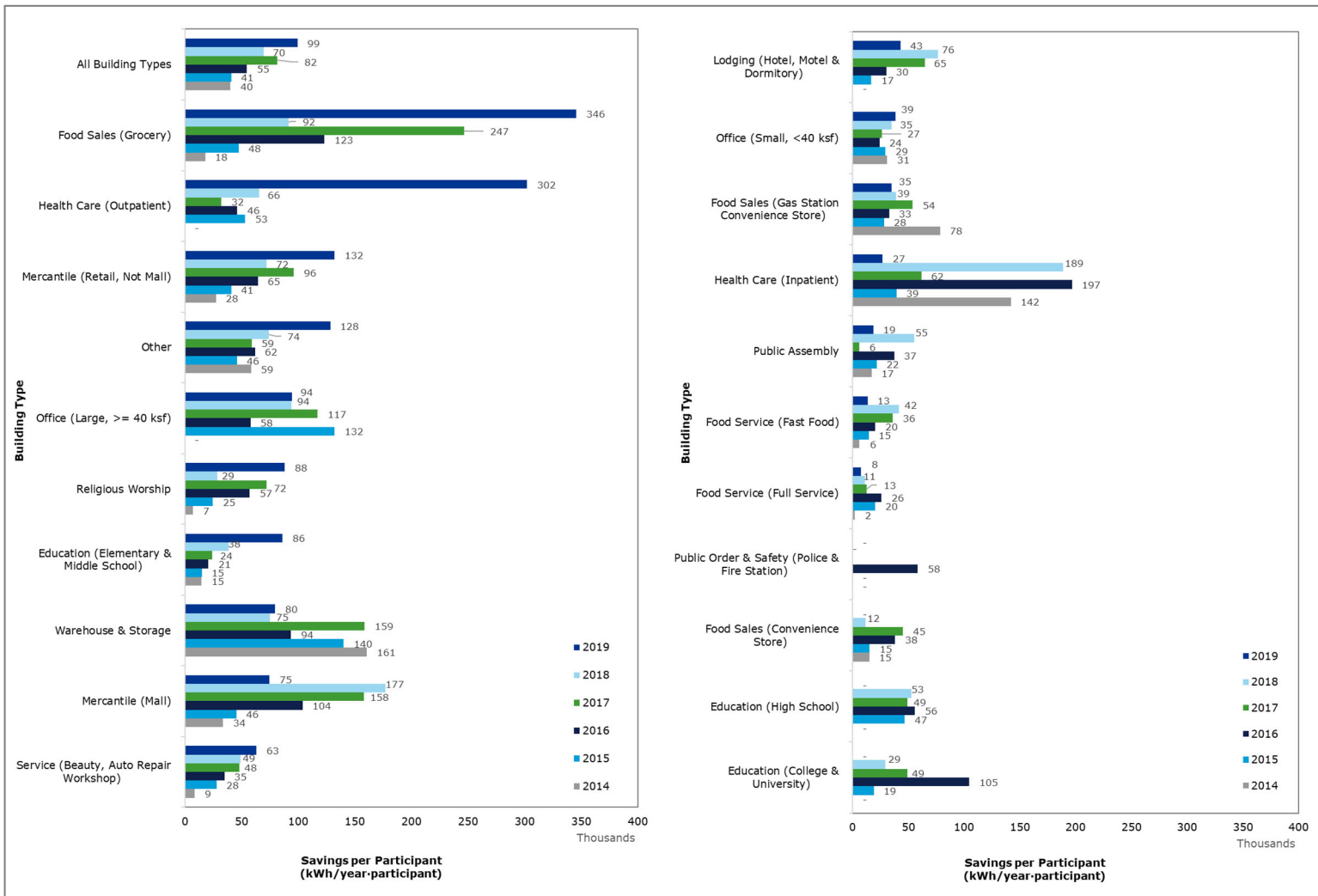


Figure 5-7. Virginia Non-residential Lighting Systems & Controls Program Gross Annualized Energy Savings by Building Type and Year (MWh/year)



In 2019, average gross energy savings per participant, by building type (Figure 5-8), was highest for participants in food sales (grocery) buildings.

Figure 5-8. Virginia Non-residential Lighting Systems and Controls Program Average Gross Annualized Energy Savings per Participant (MWh/year per participant) by Building Type and Year



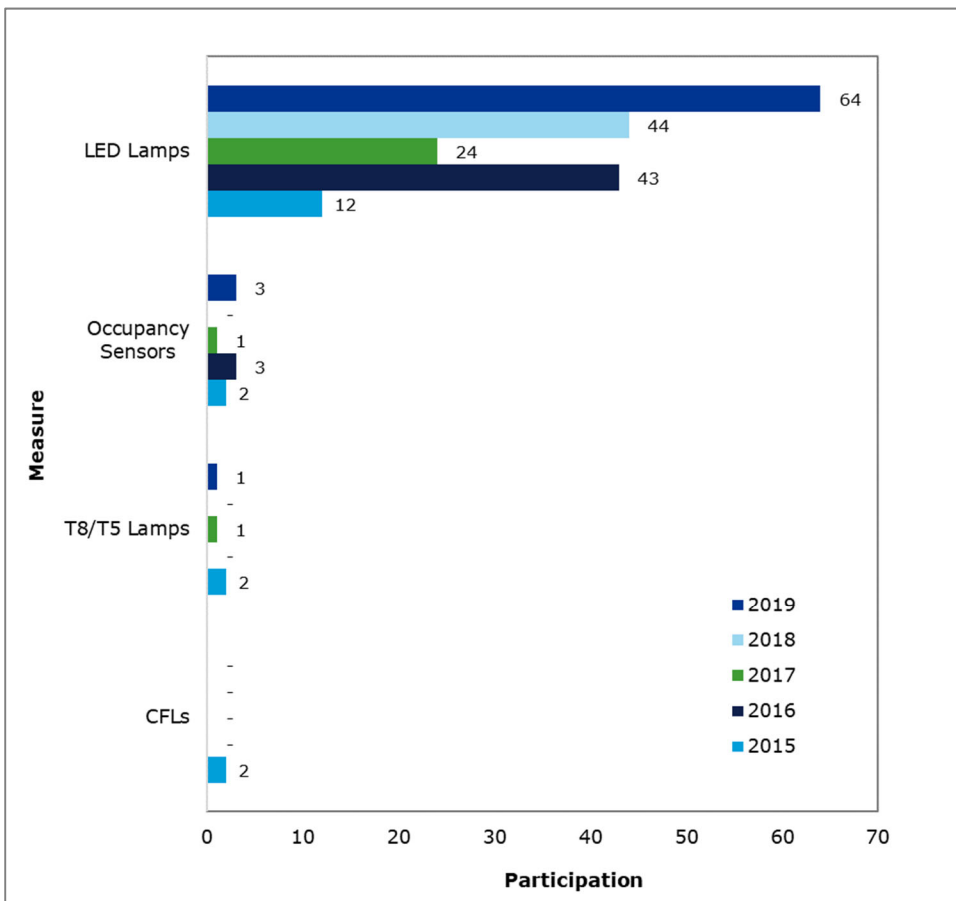
5.1.3.4 Additional North Carolina Program Data

Figure 5-9 through Figure 5-11 show participation, gross annualized energy savings, and average annualized energy savings per participant (for participants who installed the measure in the respective year) by measure type and program year.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above and the “by building” charts below, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

Each year from program inception through close, the most frequently adopted measure has been the installation of LED lamps, as shown in Figure 5-9.

Figure 5-9. North Carolina Non-residential Lighting Systems and Controls Program Participation by Measure and Year



In addition to being the most frequently adopted measure, LEDs accounted for the most gross annualized energy savings each year of the program, as shown in Figure 5-10.

Figure 5-10. North Carolina Non-residential Lighting Systems & Controls Program Gross Annualized Energy Savings (MWh/year) by Measure and Year

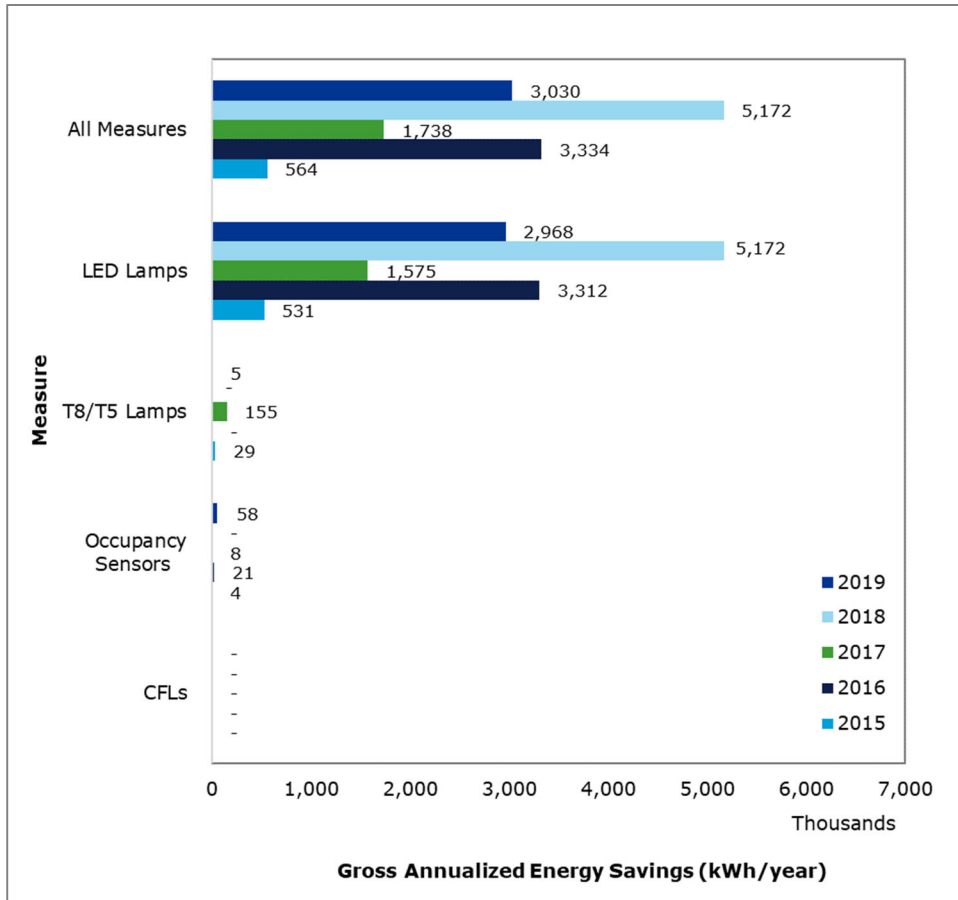


Figure 5-11 shows gross annualized energy savings per participant by measure type for each year the program has been active and cumulatively for all program years. In 2019 and cumulatively since program inception, LED lamps had the highest savings per participant. The savings per participant for T8/T5 lamps in 2017 are highest due to one participant who installed 518 high-performance T8 lamps.

Figure 5-11. North Carolina Non-residential Lighting Systems & Controls Program Average Gross Annualized Energy Savings per Participant (MWh/year per participant) by Measure and Year

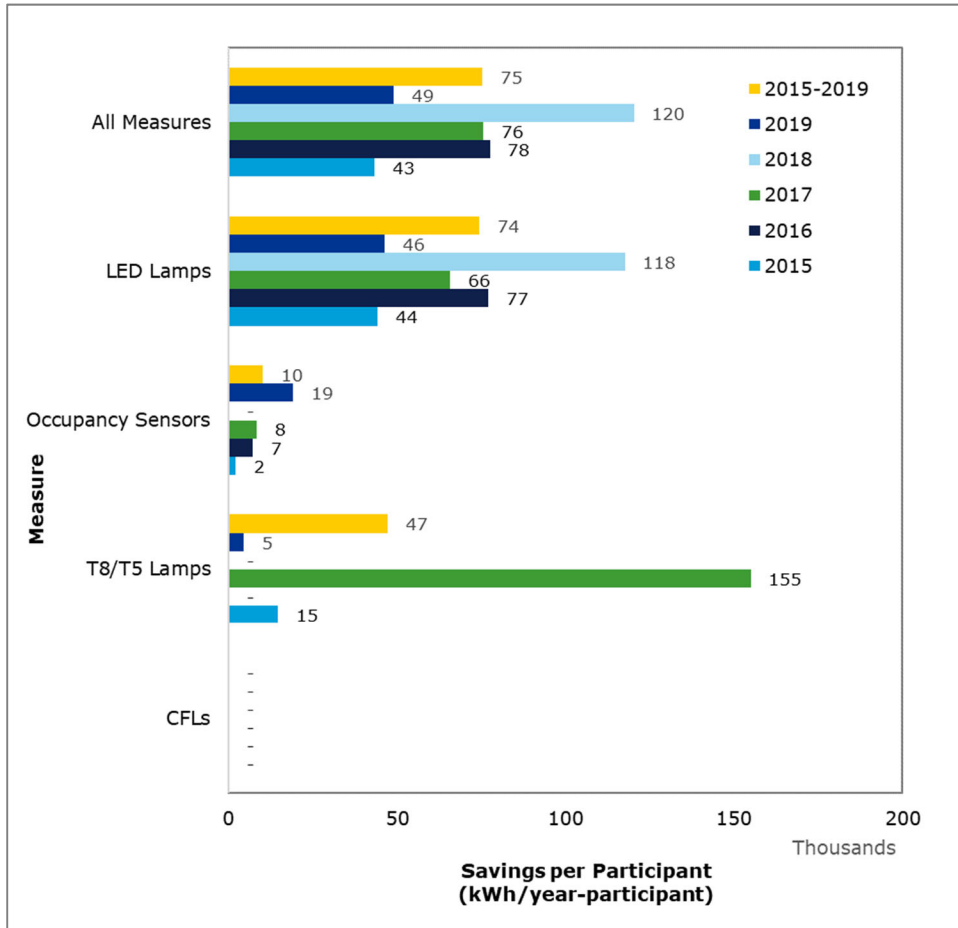


Figure 5-12 through Figure 5-14 shows the program’s participation, gross annualized energy savings, and average annualized energy savings per participant by building type and program year.

A participant is only counted once in these “by building” charts, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

In 2019, participants were most frequently (40%) located in “other” building types (Figure 5-12). Accordingly, “other” building types contributed the most (44%) towards gross annualized energy savings (Figure 5-13), followed by warehouse and storage buildings.

Figure 5-12. North Carolina Non-residential Lighting Systems & Controls Program Participation by Building Type and Year

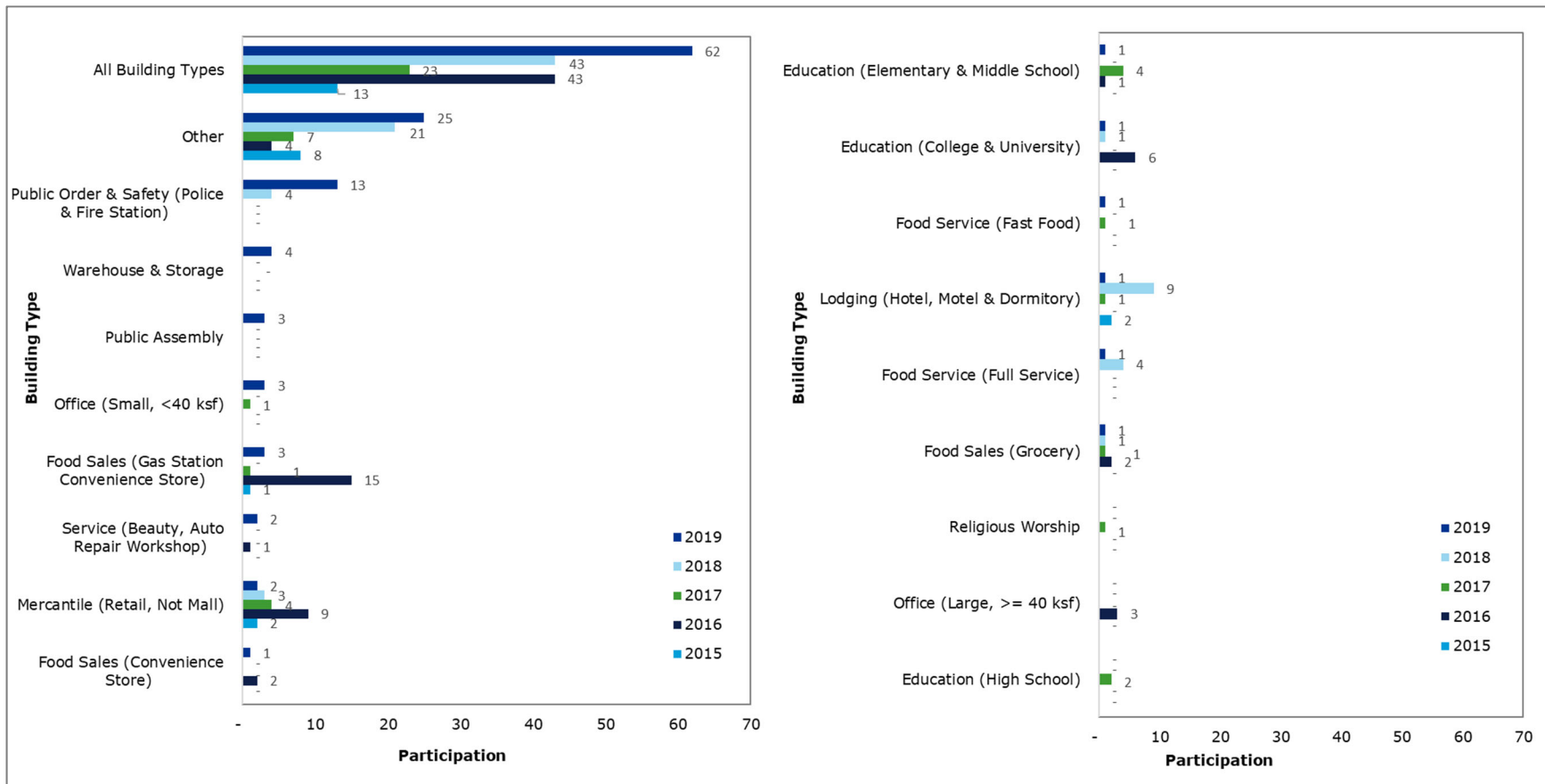
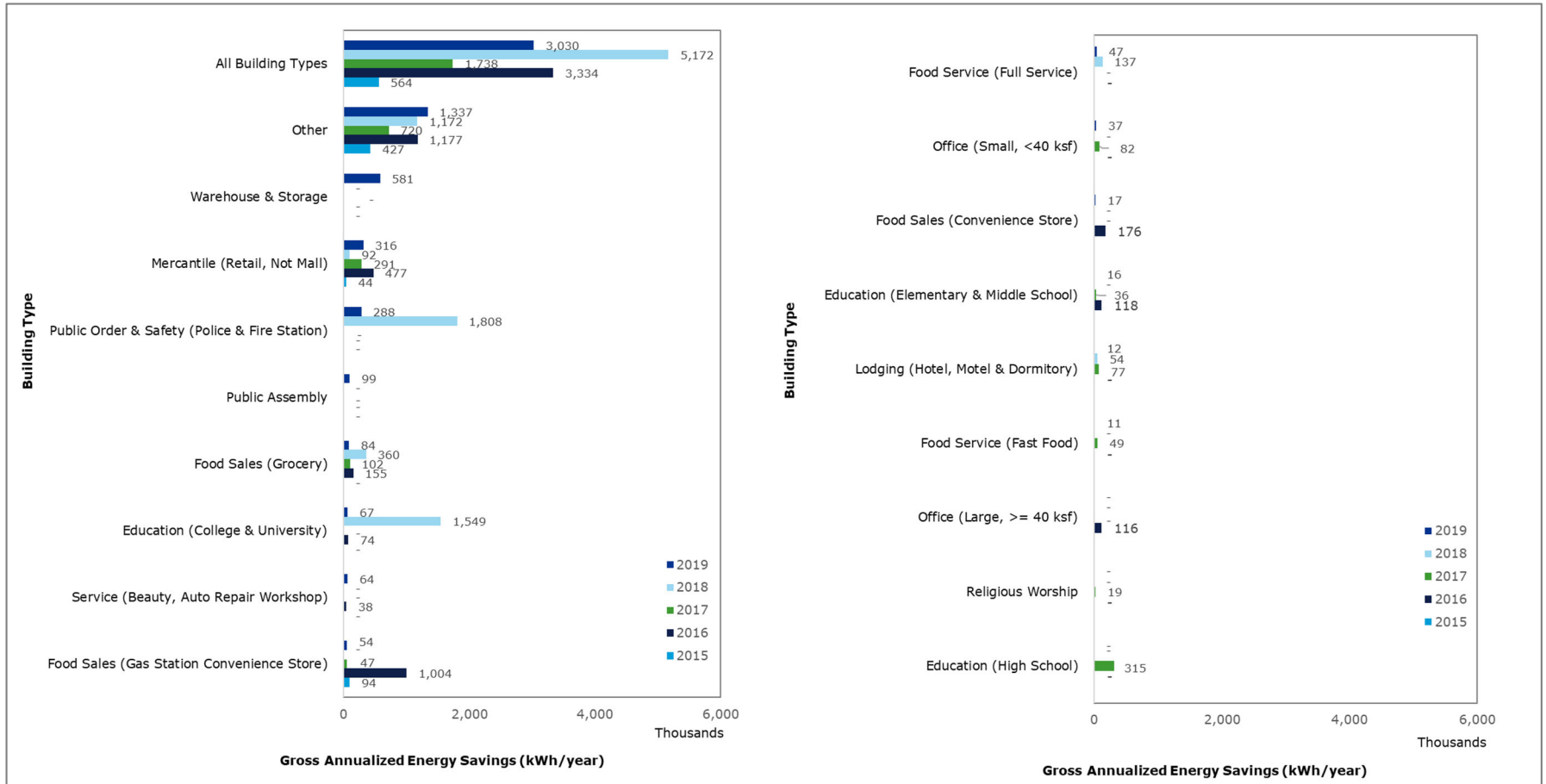
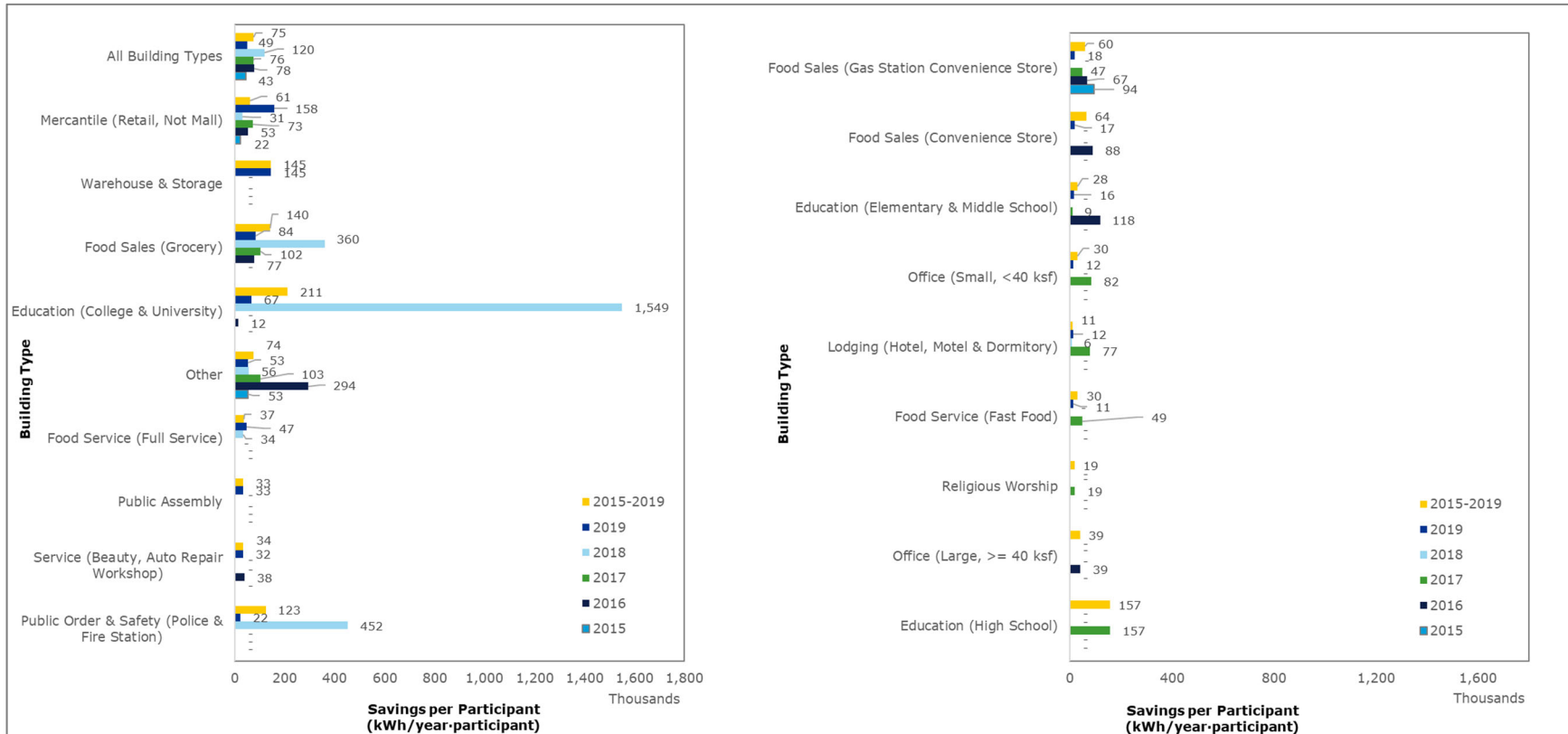


Figure 5-13. North Carolina Non-residential Lighting Systems & Controls Program Gross Annualized Energy Savings by Building Type and Year (MWh/year)



As shown in Figure 5-14, mercantile (retail, not mall) buildings had the highest average gross annualized energy savings per participant in 2019. Cumulatively across all program years, education (college and university) buildings had the highest average savings.

Figure 5-14. North Carolina Non-residential Lighting Systems & Controls Program Average Gross Annualized Energy Savings per Participant (MWh/year-participant) by Building Type and Year



5.2 Non-residential Lighting System & Controls (DSM Phase VII) – Virginia

Virginia
Case #: PUE-2018-00168

NON-RESIDENTIAL LIGHTING SYSTEMS & CONTROLS

2019-PRESENT

- kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- T8s with electronic ballast
- High-performance T8s
- T5s with electronic ballast
- LEDs
- Occupancy sensors



Enrolled **0** customers in 2019



Achieved net annual energy savings of **0 MWh/year** in 2019



Spent **36%** of planned expenditures in 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	-	-	592,373	592,373
Total Program Participants (#)	-	-	-	-	0	0
Total Gross Incremental Savings (kWh/yr)	-	-	-	-	0	-
Total Net Incremental Savings (kWh/yr)	-	-	-	-	0	-
Average Gross Incremental Demand Reduction (kW)	-	-	-	-	0	-
Average Net Incremental Demand Reduction (kW)	-	-	-	-	0	-
Total Net Lifetime Savings (kWh)	-	-	-	-	0	0
Average Lifetime Demand Reduction (kW)	-	-	-	-	0	0

TOTAL SAVINGS BY MEASURE TYPE
IN KWH

TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH

5.2.1 Program Description

The Non-residential Lighting Systems & Controls Program is the next iteration of the DSM Phase III Non-residential Lighting Systems & Controls Program. It offers non-residential customers rebate incentives to retrofit their existing lighting system with a more energy-efficient and cost-effective lighting system. The program provides rebates for the following types of measures:

- T8 with electronic ballast
- High-performance T8
- T5 with electronic ballast
- LEDs
- Occupancy sensors

This program is implemented through a contractor network.

However, customers may also self-

install equipment if they submit an initial assessment to Dominion and receive approval prior to installation.

Other reasons that require customers to submit an initial assessment to Dominion Energy include:

- previous participation in the program,
- projects with LED measures, and
- projects with an estimated rebate amount of \$10,000 or more.⁴⁹

Upon approval, those customers have 120 days to complete their projects. All Dominion Energy non-residential customers are eligible to participate except those who are exempt by statute, special contract, or have opted-out. Customers are not considered participants until a completed rebate application form is processed and a rebate is issued. This process can take several months, as customers have 45 days to submit their rebate application and Dominion Energy has 90 days to process it.

The Virginia SCC approved this program, as part of the DSM Phase VII programs, on May 2, 2019 (Case No. PUR-2018-00168) for a five-year period of July 1, 2019, through June 30, 2024. The North Carolina Utilities Commission approved this program on November 13th, 2019 (Docket No. E-22, SUB 573). Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details. The program officially launched on October 1, 2019.⁵⁰

Table 5-4 maps the applicable sections in this report to reporting requirements listed in the EM&V Rule section 50, "Standard Requirements for Evaluation, Measurement, and Verification Reporting."⁵¹



⁴⁹ Per Non-residential Lighting Systems and Controls Program Rebate Application form, https://www.dominionenergy.com/library/domcom/media/large-business/energy-conservation-programs/non-res-lighting-systems-and-controls/virginia/dev_nr_lsc_rebate_v1019_writeable.pdf?modified=20191024205255&la=en. Accessed February 20, 2020.

⁵⁰ Ibid.

⁵¹ 20 VAC 5-318-50

Table 5-4. Non-residential Lighting Systems & Controls Program (DSM Phase VII) Compliance with EM&V Rule Section 50

Subsection within 20 VAC 5-318-50	Location and Description
A. EM&V Plan	Appendix K, EM&V Plan
B. Utilizing utility-specific data or other data	<p>Per 20 VAC 5-318-40 A and B</p> <ol style="list-style-type: none"> See Appendix F. STEP Manual v10 for a description of all data or estimates used as inputs for this program and the measures within it. See the Methodologies section (section 3) of this report for a description of the overarching EM&V methodologies used to produce results in this report. <p>Per 20 VAC 5-318-40 C</p> <ol style="list-style-type: none"> There were no program participants in this program in 2019.
C. Changes to measure-level inputs and assumptions, and inputs to cost/benefit estimates	<ol style="list-style-type: none"> See Figure 5-7 for program planning assumptions See documents filed with the Virginia State Corporation Commission Docket PUR-2018-00168 for approved measure-level inputs and assumptions, and the impact of such changes on original cost/benefit estimates for DSM programs or measures.
D. Measure-level data collection methodology	See response to A. and B. above.
E. Explanation of eligibility requirements for each rate schedule that program is offered	See program description above.
F. Comparison of measured annual measure or program savings estimates to the annual usage of the average rate schedule usage, and eligible customer in each rate schedule	There were no program participants in this program in 2019.
G. Explanation of controls undertaken by utility	There were no program participants in this program in 2019.

5.2.2 Methods for the Current Reporting Period

DNV GL developed an EM&V Plan for this program, which is included in Appendix K. For the current period, the approach included reviewing the tracking data.

Table 5-5. outlines Dominion Energy’s initial program planning assumptions that were used to design the program. DNV GL uses the planned NTG factor in its net savings calculations until it can be verified through EM&V.

Table 5-5. Non-residential Lighting Systems and Controls Program (Phase VII) Planning Assumptions System-wide

Assumption	Description
Target Market	Non-residential customers
NTG Factor	70%
Measure Life (years)	10.6
Gross Average Annual Energy Savings per Participant (kWh/year)	28,778.24
Gross Average Coincident Peak Demand Reduction (kW) per Participant	3.90
Net Average Annual Energy Savings per Participant (kWh/year)	20144.77
Average Rebate (US\$) per Participant	\$2,586 per Participant

5.2.3 Assessment of Program Progress Towards Plan

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

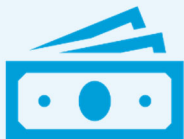
5.2.3.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 5-6 provides performance indicator data for the year and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by month are provided in Appendix A.6.



- There were no participants in 2019.

- There were no annual kWh or kW savings because there were no participants in 2019.



- Annual program costs in 2019 were 36% of planned costs.
- All costs were related to program implementation, EM&V, and other administrative activities to launch the program.

Table 5-6. Virginia Non-residential Lighting Systems and Controls Program Performance Indicators (2019)

Category	Item	2019
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	
	Direct EM&V	
	Indirect Other (Administrative)	\$20,021
Total Costs (\$)	Total ⁵²	\$592,373
	Planned	\$1,633,867
	Variance	-\$1,041,495
	Annual % of Planned	36%
Participants	Total (Gross)	0
	Planned (Gross)	333
	Variance	-333
	Annual % of Planned (Gross)	0%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	0
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	0
	Net-to-Gross Adjustment (70%)	0
	Net Adjusted Savings	0
	Planned Savings (Net)	1,445,890
	Annual % Toward Planned Savings (Net)	0%
	Avg. Savings per Participant (Gross)	N/A
	Avg. Savings per Participant (Net)	N/A
Installed Demand Reduction (kW)	Total Gross Deemed Demand	0.0
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand	0.0
	Net-to-Gross Adjustment (70%)	0.0
	Net Adjusted Demand	0.0
	Planned Demand (Net)	0.0
	Annual % Toward Planned Demand (Net)	N/A
	Avg. Peak Demand per Participant (Gross)	N/A
	Avg. Demand per Participant (Net)	N/A
Program Performance	Annual \$Admin. per Participant (Gross)	N/A

⁵² Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2019
	Annual \$Admin. per kWh/year (Gross)	N/A
	Annual \$Admin. per kW (Gross)	N/A
	Annual \$EM&V per Total Costs (\$)	8%
	Annual \$Rebate per Participant (Gross)	N/A

5.2.3.2 Additional Virginia Program Data

No Virginia customers participated in the program through 2019.

5.2.3.3 Comparison of Savings with Usage

No Virginia customers participated in the program through 2019.

5.3 Non-residential Heating and Cooling Efficiency (DSM Phase III) – Virginia and North Carolina

Virginia

Case #: PUE-2013-00072

NON-RESIDENTIAL HEATING & COOLING EFFICIENCY

2014-2019

80,876 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- Unitary and split AC units
- Air-source/ground-source heat pumps
- Packaged terminal AC and heat pumps
- Variable refrigerant flow units
- Water- and air-cooled chillers
- Variable frequency drives for HVAC applications
- Economizers



Enrolled **406** customers, 12% of planned participation



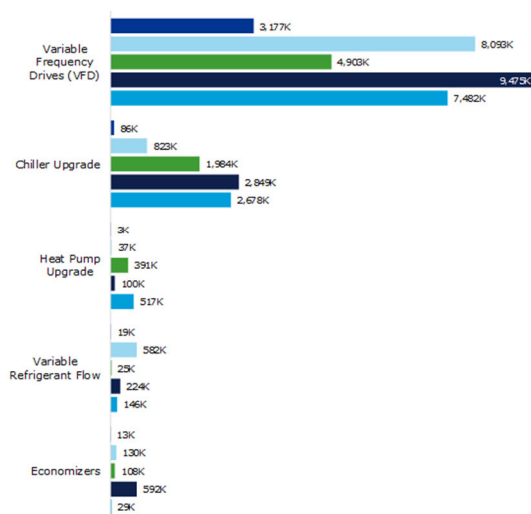
Achieved net annual energy savings of **32,836 MWh/year**, 31% of planned energy savings



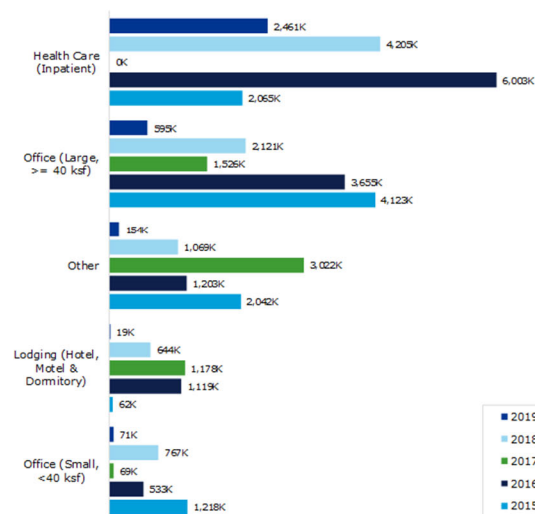
Spent **80%** of planned expenditures

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	1,347,317	1,352,118	1,756,467	1,745,485	645,966	7,308,041
Total Program Participants (#)	114	89	103	77	17	406
Total Gross Incremental Savings (kWh/yr)	11,129,837	13,647,306	7,526,876	9,818,796	3,328,123	-
Total Net Incremental Savings (kWh/yr)	7,790,886	9,553,114	5,268,813	6,873,157	2,329,686	-
Average Gross Incremental Demand Reduction (kW)	2,777	2,084	1,947	569	199	-
Average Net Incremental Demand Reduction (kW)	1,944	1,459	1,363	398	139	-
Total Net Lifetime Savings (kWh)	5,055,623	18,476,362	39,627,362	66,434,038	98,940,223	492,533,254
Average Lifetime Demand Reduction (kW)	2,301	3,760	5,123	5,521	5,660	5,660

TOTAL SAVINGS BY MEASURE TYPE TOP 5 IN KWH



TOTAL SAVINGS BY BUILDING TYPE TOP 5 IN KWH



North Carolina

Docket #: E-22 Sub 507

NON-RESIDENTIAL HEATING & COOLING EFFICIENCY

2015-2019

33,796 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor



Enrolled **16** customers, **7%** of planned participation



Achieved net annual energy savings of **541 MWh/year**, **8%** of planned energy savings



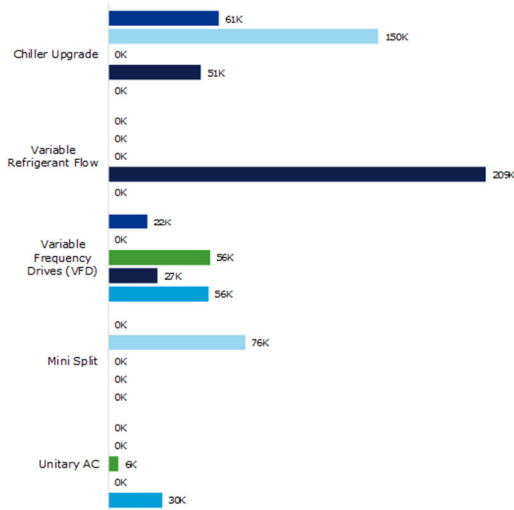
Spent **48%** of planned expenditures

Measures

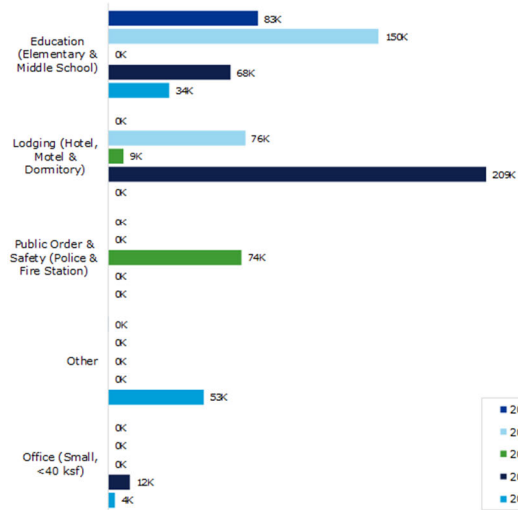
- Unitary and split AC units
- Air-source and ground-source heat pumps
- Packaged terminal AC and heat pumps
- Variable refrigerant flow units
- Water- and air-cooled chillers
- Variable frequency drives for HVAC applications
- Economizers

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	40,347	52,963	59,792	77,749	57,884	288,735
Total Program Participants (#)	3	6	3	3	1	16
Total Gross Incremental Savings (kWh/yr)	91,144	289,500	82,971	225,775	83,099	-
Total Net Incremental Savings (kWh/yr)	63,801	202,650	58,080	158,042	58,170	-
Average Gross Incremental Demand Reduction (kW)	27	93	-40	85	13	-
Average Net Incremental Demand Reduction (kW)	19	65	-28	59	9	-
Total Net Lifetime Savings (kWh)	44,748	230,526	533,684	981,181	1,501,080	8,111,136
Average Lifetime Demand Reduction (kW)	19	84	84	115	125	125

TOTAL SAVINGS BY MEASURE TYPE TOP 5 IN KWH



TOTAL SAVINGS BY BUILDING TYPE TOP 5 IN KWH



5.3.1 Program Description

The Non-residential Heating and Cooling Efficiency Program provides incentives to qualifying non-residential customers to either upgrade existing heating or cooling equipment or install new energy efficient equipment. All non-residential customers are eligible for this program except those who are exempt by statute or contract or have opted-out. Measures eligible to receive a rebate in 2019 included:

- Unitary and split AC units
- Air-source/ground-source heat pump units
- Packaged terminal AC and heat pump
- Variable refrigerant flow
- Water- and air-cooled chillers
- Variable frequency drives for HVAC applications
- Economizers



This program is implemented through a contractor network, so customers must use a participating contractor to be eligible for the rebate. Customers are not considered participants until a completed application form has been processed and a rebate has been issued. This process can take several months since customers have 45 days after measure installation to submit their rebate application, and the Company has 90 days after receipt of the application to process it.

The Virginia SCC approved this program, as part of the DSM Phase III programs, on April 29, 2014, (Case No. PUE-2013-00072) for a five-year period of May 1, 2014, through April 30, 2019. The North Carolina Utilities Commission approved this program on October 27, 2014 (Docket No. E-22, Sub 507). When the Virginia program expired in April 2019, which triggered the systemwide version of this program to close, the NCUC ordered (on October 16, 2018, Docket No. E-22, Sub 507) for this program to continue implementation only in North Carolina starting January 1, 2019, until the DSM Phase VII version of the program was available. Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details. Following program initiation activities, customer enrollment in the program began in the fall of 2014 in Virginia and in the spring of 2015 in North Carolina.

In Virginia, to be eligible for a rebate in 2019, the service must have been completed by a participating contractor by December 24, 2018, and rebate applications received by February 7, 2019. In North Carolina, rebate applications were approved as late as September 2019.

5.3.2 Methods for the Current Reporting Period

For the current period, the approach included reviewing the tracking data and then estimating gross energy savings and demand reduction using STEP Manual calculations.

Table 5-7 outlines Dominion Energy’s initial program planning assumptions used to design the program. DNV GL uses the planned NTG factor in its net savings calculations for program measures that have not yet been verified through EM&V.

Table 5-7. Non-residential Heating and Cooling Efficiency Program (Phase III) Customer Participation Planning Assumptions System-wide

Assumption	Value
Target Market	Non-residential customers
NTG Factor	70%
Measure Life (years)	15
Average Annual Energy Savings per Participant (kWh/year)	12,641
Average Peak Demand Reduction (kW) per Participant	3.2
Average Rebate (US\$) per Participant	\$1,653

5.3.3 Assessment of Program Progress Towards Plan

The next two subsections provide the tables summarizing the key indicators of the Non-residential Heating and Cooling Efficiency program progress in Virginia and North Carolina. The two subsections thereafter provide charts to show the types of participant buildings involved and the types of measures implemented.

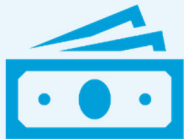
5.3.3.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia over the life of the program appear below. Following these highlights, Table 5-8 provides performance indicator data from May 2014 through December 2019 and shaded cells are considered sensitive information. Detailed program indicators by year are provided in Appendix A.7. Cumulative savings (kWh and kW) by year and month can be found in Appendix C.6, and cumulative net savings are in Appendix D.6.



- From program inception through close, 406 customers participated in the program, approximately 12% of planned participation.
- Except during the start-up and closing years, the program added an average of 96 participants per year—or about 8 participants per month.

- From program inception through close, the program achieved net energy savings of 32,835,550 kWh/year, approximately 31% of its planned target.
- The average net energy savings per participant was 80,876 kWh, approximately 640% of planned savings per participant from Table 5-7 below.
- From program inception through close, the program achieved a net demand reduction of 5,660 kW, approximately 19% of its planned target.
- The average net demand reduction per participant was 13.9 kW, approximately 434% of planned demand reduction per participant from Table 5-7 below.



- From program inception through close, the program spent approximately 80% of planned program costs.

Table 5-8. Virginia Non-residential Heating and Cooling Efficiency Program Performance Indicators (2014-2019)

Category	Item	2014	2015	2016 ⁵³	2017	2018	2019	Program Total (2014-2019)
Operations and Management Costs (\$)	Direct Rebate							
	Direct Implementation							
	Direct EM&V							
	Indirect Other (Administrative)	\$14,267	\$38,982	\$41,094	\$69,115	\$98,564	\$37,916	\$299,938
Total Costs (\$)	Total ⁵⁴	\$460,689	\$1,347,317	\$1,352,118	\$1,756,467	\$1,745,485	\$645,966	\$7,308,041
	Planned	\$1,530,331	\$1,859,694	\$1,807,707	\$1,858,262	\$1,977,851	\$100,294	\$9,134,139
	Variance	-\$1,069,642	-\$512,377	-\$455,589	-\$101,796	-\$232,365	\$545,672	-\$1,826,097
	Annual % of Planned	30%	72%	75%	95%	88%	644%	80%
Participants	Total (Gross)	6	114	89	103	77	17	406
	Planned (Gross)	261	746	782	797	807	0	3,393
	Variance	-255	-632	-693	-694	-730	17	-2,987
	Annual % of planned (Gross)	2%	15%	11%	13%	10%	N/A	12%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	1,456,991	11,129,837	13,647,306	7,526,876	9,818,796	3,328,123	46,907,929
	Realization Rate Adjustment (100%)	0	0	0	0	0	0	0
	Adjusted Gross Savings	1,456,991	11,129,837	13,647,306	7,526,876	9,818,796	3,328,123	46,907,929

⁵³ The 2016 total gross deemed savings values reported in this table differs from values in the May 1, 2017 EM&V report and have been refilled with the Commission. The adjustments totaled -154,576 kWh/year and 0 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 10. The adjustment was made to full load heating hours (FLH_{heat}) in Tables 90 and 91 to be consistent with those in the Mid-Atlantic TRM v 6, in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. This affected multiple non-residential HVAC measures (e.g. heat pumps, variable refrigerant flow, mini split systems) that reference Table 90 and 91, in multiple non-residential programs. This adjustment is reflected in STEP Manual version 8.0.0 in this EM&V report. Another adjustment was made to correct the full load cooling hours in North Carolina for this program. The code that calculated this savings did not match the STEP Manual v 7.0.0.

⁵⁴ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2014	2015	2016 ⁵³	2017	2018	2019	Program Total (2014-2019)
		Net-to-Gross Adjustment (70%) ⁵⁵	-437,097	-3,338,951	-4,094,192	-2,258,063	-2,945,639	-998,437
Net Adjusted Savings	1,019,894	7,790,886	9,553,114	5,268,813	6,873,157	2,329,686	32,835,550	
Planned Savings (Net)	3,299,301	9,430,186	24,119,220	38,355,947	31,003,178	0	106,207,832	
Annual % Toward Planned Savings (Net)	31%	83%	40%	14%	22%	N/A	31%	
Avg. Savings per Participant (Gross)	242,832	97,630	153,341	73,076	127,517	195,772	115,537	
Avg. Savings per Participant (Net)	169,982	68,341	107,338	51,154	89,262	137,040	80,876	
Installed Demand Reduction (kW)	Total Gross Deemed Demand	510.1	2,777.0	2,084.3	1,946.7	568.8	198.8	8,085.6
	Realization Rate Adjustment (100%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Adjusted Gross Demand	510.1	2,777.0	2,084.3	1,946.7	568.8	198.8	8,085.6
	Net-to-Gross Adjustment (70%) ⁵⁶	-153.0	-833.1	-625.3	-584.0	-170.6	-59.6	-2,425.7
	Net Adjusted Demand	357.1	1,943.9	1,459.0	1,362.7	398.1	139.2	5,660.0
	Planned Demand (Net)	835.2	2,387.2	4,089.6	15,592.6	7,536.0	0.0	30,440.6
	Annual % Toward Planned Demand (Net)	43%	81%	36%	9%	5%	N/A	19%
	Avg. Demand per Participant (Gross)	85.0	24.4	23.4	18.9	7.4	11.7	19.9
Avg. Demand per Participant (Net)	59.5	17.1	16.4	13.2	5.2	8.2	13.9	

⁵⁵ On the rebate application form the program implementation vendor included the question, "Did the rebate incentive offered by Dominion Energy have any influence in your decision to have the work performed?" Of the participants who responded (from program inception to the end of this reporting period), the implementation vendor has calculated that 94% answered yes at the time they filled out the rebate application. This is not a substitute for a net-to-gross analysis conducted by an independent evaluator. See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation approaches.

⁵⁶ Ibid.

Category	Item	2014	2015	2016 ⁵³	2017	2018	2019	Program Total (2014-2019)
Program Performance	Annual \$Admin. per Participant (Gross)	\$2,378	\$342	\$462	\$671	\$1,280	\$2,230	\$739
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.00	\$0.00	\$0.01	\$0.01	\$0.01	\$0.01
	Annual \$Admin. per kW (Gross)	\$28	\$14	\$20	\$36	\$173	\$191	\$37
	Annual \$EM&V per Total Costs (\$)	5.6%	6.1%	8.6%	7.6%	7.3%	11.0%	7.6%
	Annual \$Rebate per Participant (Gross)	\$19,834	\$7,909	\$10,729	\$11,629	\$15,058	\$24,826	\$11,711

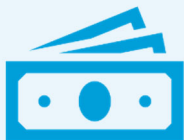
5.3.3.2 Key North Carolina Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for North Carolina from program inception to close appear below. Following these highlights, Table 5-9 provides performance indicator data from January 2015 through December 2019 and green shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix B.4. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.6, and cumulative net savings are in Appendix D.6.



- From program inception through close, 16 customers participated in the program, approximately 7% of planned participation.
- Participation peaked in 2016 (6 participants), when approximately 38% of lifetime program participants were enrolled.

- From program inception through close, the program achieved net energy savings of 540,742 kWh/year, approximately 8% of its planned target.
- The average net energy savings per participant was 33,796 kWh, approximately 267% of planned savings per participant from Table 5-9 below.
- From program inception through close, the program achieved a net demand reduction of 125 kW, approximately 6% of its planned target.
- The average net demand reduction per participant was 7.8 kW, approximately 244% of planned demand reduction per participant from Table 5-9 below.



- From program inception through close, the program spent approximately 48% of planned program costs.

Table 5-9. North Carolina Non-residential Heating and Cooling Efficiency Program Performance Indicators (2015-2019)

Category	Item	2015	2016 ⁵⁷	2017	2018	2019	Program Total (2015-2019)
		Operations and Management Costs (\$)					
	Direct Rebate						
	Direct Implementation						
	Direct EM&V						
	Indirect Other (Administrative)	\$1,360	\$1,610	\$2,353	\$4,390	\$2,934	\$12,647
Total Costs (\$)	Total ⁵⁴	\$40,347	\$52,963	\$59,792	\$77,749	\$57,884	\$288,735
	Planned	\$124,310	\$121,415	\$122,498	\$126,949	\$101,892	\$597,064
	Variance	-\$83,963	-\$68,452	-\$62,706	-\$49,200	-\$44,007	-\$308,329
	Annual % of Planned	32%	44%	49%	61%	57%	48%
Participants	Total (Gross)	3	6	3	3	1	16
	Planned (Gross)	48	52	53	53	12	218
	Variance	-45	-46	-50	-50	-11	-202
	Annual % of planned (Gross)	6%	12%	6%	6%	8%	7%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	91,144	289,500	82,971	225,775	83,099	772,489
	Realization Rate Adjustment (100%)	0	0	0	0	0	0
	Adjusted Gross Savings	91,144	289,500	82,971	225,775	83,099	772,489
	Net-to-Gross Adjustment (70%)	-27,343	-86,850	-24,891	-67,732	-24,930	-231,747

⁵⁷ The 2016 total gross deemed savings values reported in this table differs from values in the May 1, 2017 EM&V report and have been refilled with the Commission. The adjustments totaled -22,904 kWh/year and 0 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 10. The adjustment was made to full load heating hours (FLH_{heat}) in Tables 90 and 91 to be consistent with those in the Mid-Atlantic TRM v 6, in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. This affected multiple non-residential HVAC measures (e.g. heat pumps, variable refrigerant flow, mini split systems) that reference Table 90 and 91, in multiple non-residential programs. This adjustment is reflected in STEP Manual version 8.0.0 in this EM&V report.

Category	Item	2015	2016 ⁵⁷	2017	2018	2019	Program Total (2015-2019)
		Net Adjusted Savings	63,801	202,650	58,080	158,042	58,170
Planned Savings (Net)	606,768	1,619,973	2,563,872	2,043,754	168,545	7,002,913	
Annual % Toward Planned Savings (Net)	11%	13%	2%	8%	35%	8%	
Avg. Savings per Participant (Gross)	30,381	48,250	27,657	75,258	83,099	48,281	
Avg. Savings per Participant (Net)	21,267	33,775	19,360	52,681	58,170	33,796	
Installed Demand Reduction (kW)	Total Gross Deemed Demand	26.9	93.2	-40.3	84.7	13.3	177.9
	Realization Rate Adjustment (100%)	0.0	0.0	0.0	0.0	0.0	0.0
	Adjusted Gross Demand	26.9	93.2	-40.3	84.7	13.3	177.9
	Net-to-Gross Adjustment (70%)	-8.1	-28.0	12.1	-25.4	-4.0	-53.4
	Net Adjusted Demand	18.8	65.3	-28.2	59.3	9.3	124.5
	Planned Demand (Net)	154.2	274.7	1,042.3	497.0	41.0	2,009.1
	Annual % Toward Planned Demand (Net)	12%	24%	-3%	12%	23%	6%
	Avg. Demand per Participant (Gross)	9.0	15.5	-13.4	28.2	13.3	11.1
	Avg. Demand per Participant (Net)	6.3	10.9	-9.4	19.8	9.3	7.8
	Program Performance	Annual \$Admin. per Participant (Gross)	\$453	\$268	\$784	\$1,463	\$2,934
Annual \$Admin. per kWh/year (Gross)		\$0.01	\$0.01	\$0.03	\$0.02	\$0.04	\$0.02
Annual \$Admin. per kW (Gross)		\$51	\$17	-\$58	\$52	\$220	\$71
Annual \$EM&V per Total Costs (\$)		14%	15%	15%	11%	8%	12%
Annual \$Rebate per Participant (Gross)		\$2,728	\$3,404	\$6,996	\$11,613	\$21,728	\$6,635



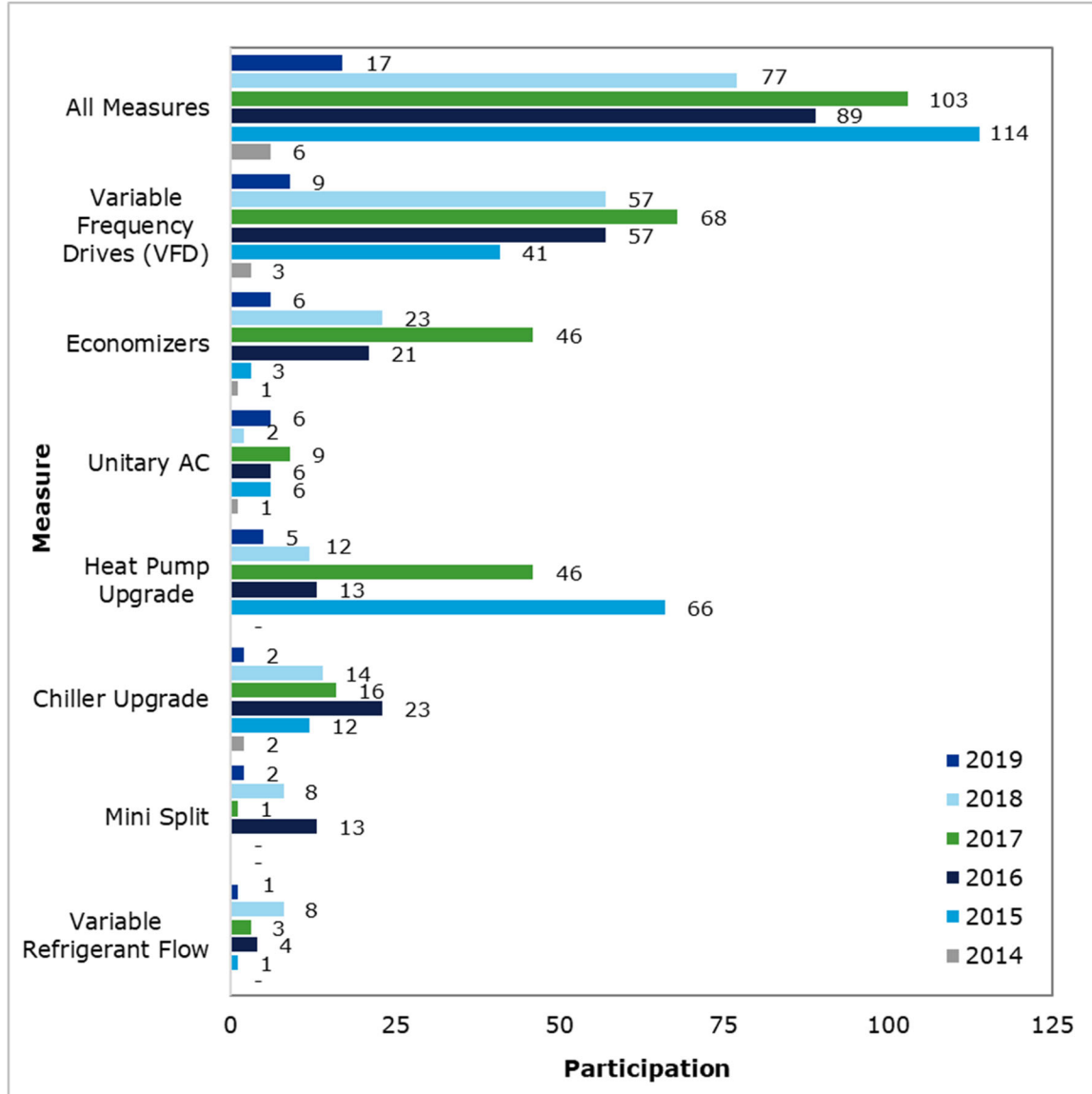
5.3.3.3 Additional Virginia Program Data

This section provides a series of charts to show the program performance over the life of the program in Virginia by year, by measure type, and by building type.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above and the “by building” charts below, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

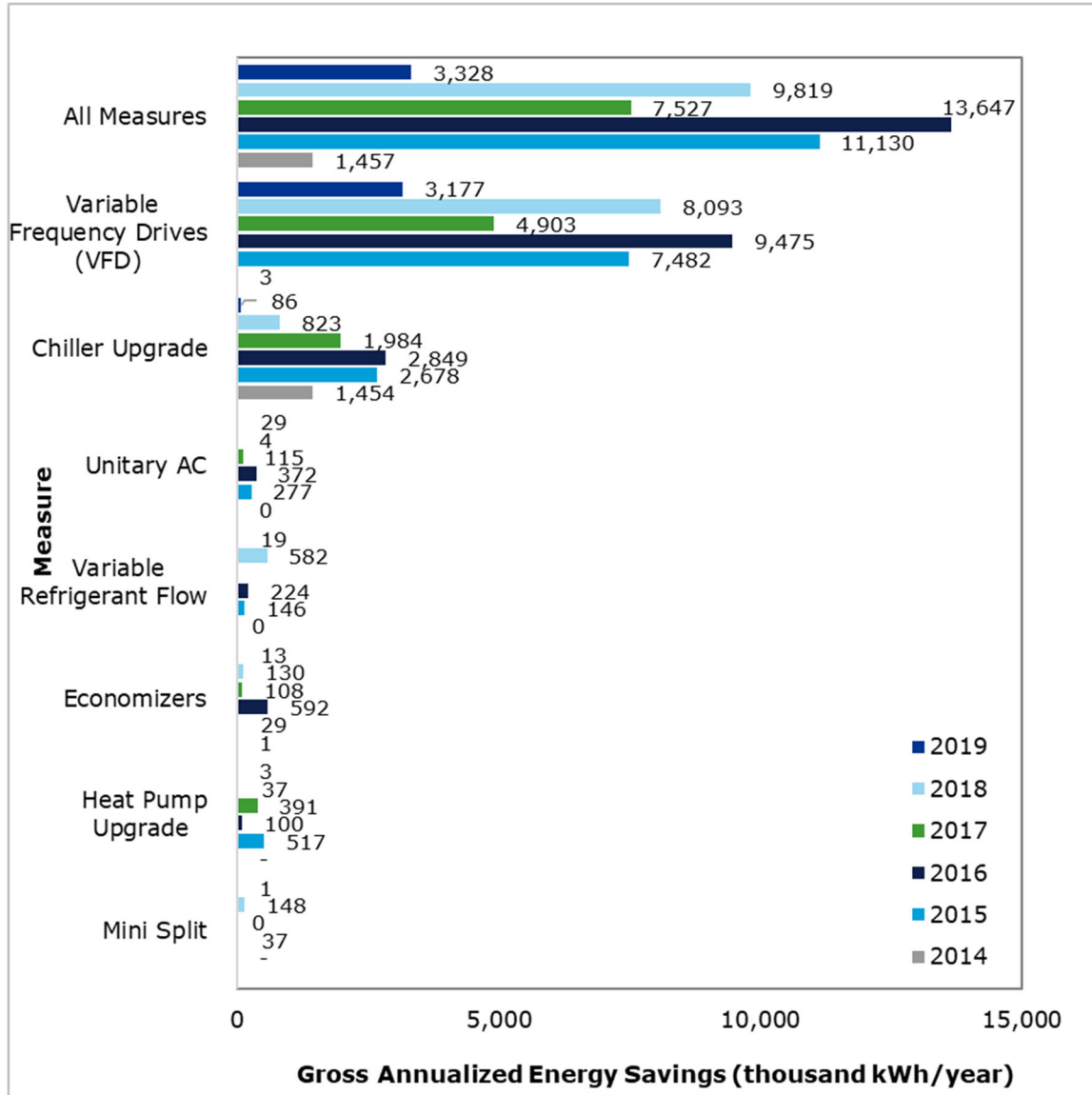
Figure 5-15 shows the annual number of new participants that installed the various measures offered through the program in Virginia. There were 17 new participants in 2019. The majority installed variable frequency drives (VFDs) followed by economizers, unitary ACs, and heat pumps.

Figure 5-15. Virginia Non-residential Heating and Cooling Efficiency Program Participation by Measure and Year



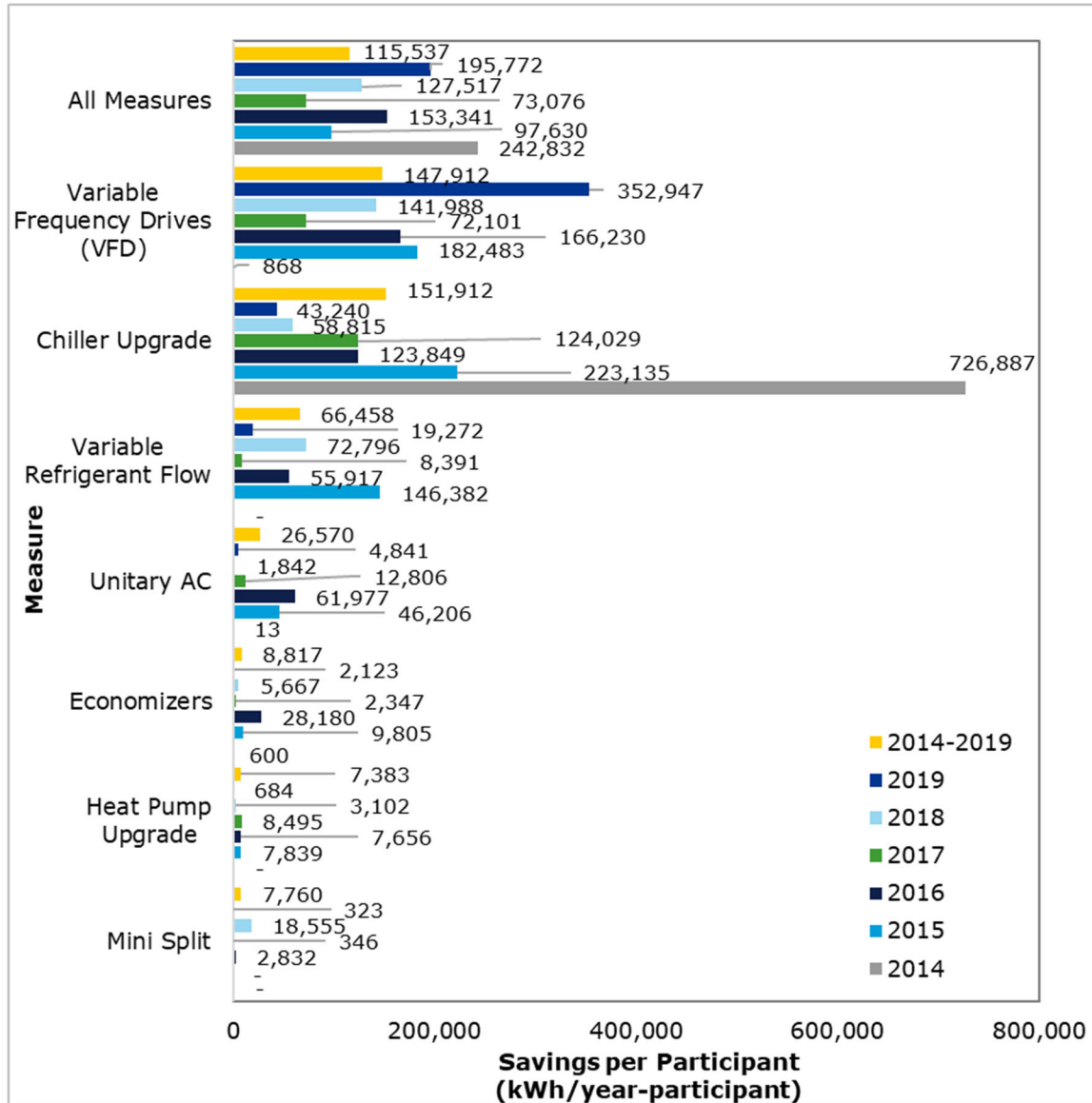
In Figure 5-16, the gross annualized savings for each program year are presented by measure category. To date, the VFD measure has yielded the most savings and is followed by the chiller upgrade measure. In 2017, VFDs had their highest number of participants, but second lowest annualized energy savings (see Figure 5-15 and Figure 5-16).

Figure 5-16. Virginia Non-residential Heating and Cooling Efficiency Program Gross Annualized Energy Savings (MWh/year) by Measure and Year



In Figure 5-17, the average energy savings per participant (gross annualized) is shown for each measure category, by year and over the life of the program. Chiller upgrades and VFDs have yielded the highest average savings per participant, surpassing the program-wide average of 115,537 kWh/year-participant.

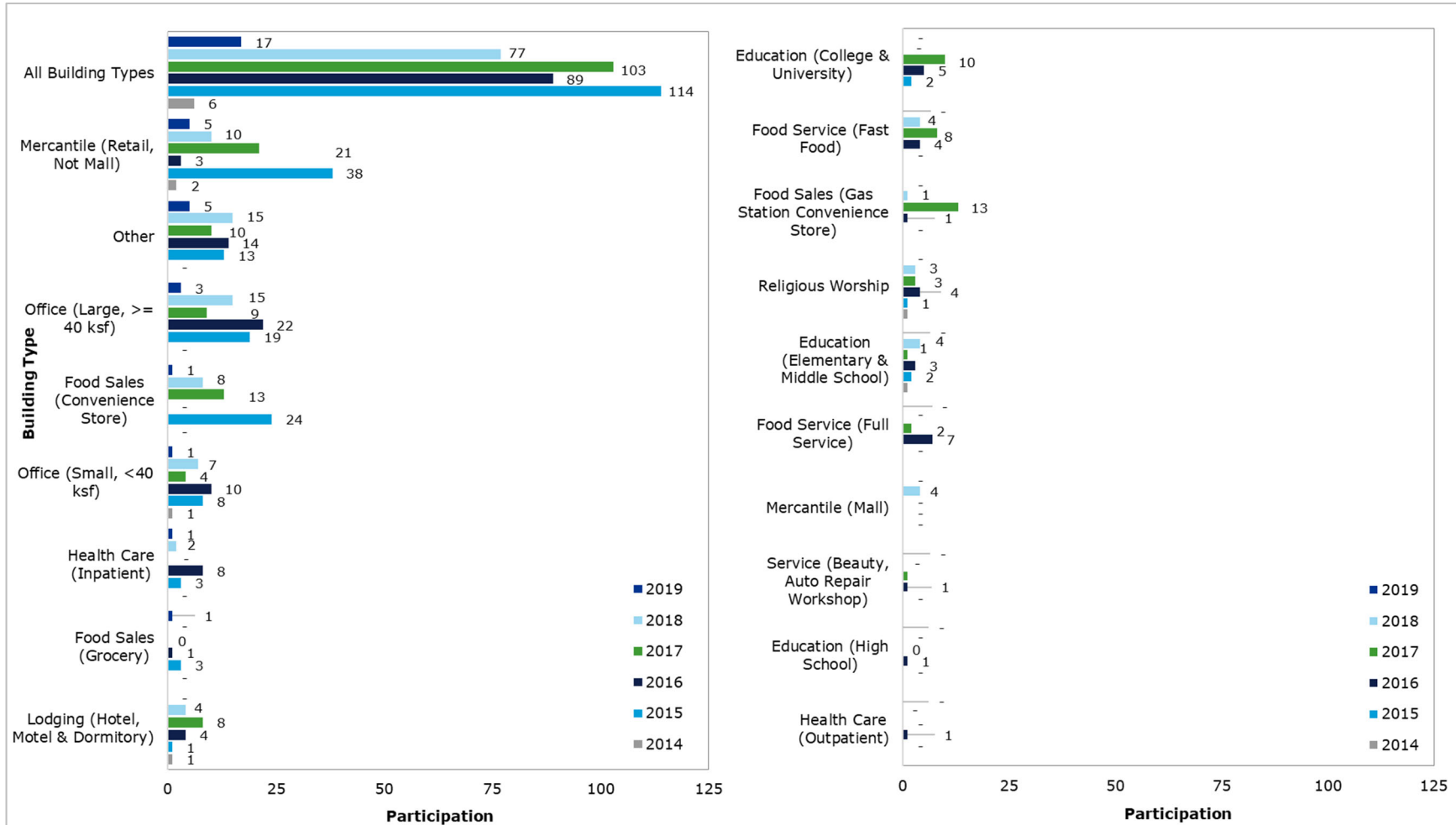
Figure 5-17. Virginia Non-residential Heating and Cooling Efficiency Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure and Year



The next set of three figures are segmented by building type rather than measure category. A participant is only counted once in these charts, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

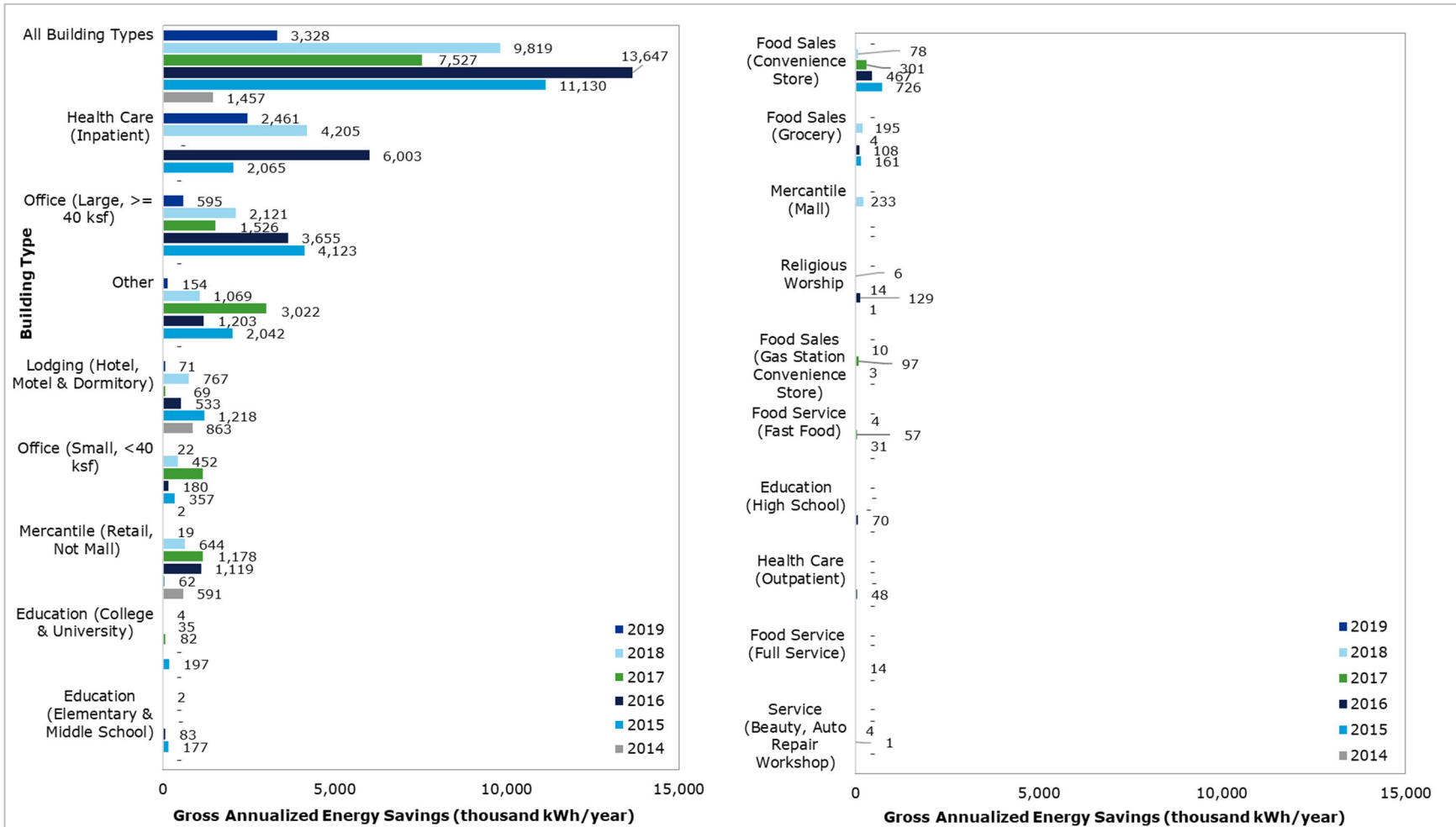
Figure 5-18 shows that the building types with the largest number of participants, in 2019, are mercantile (retail, not mall), large offices, and other building types. 2015 had the most building types with mercantile (retail, not mall), and food sales (convenience stores) combining for the majority of building types.

Figure 5-18. Virginia Non-residential Heating and Cooling Efficiency Program Participation by Building Type and Year



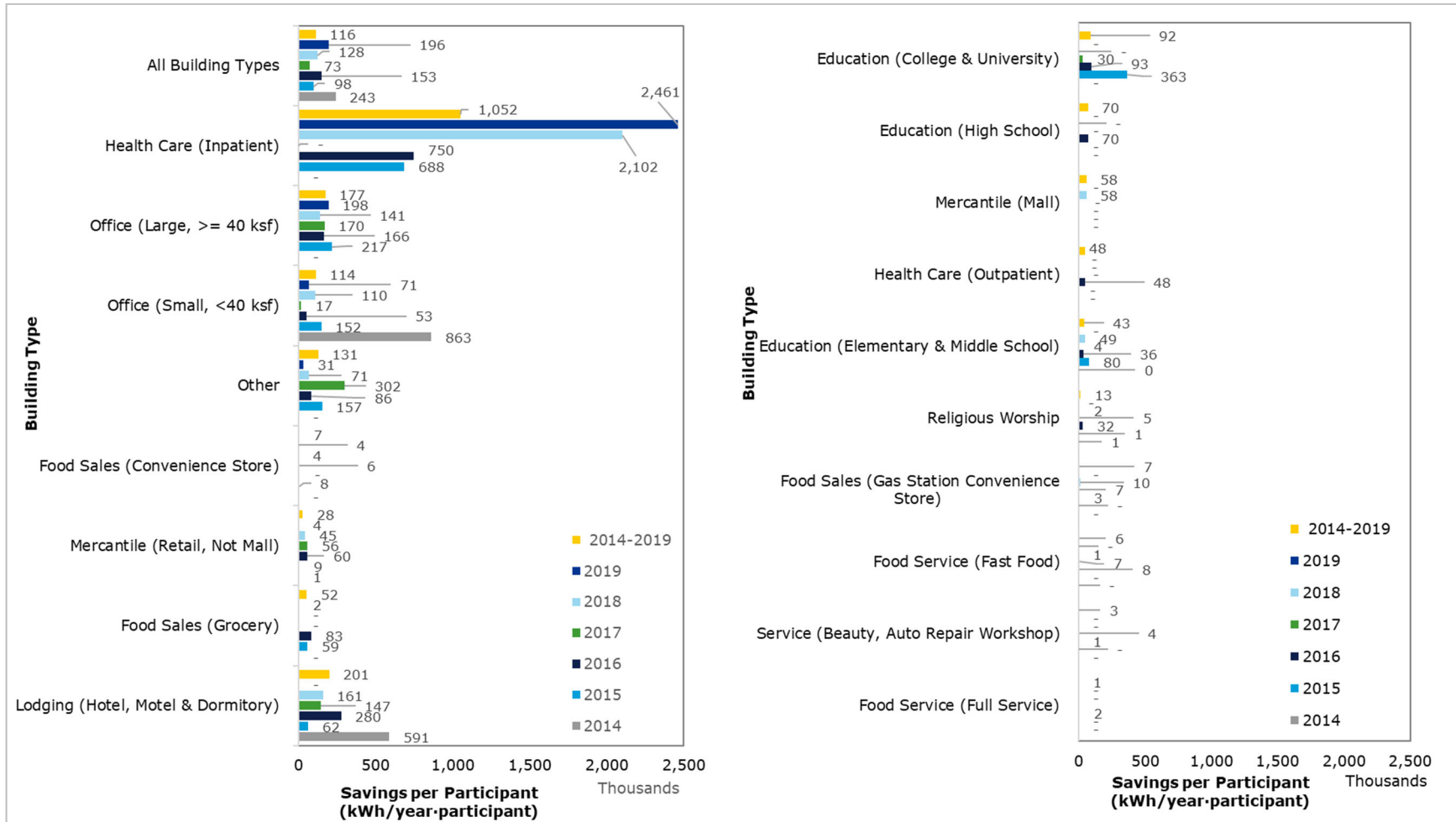
In Figure 5-19, the largest share of gross annualized savings in 2019 occurs at hospitals (inpatient health care facilities) followed by large office buildings.

Figure 5-19. Virginia Non-residential Heating and Cooling Efficiency Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year



As shown in Figure 5-20, the highest average per-participant energy savings during the program's lifetime (gross, annualized) was yielded at hospitals (inpatient health care facilities), lodging, and large offices.

Figure 5-20. Virginia Non-residential Heating and Cooling Efficiency Program Average Gross Annualized Energy Savings per Participant (MWh/year-participant) by Building Type and Year



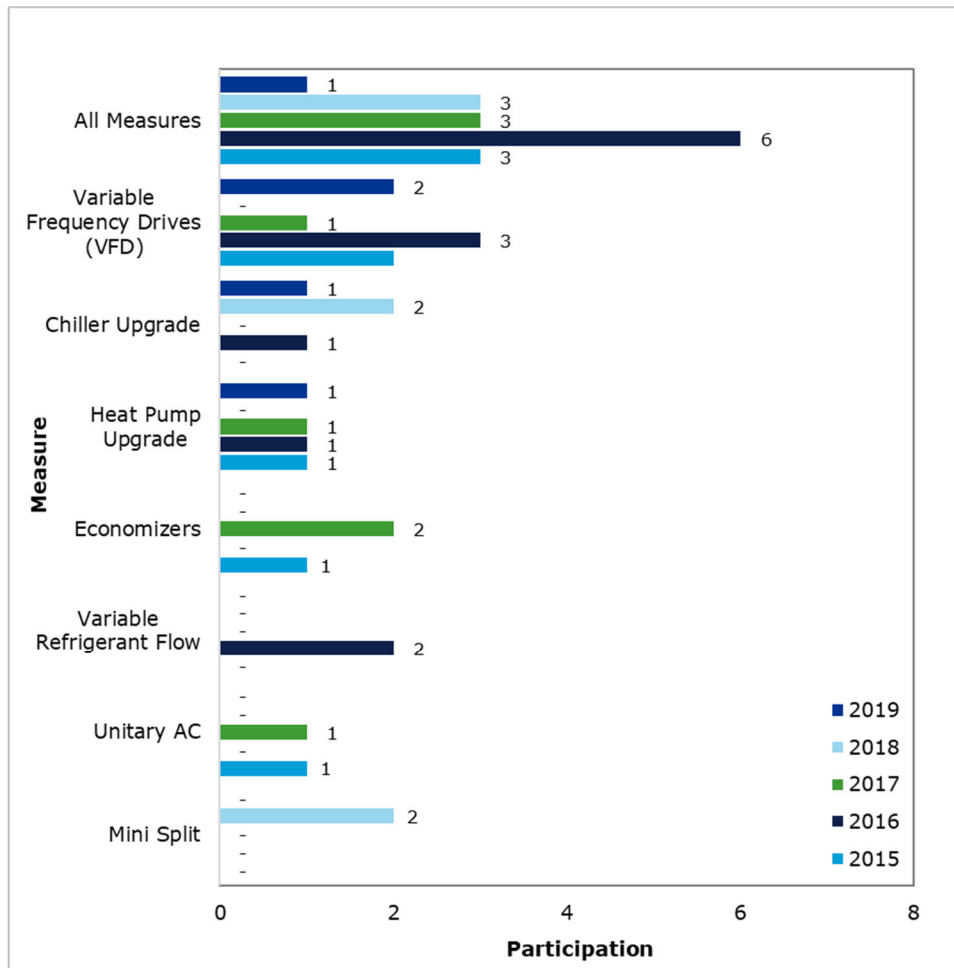
5.3.3.4 Additional North Carolina Program Data

This section provides a series of charts to show the program performance over the life of the program in North Carolina, by year, by measure type, and by building type.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above and the “by building” charts below, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

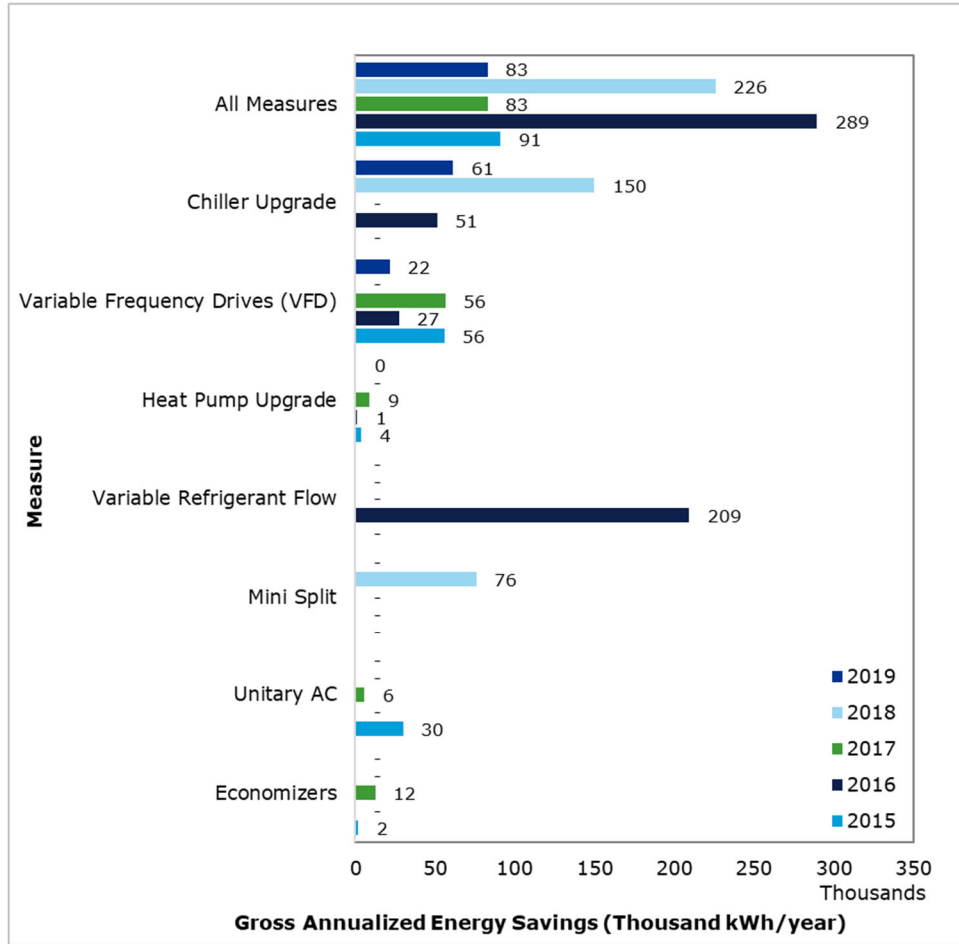
Figure 5-21 shows the number of new participants that install the various measures offered through the program. They are shown for each year and overall. Of all the measures offered by the program, VFDs were implemented by the most participants.

Figure 5-21. North Carolina Non-residential Heating and Cooling Efficiency Program Participation by Measure and Year



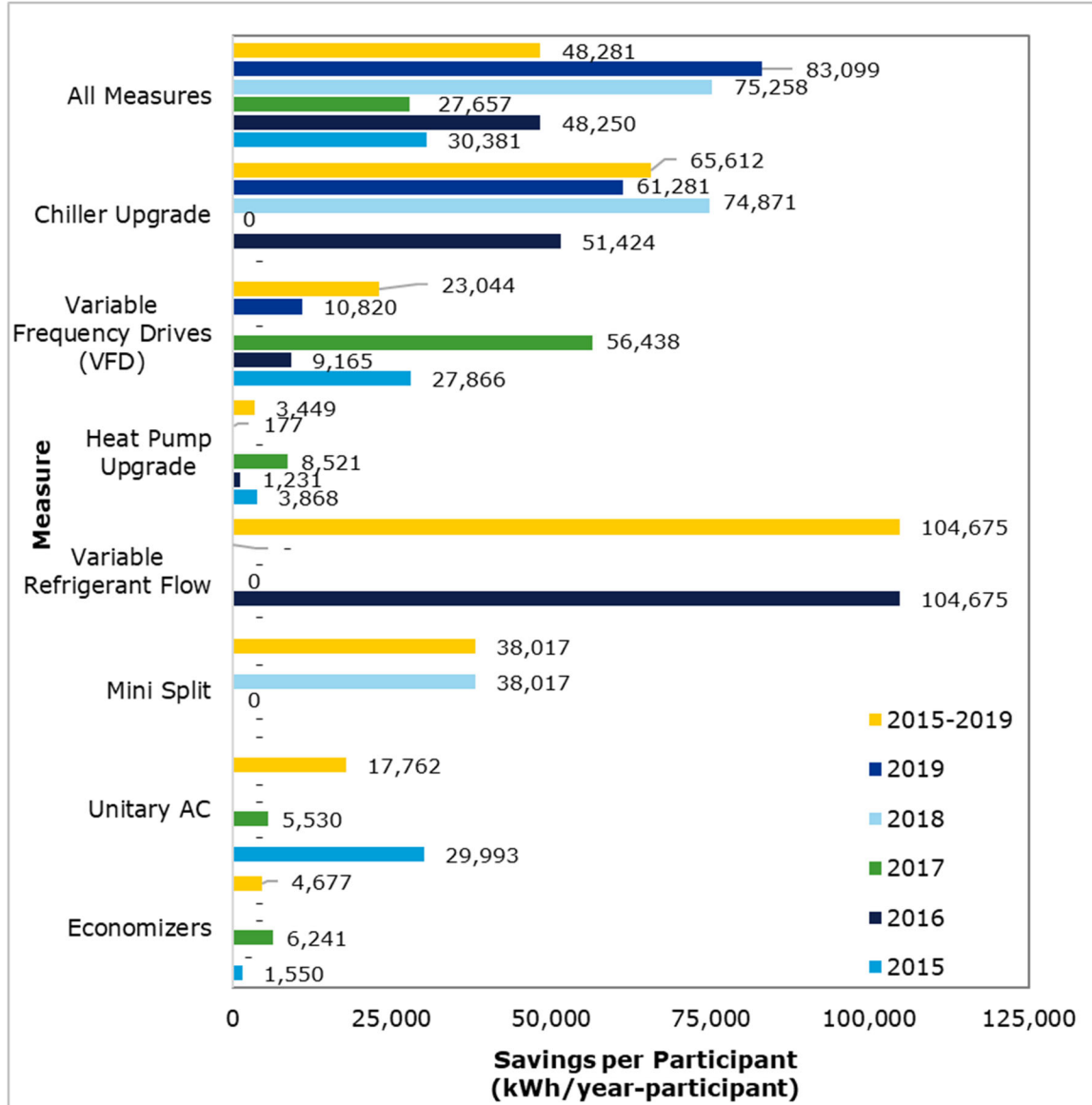
In Figure 5-22, the gross annualized savings for each program year are presented by measure category. In 2019, chiller upgrades yielded the most annual savings and were followed by variable frequency drives. Since program inception in North Carolina, the chiller upgrades measure has yielded the most total savings and was followed by variable refrigeration flow (VRF).

Figure 5-22. North Carolina Non-residential Heating and Cooling Efficiency Program Gross Annualized Energy Savings (MWh/year) by Measure Type



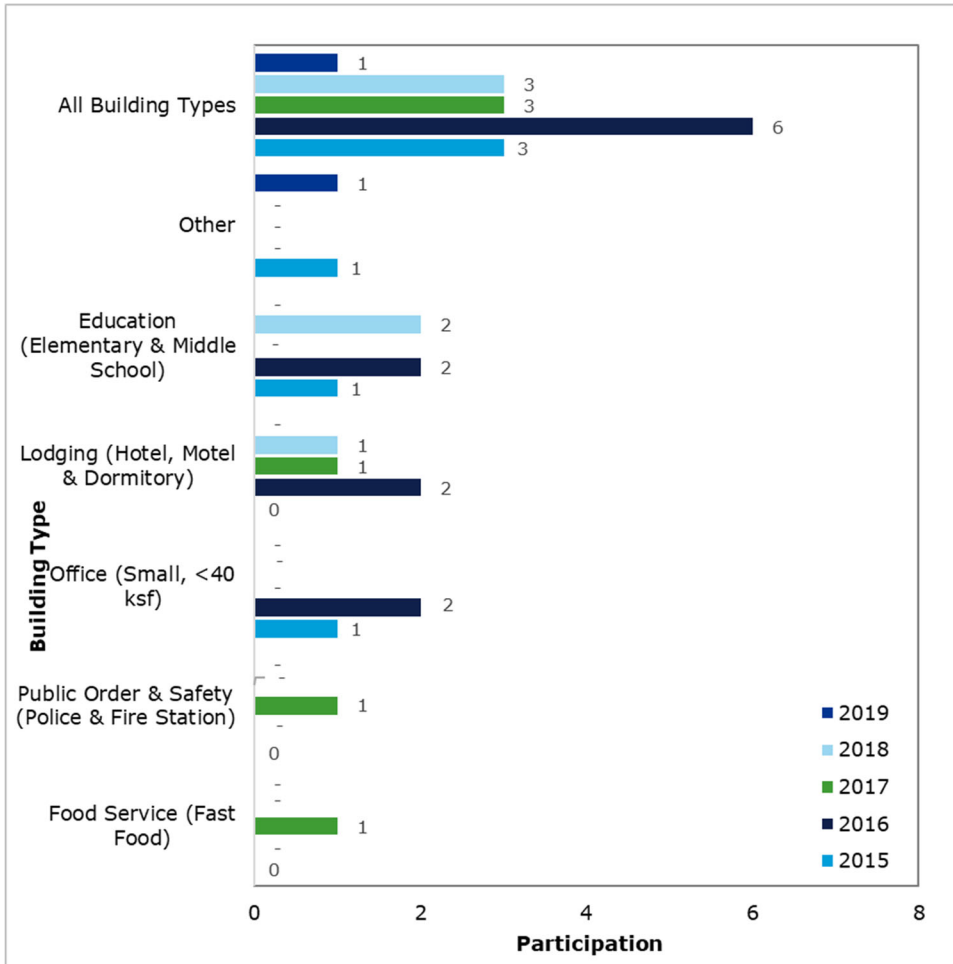
In Figure 5-23, the average energy savings per participant (gross annualized) are shown for each measure category, by year and overall. In 2019, chiller upgrades yielded the highest average savings per participant and were followed by variable frequency drives.

Figure 5-23. North Carolina Non-residential Heating and Cooling Efficiency Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure and Year



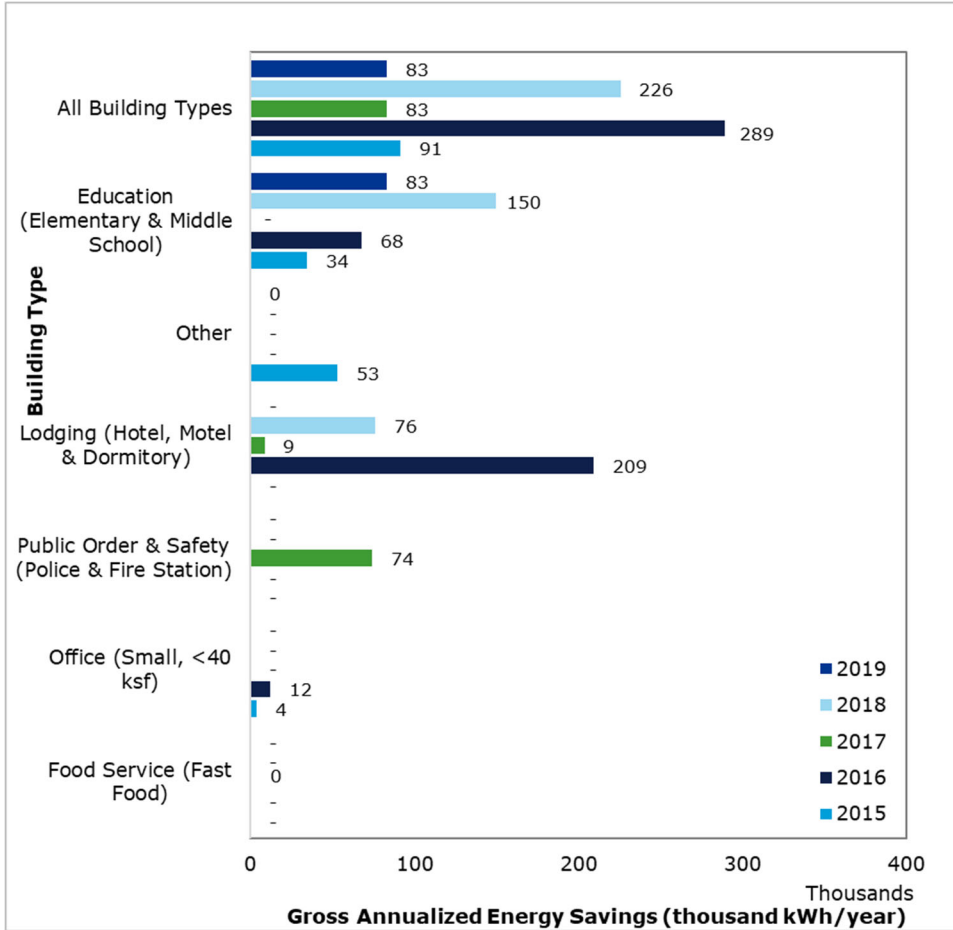
According to Figure 5-24, the leading building type in the program in 2019 was “other” building type whereas the leading building types over the life of the program were elementary/middle schools and lodging.

Figure 5-24. North Carolina Non-residential Heating and Cooling Efficiency Program Participation by Building Type and Year



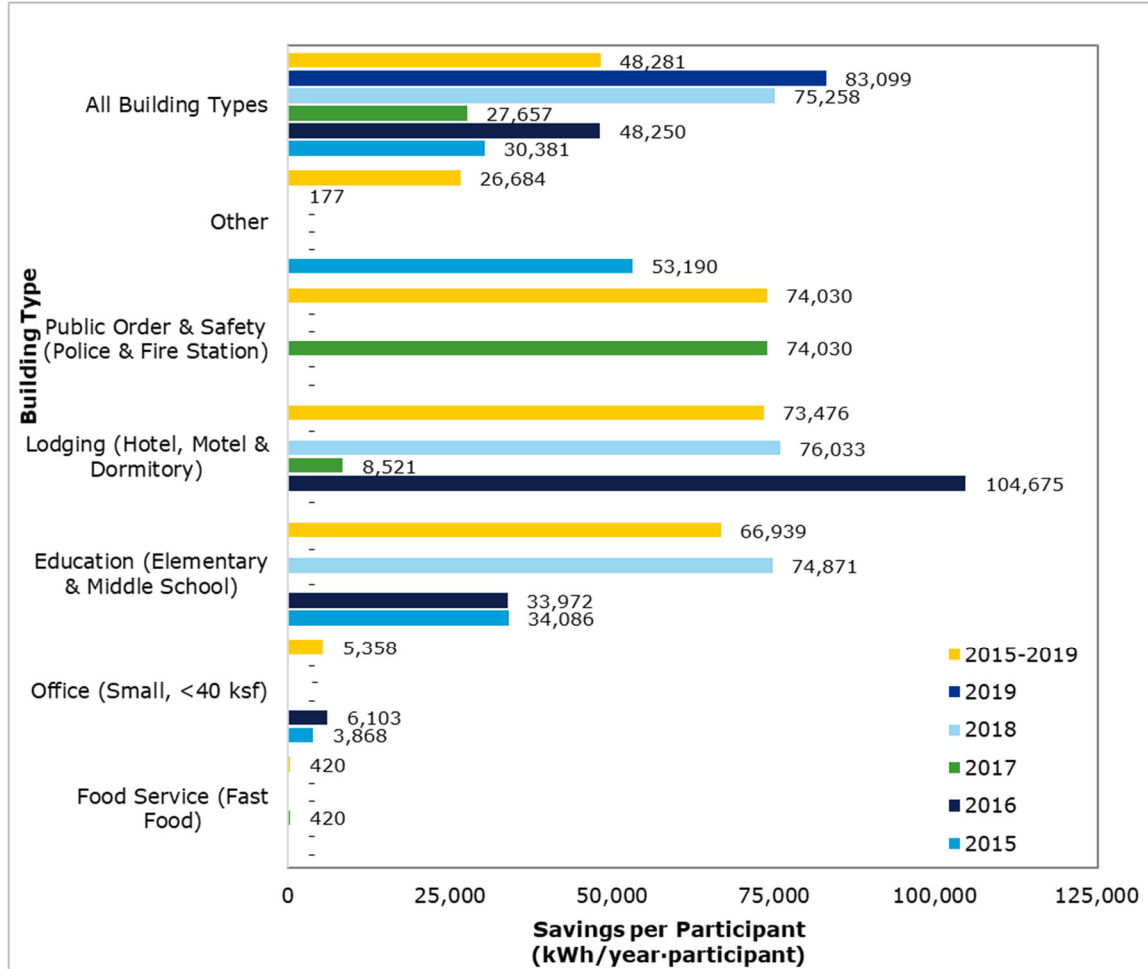
According to Figure 5-25, the leading building types to realize energy savings in 2019 included elementary/middle schools and lodging. Since the beginning of the program, however, lodging facilities have yielded the most savings.

Figure 5-25. North Carolina Non-residential Heating and Cooling Efficiency Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year



In 2019, the highest average energy savings per participant (gross, annualized) were yielded by new participants in the "Other" building category (Figure 5-26). Over the life of the program, however, the highest average energy savings per participant were yielded at police and fire stations.

Figure 5-26. North Carolina Non-residential Heating and Cooling Efficiency Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year



5.4 Non-residential Heating and Cooling Efficiency (DSM Phase VII) – Virginia

Virginia

Case #: PUE-2018-00168

NON-RESIDENTIAL HEATING & COOLING EFFICIENCY

2019-PRESENT

- kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- Unitary and split AC units
- Air-source and ground-source heat pumps
- Packaged terminal AC and heat pumps
- Variable refrigerant flow units
- Water- and air-cooled chillers
- Variable frequency drives for HVAC applications
- Economizers



Enrolled **0** customers in 2019



Achieved net annual energy savings of **0 MWh/year** in 2019



Spent **30%** of planned expenditures in 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	-	-	342,194	342,194
Total Program Participants (#)	-	-	-	-	0	0
Total Gross Incremental Savings (kWh/yr)	-	-	-	-	0	-
Total Net Incremental Savings (kWh/yr)	-	-	-	-	0	-
Average Gross Incremental Demand Reduction (kW)	-	-	-	-	0	-
Average Net Incremental Demand Reduction (kW)	-	-	-	-	0	-
Total Net Lifetime Savings (kWh)	-	-	-	-	0	0
Average Lifetime Demand Reduction (kW)	-	-	-	-	0	0

TOTAL SAVINGS BY MEASURE TYPE
IN KWH

TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH

5.4.1 Program Description

The Non-residential Heating and Cooling Efficiency Program (DSM Phase VII) provides incentives to qualifying non-residential customers to either upgrade existing heating or cooling equipment or install new energy efficient equipment. All non-residential customers are eligible for this program except those who are exempt by statute or contract or have opted-out. Measures eligible to receive a rebate in 2019 included:

- Unitary and split AC units
- Air-source/ground-source heat pump units
- Packaged terminal AC and heat pump
- Variable refrigerant flow
- Water- and air-cooled chillers
- Variable frequency drives for HVAC applications
- Economizers

This program is implemented through a contractor network, so customers must use a participating contractor to be eligible for the rebate. Customers are not considered participants until a completed application form has been processed and a rebate has been issued. This process can take several months since customers have 45 days after measure installation to submit their rebate application, and the Company has 90 days after receipt of the application to process it.



The Virginia SCC approved this program, as part of the DSM Phase VII programs, on May 2, 2019 (Case No. PUR-2018-00168) for a five-year period of July 1, 2019, through June 30, 2024. The North Carolina Utilities Commission approved this program on November 13, 2019 (Docket No. E-22, SUB 574). Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details.

Table 5-10 maps the applicable sections in this report to reporting requirements listed in the EM&V Rule section 50, "Standard Requirements for Evaluation, Measurement, and Verification Reporting."⁵⁸

Table 5-10. Non-residential Heating and Cooling Efficiency Program (DSM Phase VII) Compliance with EM&V Rule Section 50

Subsection within 20 VAC 5-318-50	Location and Description
A. EM&V Plan	Appendix L, EM&V Plan
B. Utilizing utility-specific data or other data	<p>Per 20 VAC 5-318-40 A and B</p> <ol style="list-style-type: none"> 1. See Appendix F. STEP Manual v10 for a description of all data or estimates used as inputs for this program and the measures within it. 2. See the Methodologies section (section 3) of this report for a description of the overarching EM&V methodologies used to report results in this report. <p>Per 20 VAC 5-318-40 C</p> <ol style="list-style-type: none"> 3. There were no program participants in this program in 2019.

⁵⁸ 20 VAC 5-318-50

Subsection within 20 VAC 5-318-50	Location and Description
C. Changes to measure-level inputs and assumptions, and inputs to cost/benefit estimates	<ol style="list-style-type: none"> 1. See Table 5-11 for program planning assumptions 2. See documents filed with the Virginia State Corporation Commission Docket PUR-2018-00168 for approved measure-level inputs and assumptions, and the impact of such changes on original cost/benefit estimates for DSM programs or measures.
D. Measure-level data collection methodology	See response to A. and B. above.
E. Explanation of eligibility requirements for each rate schedule that program is offered	See program description above.
F. Comparison of measured annual measure or program savings estimates to the annual usage of the average rate schedule usage, and eligible customer in each rate schedule	There were no program participants in this program in 2019.
G. Explanation of controls undertaken by utility	There were no program participants in this program in 2019.

5.4.2 Methods for the Current Reporting Period

DNV GL developed an EM&V Plan for this program that is included in Appendix L. For the upcoming period, the approach will include reviewing the tracking data and then estimating gross energy savings and demand reduction using STEP Manual calculations.

Table 5-11 outlines Dominion Energy’s initial program planning assumptions used to design the program. DNV GL uses the planned NTG factor in its net savings calculations until it can be verified through EM&V.

Table 5-11. Non-residential Heating and Cooling Efficiency Program (Phase VII) Planning Assumptions System-wide

Assumption	Value
Target Market	Non-residential customers
NTG Factor	70%
Measure Life (years)	15
Gross Average Annual Energy Savings per Participant (kWh/year)	17,760
Gross Average Coincident Peak Demand Reduction (kW) per Participant	3.2
Net Average Annual Energy Savings per Participant (kWh/year)	12,432
Average Rebate (US\$) per Participant	\$1,901

5.4.3 Assessment of Program Progress Towards Plan

The next subsection provides the tables summarizing the key indicators of the Non-residential Heating and Cooling Efficiency program progress in Virginia.

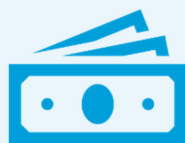
5.4.3.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 5-12 provides performance indicator data from January 1, 2019 through December 31, 2019 and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix A.8.



- There were no participants in 2019.

- There were no annual kWh or kW savings because there were no participants in 2019.



- Annual program costs in 2019 were 30% of planned costs.
- All costs were related to program implementation, EM&V, and other administrative activities to launch the program.

Table 5-12. Virginia Non-residential Heating and Cooling Efficiency Program Performance Indicators (2019)

Category	Item	2019
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	
	Direct EM&V	
	Indirect Other (Administrative)	\$11,566
Total Costs (\$)	Total ⁵⁹	\$342,194
	Planned	\$1,130,793
	Variance	-\$788,599
	Annual % of Planned	30%

⁵⁹ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2019
Participants	Total (Gross)	0
	Planned (Gross)	350
	Variance	-350
	Annual % of Planned (Gross)	0%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	0
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	0
	Net-to-Gross Adjustment (70%)	0
	Net Adjusted Savings	0
	Planned Savings (Net)	1,014,615
	Annual % Toward Planned Savings (Net)	0.00%
	Avg. Savings per Participant (Gross)	N/A
	Avg. Savings per Participant (Net)	N/A
Installed Demand Reduction (kW)	Total Gross Deemed Demand	0.0
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand	0.0
	Net-to-Gross Adjustment (70%)	0.0
	Net Adjusted Demand	0.0
	Planned Demand (Net)	0.0
	Annual % Toward Planned Demand (Net)	N/A
	Avg. Peak Demand per Participant (Gross)	N/A
	Avg. Demand per Participant (Net)	N/A
Program Performance	Annual \$Admin. per Participant (Gross)	N/A
	Annual \$Admin. per kWh/year (Gross)	N/A
	Annual \$Admin. per kW (Gross)	N/A
	Annual \$EM&V per Total Costs (\$)	11%
	Annual \$Rebate per Participant (Gross)	N/A

5.4.3.2 Additional Virginia Program Data

No Virginia customers have participated in the program through 2019.

5.4.3.3 Comparison of Savings with Usage

No Virginia customers have participated in the program through 2019.

5.5 Non-residential Window Film (DSM Phase III) – Virginia and North Carolina

Virginia

Case #: PUE-2013-00072

NON-RESIDENTIAL WINDOW FILM

2014-2019

20,900 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- Solar reduction window film



Enrolled **253** customers and installed **476,378** square feet of window film, **10%** of planned square feet



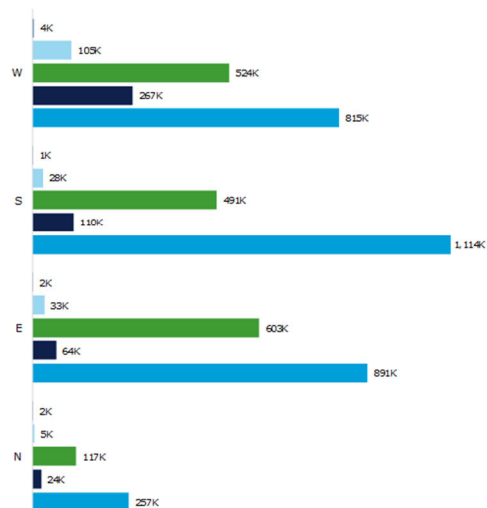
Achieved net annual energy savings of **5,288 MWh/year**, **12%** of planned energy savings



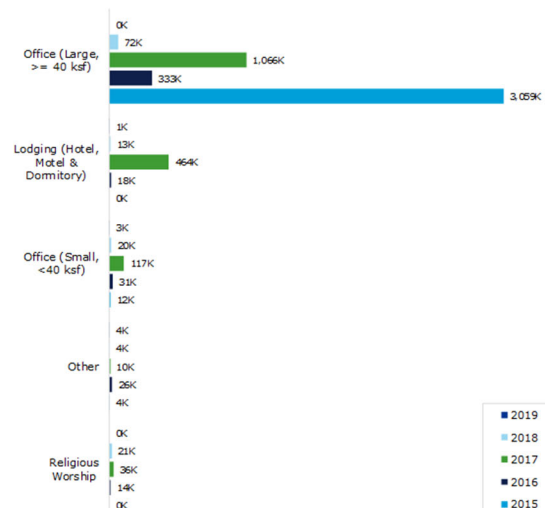
Spent **28%** of planned expenditures

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	400,634	430,529	550,444	369,265	103,090	2,236,675
Total Program Participants (#)	22	70	59	91	8	253
Total Gross Incremental Savings (kWh/yr)	3,077,815	464,794	1,734,665	170,954	8,956	-
Total Net Incremental Savings (kWh/yr)	2,462,252	371,835	1,387,732	136,764	7,165	-
Average Gross Incremental Demand Reduction (kW)	627	140	471	58	2	-
Average Net Incremental Demand Reduction (kW)	501	112	377	46	2	-
Total Net Lifetime Savings (kWh)	2,842,285	6,459,793	10,885,846	16,111,846	21,399,185	52,877,279
Average Lifetime Demand Reduction (kW)	688	800	1,177	1,223	1,225	1,225

TOTAL SAVINGS BY ORIENTATION ALL IN KWH



TOTAL SAVINGS BY BUILDING TYPE TOP 5 IN KWH



North Carolina

Docket #: E-22 Sub 509

NON-RESIDENTIAL WINDOW FILM

2015-2019

3,613 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- Solar reduction window film



Enrolled **1** customers and installed **402** square feet of window film, **<1%** of planned square feet



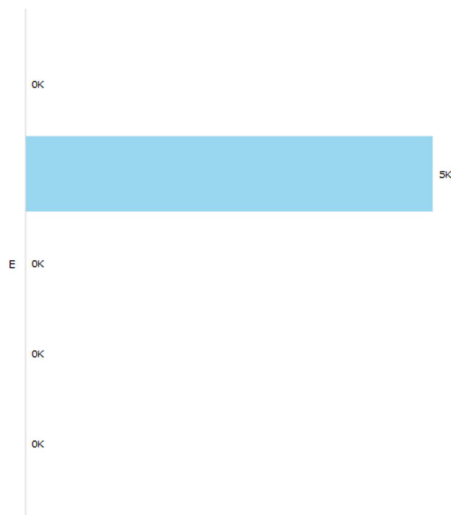
Achieved net annual energy savings of **4 MWh/year**, **0%** of planned energy savings



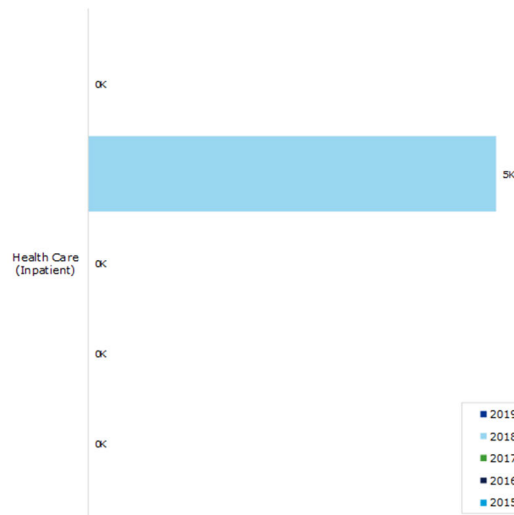
Spent **21%** of planned expenditures

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	24,693	26,289	22,104	17,432	6,937	97,455
Total Program Participants (#)	0	0	0	1	0	1
Total Gross Incremental Savings (kWh/yr)	0	0	0	4,516	0	-
Total Net Incremental Savings (kWh/yr)	0	0	0	3,613	0	-
Average Gross Incremental Demand Reduction (kW)	0	0	0	1	0	-
Average Net Incremental Demand Reduction (kW)	0	0	0	1	0	-
Total Net Lifetime Savings (kWh)	0	0	0	1,505	5,118	36,128
Average Lifetime Demand Reduction (kW)	0	0	0	1	1	1

TOTAL SAVINGS BY ORIENTATION
ALL IN KWH



TOTAL SAVINGS BY BUILDING TYPE
ALL IN KWH



5.5.1 Program Description

The program provides an incentive to non-residential customers to install solar reduction window film to reduce energy consumption and demand during the cooling season. All non-residential customers in Virginia and North Carolina, not exempt by statute or contract, and who have not opted-out, are eligible.

This program is implemented through a contractor network, such that customers must contact a participating contractor to be eligible for the rebate. Customers are not considered participants until a completed application form is processed and a rebate is issued. This process can take several months, because customers have 45 days to submit their rebate application and the Company has 90 days to process it.



The Virginia SCC approved this program, as part of the DSM Phase III programs, on April 29, 2014 (Case No. PUE-2013-00072) for a five-year period of May 1, 2014 through April 30, 2019. The North Carolina Utilities Commission approved this program on October 27, 2014 (Docket No. E-22, Sub 509). When the Virginia program expired in April 2019, it triggered the systemwide version of this program to close, to include in North Carolina also. These incentives will be available in the DSM Phase VII version of the program. Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details in both states.

5.5.2 Methods for the Current Reporting Period

For the current period, the approach included reviewing the tracking data, then estimating gross energy and demand savings using STEP Manual calculations.

Table 5-13 outlines Dominion Energy's initial program planning assumptions used to design the program. DNV GL uses the planned NTG factor in its net savings calculations for the program measures that have not yet been verified through EM&V.

Table 5-13. Non-residential Window Film Program (Phase III) Planning Assumptions

Assumption	Value
Target Market	Non-residential customers
NTG Factor	80%
Measure Life (years)	10
Average Annual Energy Savings (kWh/per square foot/participant)	18
Gross Average Peak Demand Reduction (kW/per participant)	0.004
Average Rebate per Participant (US\$)	\$0.91

5.5.3 Assessment of Program Progress Towards Plan

The next section describes the program's progress towards planned spending, participants, square feet of installed window film, annual energy savings and demand reduction.

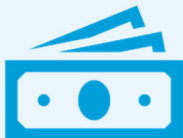
5.5.3.1 Key Virginia Program Data

Key data highlights for enrollment, square feet of installed window film, energy savings, demand reduction and program costs in Virginia from program launch in May 2014 through program close in April 2019 appear below. Following this summary, Table 5-14 provides performance indicator data by year and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix A.9. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.7, and cumulative net savings are in Appendix D.7.



- From program inception through close, the program enrolled 253 participants and installed 476,378 square feet (10% of planned square feet).
- Participation grew each full program year, with exception of 2017; however, 2017 saw the most square feet of window film installed, indicating larger projects.

- From program inception through close, the program achieved approximately 12% of planned energy savings and 3% of planned demand reduction.
- On a per-square foot basis, the net savings was approximately 61% of initial planning assumptions.



- From program inception through close, the program spent approximately 28% of planned spending.

Table 5-14. Virginia Non-residential Window Film Program Performance Indicators (2014-2019)

Category	Item	2014	2015	2016	2017	2018	2019	Program Total (2014-2019)
		Operations and Management Costs (\$)						
	Direct Rebate							
	Direct Implementation							
	Direct EM&V							
	Indirect Other (Administrative)	\$11,980	\$12,457	\$13,085	\$21,659	\$20,852	\$5,421	\$85,454
Total Costs (\$)	Total ⁶⁰	\$382,712	\$400,634	\$430,529	\$550,444	\$369,265	\$103,090	\$2,236,675
	Planned	\$705,718	\$1,240,249	\$1,712,877	\$1,921,714	\$2,237,336	\$60,177	\$7,878,071
	Variance	-\$323,005	-\$839,615	-\$1,282,348	-\$1,371,270	-\$1,868,072	\$42,913	-\$5,641,396
	Annual % of Planned	54%	32%	25%	29%	17%	171%	28%
Participants	Total Participants	3	22	70	59	91	8	253
	Total Square Feet	53,021	97,121	57,228	231,634	33,461	3,913	476,378
	Planned Square Feet	133,086	681,000	1,148,077	1,371,237	1,454,781	0	4,788,181
	Variance	-80,065	-583,879	-1,090,849	-1,139,603	-1,421,320	3,913	-4,311,803
	Annual % Toward Planned Total	40%	14%	5%	17%	2%	N/A	10%
Square feet	Total Square Feet	53,021	97,121	57,228	231,634	33,461	3,913	476,378
	North Facing	11,663	23,535	13,931	48,150	2,090	1,104	100,473
	East Facing	14,597	24,260	8,105	61,663	7,387	424	116,436
	West Facing	15,090	22,836	15,826	62,196	12,254	713	128,915
	South Facing	11,671	26,490	19,366	59,625	11,730	1,672	130,554

⁶⁰ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2014	2015	2016	2017	2018	2019	Program Total (2014-2019)
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	1,152,476	3,077,815	464,794	1,734,665	170,954	8,956	6,609,660
	Realization Rate Adjustment (100%)	0	0	0	0	0	0	0
	Adjusted Gross Savings	1,152,476	3,077,815	464,794	1,734,665	170,954	8,956	6,609,660
	Net-to-Gross Adjustment (80%) ⁶¹	-230,495	-615,563	-92,959	-346,933	-34,191	-1,791	-1,321,932
	Net Adjusted Savings	921,980	2,462,252	371,835	1,387,732	136,764	7,165	5,287,728
	Planned Savings (Net)	2,395,548	12,258	15,842,639	15,209,376	10,484,938	0	43,944,759
	Annual % Toward Planned Savings (Net)	38%	20087% ⁶²	2%	9%	1%	N/A	12%
	Avg. Savings per Participant (Gross)	384,159	139,901	6,640	29,401	1,879	1,119	26,125
	Avg. Savings per Square Foot (Gross)	22	32	8	7	5	2	14
	Avg. Savings per Participant (Net)	307,327	111,921	5,312	23,521	1,503	896	20,900
	Avg. Savings per Square Foot (Net)	17	25	6	6	4	2	11

⁶¹ On the rebate application form the program implementation vendor included the question, "Did the rebate incentive offered by Dominion Energy have any influence in your decision to have the work performed?" Of the participants who responded (from program inception to the end of this reporting period), the implementation vendor has calculated that 99% answered yes at the time they filled out the rebate application. This is not a substitute for a net-to-gross analysis conducted by DNV GL. See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation approaches.

⁶² The planned net savings is an error, thereby causing an error in the percentage toward planned.

Category	Item	2014	2015	2016	2017	2018	2019	Program Total (2014-2019)
Installed Demand Reduction (kW)	Total Gross Deemed Demand	233	627	140	471	58	2	1,531
	Realization Rate Adjustment (100%)	0	0	0	0	0	0	0
	Adjusted Gross Demand	233	627	140	471	58	2	1,531
	Net-to-Gross Adjustment (80%) ⁶³	-47	-125	-28	-94	-12	0	-306
	Net Adjusted Demand	187	501	112	377	46	2	1,225
	Planned Demand (Net)	532	2	14,497	13,693	9,627	0	38,352
	Annual % Toward Planned Demand (Net)	35%	20885%	1%	3%	0%	N/A	3%
	Avg. Demand per Participant (Gross)	78	28	2	8	1	0	6
	Avg. Demand Reduction per Square Foot (Gross)	0.004	0.006	0.002	0.002	0.002	0.001	0.003
	Avg. Demand per Participant (Net)	62	23	2	6	1	0	5
Avg. Demand Reduction per Square Foot (Net)	0.004	0.005	0.002	0.002	0.001	0.001	0.003	
Program Performance	Annual \$Admin. per Participant (Gross)	\$3,993	\$566	\$187	\$367	\$229	\$678	\$338

63 Ibid.

Category	Item	2014	2015	2016	2017	2018	2019	Program Total (2014-2019)
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.00	\$0.03	\$0.01	\$0.12	\$0.61	\$0.01
	Annual \$Admin. per kW (Gross)	\$51	\$20	\$94	\$46	\$362	\$2,183	\$56
	Annual \$EM&V per Total Costs (\$)	22%	17%	26%	16%	22%	54%	22%
	Annual \$Rebate per Participant (Gross)	\$6,090	\$512	\$667	\$3,284	\$285	\$406	\$1,182

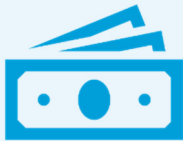
5.5.3.2 Key North Carolina Program Data

Key data highlights for enrollment, square feet of installed window film, energy savings, demand reduction and program costs in North Carolina from program launch in January 2015 through program close in April 2019 appear below. Following this summary, Table 5-15 provides performance indicator data and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix B.5. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.7, and cumulative net savings are in Appendix D.7.



- From program inception through close, the program enrolled one participant (in 2018).

- From program inception through close, the program achieved less than 1% of planned energy savings and demand reduction.



- From program inception through close, the program spent approximately 21% of planned spending.

Table 5-15. North Carolina Window Film Program Performance Indicators (2015-2019)

Category	Item	2015	2016	2017	2018	2019	Program Total (2015-2019)
Operations and Management Costs (\$)	Direct Rebate						
	Direct Implementation						
	Direct EM&V						
	Indirect Other (Administrative)	\$851	\$799	\$870	\$984	\$344	\$3,849
Total Costs (\$)	Total ⁶⁰	\$24,693	\$26,289	\$22,104	\$17,432	\$6,937	\$97,455
	Planned	\$82,903	\$115,046	\$126,681	\$143,604	\$3,850	\$472,084
	Variance	-\$58,211	-\$88,757	-\$104,577	-\$126,172	\$3,087	-\$374,629
	Annual % of Planned	30%	23%	17%	12%	180%	21%
Participants	Total Participants	0	0	0	1	0	1
	Total Square Feet	0	0	0	402	0	402
	Planned Square Feet	48,000	76,742	91,659	95,900	0	312,301
	Variance	-48,000	-76,742	-91,659	-95,498	0	-311,899
Annual % Toward Planned Total	0%	0%	0%	0%	N/A	0%	
Square feet	Total Square Feet	0	0	0	402	0	402
	North Facing	0	0	0	0	0	0
	East Facing	0	0	0	402	0	402
	West Facing	0	0	0	0	0	0
	South Facing	0	0	0	0	0	0
Installed Energy	Total Gross Deemed Savings	0	0	0	4,516	0	4,516
	Realization Rate Adjustment (100%)	0	0	0	0	0	0

Category	Item	Year						Program Total (2015-2019)
		2015	2016	2017	2018	2019		
Savings (kWh/year)	Adjusted Gross Savings	0	0	0	4,516	0	4,516	4,516
	Net-to-Gross Adjustment (80%)	0	0	0	-903	0	-903	-903
	Net Adjusted Savings	0	0	0	3,613	0	3,613	3,613
	Planned Savings (Net)	864	1,064,075	1,016,658	691,176	0	2,772,773	2,772,773
	Annual % Toward Planned Savings (Net)	0%	0%	0%	1%	N/A	0%	0%
	Avg. Savings per Participant (Gross)	N/A	N/A	N/A	4,516	N/A	4,516	4,516
	Avg. Savings per Square Foot (Gross)	N/A	N/A	N/A	11	N/A	11	11
	Avg. Savings per Participant (Net)	N/A	N/A	N/A	3,613	N/A	3,613	3,613
	Avg. Savings per Square Foot (Net)	N/A	N/A	N/A	9	N/A	9	9
Installed Demand Reduction (kW)	Total Gross Deemed Demand	0	0	0	1	0	1	1
	Realization Rate Adjustment (100%)	0	0	0	0	0	0	0
	Adjusted Gross Demand	0	0	0	1	0	1	1
	Net-to-Gross Adjustment (80%)	0	0	0	0	0	0	0
	Net Adjusted Demand	0	0	0	1	0	1	1
	Planned Demand (Net)	0	974	915	635	0	2,524	2,524
	Annual % Toward Planned Demand (Net)	0%	0%	0%	0%	N/A	0%	0%
	Avg. Demand per Participant (Gross)	N/A	N/A	N/A	1	N/A	1	1

Category	Item	Year					Program Total (2015-2019)
		2015	2016	2017	2018	2019	
	Avg. Demand per Square Foot (Gross)	N/A	N/A	N/A	0.002	N/A	0.002
	Avg. Demand per Participant (Net)	N/A	N/A	N/A	1	N/A	1
	Avg. Demand per Square Foot (Net)	N/A	N/A	N/A	0.001	N/A	0.001
Program Performance	Annual \$Admin. per Participant (Gross)	N/A	N/A	N/A	\$984	N/A	\$3,849
	Annual \$Admin. per kWh/year (Gross)	N/A	N/A	N/A	\$0.22	N/A	\$0.85
	Annual \$Admin. per kW (Gross)	N/A	N/A	N/A	\$1,337	N/A	\$5,227
	Annual \$EM&V per Total Costs (\$)	18%	29%	25%	29%	51%	27%
	Annual \$Rebate per Participant (Gross)	N/A	N/A	N/A	\$342	N/A	\$342

5.5.3.3 Additional Virginia Program Data

Figure 5-27 shows the average gross energy savings per participant by the window orientation.

Note participation in these “by orientation” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above and the “by building” charts below, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

In 2019, west facing windows averaged 0.665 MWh/year per participant (or 665 kWh/year per participant), the highest per-participant level average savings for all window orientations.

Figure 5-27. Virginia Non-residential Window Film Program Average Gross Annualized Energy Savings per Participant (MWh/year-participant) by Window Orientation and Year

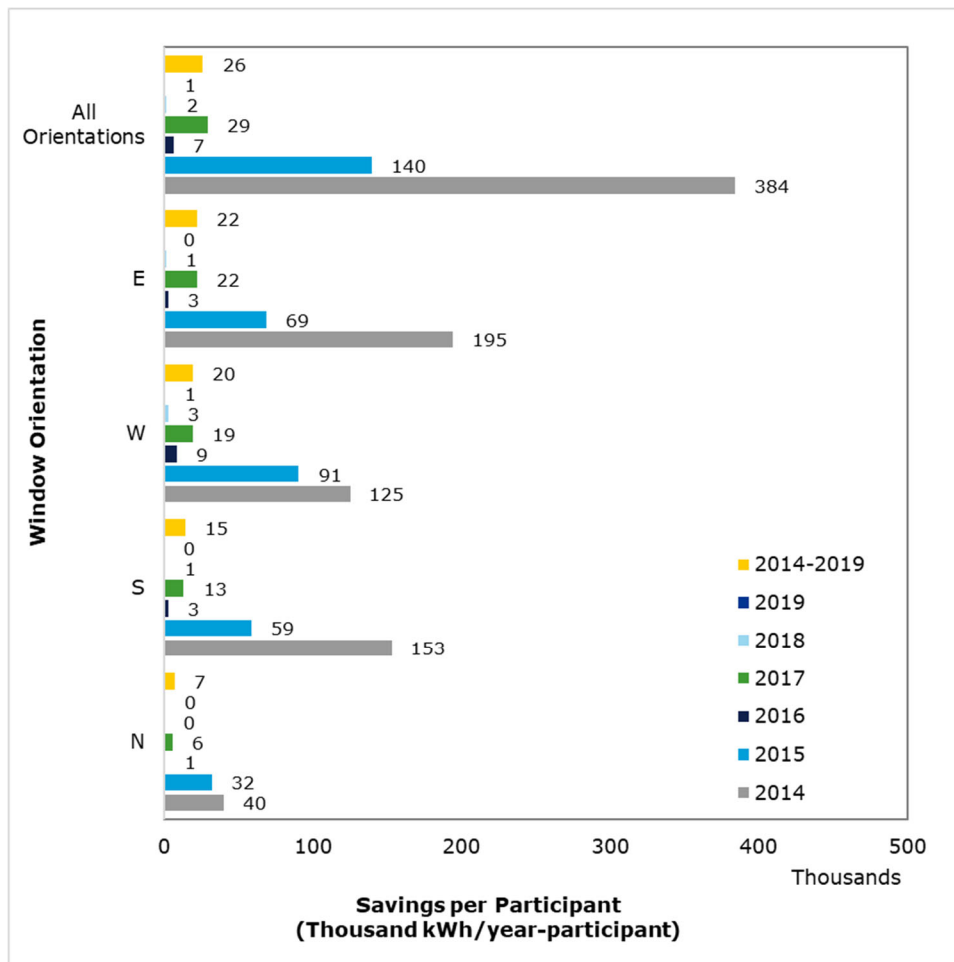


Figure 5-28 shows the number of participants by building type for year program year. A participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

In 2019, small offices (less than 40,000 square feet) participated most frequently in the program, accounting for 3 out of 8 participants.

Figure 5-28. Virginia Non-residential Window Film Program Participation by Building Type and Year

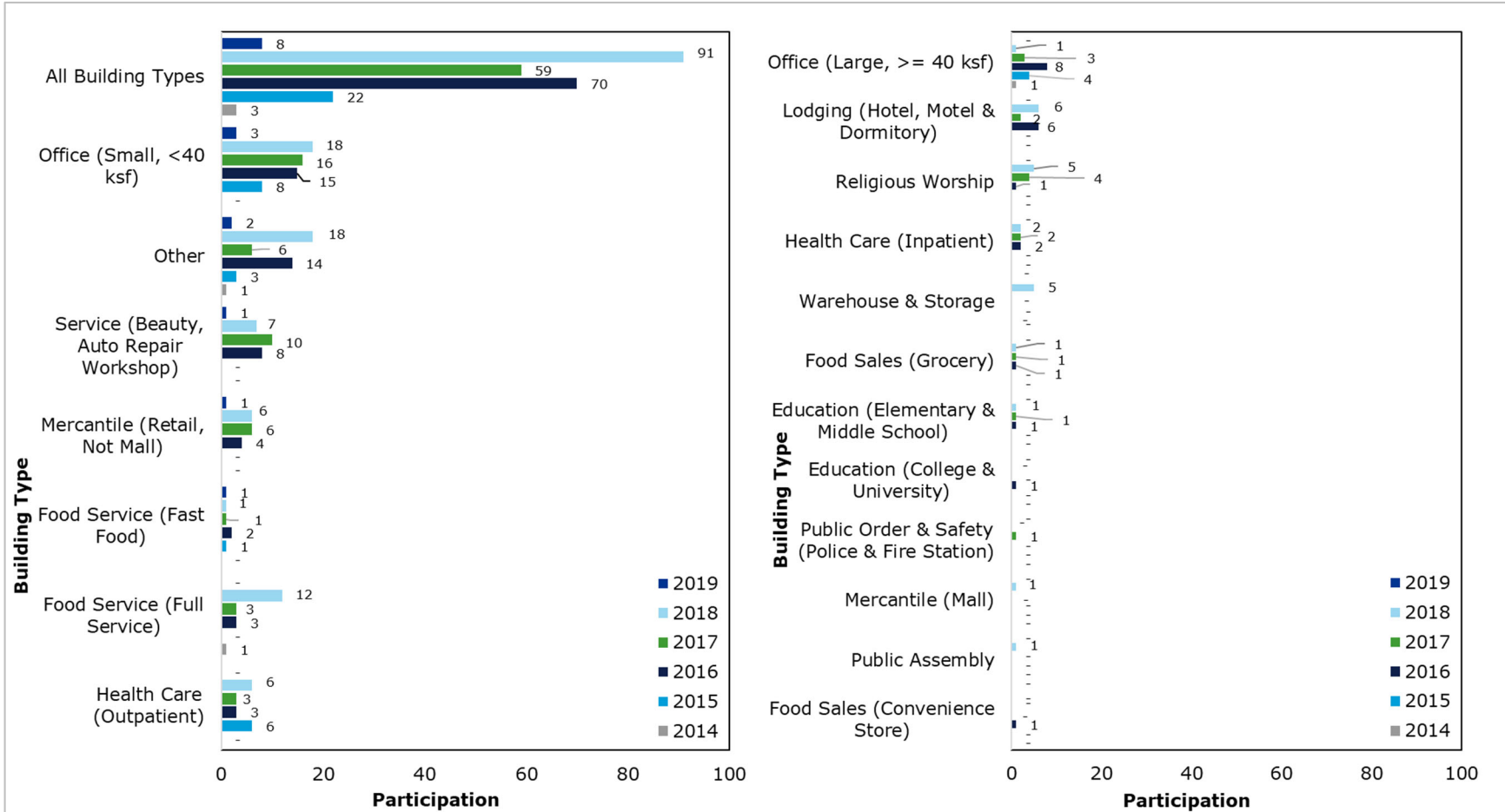


Figure 5-29 shows the total gross savings, by building type for each program year. In 2019, "other" buildings accounted for 40% of the gross energy savings, the most compared to all other building types.

Figure 5-29. Virginia Non-residential Window Film Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year

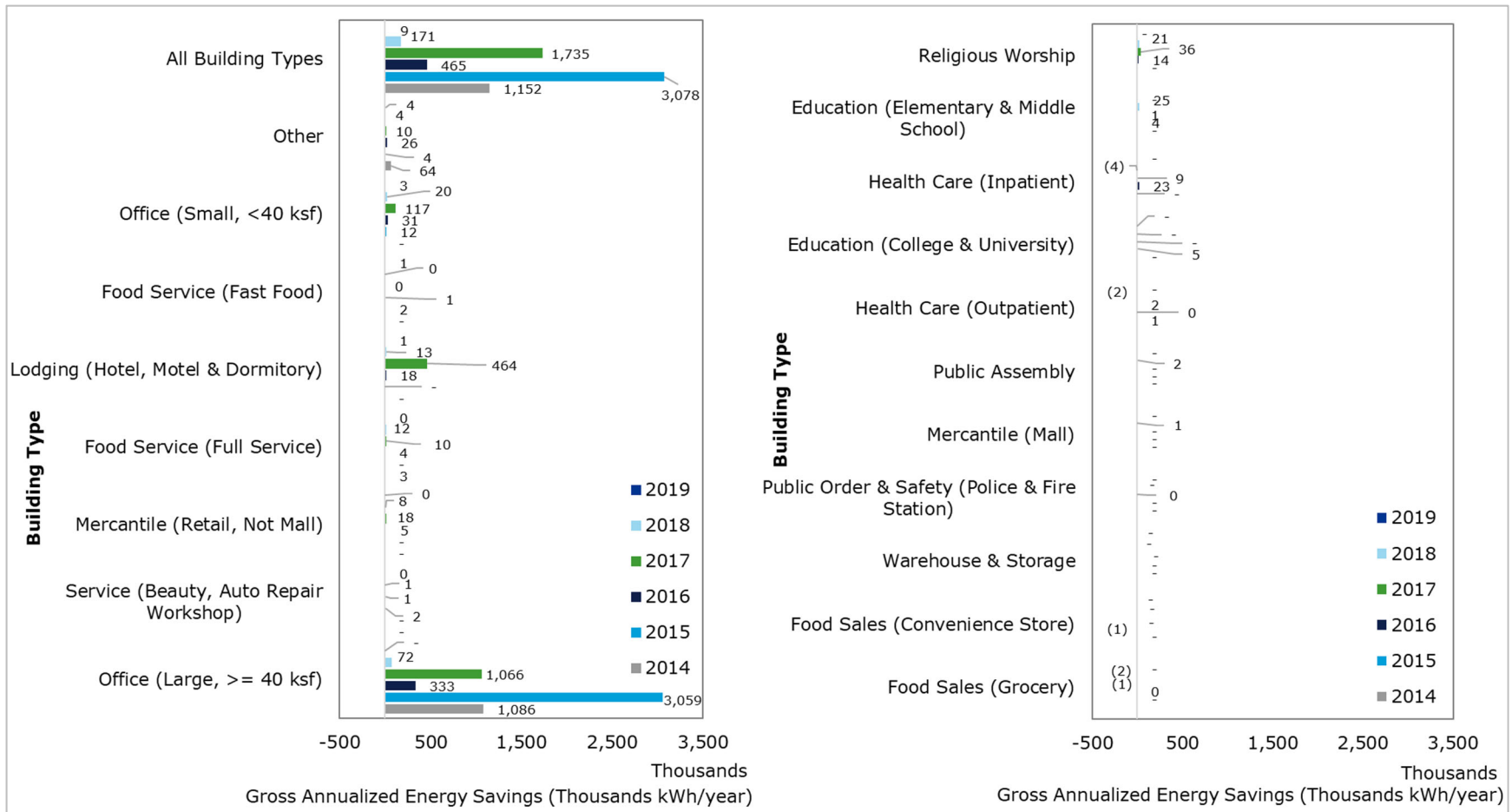
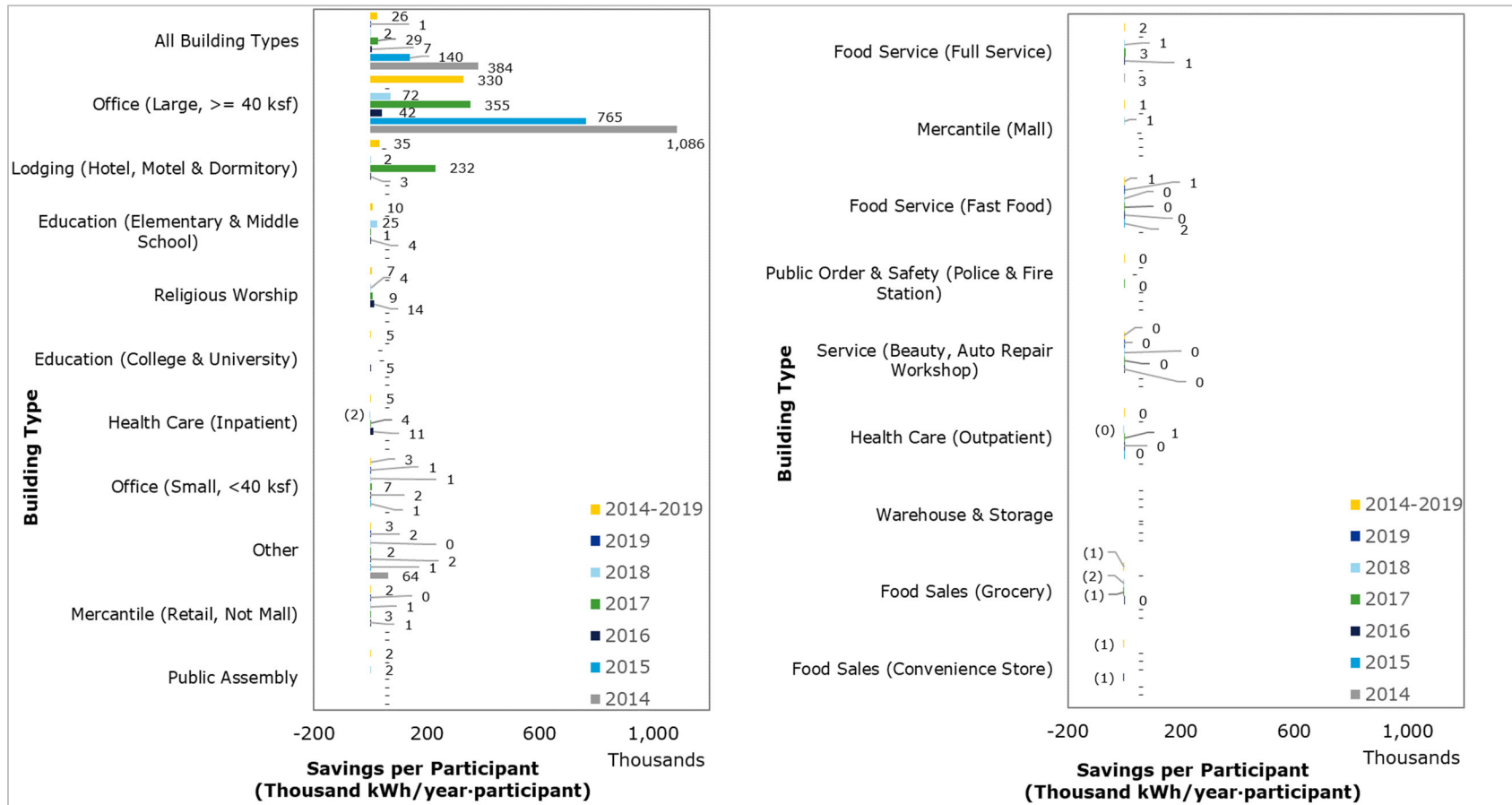


Figure 5-30 shows the average savings per participant by building type. In 2019, "other" building types averaged 1.798 MWh/year per participant (or 1,798 kWh/year per participant), the highest average gross savings per participant by building type.

Figure 5-30. Virginia Non-residential Window Film Program Average Gross Annualized Energy Savings per Participant (MWh/year-participant) by Building Type and Year





5.5.3.4 Additional North Carolina Program Data

North Carolina received its only participant to the program in 2018. The participant was a health care (inpatient) building and received window film on 402 square feet of east facing window, generating gross annualized energy savings of 4,516 kWh/year.

5.6 Non-residential Window Film (DSM Phase VII) – Virginia



Case #: PUE-2018-00168

NON-RESIDENTIAL WINDOW FILM

2019-PRESENT

- kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- Solar reduction window film



Enrolled **0** customers in 2019



Achieved net annual energy savings of **0 MWh/year** in 2019



Spent **61%** of planned expenditures in 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	-	-	192,146	192,146
Total Program Participants (#)	-	-	-	-	0	0
Total Gross Incremental Savings (kWh/yr)	-	-	-	-	0	-
Total Net Incremental Savings (kWh/yr)	-	-	-	-	0	-
Average Gross Incremental Demand Reduction (kW)	-	-	-	-	0	-
Average Net Incremental Demand Reduction (kW)	-	-	-	-	0	-
Total Net Lifetime Savings (kWh)	-	-	-	-	0	0
Average Lifetime Demand Reduction (kW)	-	-	-	-	0	0

TOTAL SAVINGS BY MEASURE TYPE
IN KWH

TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH

5.6.1 Program Description

The Non-residential Window Film Program provides incentives to qualifying non-residential customers to install solar reduction window film to lower their cooling bills and improve occupant comfort.

This program is implemented through a contractor network, so customers must contact a participating contractor to be eligible for the rebate. All Dominion Energy non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out. Customers are not considered participants until a completed application form is processed and a rebate is issued. This process can take several months, as customers have 45 days to submit their rebate application and Dominion Energy has 90 days to process it.

The Virginia SCC approved this program, as part of the DSM Phase VII programs, on May 2, 2019, (Case No. PUR-2018-00168) for a five-year period of July 1, 2019, through June 30, 2024. The North Carolina Utilities Commission approved this program on November 13, 2019 (Docket No. E-22, SUB 570). Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details.

Table 5-16 maps the applicable sections in this report to reporting requirements listed in the EM&V Rule section 50, "Standard Requirements for Evaluation, Measurement, and Verification Reporting."⁶⁴

Table 5-16. Non-residential Window Film Program (DSM Phase VII) Compliance with EM&V Rule Section 50

Subsection within 20 VAC 5-318-50	Location and Description
A. EM&V Plan	Appendix M, EM&V Plan
B. Utilizing utility-specific data or other data	<p>Per 20 VAC 5-318-40 A and B</p> <ol style="list-style-type: none"> 1. See Appendix F. STEP Manual v10 for a description of all data or estimates used as inputs for this program and the measures within it. 2. See the Methodologies section (section 3) of this report for a description of the overarching EM&V methodologies used to report results in this report. <p>Per 20 VAC 5-318-40 C</p> <ol style="list-style-type: none"> 3. There were no program participants in this program in 2019.
C. Changes to measure-level inputs and assumptions, and inputs to cost/benefit estimates	<ol style="list-style-type: none"> 1. See Table 5-17 for program planning assumptions 2. See documents filed with the Virginia State Corporation Commission Docket PUR-2018-00168 for approved measure-level inputs and assumptions, and the impact of such changes on original cost/benefit estimates for DSM programs or measures.
D. Measure-level data collection methodology	See response to A. and B. above.
E. Explanation of eligibility requirements for each rate schedule that program is offered	See program description above.
F. Comparison of measured annual measure or program savings	There were no program participants in this program in 2019.

⁶⁴ 20 VAC 5-318-50



Subsection within 20 VAC 5-318-50	Location and Description
estimates to the annual usage of the average rate schedule usage, and eligible customer in each rate schedule	
G. Explanation of controls undertaken by utility	There were no program participants in this program in 2019.

5.6.2 Methods for the Current Reporting Period

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

Table 5-17. Non-residential Window Film Program (Phase VII) Planning Assumptions System-wide

Assumption	Value
Target Market	Non-residential customers
NTG Factor	80%
Measure Life (years)	10
Gross Average Annual Energy Savings per Participant (kWh/year)	16.50
Gross Average Coincident Peak Demand Reduction (kW) per Participant	0
Net Average Annual Energy Savings per Participant (kWh/year)	13
Average Rebate per Participant	1

5.6.3 Assessment of Program Progress Towards Plan

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

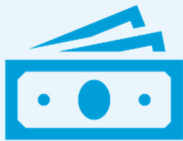
5.6.3.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 5-18 provides performance indicator data from July 1, 2019 through December 31, 2019, and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix A.10.



- There were no participants in 2019.

- There were no annual kWh or kW savings because there were no participants in 2019.



- The Program opened on July 1, 2019, resulting in a total cost for the year of \$192,146. The total cost for 2019 was only 61% of planned cost.
- All costs were related to program implementation, EM&V, and other administrative activities to launch the program.

Table 5-18. Virginia Non-residential Window Film Program Performance Indicators (2019)

Category	Item	2019
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	
	Direct EM&V	
	Indirect Other (Administrative)	\$6,494
Total Costs (\$)	Total ⁶⁵	\$192,146
	Planned	\$317,588
	Variance	-\$125,441
	Annual % of Planned	61%
Participants	Total (Gross)	0
	Planned (Gross)	0
	Variance	0
	Annual % of Planned (Gross)	0
Square Feet	Total Square Feet	0

⁶⁵ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2019
	North Facing	0
	East Facing	0
	West Facing	0
	South Facing	0
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	0
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	0
	Net-to-Gross Adjustment (80%)	0
	Net Adjusted Savings	0
	Planned Savings (Net)	170,812
	Annual % Toward Planned Savings (Net)	0.00%
	Avg. Savings per Participant (Gross)	N/A
	Avg. Savings per Participant (Net)	N/A
Installed Demand Reduction (kW)	Total Gross Deemed Demand	0.0
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand	0.0
	Net-to-Gross Adjustment (80%)	0.0
	Net Adjusted Demand	0.0
	Planned Demand (Net)	0.0
	Annual % Toward Planned Demand (Net)	N/A
	Avg. Peak Demand per Participant (Gross)	N/A
	Avg. Demand per Participant (Net)	N/A
Program Performance	Annual \$Admin. per Participant (Gross)	N/A
	Annual \$Admin. per kWh/year (Gross)	N/A
	Annual \$Admin. per kW (Gross)	N/A
	Annual \$EM&V per Total Costs (\$)	15%
	Annual \$Rebate per Participant (Gross)	N/A

5.6.3.2 Additional Virginia Program Data

No Virginia customers have participated in the program through 2019.

5.6.3.3 Comparison of Savings with Usage

No Virginia customers have participated in the program through 2019.

5.7 Non-residential Small Business Improvement (DSM Phase V) – Virginia and North Carolina

Virginia
Case #: PUE-2015-00089

NON-RESIDENTIAL SMALL BUSINESS IMPROVEMENT

2016-PRESENT

19,828 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers with privately-owned business in ≤ 5 locations that with monthly demand of ≤ 100 kW no more than 3 times in the past year, have not opted out of participation, are responsible for the electric bill and owners of the facility or reasonably able to secure permission to complete measures.
- Work must be completed by participating contractor.

Measures

- Direct install lighting units
- Variable frequency drives Prescriptive re-commissioning
- Efficient heat pumps
- Efficient air conditioning

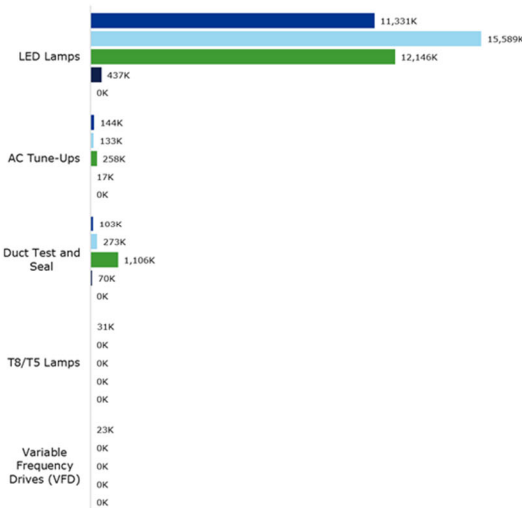
Enrolled **2,017** customers through 2019, **79%** of planned participation

Achieved net annual energy savings of **39,990 MWh/year** through 2019, **189%** of planned energy savings

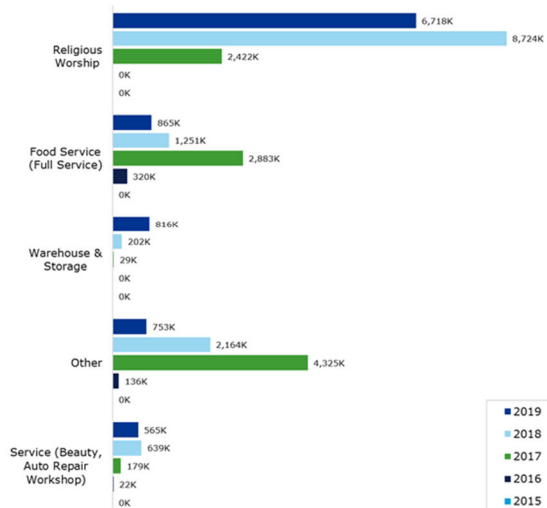
Spent **52%** of planned expenditures through 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	705,139	3,827,332	3,375,566	3,446,135	11,354,171
Total Program Participants (#)	-	67	937	510	503	2,017
Total Gross Incremental Savings (kWh/yr)	-	656,801	14,699,005	15,998,914	11,648,664	-
Total Net Incremental Savings (kWh/yr)	-	610,825	13,670,074	14,878,990	10,833,258	-
Average Gross Incremental Demand Reduction (kW)	-	132	3,098	3,476	2,554	-
Average Net Incremental Demand Reduction (kW)	-	122	2,881	3,232	2,375	-
Total Net Lifetime Savings (kWh)	-	68,256	7,471,590	30,421,359	65,609,192	559,904,063
Average Lifetime Demand Reduction (kW)	-	122	3,004	6,236	8,783	8,783

**TOTAL SAVINGS BY MEASURE TYPE
TOP 5 IN KWH**



**TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH**



North Carolina

Docket #: E-22 Sub 538

NON-RESIDENTIAL SMALL BUSINESS IMPROVEMENT

2017-PRESENT

24,748 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers with privately-owned business in ≤ 5 locations that with monthly demand of ≤ 100 kW no more than 3 times in the past year, have not opted out of participation, are responsible for the electric bill and owners of the facility or reasonably able to secure permission to complete measures.
- Work must be completed by participating contractor.

Measures

- Direct install lighting units
- Variable frequency drives Prescriptive re-commissioning
- Efficient heat pumps
- Efficient air conditioning



Enrolled **70** customers through 2019, **45%** of planned participation



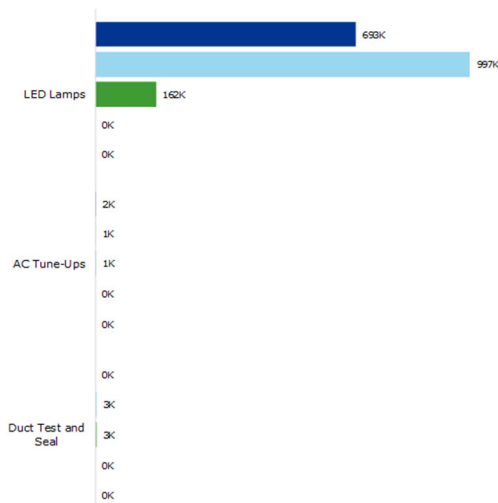
Achieved net annual energy savings of **1,732 MWh/year** through 2019, **131%** of planned energy savings



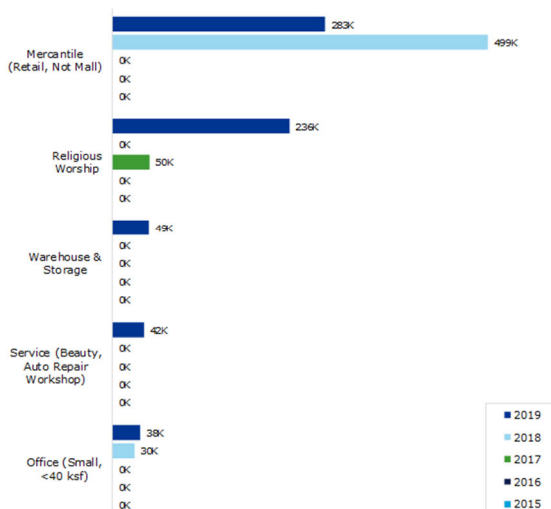
Spent **34%** of planned expenditures through 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	98,352	180,923	156,020	435,296
Total Program Participants (#)	-	-	7	36	27	70
Total Gross Incremental Savings (kWh/yr)	-	-	166,507	1,000,716	695,521	-
Total Net Incremental Savings (kWh/yr)	-	-	154,851	930,665	646,835	-
Average Gross Incremental Demand Reduction (kW)	-	-	33	219	140	-
Average Net Incremental Demand Reduction (kW)	-	-	30	204	130	-
Total Net Lifetime Savings (kWh)	-	-	39,109	654,867	2,154,378	24,252,919
Average Lifetime Demand Reduction (kW)	-	-	30	234	365	365

TOTAL SAVINGS BY MEASURE TYPE
ALL IN KWH



TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH



5.7.1 Program Description



In the Non-residential Small Business Improvement Program, qualifying customers are eligible to receive an on-site energy assessment, or audit, by a participating contractor in Dominion Energy’s Small Business contractor network. Eligible participants are non-residential customers with privately-owned businesses in five or fewer locations and have not exceeded monthly demand of 100 kilowatts more than three times in the past 12 months. The customer must be responsible for

the electric bill and must be the owner of the facility or reasonably able to secure permission to complete the measures.

The program became available to customers in the Company’s Virginia service territory in 2016. The program was approved in Virginia on April 19, 2016, in Case No. PUE-2015-00089. On October 26, 2016, the program was approved for implementation in North Carolina in Docket E-22, Sub 538 and launched in 2017. DNV GL developed an EM&V Plan for this program, which is included in Appendix N.

After an energy assessment, the customer receives a personalized report showing the projected energy and cost savings anticipated from the implementation of energy efficiency measure options identified during the audit. Once a qualifying customer provides documentation that at least one of the recommended EE improvements has been made, a portion of the audit value will be refunded—based on the measures installed—up to the full value of the audit.

Since the program is implemented through a contractor network, customers must contact a participating contractor to receive the energy audit. Customers are not considered participants until a completed application form is processed and a rebate issued. Work must be completed within six months of the audit to qualify for a rebate.

The program measures are primarily energy efficiency measures designed to decrease energy consumption through replacement of less efficient equipment, installation of new equipment that exceeds current code efficiency standards or recommissioning of existing equipment. Measures eligible to receive a rebate through the program are shown in Table 5-19.

As a result of the Virginia SCC’s June 2017 Final Order, refrigeration measures were no longer deemed eligible for a program incentive. These measures were later approved in the Company’s Non-residential Prescriptive Program.

Table 5-19. Measures Offered Through Small Business Improvement Program

End-Use	Measure
Lighting	T5/T8 Fluorescent Lamp/Ballast
	LED Lamp/Fixture
	CFL Lamp/Fixture
	De-lamping
Refrigeration ⁶⁶	Door Gasket (cooler and freezer)
	Door Closer (cooler and freezer)
	Strip Curtain (cooler and freezer)
	Night Cover
HVAC	Unitary/Split AC & HP Upgrade
	Mini-split Heat Pump
	Dual Enthalpy Air-side Economizer
	Variable Frequency Drive
	Programmable Thermostat
HVAC, recommissioning	Duct Testing & Sealing
	Unitary/Split AC & HP Tune-up
	Refrigerant Charge Correction
Other, recommissioning	Compressed Air Leak Repair

5.7.2 Methods for the Current Reporting Period

DNV GL developed an EM&V Plan for this program, which is included in Appendix N. For the current period, the approach included reviewing the tracking data, then estimating gross energy and demand savings using STEP Manual calculations.

Table 5-20 outlines Dominion Energy’s initial program planning assumptions used to design the program. DNV GL uses the planned NTG factor in its net savings calculations for the program measures that have not yet been verified through EM&V.

Table 5-20. Non-residential Small Business Improvement Program (Phase V) Planning Assumptions System-wide

Assumption	Value
Target Market	Non-residential, small business customers
NTG Factor	93%
Measure Life (years)	14
Average Annual Energy Savings per Participant (kWh/year)	17,717
Average Peak Demand Reduction (kW) per Participant	5.1
Average Rebate (US\$) per Participant	\$6,304

⁶⁶ As of June 1, 2017, refrigeration measures ceased to be offered through this program as a result of the ruling in Virginia SCC Case No. PUE-2016-00111 issued and effective on the same date.

5.7.3 Assessment of Program Progress Towards Plan

The next subsections describe the program's progress towards planned participants, energy savings, and demand reduction.

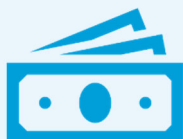
5.7.3.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 5-21 provides performance indicator data from July 1, 2016 through December 31, 2019, and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix A.11. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.8, and cumulative net savings are in Appendix D.8.



- The program enrolled 503 participants in 2019, approximately 54% of planned participation.
- Cumulatively, from program inception through 2019, the program has enrolled a total of 2,017 participants, approximately 79% of planned participation.

- The program achieved net annual energy savings of 10,833,258 kWh in 2019, approximately 111% of planned savings.
- Average net annual energy savings per participant was 21,537 kWh, approximately 122% of planned savings per participant.
- The program achieved a net demand reduction of 2,374.8 kW in 2019, approximately 123% of planned reduction.
- Average net demand reduction per participant was 4.7 kW, approximately 93% of planned reduction per participant.



- Total annual program costs were approximately 44% of planned costs in 2019.
- Total program costs, from program inception through 2019, have been approximately 52% of planned costs.

Table 5-21. Virginia Non-residential Small Business Improvement Program Performance Indicators (2016-2019)

Category	Item	2016 ⁶⁷	2017	2018	2019	Program Total (2016-2019)
Operations and Management Costs (\$)	Direct Rebate					
	Direct Implementation					
	Direct EM&V					
	Indirect Other (Administrative)	\$21,431	\$150,600	\$190,612	\$162,502	\$525,145
Total Costs (\$)	Total ⁶⁸	\$705,139	\$3,827,332	\$3,375,566	\$3,446,135	\$11,354,171
	Planned	\$2,306,687	\$5,322,647	\$6,548,890	\$7,784,513	\$21,962,738
	Variance	-\$1,601,548	-\$1,495,315	-\$3,173,324	-\$4,338,378	-\$10,608,566
	Annual % of Planned	31%	72%	52%	44%	52%
Participants	Total (Gross)	67	937	510	503	2,017
	Planned (Gross)	216	635	780	928	2,559
	Variance	-149	302	-270	-425	-542
	Annual % of Planned (Gross)	31%	148%	65%	54%	79%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	656,801	14,699,005	15,998,914	11,648,664	43,003,384
	Realization Rate Adjustment (100%)	0	0	0	0	0
	Adjusted Gross Savings	656,801	14,699,005	15,998,914	11,648,664	43,003,384
	Net-to-Gross Adjustment (93%) ⁶⁹	-45,976	-1,028,930	-1,119,924	-815,407	-3,010,237

⁶⁷ The 2016 total gross deemed savings values reported in this table differ from values in the May 1, 2017 EM&V report and have been refiled with the Commission. The adjustments totaled -171,768 kWh/year and 3 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 15. The adjustment was to waste heat factors (WHFe and WHFd) applied to lighting fixtures installed in 2016, where the program participant building HVAC systems were assumed to be heat pump heating and cooling systems, rather than the previous assumption of AC cool and non-electric heat systems. This adjustment was made in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. It is reflected in STEP Manual version 8.0.0 in this EM&V report.

⁶⁸ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

⁶⁹ On the rebate application form the program implementation vendor included the question, "Did the rebate incentive offered by Dominion Energy have any influence in your decision to have the work performed?" Of the participants who responded (from program inception to the end of this reporting period), the implementation vendor has calculated that 100% answered yes at the time they filled out the rebate application. This is not a substitute for a net-to-gross analysis conducted by an independent evaluator. See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation approaches.

Category	Item	2016 ⁶⁷					2019	Program Total (2016-2019)
		2016	2017	2018	2019	2019		
	Net Adjusted Savings	610,825	13,670,074	14,878,990	10,833,258	39,993,147		
	Planned Savings (Net)	1,255,549	4,323,476	5,760,927	9,774,740	21,114,692		
	Annual % Toward Planned Savings (Net)	49%	316%	258%	110.8%	189.4%		
	Avg. Savings per Participant (Gross)	9,803	15,687	31,370	23,158	21,320		
	Avg. Savings per Participant (Net)	9,117	14,589	29,174	21,537	19,828		
Installed Demand Reduction (kW)	Total Gross Deemed Demand	131.5	3,098.0	3,475.7	2,553.5	9,258.8		
	Realization Rate Adjustment (100%)	0.0	0.0	0.0	0.0	0.0		
	Adjusted Gross Demand	131.5	3,098.0	3,475.7	2,553.5	9,258.8		
	Net-to-Gross Adjustment (93%) ⁷⁰	-9.2	-216.9	-243.3	-178.7	-648.1		
	Net Adjusted Demand	122.3	2,881.2	3,232.4	2,374.8	8,610.7		
	Planned Demand (Net)	308.0	660.7	1,135.0	1,930.3	4,034.1		
	Annual % Toward Planned Reduction (Net)	40%	436%	285%	123.0%	213.4%		
	Avg. Demand per Participant (Gross)	2.0	3.3	6.8	5.1	4.6		
	Avg. Demand per Participant (Net)	1.8	3.1	6.3	4.7	4.3		
Program Performance	Annual \$Admin. per Participant (Gross)	\$320	\$161	\$374	\$323	\$260		
	Annual \$Admin. per kWh/year (Gross)	\$0.03	\$0.01	\$0.01	\$0.01	\$0.01		
	Annual \$Admin. per kW (Gross)	\$163	\$49	\$55	\$64	\$57		
	Annual \$EM&V per Total Costs (\$)	6.5%	2.9%	3.3%	2.2%	3.0%		
	Annual \$Rebate per Participant (Gross)	\$1,364	\$2,686	\$4,180	\$4,510	\$3,475		

⁷⁰ Ibid.

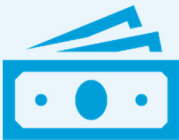
5.7.3.2 Key North Carolina Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for North Carolina in 2019 appear below. Following this summary, Table 5-22 provides performance indicator data from 2017 through December 31, 2019, and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix B.6. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.8, and cumulative net savings are in Appendix D.8.



- The program enrolled 27 participants in 2019, approximately 44% of planned participation.
- Cumulatively, from program inception through 2019, the program has enrolled a total of 70 participants, approximately 45% of planned participation.

- The program achieved net annual energy savings of 646,835 kWh in 2019, approximately 99% of planned savings.
- Average net annual energy savings per participant was 23,957 kWh, approximately 135% of planned savings per participant from Table 5-22.
- The program achieved a net demand reduction of 130 kW in 2019, approximately 101% of planned reduction.
- Average net demand reduction per participant was 4.8 kW, approximately 94% of planned reduction per participant from Table 5-22.



- Total annual program costs were approximately 31% of planned costs in 2019.
- Total program costs, from program inception through 2019, have been approximately 34% of planned costs.

Table 5-22. North Carolina Non-residential Small Business Improvement Program Performance Indicators (2017–2019)

Category	Item	2017	2018	2019	Program Total (2017–2019)
Operations and Management Costs (\$)	Direct Rebate				
	Direct Implementation				
	Direct EM&V				
	Indirect Other (Administrative)	\$3,870	\$10,216	\$7,730	\$21,816
Total Costs (\$)	Total ⁶⁸	\$98,352	\$180,923	\$156,020	\$435,296
	Planned	\$350,873	\$420,342	\$498,047	\$1,269,262
	Variance	-\$252,521	-\$239,419	-\$342,027	-\$833,967
	Annual % of Planned	28%	43%	31%	34%
Participants	Total (Gross)	7	36	27	70
	Planned (Gross)	42	53	62	157
	Variance	-35	-17	-35	-87
	Annual % of Planned (Gross)	17%	68%	44%	45%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	166,507	1,000,716	695,521	1,862,743
	Realization Rate Adjustment (100%)	0	0	0	0
	Adjusted Gross Savings	166,507	1,000,716	695,521	1,862,743
	Net-to-Gross Adjustment (93%)	-11,655	-70,050	-48,686	-130,392
	Net Adjusted Savings	154,851	930,665	646,835	1,732,351
	Planned Savings (Net)	288,232	384,890	653,054	1,326,175
	Annual % Toward Planned Savings (Net)	54%	242%	99%	131%
	Avg. Savings per Participant (Gross)	23,787	27,798	25,760	26,611
	Avg. Savings per Participant (Net)	22,122	25,852	23,957	24,748
Installed Demand Reduction (kW)	Total Gross Deemed Demand	32.6	219.1	140.2	391.9
	Realization Rate Adjustment (100%)	0.0	0.0	0.0	0.0
	Adjusted Gross Demand	32.6	219.1	140.2	391.9

Category	Item	Program Total (2017-2019)			
		2017	2018	2019	Program Total (2017-2019)
	Net-to-Gross Adjustment (93%)	-2.3	-15.3	-9.8	-27.4
	Net Adjusted Demand	30.3	203.8	130.4	364.5
	Planned Demand (Net)	43.7	76.0	129.0	248.7
	Annual % Toward Planned Demand (Net)	69%	268%	101.1%	146.6%
	Avg. Demand per Participant (Gross)	4.7	6.1	5.2	5.6
	Avg. Demand per Participant (Net)	4.3	5.7	4.8	5.2
Program Performance	Annual \$Admin. per Participant (Gross)	\$553	\$284	\$286	\$312
	Annual \$Admin. per kWh/year (Gross)	\$0.02	\$0.01	\$0.01	\$0.01
	Annual \$Admin. per kW (Gross)	\$119	\$47	\$55	\$56
	Annual \$EM&V per Total Costs (\$)	7.4%	3.9%	3.1%	4.4%
	Annual \$Rebate per Participant (Gross)	\$3,778	\$2,791	\$3,050	\$2,989

5.7.3.3 Additional Virginia Program Data

This subsection provides a series of charts to show the program performance over the life of the program in Virginia, by year, by measure type and by building type. Note that program implementation did not begin until July 1, 2016.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above and the “by building” charts below, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

In Figure 5-31, it can be seen that LED lamps, AC tune-ups, and duct test and seal measures were the most frequently installed measures by participants in 2019, continuing a trend begun in 2018. As previously indicated, refrigeration measures were discontinued midway through 2017.

Figure 5-31. Virginia Non-residential Small Business Improvement Program Participation by Measure and Year

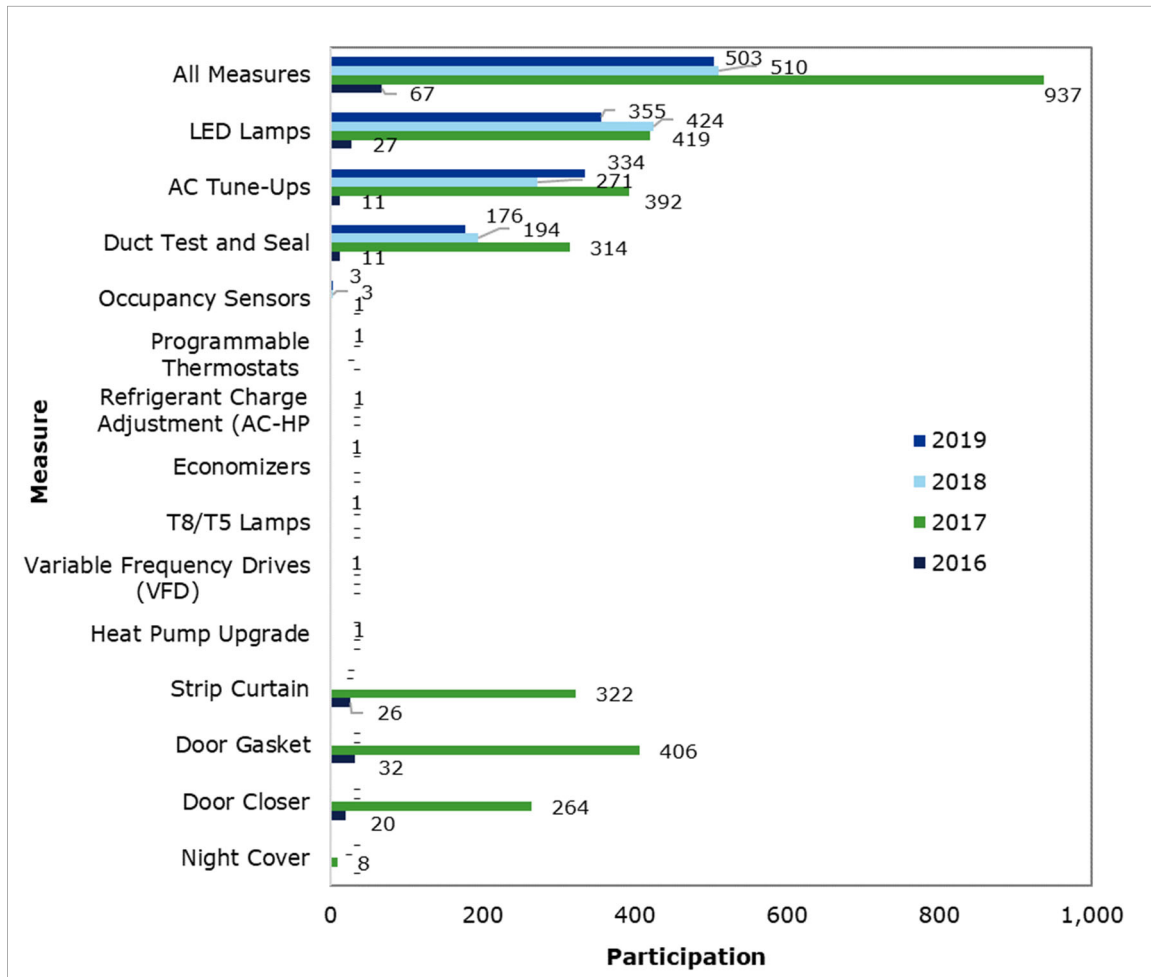
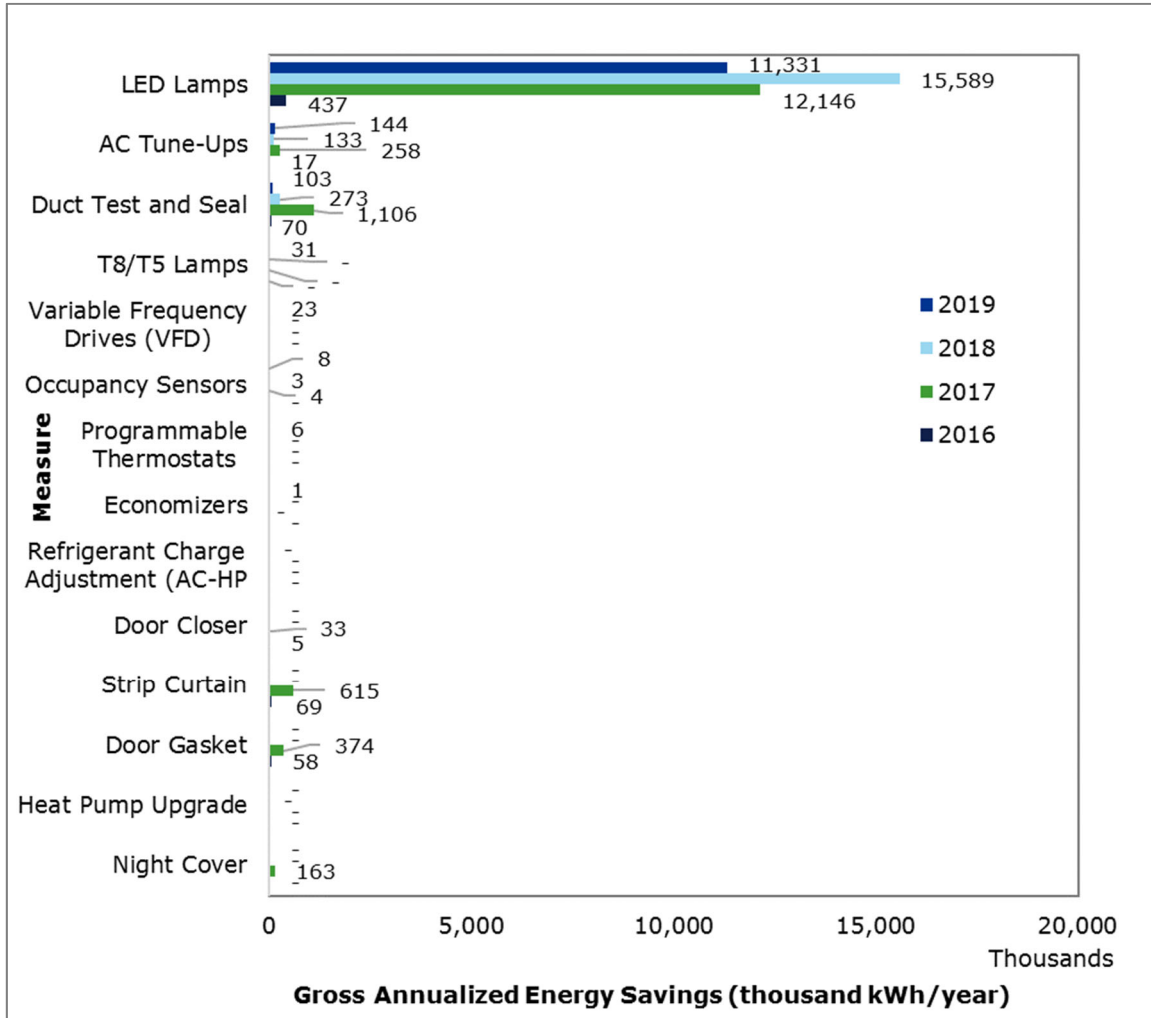


Figure 5-32 shows that LED lamps accounted for the vast majority of 2019 energy savings.

Figure 5-32. Virginia Non-residential Small Business Improvement Program Gross Annualized Energy Savings (MWh/year) by Measure and Year



In Figure 5-33, the average energy savings per participant (gross annualized) are shown for each measure category, by year and cumulatively. In 2019 and cumulatively, LED lamps have yielded the highest average savings per participant.

Figure 5-33. Virginia Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure

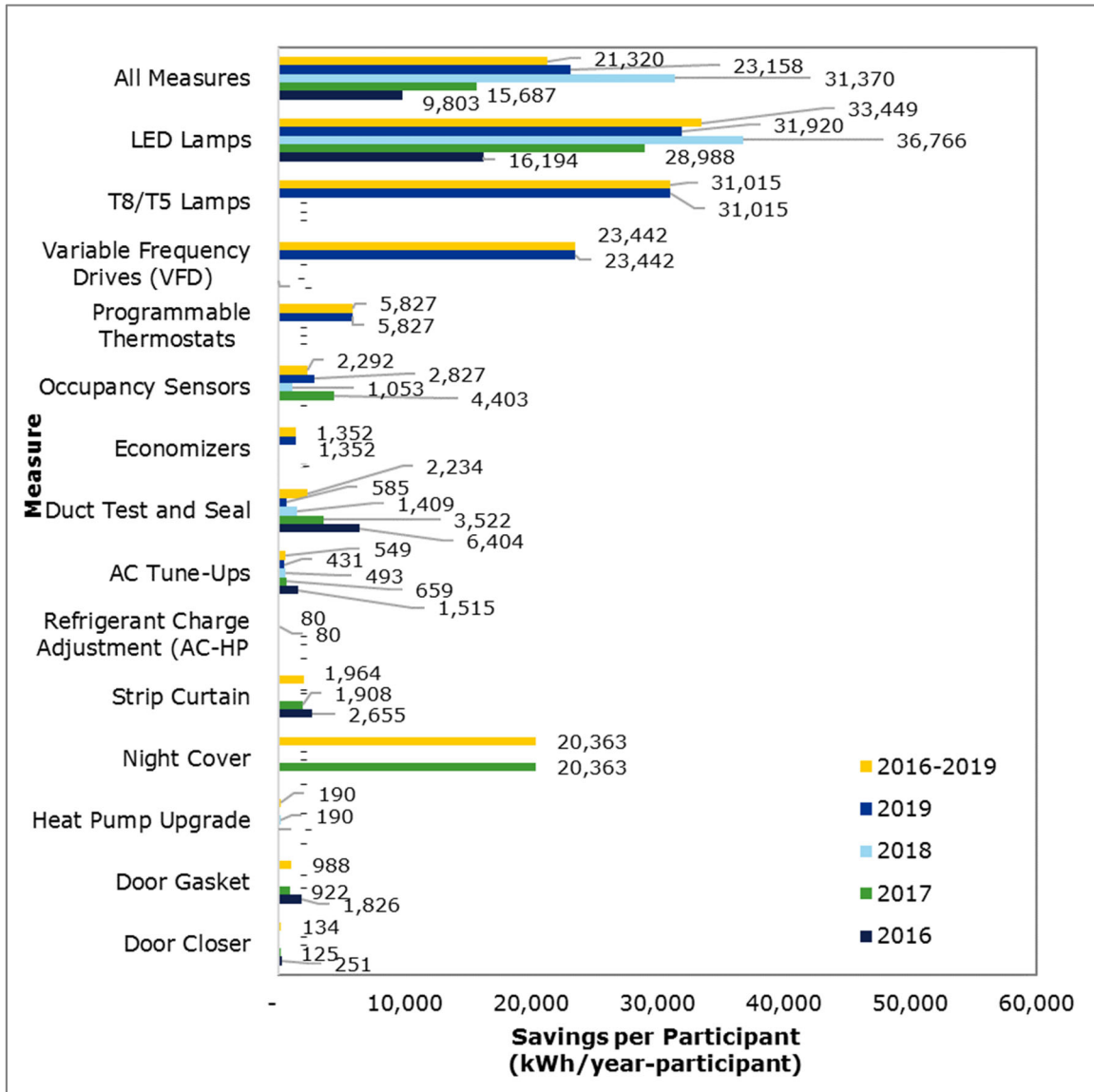


Figure 5-34 shows the participant building types by year and cumulatively for all program years. A participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

In 2019, religious worship buildings participated most frequently in the program, accounting for 221 participants, approximately 44% of participants for the year. Cumulatively, food service (full service) buildings have participated most frequently in the program with 442 participants, approximately 22% of total program participants.

Figure 5-34. Virginia Non-residential Small Business Improvement Program Participation by Building Type and Year

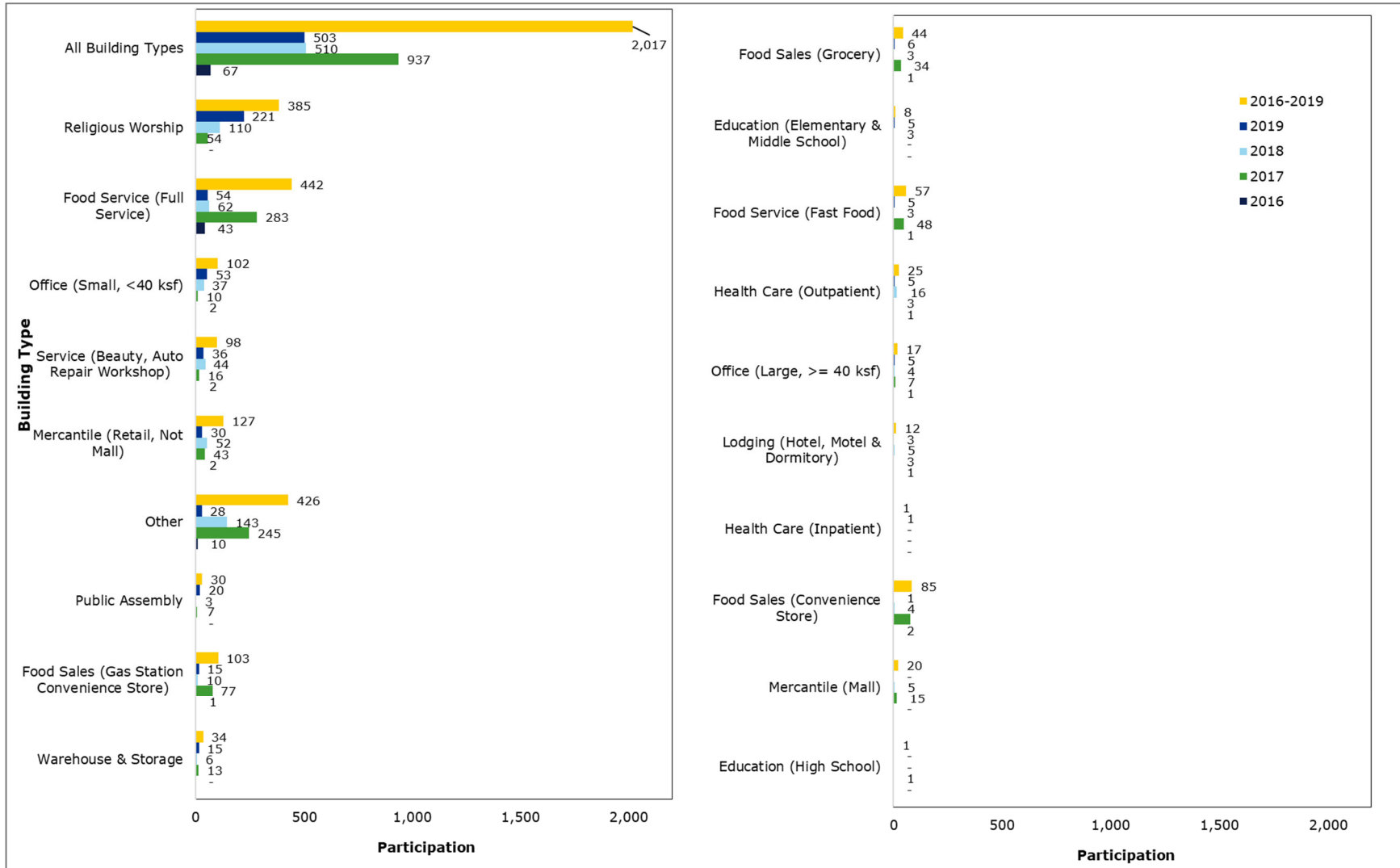
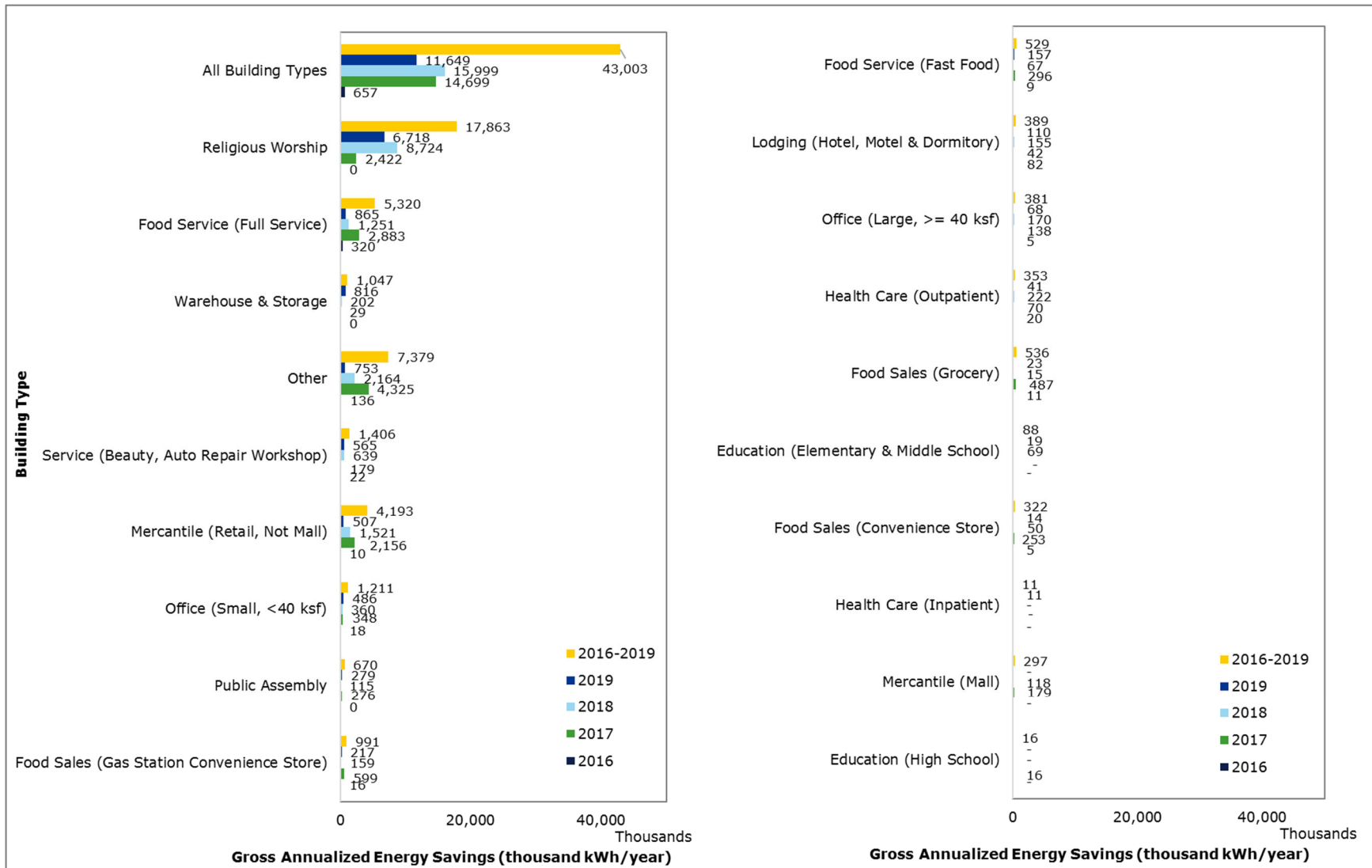


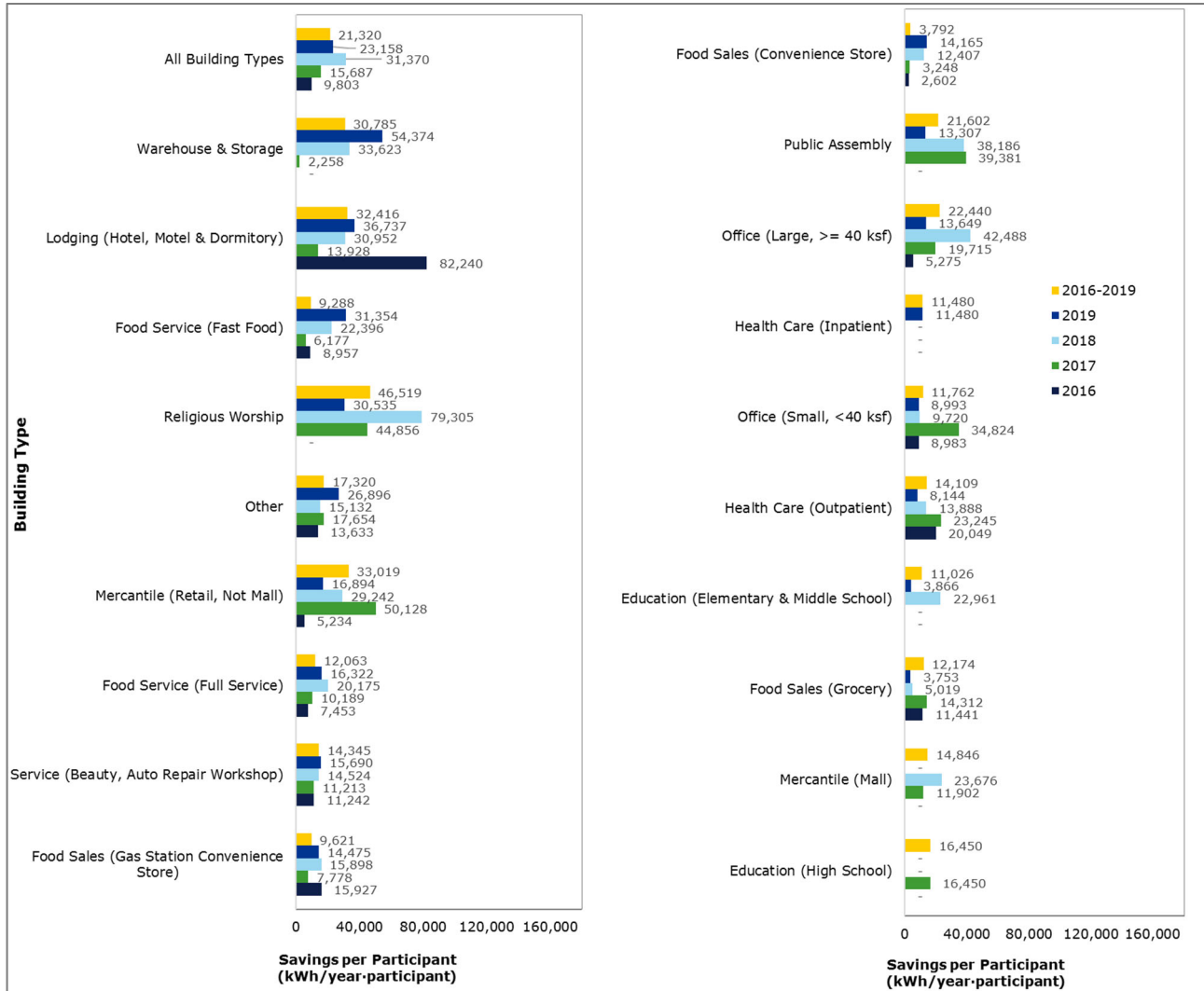
Figure 5-35 shows that religious worship buildings contributed the most gross annual energy savings in 2019 and cumulatively for the life of the program.

Figure 5-35. Virginia Non-residential Small Business Improvement Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year



In 2019, warehouse and storage buildings had the highest average per-participant energy savings, as shown in **Figure 5-36**. Cumulatively, over the life of the program, religious worship buildings had the highest savings per participant.

Figure 5-36. Virginia Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year



5.7.3.4 Additional North Carolina Program Data

This section provides a series of charts to show the program performance in North Carolina from program inception in 2017, through 2019, by measure type and by building type.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above and the “by building” charts below, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

The number of participants by measure and the distribution of savings by measure are shown in Figure 5-37 and Figure 5-38, respectively. In 2019, similar to 2017 and 2018, LED lamps have been the most frequently adopted measure by participants. Accordingly, 2019 program savings have been comprised almost entirely (99.7%) of LED lamp installations.

Figure 5-37. North Carolina Non-residential Small Business Improvement Program Participation by Measure and Year

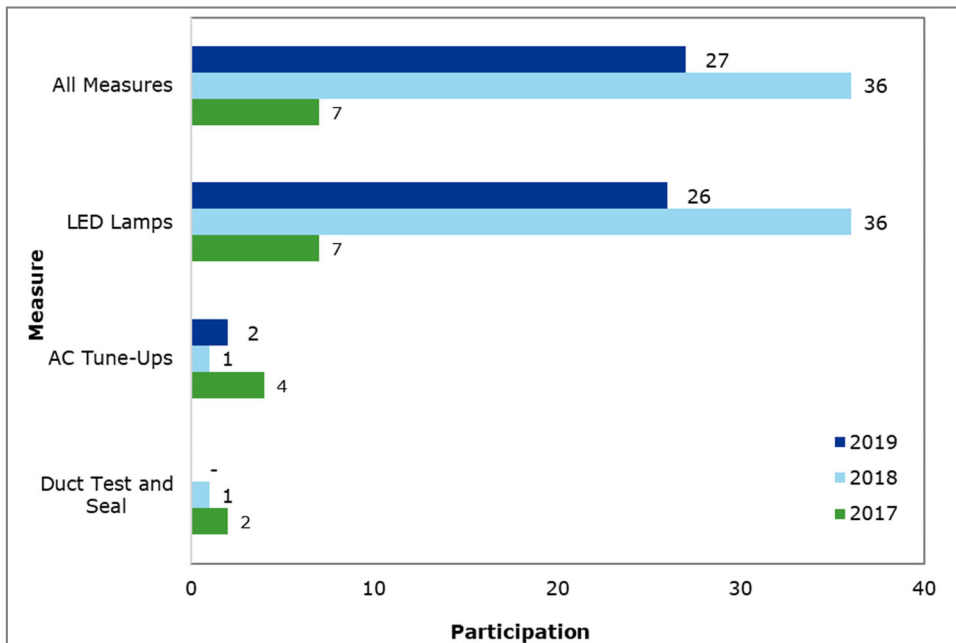
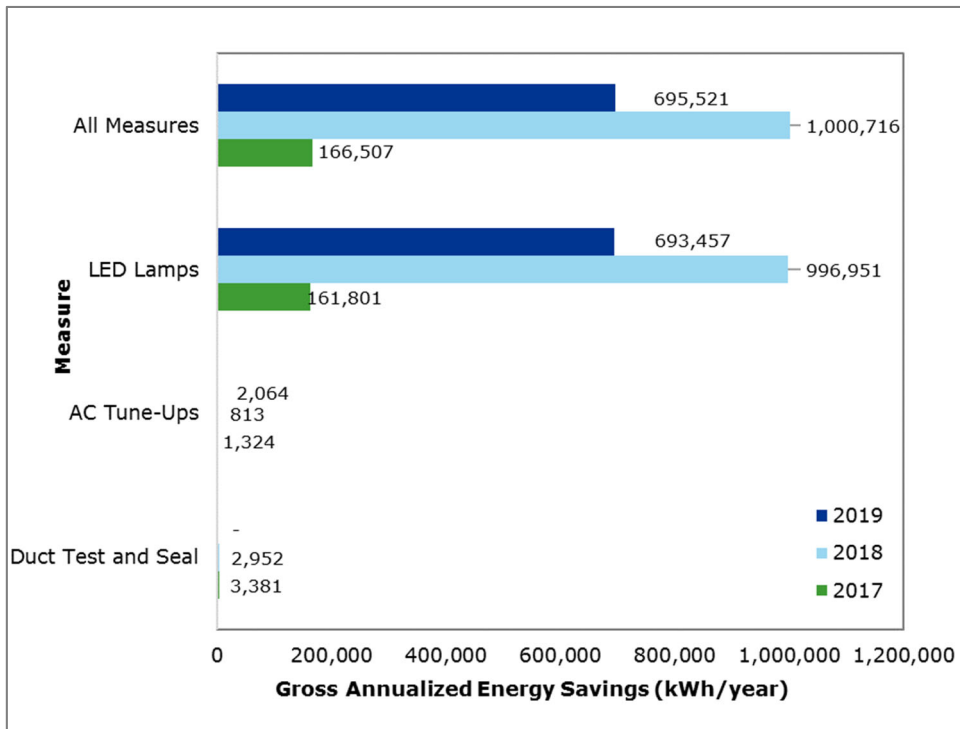


Figure 5-38. North Carolina Non-residential Small Business Improvement Program Gross Annualized Energy Savings (kWh/year) by Measure and Year



In Figure 5-39, the average energy savings per participant (gross annualized) is shown for each measure that has been installed. The savings per participant for LED lamp installations are markedly higher than the other two measures installed in 2019 and cumulatively.

Figure 5-39. North Carolina Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure and Year

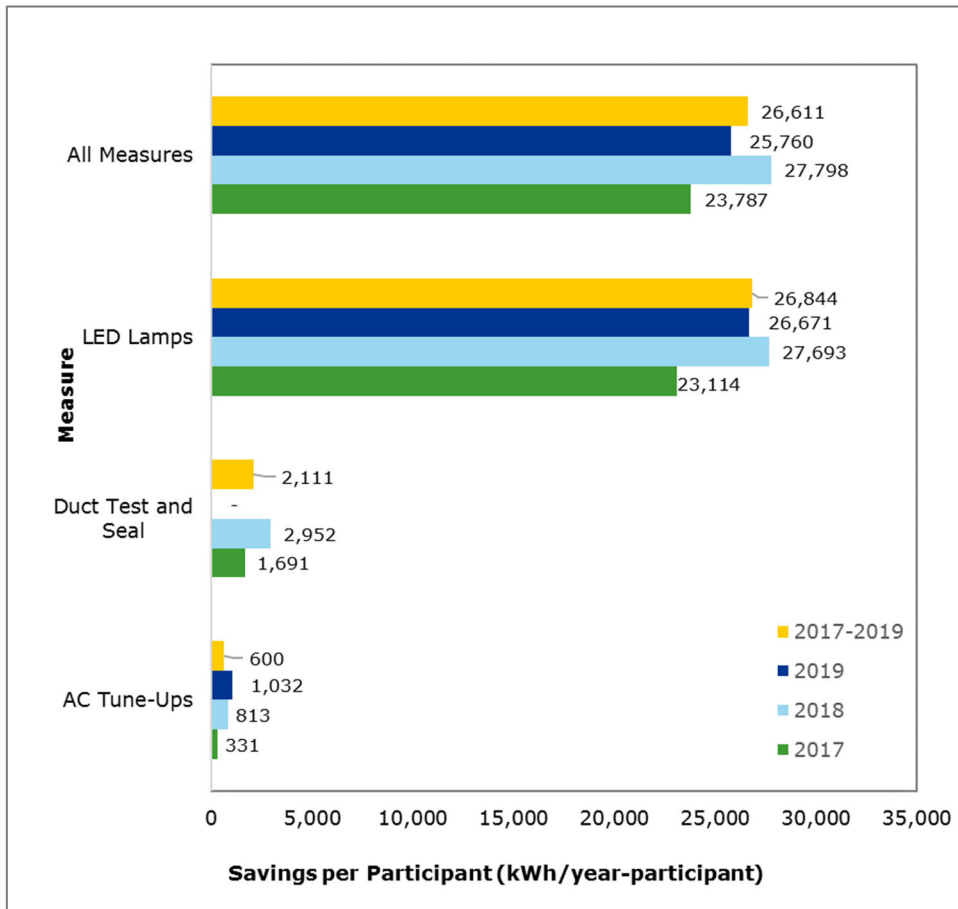


Figure 5-40 through Figure 5-42 show the participation, total gross energy savings, and average gross energy savings by building type for each program year and cumulatively for all program years (through 2019). A participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

Figure 5-40 and Figure 5-41 show that mercantile (retail, not mall) buildings participated most frequently and contributed the most energy savings to the program in 2019 and cumulatively for all program years.

Figure 5-40. North Carolina Non-residential Small Business Improvement Program Participation by Building Type and Year

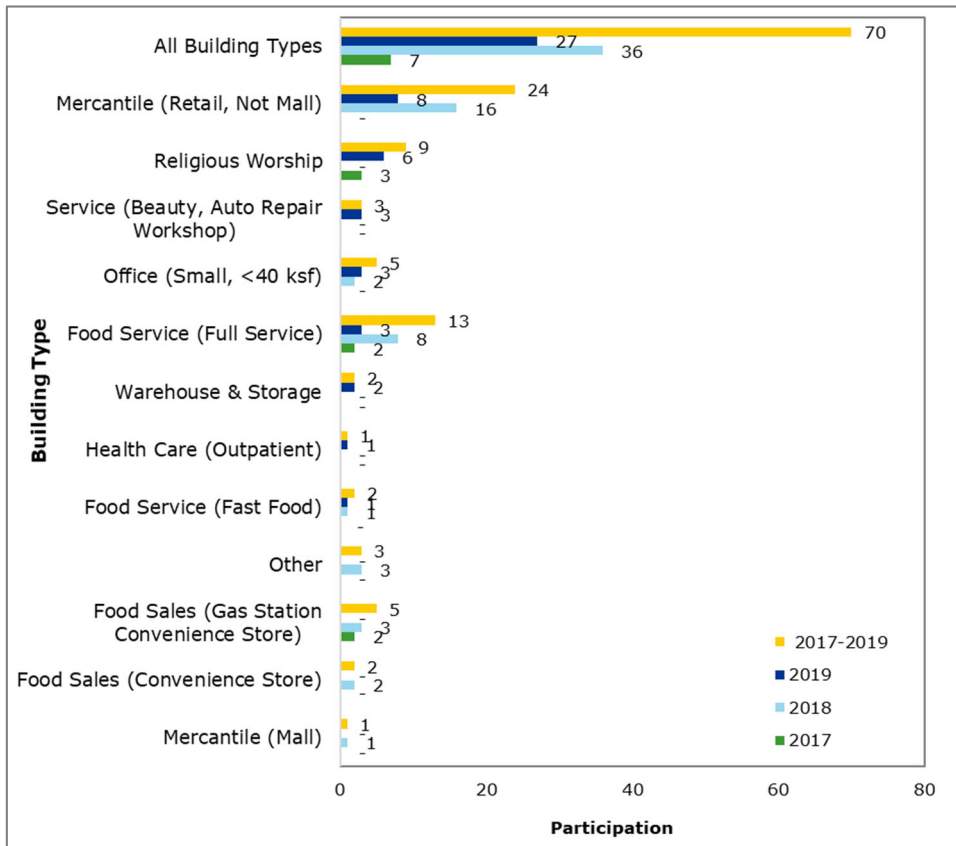
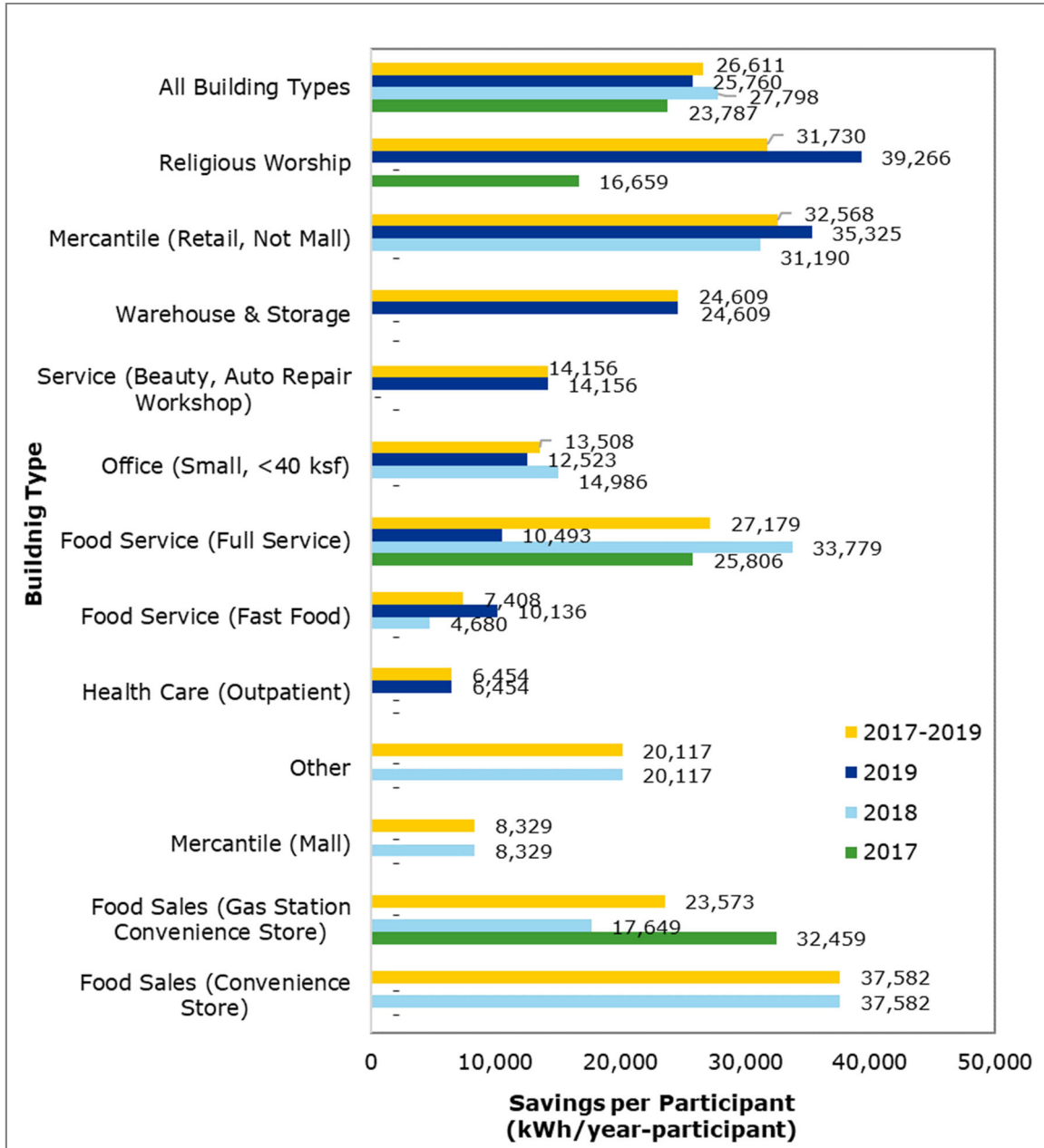
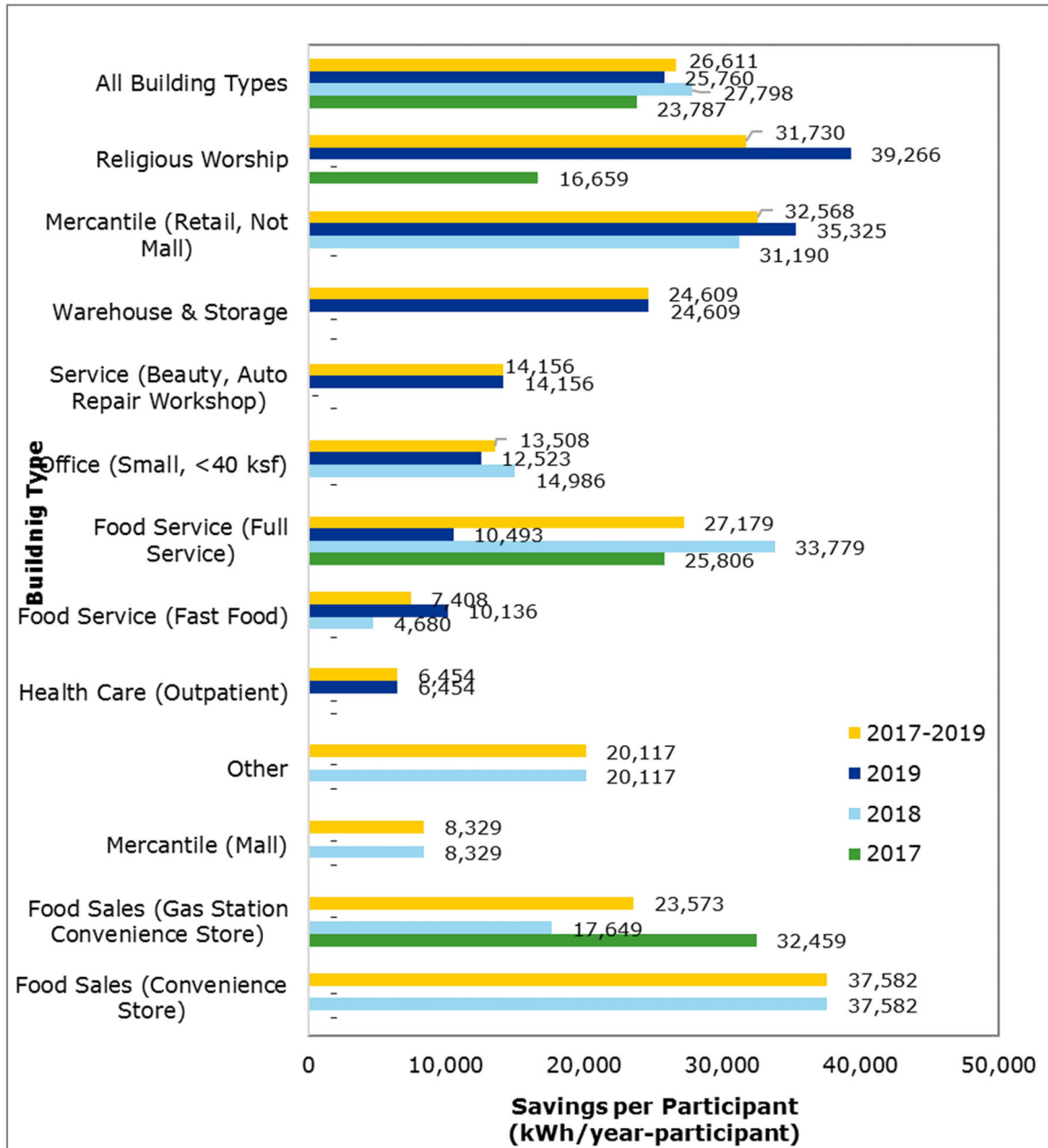


Figure 5-41. North Carolina Non-residential Small Business Improvement Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year



When looking at the average participant savings by building type, Figure 5-42 shows that religious worship buildings saved the most per participant in 2019. Cumulatively, food sales (convenience store) buildings saved the most per participant in 2018.

Figure 5-42. North Carolina Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year



5.8 Non-residential Prescriptive – Virginia and North Carolina

Virginia

Case #: PUE-2016-00111

NON-RESIDENTIAL PRESCRIPTIVE

2017-PRESENT

6,328 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- Properly sealed duct and air distribution systems
- Efficient refrigeration system and kitchen appliances
- Efficient heating and cooling systems

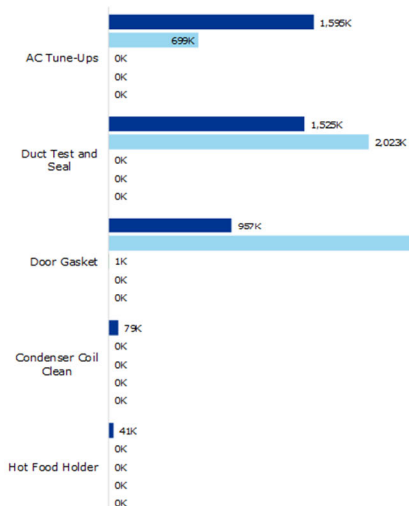
Enrolled **1,535** customers through 2019, **137%** of planned participation

Achieved net annual energy savings of **9,714 MWh/year** through 2019, **28%** of planned energy savings

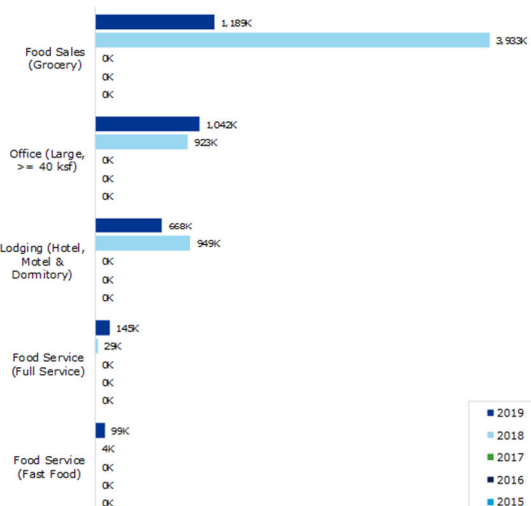
Spent **82%** of planned expenditures through 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	734,410	6,748,855	5,887,581	13,370,846
Total Program Participants (#)	-	-	4	865	666	1,535
Total Gross Incremental Savings (kWh/yr)	-	-	699	7,023,169	4,403,947	-
Total Net Incremental Savings (kWh/yr)	-	-	594	5,969,694	3,743,355	-
Average Gross Incremental Demand Reduction (kW)	-	-	0	3,366	3,385	-
Average Net Incremental Demand Reduction (kW)	-	-	0	2,861	2,877	-
Total Net Lifetime Savings (kWh)	-	-	50	3,828,000	11,815,917	60,710,271
Average Lifetime Demand Reduction (kW)	-	-	0	2,861	5,739	5,739

TOTAL SAVINGS BY MEASURE TYPE TOP 5 IN KWH



TOTAL SAVINGS BY BUILDING TYPE TOP 5 IN KWH



North Carolina

Docket #: E-22 Sub 543

NON-RESIDENTIAL PRESCRIPTIVE

2018-PRESENT

6,704 kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- Properly sealed duct and air distribution systems
- Efficient refrigeration system and kitchen appliances
- Efficient heating and cooling systems



Enrolled **57** customers through 2019, **98%** of planned participation



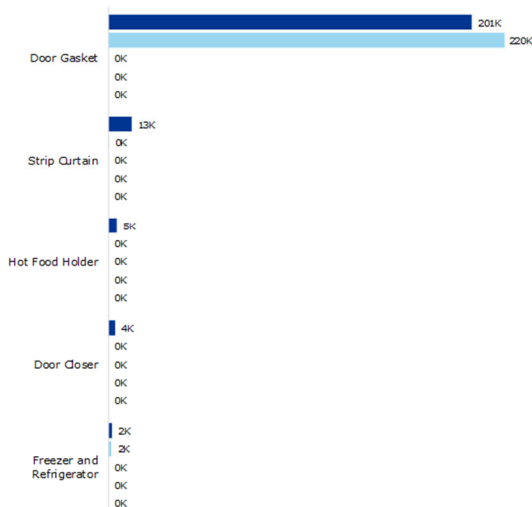
Achieved net annual energy savings of **382 MWh/year** through 2019, **20%** of planned energy savings



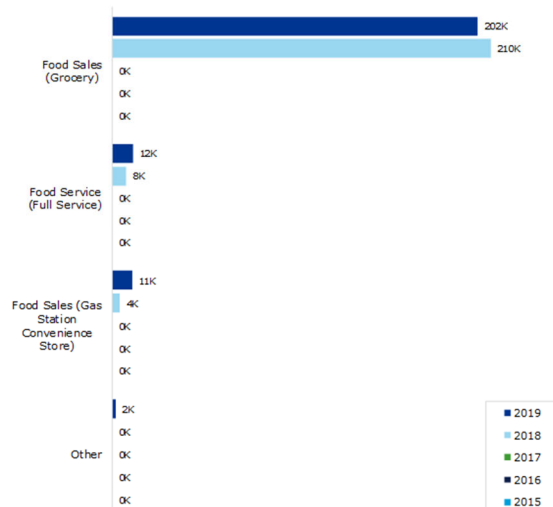
Spent **46%** of planned expenditures through 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	-	180,139	189,380	369,519
Total Program Participants (#)	-	-	-	21	36	57
Total Gross Incremental Savings (kWh/yr)	-	-	-	221,779	227,788	-
Total Net Incremental Savings (kWh/yr)	-	-	-	188,512	193,620	-
Average Gross Incremental Demand Reduction (kW)	-	-	-	25	30	-
Average Net Incremental Demand Reduction (kW)	-	-	-	21	26	-
Total Net Lifetime Savings (kWh)	-	-	-	27,070	385,859	2,388,322
Average Lifetime Demand Reduction (kW)	-	-	-	21	47	47

TOTAL SAVINGS BY MEASURE TYPE
TOP 5 IN KWH



TOTAL SAVINGS BY BUILDING TYPE
ALL IN KWH



5.8.1 Program Description



In the Non-residential Prescriptive program, qualifying customers are eligible to pursue one or more of the qualified measures through a participating contractor registered with the program. To qualify for this program, the customer must be responsible for the electric bill and must be the owner of the facility or reasonably able to secure

permission to complete the measures.

This program was approved in Virginia on June 1, 2017, in Case No. PUE-2016-00111, and the program became available to eligible customers in the Company’s Virginia service territory in the last quarter of 2017. On October 16, 2017, the program was approved for implementation in North Carolina in Docket E-22, Sub 543 and launched in 2017. DNV GL developed an EM&V Plan for this program, which is included in Appendix O.

Since the program is implemented through a contractor network, customers must contact a participating vendor to pursue the qualifying measures. Upon completion of the work, a rebate application is submitted by the contractor. Customers can either opt to receive the rebate directly or authorize the rebate to be paid to the contractor. Customers are not counted as participants until a completed application form is processed and a rebate has been issued.

The program measures offered are primarily EE measures designed to decrease energy consumption through replacement of inefficient equipment, installation of new equipment that exceeds current code efficiency standards and recommissioning of existing HVAC equipment. Measures eligible to receive a rebate include those shown in Table 5-23.

Table 5-23. Measures offered through Non-residential Prescriptive Program

End-Use	Measure
Cooking	Commercial Convection Oven
	Commercial Electric Combination Oven
	Commercial Electric Fryer
	Commercial Griddle
	Commercial Hot Food Holding Cabinet
	Commercial Steam Cooker
HVAC	Duct Testing & Sealing
	Unitary/Split AC & HP Tune-up
	Variable Speed Drives on Kitchen Fan
Plug Load	Smart Strip
Refrigeration	Door Closer
	Door Gasket
	Evaporator Fan Control
	Floating Head Pressure Control

End-Use	Measure
	Refrigeration Night Cover
	Refrigeration Coil Cleaning
	Suction Pipe Insulation
	Strip Curtain
	Vending Machine Miser
	Commercial Freezers and Refrigerators – Solid Door
	Ice Maker
	Low/No-Sweat Door Film

5.8.2 Methods for the Current Reporting Period

DNV GL developed an EM&V Plan for this program, which is included in Appendix O. For the current period, the approach included reviewing the tracking data, then estimating gross energy and demand savings using STEP Manual calculations.

Table 5-24 outlines Dominion Energy’s initial program planning assumptions used to design the program. DNV GL uses the planned NTG factor in its net savings calculations for the program measures that have not yet been verified through EM&V.

Table 5-24. Virginia Non-residential Prescriptive Program Planning Assumptions

Assumption	Value
Target Market	Non-residential customers
NTG Factor	85%
Measure Life (years)	6.3 years
Average Annual Energy Savings per Participant (kWh/year)	128,984 kWh per participant per year
Average Peak Demand Reduction (kW) per Participant	19.29 kW per participant per year
Average Rebate per Participant (US\$)	\$10,091 per participant

5.8.3 Assessment of Program Progress Towards Plan

The next subsections describe the program’s progress towards planned participants, energy savings, and demand reduction targets.

5.8.3.1 Key Virginia Program Data

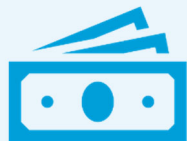
Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 5-25 provides performance indicator data from program inception in 2017 through December 31, 2019, and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix A.12. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.9, and cumulative net savings are in Appendix D.9.

Note that the Company is reviewing several aspects of the deemed energy savings used in the EM&V results and going-forward cost-benefit analysis as they relate to the filed program design for specific measures, including the AC Tune-up and Duct Testing & Sealing. The Company is also considering conducting additional EM&V studies.



- The program enrolled 666 participants in 2019, approximately 156% of planned participation.
- From program inception through 2019, the program enrolled 1,535 participants, approximately 137% of planned participation.

- The program achieved net annual energy savings of 3,743,355 kWh in 2019, approximately 224% of planned savings.
- Average net annual energy savings per participant in 2019 was 5,621 kWh, approximately 144% of planned savings per participant.
- The program achieved a net demand reduction of 2,877 kW in 2019, approximately 420% of planned reduction.
- Average net demand reduction per participant in 2019 was 4.3 kW, approximately 268% of planned reduction per participant.



- Total annual program costs were approximately 93% of planned costs in 2019.
- Total program costs, from program inception through 2019, have been approximately 82% of planned costs.

Table 5-25. Virginia Non-residential Prescriptive Program Performance Indicators (2017 – 2019)

Category	Item	2017			2018 ⁷¹			2019			Program Total (2017–2019)
Operations and Management Costs (\$)	Direct Rebate										
	Direct Implementation										
	Direct EM&V										
	Indirect Other (Administrative)	\$28,898		\$381,096		\$281,598		\$691,591			
Total Costs (\$)	Total ⁷²	\$734,410		\$6,748,855		\$5,887,581		\$13,370,846			
	Planned	\$3,735,349		\$6,246,114		\$6,354,082		\$16,335,545			
	Variance	-\$3,000,939		\$502,740		-\$466,501		-\$2,964,700			
	Annual % of Planned	20%		108%		93%		82%			
Participants	Total (Gross)	4		865		666		1,535			
	Planned (Gross)	266		427		427		1,120			
	Variance	-262		438		239		415			
	Annual % of Planned (Gross)	2%		203%		156%		137%			
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	699		7,023,169		4,403,947		11,427,816			
	Realization Rate Adjustment (100%)	0		0		0		0			
	Adjusted Gross Savings	699		7,023,169		4,403,947		11,427,816			
	Net-to-Gross Adjustment (85%) ⁷³	-105		-1,053,475		-660,592		-1,714,172			
	Net Adjusted Savings	594		5,969,694		3,743,355		9,713,643			

⁷¹ 2018 Total Gross Deemed Savings changed as a result of an error correction made in this report (May 1, 2020). The correction assigns a full 5% savings to records with refrigerant charge adjustments completed during their HVAC tune-up activities. Previously, those records were not being assigned savings for refrigerant charge adjustments, which was incorrect. The correction resulted in a savings increase of 273,003 kWh/year (gross) in Virginia for program year 2018, from what was previously reported (in the May 1, 2019 EM&V report) as 6,750,166 kWh/year (gross). This change resulted in a 20% increase in 2018 total installed gross energy savings (kWh/year). The Total Gross Deemed Demand also increased from 3,083.6 kW (gross) to 3,366.4 kW (gross) for program year 2018, which was a 10% increase.

⁷² Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

⁷³ On the rebate application form the program implementation vendor included the question, "Did the rebate incentive offered by Dominion Energy have any influence in your decision to have the work performed?" Of the participants who responded (from program inception to the end of this reporting period), the implementation vendor has calculated that 92% answered yes at the time they filled out the rebate application. This is not a substitute for a net-to-gross analysis conducted by DNV GL. See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation approaches.

Category	Item	2017			2018 ⁷¹		2019		Program Total (2017-2019)
	Planned Savings (Net)	5,959,948		26,839,364		1,672,489		34,471,800	
	Annual % Toward Planned Savings (Net)	0%		22%		224%		28%	
	Avg. Savings per Participant (Gross)	175		8,119		6,613		7,445	
	Avg. Savings per Participant (Net)	149		6,901		5,621		6,328	
Installed Demand Reduction (kW)	Total Gross Deemed Demand	0.1		3,366.4		3,385.2		6,751.7	
	Realization Rate Adjustment (100%)	0.0		0.0		0.0		0.0	
	Adjusted Gross Demand	0.1		3,366.4		3,385.2		6,751.7	
	Net-to-Gross Adjustment (85%) ⁷⁴	0.0		-505.0		-507.8		-1,012.7	
	Net Adjusted Demand	0.1		2,861.4		2,877.4		5,738.9	
	Planned Demand (Net)	0.0		4,296.0		684.7		4,980.7	
	Annual % Toward Planned Demand (Net)	N/A		66.6%		420%		115.2%	
	Avg. Demand per Participant (Gross)	0.02		3.9		5.1		4.4	
	Avg. Demand per Participant (Net)	0.02		3.3		4.3		3.7	
	Program Performance	Annual \$Admin. per Participant (Gross)	\$7,225		\$441		\$423		\$451
Annual \$Admin. per kWh/year (Gross)		\$41.32		\$0.05		\$0.06		\$0.06	
Annual \$Admin. per kW (Gross)		\$351,557		\$113		\$83		\$102	
Annual \$EM&V per Total Costs (\$)		11%		2%		2%		2.4%	
Annual \$Rebate per Participant (Gross)		\$157		\$5,315		\$6,099		\$5,641	

⁷⁴ Ibid.

5.8.3.2 Key North Carolina Program Data

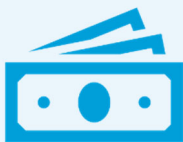
Key data highlights for enrollment, energy savings, demand reduction and program costs for North Carolina in 2019 appear below. Following this summary, Table 5-26 provides performance indicator data from program inception in 2018 through December 31, 2019, and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix B.7. Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.9, and cumulative net savings are in Appendix D.9.

Note that the Company is reviewing several aspects of the deemed energy savings used in the EM&V results and going-forward cost-benefit analysis as they relate to the filed program design for specific measures, including the AC Tune-up and Duct Testing & Sealing. The Company is also considering conducting additional EM&V studies.



- The program enrolled 36 participants in 2019, approximately 124% of planned participation.
- From program inception through 2019, the program enrolled 57 participants, approximately 98% of planned participation.

- The program achieved net annual energy savings of 193,620 kWh in 2019, approximately 170% of planned savings.
- Average net annual energy savings per participant in 2019 was 5,378 kWh, approximately 137% of planned savings per participant.
- The program achieved a net demand reduction of 26 kW in 2019, approximately 56% of planned reduction.
- Average net demand reduction per participant in 2019 was 0.7 kW, approximately 44% of planned reduction per participant.



- Total annual program costs were approximately 47% of planned costs in 2019.
- Total program costs, from program inception through 2019, have been approximately 46% of planned costs.

Table 5-26. North Carolina Non-residential Prescriptive Program Performance Indicators (2018–2019)

Category	Item	2018	2019	Program Total (2018–2019)
Operations and Management Costs (\$)	Direct Rebate			
	Direct Implementation			
	Direct EM&V			
	Indirect Other (Administrative)	\$10,172	\$10,038	\$20,210
Total Costs (\$)	Total ⁷²	\$180,139	\$189,380	\$369,519
	Planned	\$400,909	\$406,529	\$807,438
	Variance	-\$220,770	-\$217,149	-\$437,919
	Annual % of Planned	45%	47%	46%
Participants	Total (Gross)	21	36	57
	Planned (Gross)	29	29	58
	Variance	-8	7	-1
	Annual % of Planned (Gross)	72%	124%	98%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	221,779	227,788	449,567
	Realization Rate Adjustment (100%)	0	0	0
	Adjusted Gross Savings	221,779	227,788	449,567
	Net-to-Gross Adjustment (85%)	-33,267	-34,168	-67,435
	Net Adjusted Savings	188,512	193,620	382,132
	Planned Savings (Net)	1,822,814	113,588	1,936,402
	Annual % Toward Planned Savings (Net)	10%	170%	20%
	Avg. Savings per Participant (Gross)	10,561	6,327	7,887
	Avg. Savings per Participant (Net)	8,977	5,378	6,704
Installed Demand Reduction (kW)	Total Gross Deemed Demand	25.3	30.4	55.6
	Realization Rate Adjustment (100%)	0.0	0.0	0.0
	Adjusted Gross Demand	25.3	30.4	55.6
	Net-to-Gross Adjustment (85%)	-3.8	-4.6	-8.3
	Net Adjusted Demand	21.5	25.8	47.3
	Planned Demand (Net)	292.0	46.5	338.5

Category	Item	2018	2019	Program Total (2018-2019)
	Annual % Toward Planned Demand (Net)	7%	55.5%	14.0%
	Avg. Demand per Participant (Gross)	1.2	0.8	1.0
	Avg. Demand per Participant (Net)	1.0	0.7	0.8
Program Performance	Annual \$Admin. per Participant (Gross)	\$484	\$279	\$355
	Annual \$Admin. per kWh/year (Gross)	\$0.05	\$0.04	\$0.04
	Annual \$Admin. per kW (Gross)	\$403	\$330	\$363
	Annual \$EM&V per Total Costs (\$)	5%	4%	4%
	Annual \$Rebate per Participant (Gross)	\$3,919	\$2,208	\$2,838



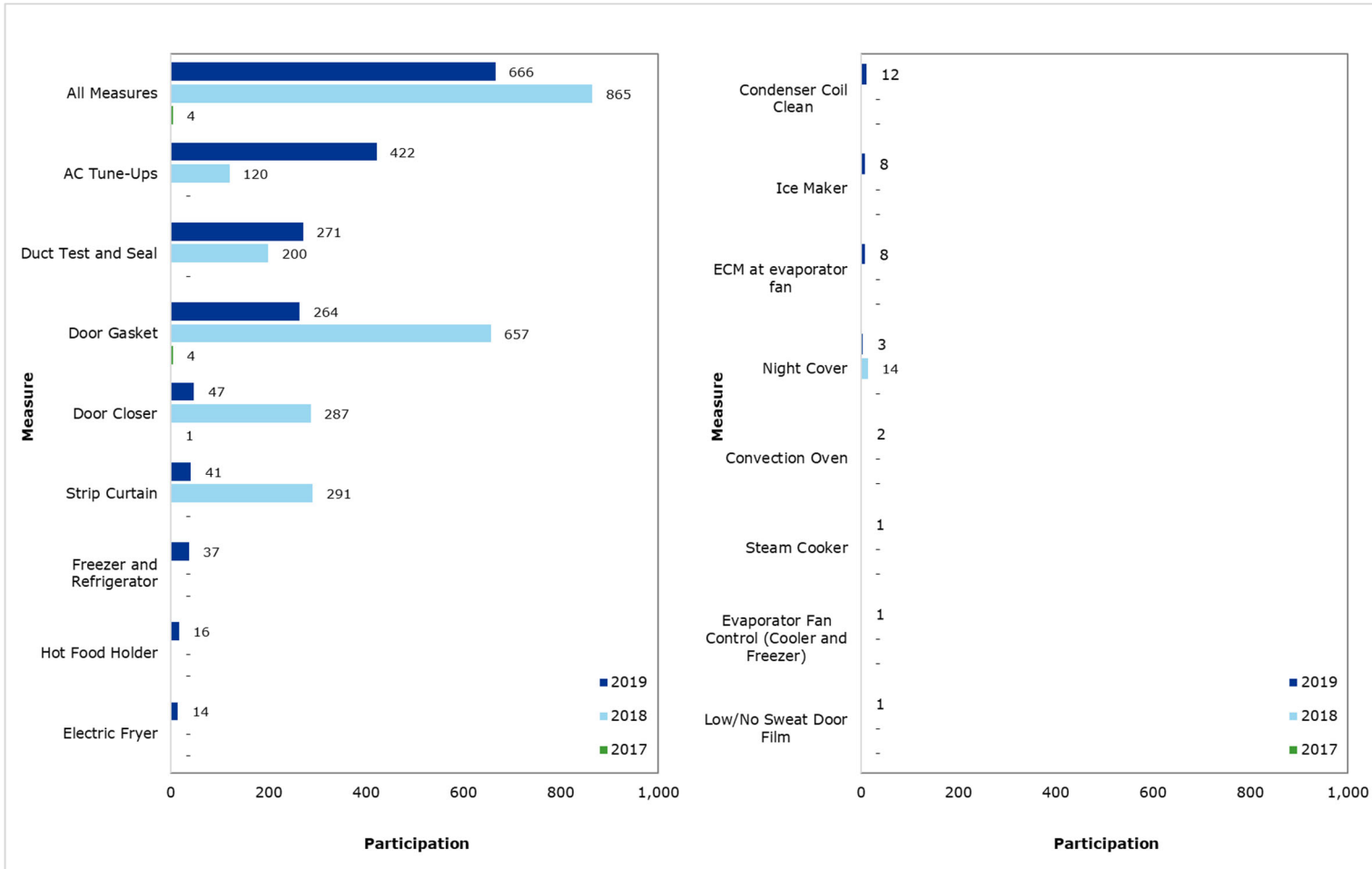
5.8.3.3 Additional Virginia Program Data

Additional program data regarding energy savings per participant, participation, and overall program savings for Virginia are provided below.

Note participation in these “by measure” charts are the count of new unique customers in each year. This differs from participation count presented in the Key Virginia Program Data and Key North Carolina Program Data sections above and the “by building” charts below, where a participant is only counted once, the first time they receive a rebate. After the first time the participant enrolls in a program, future applications are not counted as a new participant, though their savings are counted.

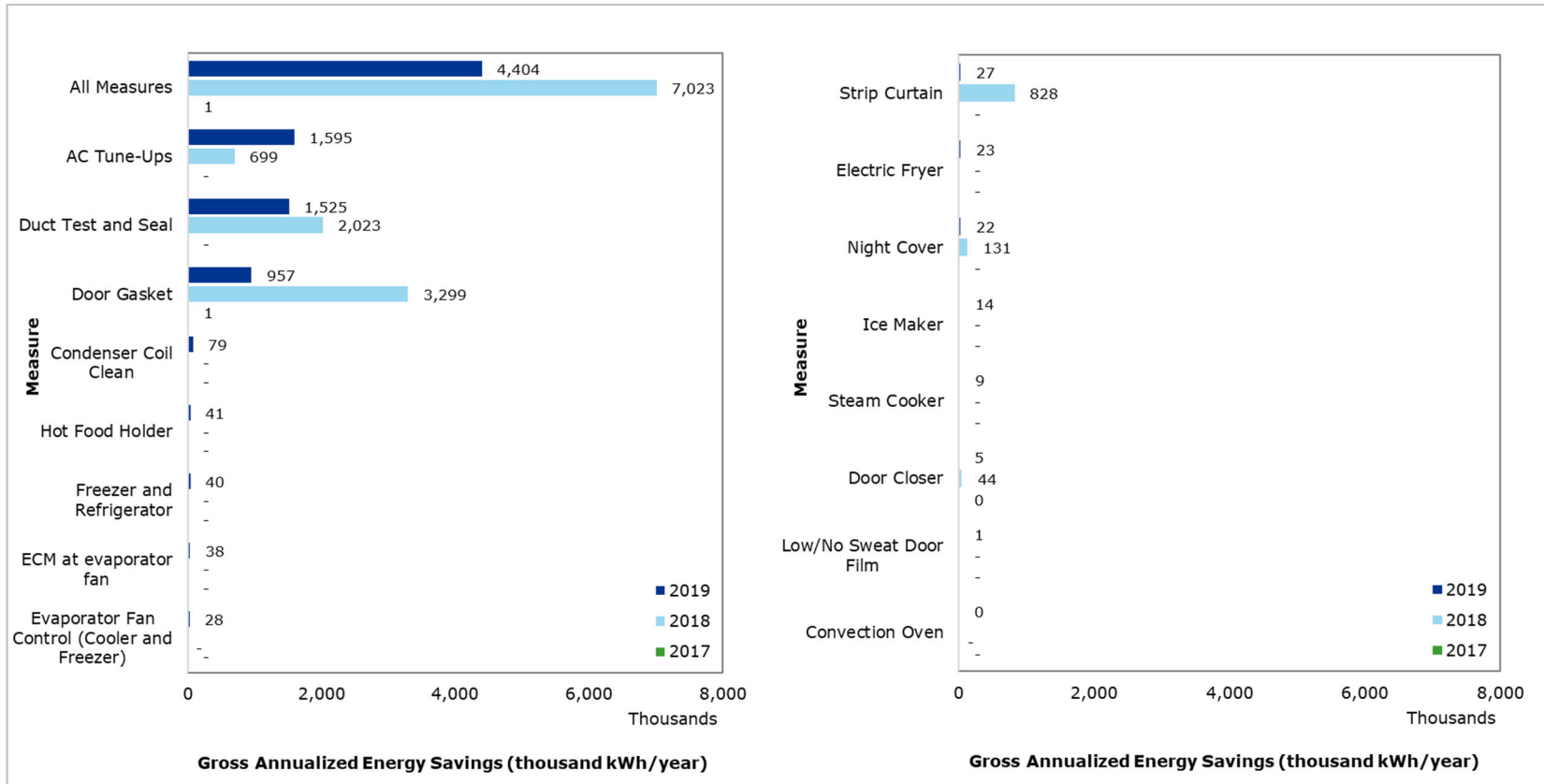
Figure 5-43 shows that AC tune-ups were the most frequently performed measure by participants in 2019, followed by duct testing and sealing.

Figure 5-43. Virginia Non-residential Prescriptive Program Participation by Measure and Year



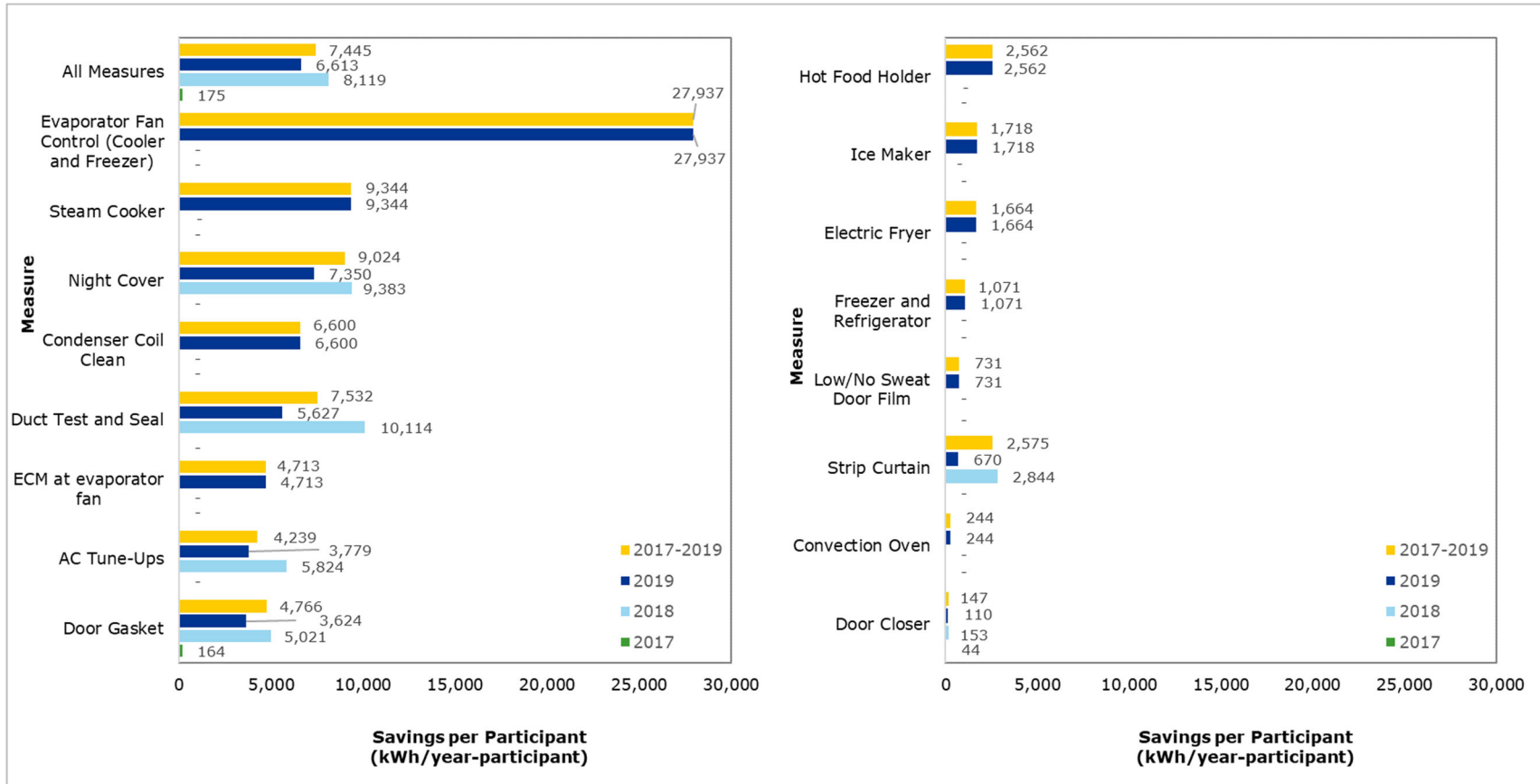
The program achieved gross annualized energy savings of 4,404 MWh/year in 2019, as shown in Figure 5-44. AC Tune-Ups generated the most savings, accounting for approximately 36% of 2019 savings. Duct testing and sealing savings were close behind at 35% of 2019 savings.

Figure 5-44. Virginia Non-residential Prescriptive Program Gross Annualized Energy Savings (MWh/year) by Measure and Year



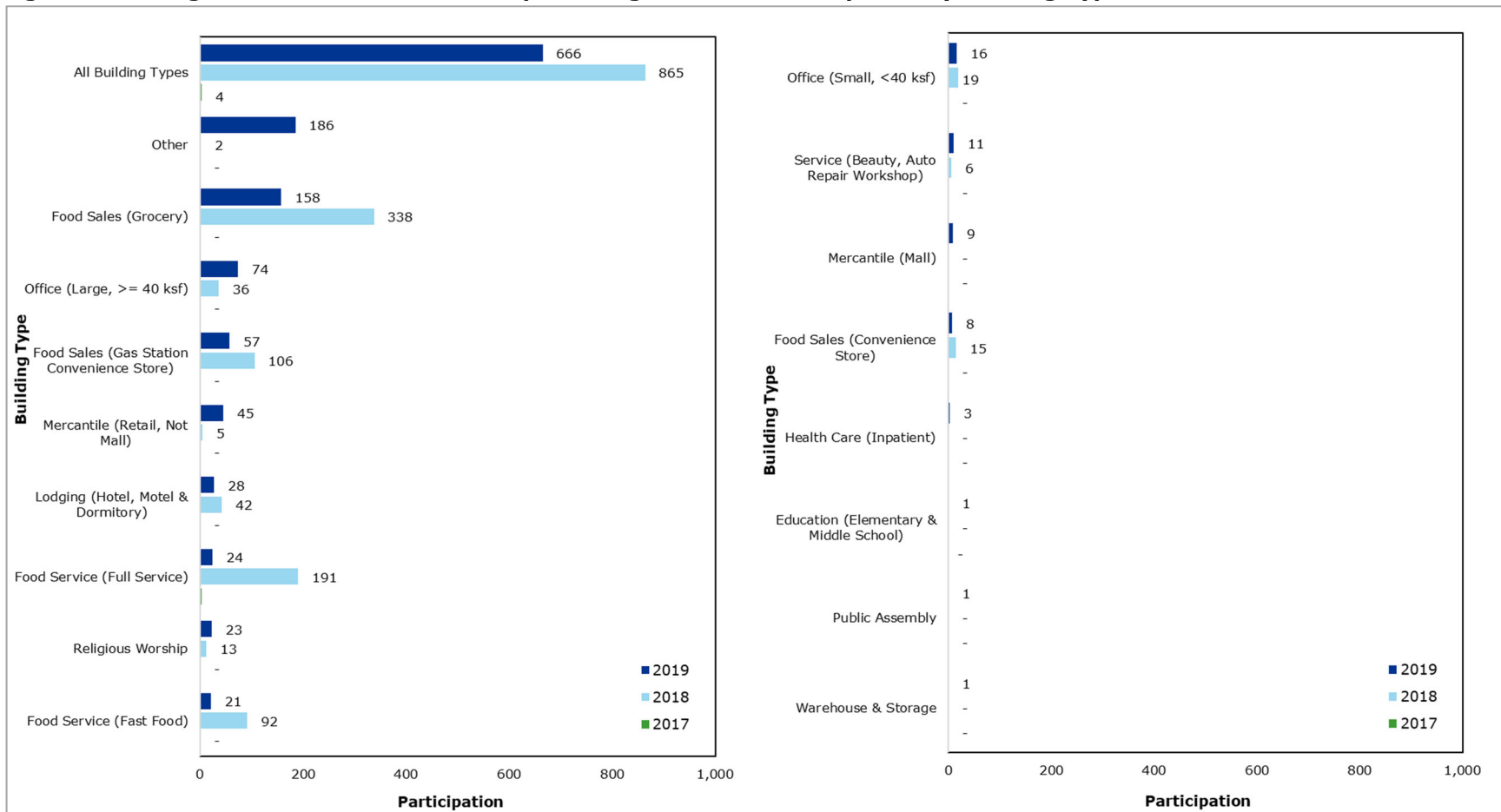
In 2019, one participant installed 12 evaporator fan controls, making it the highest average annual savings per participant, as shown in Figure 5-45. It is also the highest savings per participant cumulatively, across all program years.

Figure 5-45. Virginia Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure and Year



In 2019, the largest proportion of participants were located in “other” building types, followed by food sales (grocery) buildings, which was the most frequent building type for participants in 2018, as shown in Figure 5-46.

Figure 5-46. Virginia Non-residential Prescriptive Program Gross Participation by Building Type and Year



In 2019, food sales (grocery) participants contributed the most savings (~32%) to the program, as shown in Figure 5-47.

Figure 5-47. Virginia Non-residential Prescriptive Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year

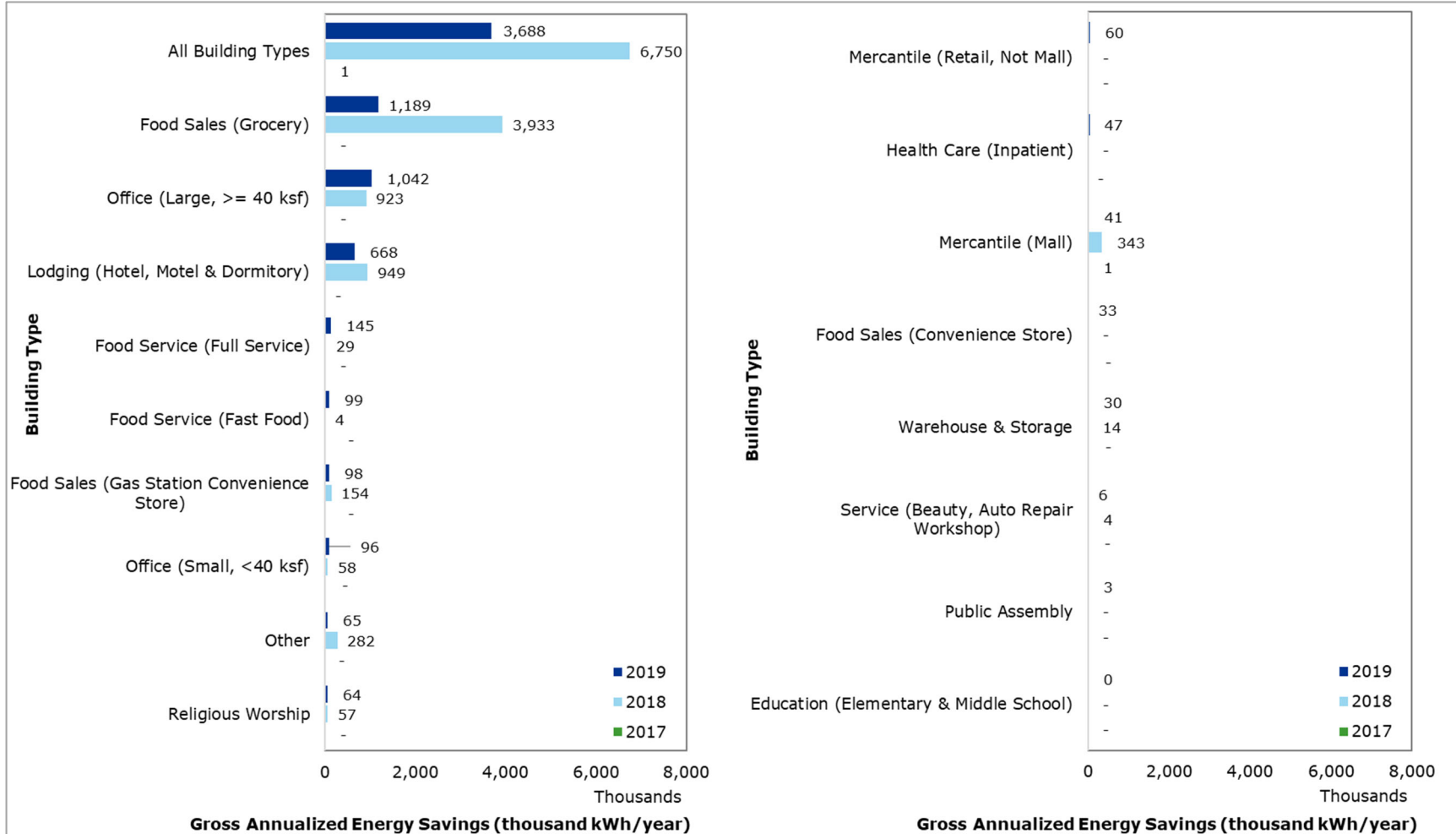
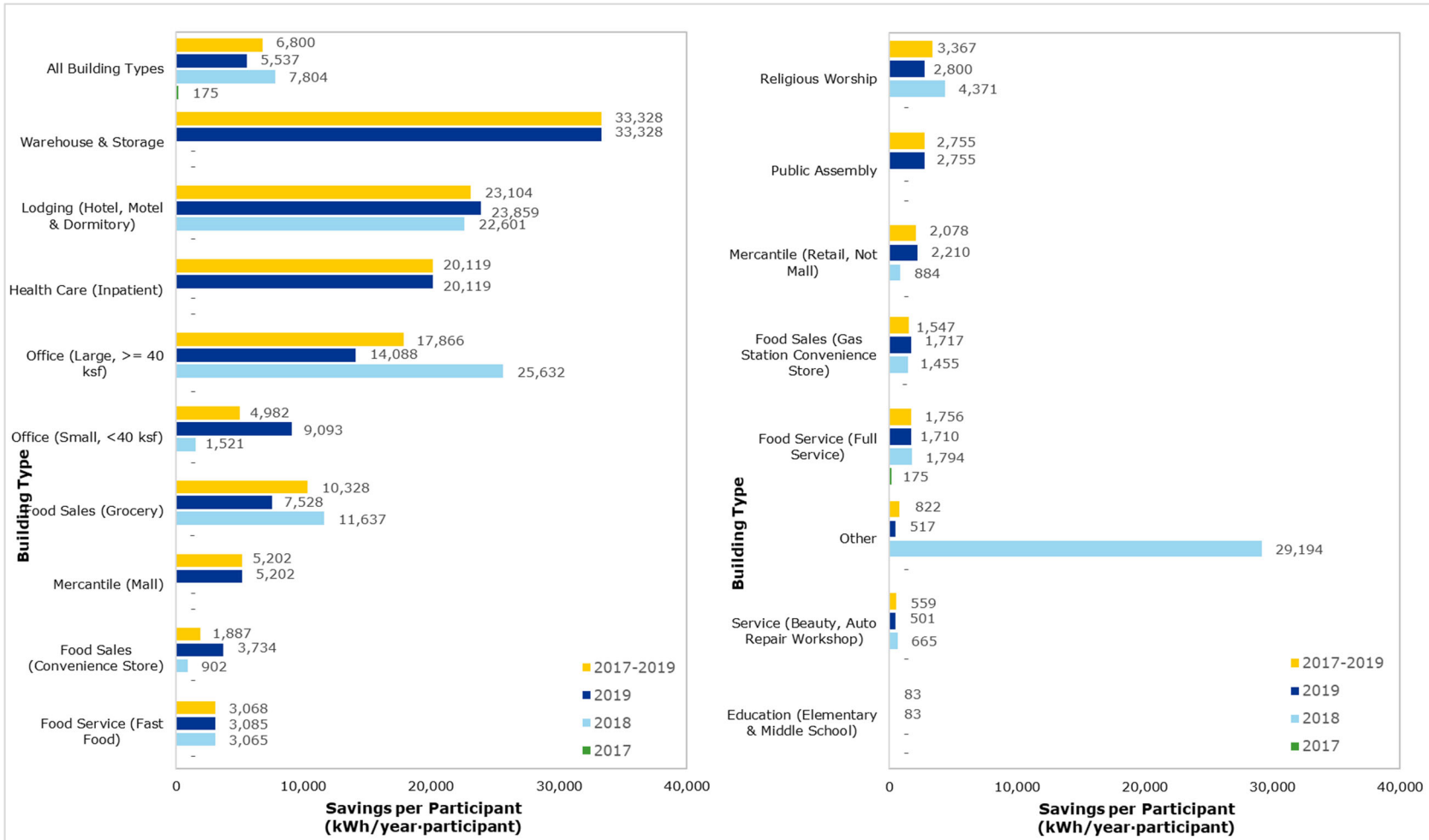


Figure 5-48 shows that the highest gross annualized energy savings per participant were achieved by warehouse & storage buildings, in 2019 and cumulatively for the life of the program.

Figure 5-48. Virginia Non-residential Prescriptive Program Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year



5.8.3.4 Additional North Carolina Program Data

Additional program data regarding energy savings per participant, participation, and overall program savings for North Carolina are provided below.

Figure 5-49 through Figure 5-51 show participation and net annualized energy savings by measure type and program year. Continuing a trend from 2018, door gaskets for refrigerated enclosures were the most frequently installed measure in 2019, installed by approximately 92% of participants, as shown in Figure 5-49. Accordingly, door gaskets accounted for a similar proportion (~89%) of the gross annualized savings in 2019 (Figure 5-50) and had the highest per-participant savings (Figure 5-51).

Figure 5-49. North Carolina Non-residential Prescriptive Program Gross Participation by Measure

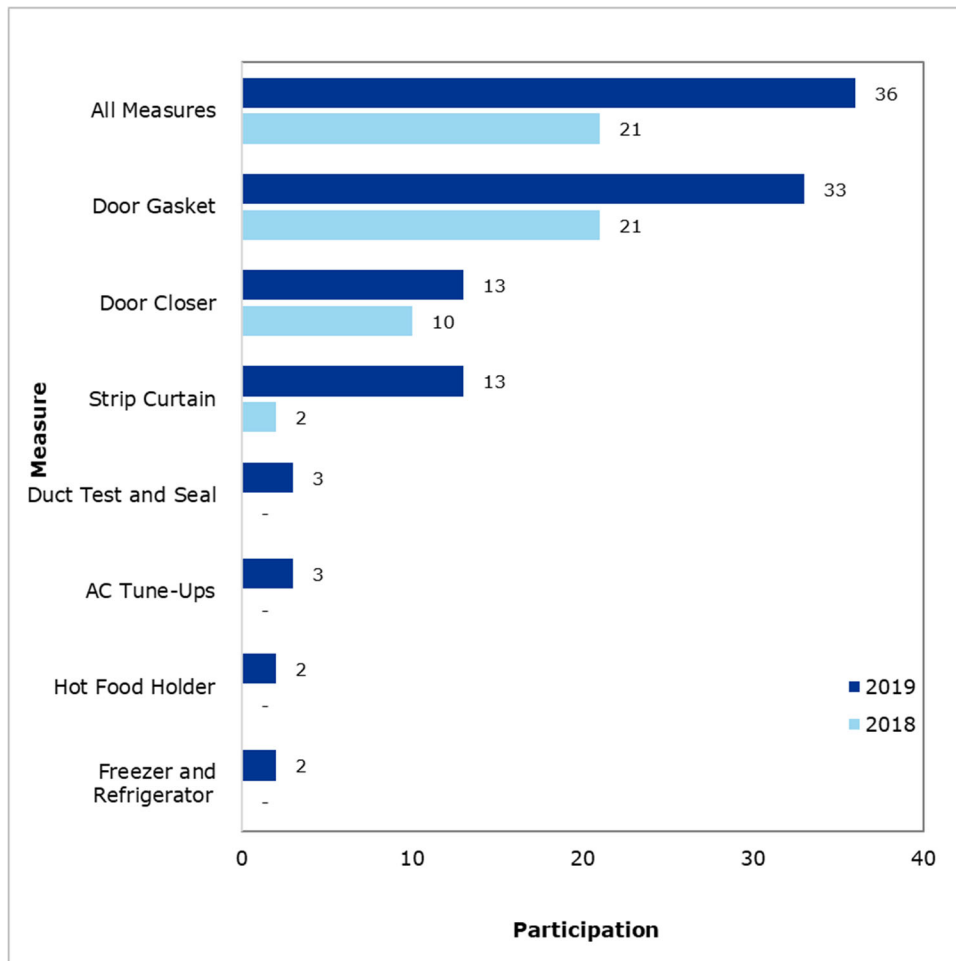


Figure 5-50. North Carolina Non-residential Prescriptive Program Gross Annualized Energy Savings (kWh/year) by Measure

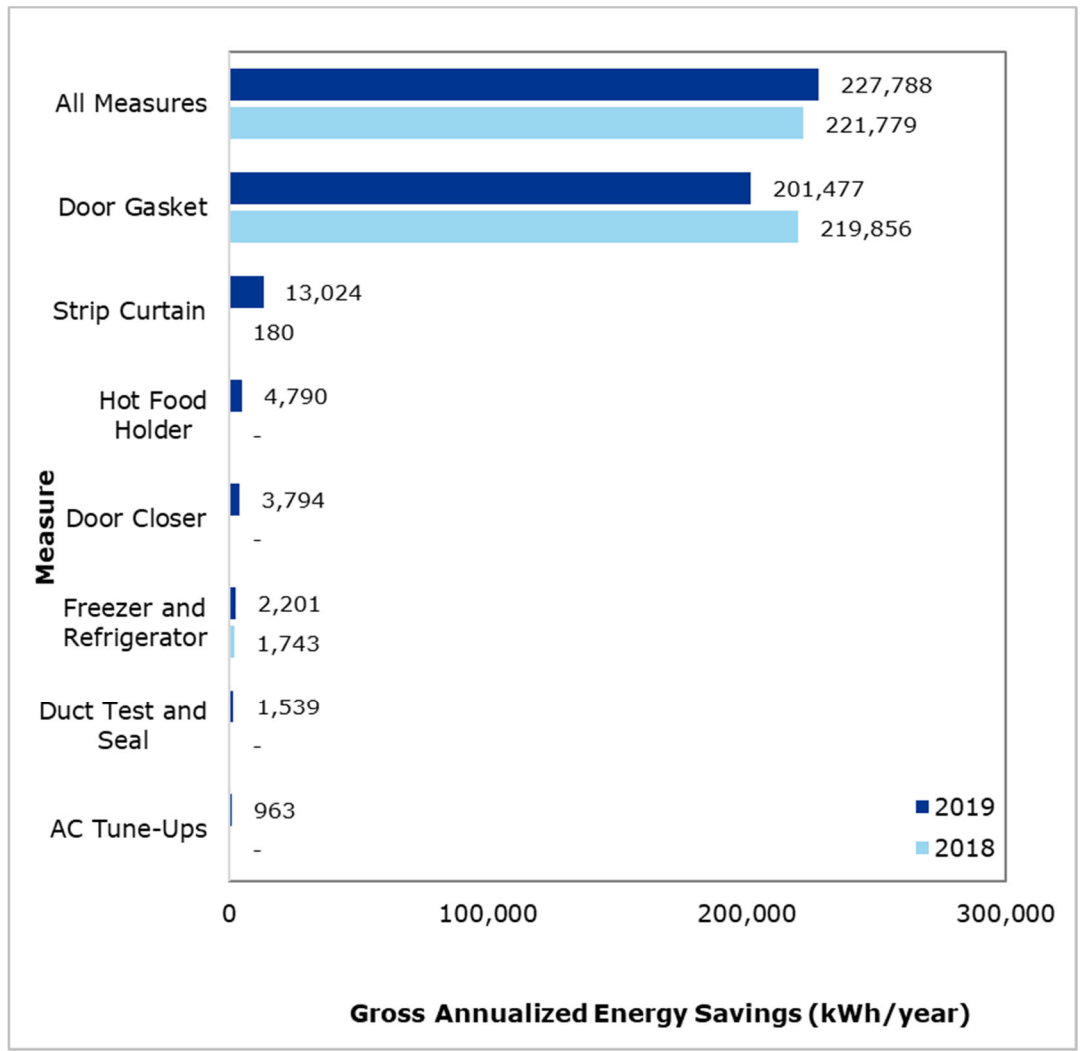


Figure 5-51. North Carolina Non-residential Prescriptive Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure

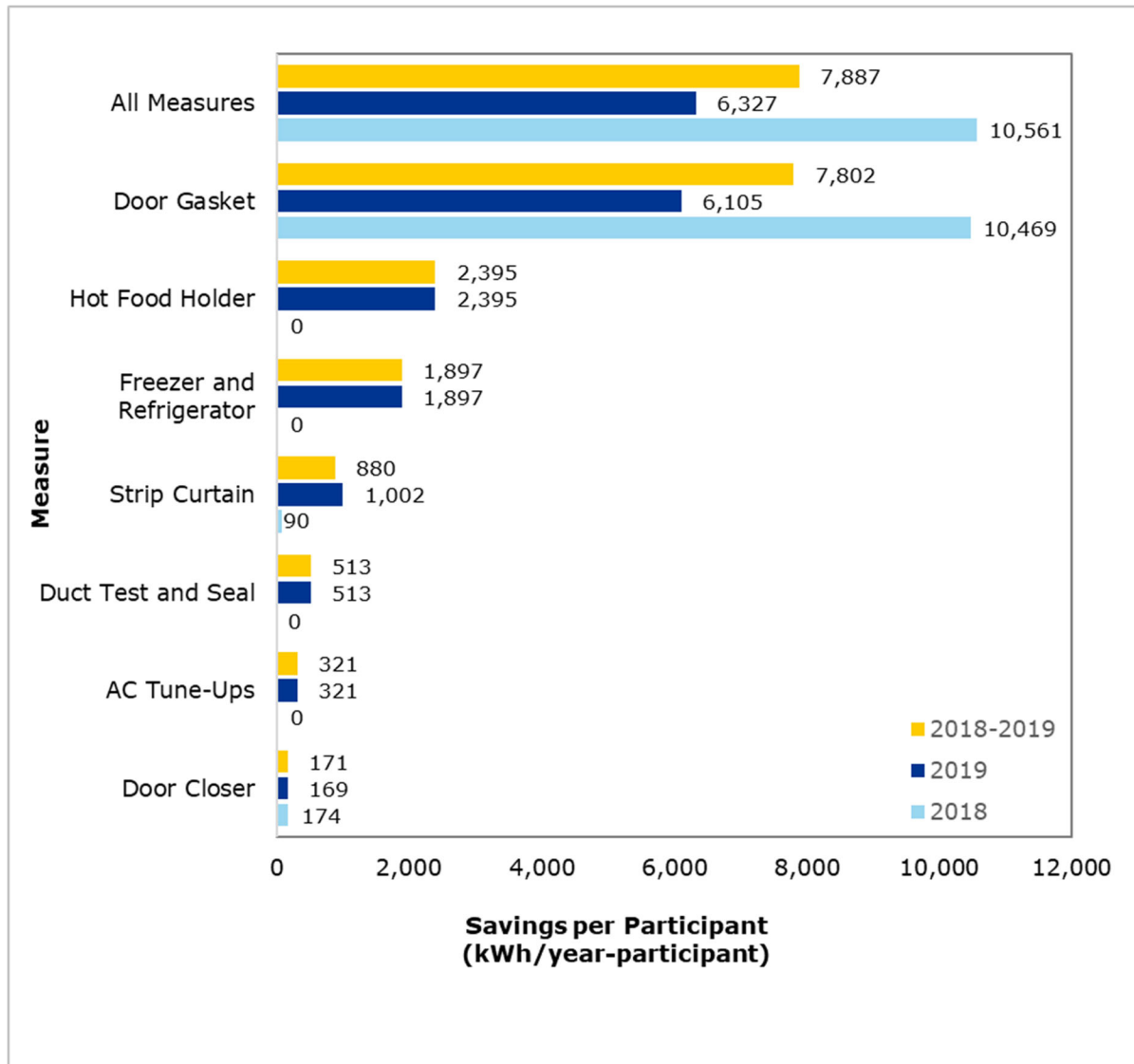


Figure 5-52 shows that food sales (grocery) buildings participated most frequently in 2019, continuing a trend from 2018.

Figure 5-52. North Carolina Non-residential Prescriptive Program Gross Participation by Building Type

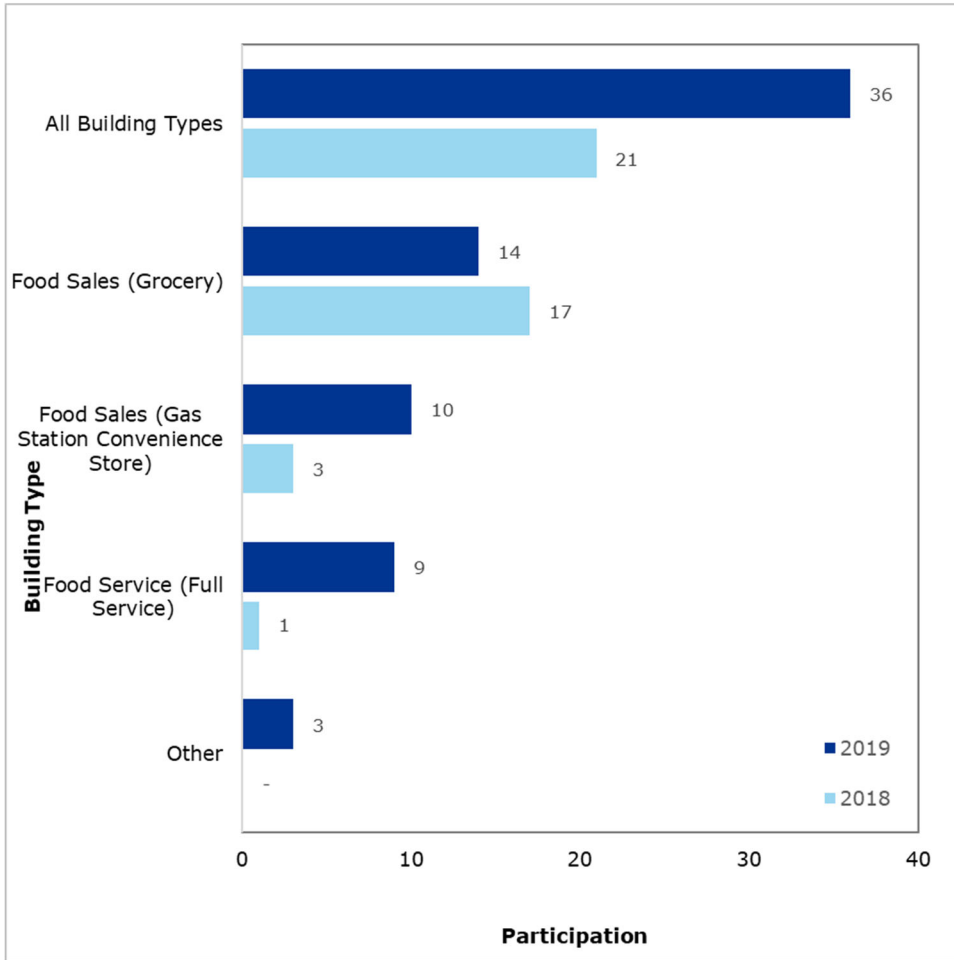
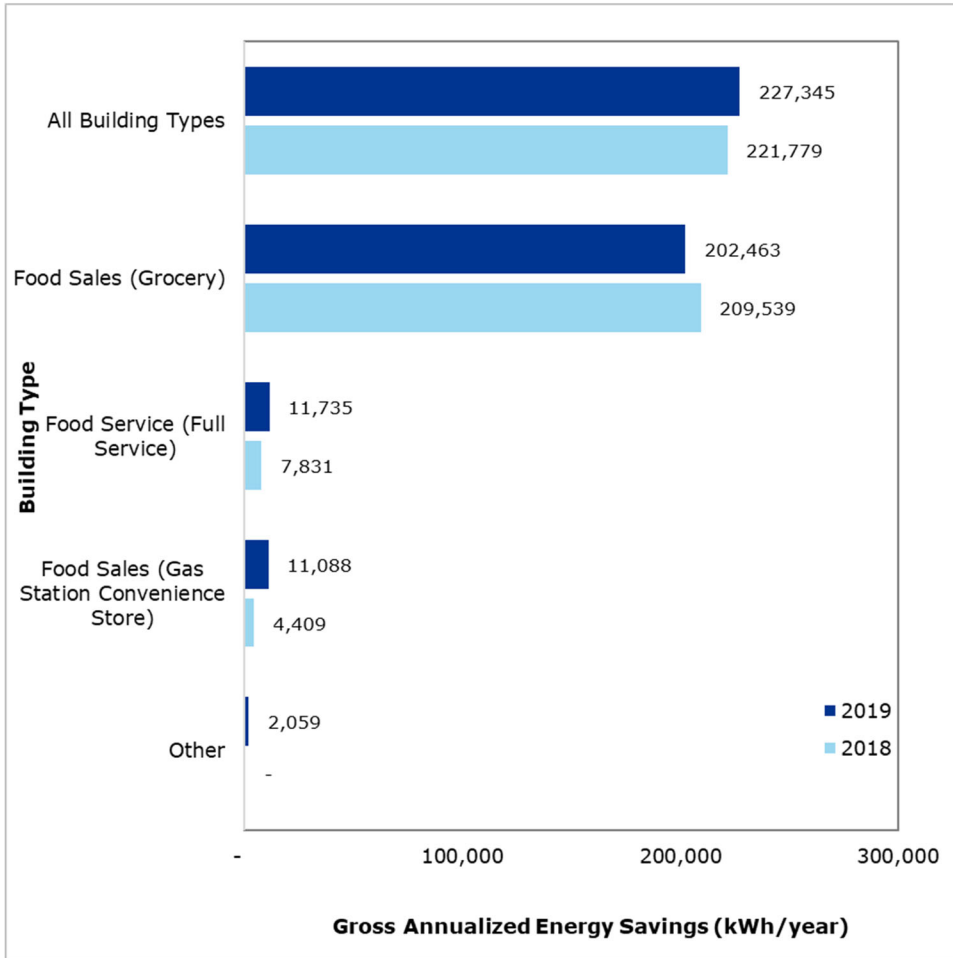


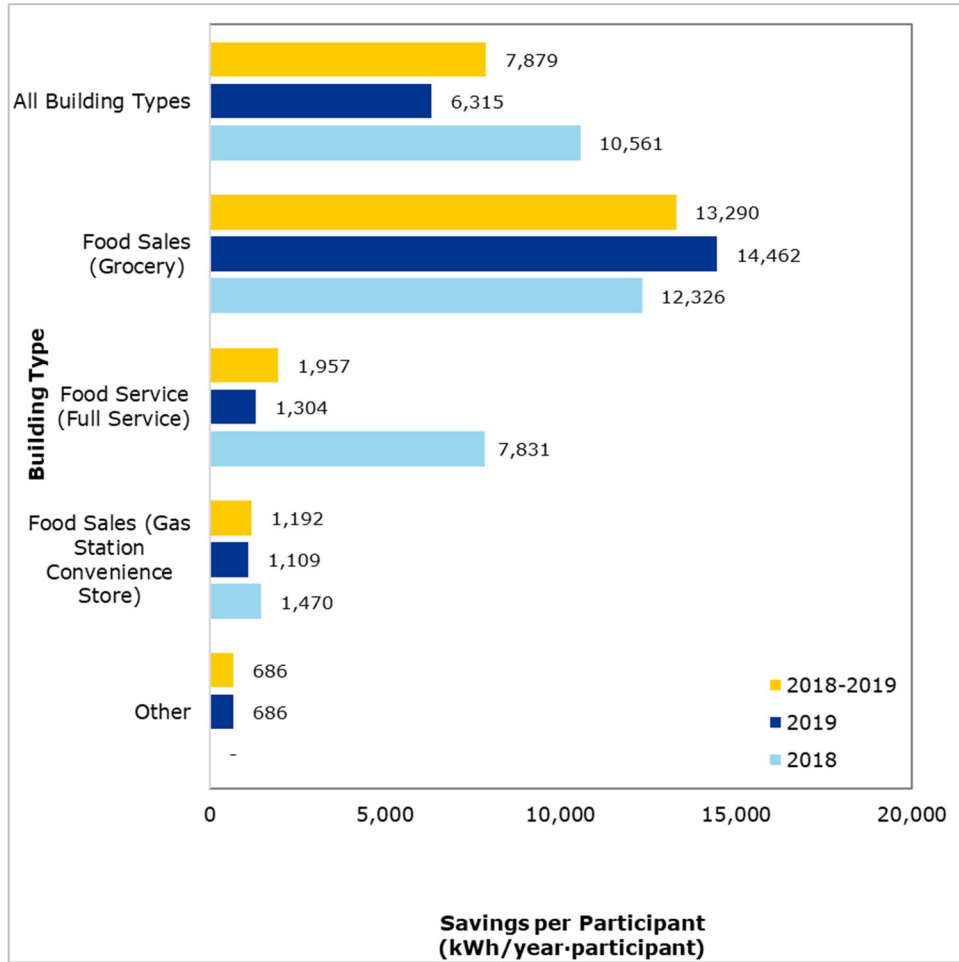
Figure 5-53 shows that the vast majority of the gross annual energy savings (~89%) were generated by food sales (grocery) buildings in 2019, similar to 2018.

Figure 5-53. North Carolina Non-residential Prescriptive Program Gross Annualized Energy Savings (kWh/year) by Building Type



Food sales (grocery) buildings had the highest average energy savings per participant in each program year, as shown in Figure 5-54.

Figure 5-54. North Carolina Non-residential Prescriptive Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type



5.9 Non-residential Small Manufacturing (DSM Phase VII) – Virginia

Virginia

Case #: PUE-2018-00168

NON-RESIDENTIAL SMALL MANUFACTURING

2019-PRESENT

- kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- Facility assessment
- Compressed air leak repair
- No loss condensate drains
- Efficient VSD compressors
- Cycling refrigerant dryers



Enrolled 0 customers in 2019



Achieved net annual energy savings of 0 MWh/year in 2019



Spent 43% of planned expenditures in 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	-	-	367,297	367,297
Total Program Participants (#)	-	-	-	-	0	0
Total Gross Incremental Savings (kWh/yr)	-	-	-	-	0	-
Total Net Incremental Savings (kWh/yr)	-	-	-	-	0	-
Average Gross Incremental Demand Reduction (kW)	-	-	-	-	0	-
Average Net Incremental Demand Reduction (kW)	-	-	-	-	0	-
Total Net Lifetime Savings (kWh)	-	-	-	-	0	0
Average Lifetime Demand Reduction (kW)	-	-	-	-	0	0

TOTAL SAVINGS BY MEASURE TYPE
IN KWH

TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH

5.9.1 Program Description



This program provides qualifying non-residential customers with incentives for the installation of energy efficiency improvements, consisting of primarily compressed air systems measures for small manufacturing facilities.

This program is implemented through a contractor network, so customers must contact a participating contractor to be eligible for the rebate. All Dominion Energy non-residential customers are eligible except those who are exempt by statute, special contract, or have

opted-out. Customers are not considered participants until a completed application form is processed and a rebate is issued. This process can take several months, as customers have 45 days to submit their rebate application and Dominion Energy has 90 days to process it.

The Virginia SCC approved this program, as part of the DSM Phase VII programs, on May 2, 2019, (Case No. PUR-2018-00168) for a five-year period of July 1, 2019, through June 30, 2024. The North Carolina Utilities Commission approved this program on November 13, 2019 (Docket No. E-22, SUB 571). Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details.

Table 5-27 maps the applicable sections in this report to reporting requirements listed in the EM&V Rule section 50, "Standard Requirements for Evaluation, Measurement, and Verification Reporting."⁷⁵

Table 5-27. Non-residential Small Manufacturing Program Compliance with EM&V Rule Section 50

Subsection within 20 VAC 5-318-50	Location and Description
A. EM&V Plan	Appendix P. EM&V Plan
B. Utilizing utility-specific data or other data	<p>Per 20 VAC 5-318-40 A and B</p> <ol style="list-style-type: none"> 1. See Appendix F. STEP Manual v10 for a description of all data or estimates used as inputs for this program and the measures within it. 2. See the Methodologies section (section 3) of this report for a description of the overarching EM&V methodologies used to produce results in this report. <p>Per 20 VAC 5-318-40 C</p> <ol style="list-style-type: none"> 3. There were no program participants in this program in 2019
C. Changes to measure-level inputs and assumptions, and inputs to cost/benefit estimates	<ol style="list-style-type: none"> 1. See Table 5-28 for program planning assumptions 2. See documents filed with the Virginia State Corporation Commission Docket PUR-2018-00168 for approved measure-level inputs and assumptions, and the impact of such changes on original cost/benefit estimates for DSM programs or measures.
D. Measure-level data collection methodology	See response to A. and B. above.

⁷⁵ 20 VAC 5-318-50

Subsection within 20 VAC 5-318-50	Location and Description
E. Explanation of eligibility requirements for each rate schedule that program is offered	See program description above.
F. Comparison of measured annual measure or program savings estimates to the annual usage of the average rate schedule usage, and eligible customer in each rate schedule	There were no program participants in this program in 2019
G. Explanation of controls undertaken by utility	There were no program participants in this program in 2019

5.9.2 Methods for the Current Reporting Period

This section describes the program’s planned participants, energy savings, and demand reduction.

Table 5-28. Non-residential Small Manufacturing Program (Phase VII) Planning Assumptions System-wide

Assumption	Value
Target Market	Non-residential customers
NTG Factor	90%
Measure Life (years)	12.24
Average Annual Energy Savings per Participant (kWh/year)	50,767
Average Coincident Peak Demand Reduction (kW) per Participant	10.7
Average Rebate per Participant (US\$)	\$9,815.00

5.9.3 Assessment of Program Progress Towards Plan

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

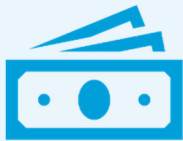
5.9.3.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 5-29 provides performance indicator data from July 1, 2019 through December 31, 2019, and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix A.13.



- There were no participants in 2019.

- There were no kWh or kW savings because there were no participants in 2019.



- Total cost for 2019 was 43% of planned cost.
- All costs were related to program implementation, EM&V, and other administrative activities to launch the program.

Table 5-29. Virginia Non-residential Small Manufacturing Program Performance Indicators (2019)

Category	Item	2019
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	
	Direct EM&V	
	Indirect Other (Administrative)	\$12,414
Total Costs (\$)	Total ⁷⁶	\$367,297
	Planned	\$862,936
	Variance	-\$495,639
	Annual % of Planned	43%
Participants	Total (Gross)	0
	Planned (Gross)	35
	Variance	-35
	Annual % of Planned (Gross)	0%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	0
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	0
	Net-to-Gross Adjustment (80%)	0
	Net Adjusted Savings	0
	Planned Savings (Net)	351,539
	Annual % Toward Planned Savings (Net)	0.00%
	Avg. Savings per Participant (Gross)	N/A
Avg. Savings per Participant (Net)	N/A	
Installed Demand Reduction (kW)	Total Gross Deemed Demand	0.0
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand	0.0
	Net-to-Gross Adjustment (90%)	0.0
	Net Adjusted Demand	0.0
	Planned Demand (Net)	0.0
	Annual % Toward Planned Demand (Net)	N/A
	Avg. Peak Demand per Participant (Gross)	N/A
Avg. Demand per Participant (Net)	N/A	

⁷⁶ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2019
Program Performance	Annual \$Admin. per Participant (Gross)	N/A
	Annual \$Admin. per kWh/year (Gross)	N/A
	Annual \$Admin. per kW (Gross)	N/A
	Annual \$EM&V per Total Costs (\$)	21%
	Annual \$Rebate per Participant (Gross)	N/A

5.9.3.2 Additional Virginia Program Data

No Virginia customers have participated in the program through 2019.

5.9.3.3 Comparison of Savings with Usage

No Virginia customers have participated in the program through 2019.

5.10 Non-residential Office (DSM Phase VII) – Virginia

Virginia

Case #: PUE-2018-00168

NON-RESIDENTIAL OFFICE

PROGRAM STARTED IN 2019

- kWh/yr in Average Net Savings Per Participant

Eligibility

- All non-residential customers are eligible except those who are exempt by statute, special contract, or have opted-out
- Must be the owner of the facility or reasonably able to secure permission to complete measures
- Work must be completed by participating contractor

Measures

- Facility assessment
- Lighting equipment scheduling
- HVAC equipment scheduling
- Night temperature setback
- Supply air temperature setback



Enrolled **0** customers in 2019



Achieved net annual energy savings of **0 MWh/year** in 2019



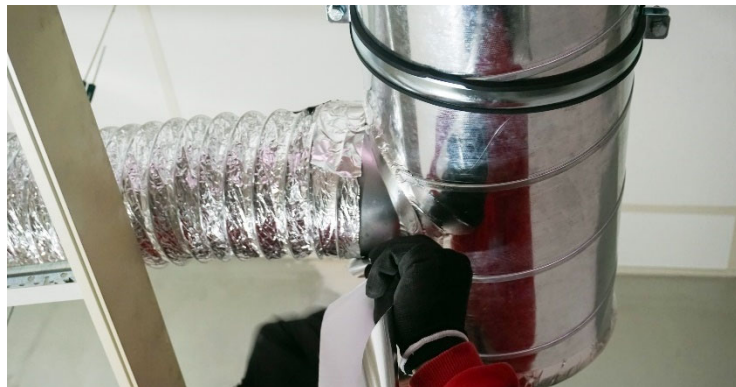
Spent **49%** of planned expenditures in 2019

Category	2015	2016	2017	2018	2019	Lifetime
Total Program Cost (\$)	-	-	-	-	405,507	405,507
Total Program Participants (#)	-	-	-	-	0	0
Total Gross Incremental Savings (kWh/yr)	-	-	-	-	0	-
Total Net Incremental Savings (kWh/yr)	-	-	-	-	0	-
Average Gross Incremental Demand Reduction (kW)	-	-	-	-	0	-
Average Net Incremental Demand Reduction (kW)	-	-	-	-	0	-
Total Net Lifetime Savings (kWh)	-	-	-	-	0	0
Average Lifetime Demand Reduction (kW)	-	-	-	-	0	0

TOTAL SAVINGS BY MEASURE TYPE
IN KWH

TOTAL SAVINGS BY BUILDING TYPE
TOP 5 IN KWH

5.10.1 Program Description



This program provides qualifying non-residential customers with incentives for the installation of energy efficiency improvements, consisting of recommissioning measures at small office facilities.

This program is implemented through a contractor network, so customers must contact a participating contractor to be eligible for the rebate. All Dominion Energy non-residential customers are eligible except those who are exempt by statute, special

contract, or have opted-out. Customers are not considered participants until a completed application form is processed and a rebate is issued. This process can take several months, as customers have 45 days to submit their rebate application and Dominion Energy has 90 days to process it.

The Virginia SCC approved this program, as part of the DSM Phase VII programs, on May 2, 2019, (Case No. PUR-2018-00168) for a five-year period of July 1, 2019, through June 30, 2024. The North Carolina Utilities Commission approved this program on November 13, 2019 (Docket No. E-22, SUB 572). Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details.

Table 5-30 maps the applicable sections in this report to reporting requirements listed in the EM&V Rule section 50, "Standard Requirements for Evaluation, Measurement, and Verification Reporting."⁷⁷

Table 5-30. Non-residential Office Program Compliance with EM&V Rule Section 50

Subsection within 20 VAC 5-318-50	Location and Description
A. EM&V Plan	Appendix Q, EM&V Plan
B. Utilizing utility-specific data or other data	<p>Per 20 VAC 5-318-40 A and B</p> <ol style="list-style-type: none"> 1. See Appendix F. STEP Manual v10 for a description of all data or estimates used as inputs for this program and the measures within it. 2. See the Methodologies section (section 3) of this report for a description of the overarching EM&V methodologies used to produce results in this report. <p>Per 20 VAC 5-318-40 C</p> <ol style="list-style-type: none"> 3. There were no program participants in this program in 2019
C. Changes to measure-level inputs and assumptions, and inputs to cost/benefit estimates	<ol style="list-style-type: none"> 1. See Table 5-31 for program planning assumptions 2. See documents filed with the Virginia State Corporation Commission Docket PUR-2017-00129 for approved measure-level inputs and assumptions, and the impact of such changes on original cost/benefit estimates for DSM programs or measures.
D. Measure-level data collection methodology	See response to A. and B. above.

⁷⁷ 20 VAC 5-318-50

Subsection within 20 VAC 5-318-50	Location and Description
E. Explanation of eligibility requirements for each rate schedule that program is offered	See program description above.
F. Comparison of measured annual measure or program savings estimates to the annual usage of the average rate schedule usage, and eligible customer in each rate schedule	There were no program participants in this program in 2019
G. Explanation of controls undertaken by utility	There were no program participants in this program in 2019

5.10.2 Methods for the Current Reporting Period

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

Table 5-31. Non-residential Office Program (Phase VII) Planning Assumptions System-wide

Assumption	Value
Target Market	Non-residential customers
NTG Factor	90%
Measure Life (years)	7
Average Annual Energy Savings per Participant (kWh/year)	65,104.24
Average Coincident Peak Demand Reduction (kW) per Participant	1
Average Rebate (US\$) per Participant	\$6,649

5.10.3 Assessment of Program Progress Towards Plan

The next section describes the program’s progress towards planned participants, energy savings, and demand reduction.

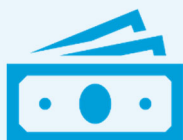
5.10.3.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2019 appear below. Following this summary, Table 5-32 provides performance indicator data from July 1, 2019 through December 31, 2019, and shaded cells are considered extraordinarily sensitive information. Detailed program indicators by year and month are provided in Appendix A.14.



- There were no participants in 2019.

- There were no annual kWh or kW savings because there were no participants in 2019.



- Total expenditures in 2019 were 49% of planned costs.
- All costs were related to program implementation, EM&V, and other administrative activities to launch the program.

Table 5-32. Virginia Non-residential Office Program Performance Indicators (2019)

Category	Item	2019
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	
	Direct EM&V	
	Indirect Other (Administrative)	\$13,706
Total Costs (\$)	Total ⁷⁸	\$405,507
	Planned	\$832,726
	Variance	-\$427,218
	Annual % of Planned	49%
Participants	Total (Gross)	0
	Planned (Gross)	42
	Variance	-42
	Annual % of Planned (Gross)	0%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	0

⁷⁸ Program expenditures include operations and maintenance, capital spending, and common costs. Operations and maintenance spending are separated by direct rebate, direct implementation, direct EM&V, other indirect or administrative spending. The expenditures reported in this document do not include the Company's margins.

Category	Item	2019
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	0
	Net-to-Gross Adjustment (90%)	0
	Net Adjusted Savings	0
	Planned Savings (Net)	594,427
	Annual % Toward Planned Savings (Net)	0%
	Avg. Savings per Participant (Gross)	N/A
	Avg. Savings per Participant (Net)	N/A
Installed Demand Reduction (kW)	Total Gross Deemed Demand	0.0
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand	0.0
	Net-to-Gross Adjustment (90%)	0.0
	Net Adjusted Demand	0.0
	Planned Demand (Net)	0.0
	Annual % Toward Planned Demand (Net)	N/A
	Avg. Peak Demand per Participant (Gross)	N/A
	Avg. Demand per Participant (Net)	N/A
Program Performance	Annual \$Admin. per Participant (Gross)	N/A
	Annual \$Admin. per kWh/year (Gross)	N/A
	Annual \$Admin. per kW (Gross)	N/A
	Annual \$EM&V per Total Costs (\$)	26%
	Annual \$Rebate per Participant (Gross)	N/A

5.10.3.2 Additional Virginia Program Data

No Virginia customers have participated in the program through 2019.

5.10.3.3 Comparison of Savings with Usage

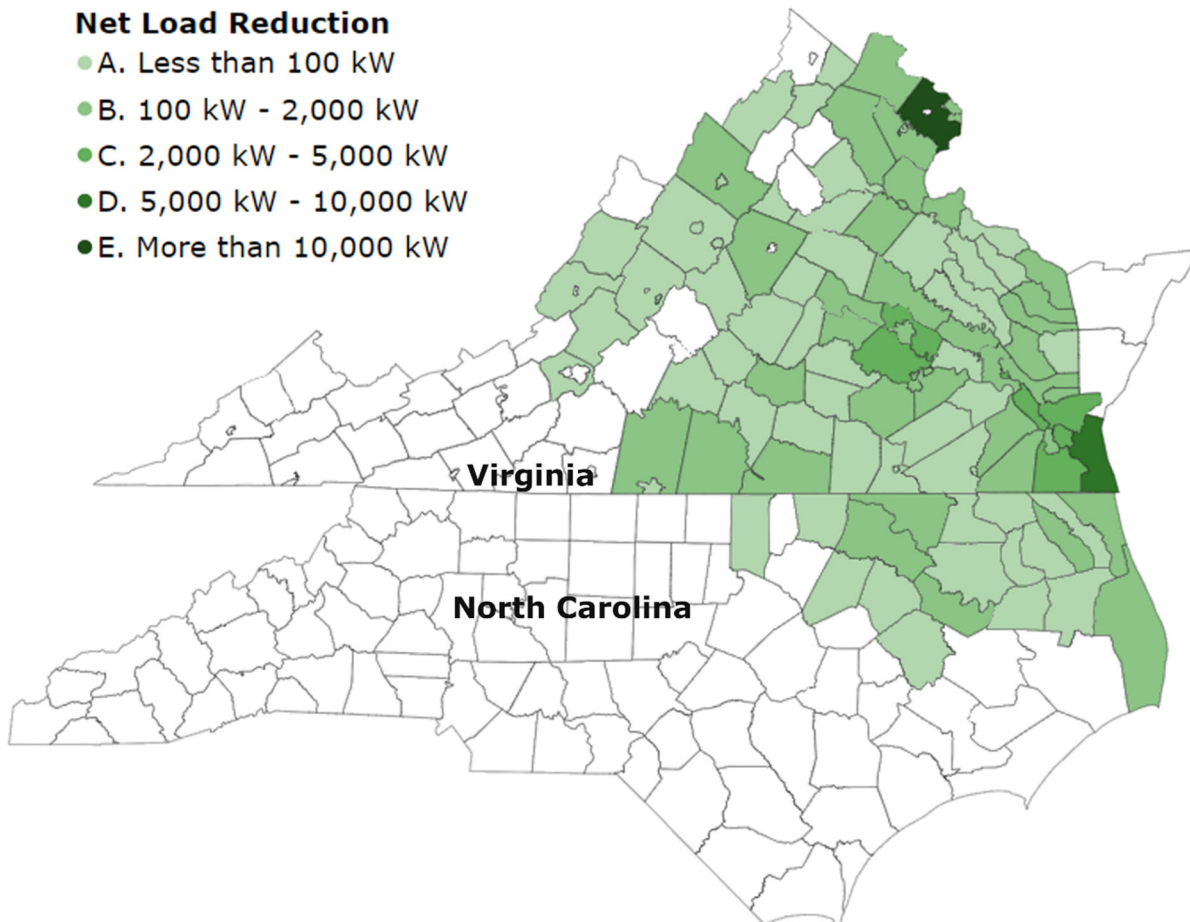
No Virginia customers have participated in the program through 2019.

6 PEAK SHAVING PROGRAMS

The Company operates two peak shaving (demand response) programs, the Residential AC Cycling Program and the Non-residential DG Program. Both programs operate by dispatching load on a limited number of non-holiday weekday hours, referred to as peak shaving events. Figure 6-1 illustrates the combined peak shaving potential (in kW) from both programs at the county level. The deeper the color, the greater the peak shaving potential.

As with the DSM energy efficiency programs, the Virginia counties with the highest potential center around Richmond, Norfolk, and northern Virginia. In decreasing order, the jurisdictions with the highest peak shaving potentials are Fairfax, Virginia Beach City, and Newport News City. In North Carolina, the jurisdictions with the highest peak shaving potentials are Dare, Halifax, and Currituck, in decreasing order.

Figure 6-1. Peak Shaving Potential for the Residential AC Cycling and Non-residential Distributed Generation Program by County as of December 31, 2019.



6.1 Residential AC Cycling – Virginia and North Carolina

Virginia

Case #: PUE-2016-00111

RESIDENTIAL AC CYCLING

PROGRAM STARTED IN 2010
0.63 kW/participant in Ex Ante kW Estimates

Eligibility

- Eligible customers must reside in an owner-occupied single-family home, townhouse, or condominium.
- A participant is defined as one customer account but a participant may have multiple AC switches.

 75,386 participants in 2019

 0.63 kW estimated event-based load reduction at Dominion's peak planning conditions

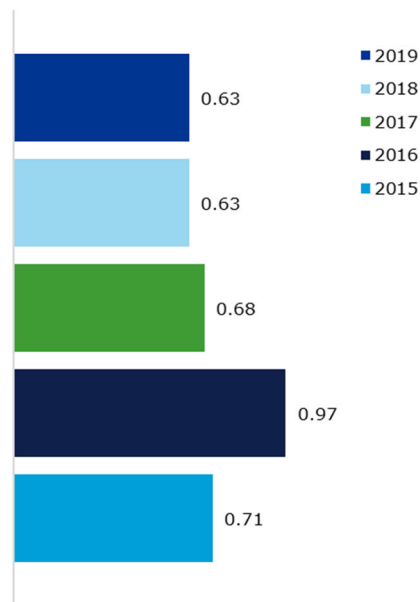
 Spent 68% of planned expenditures

Events

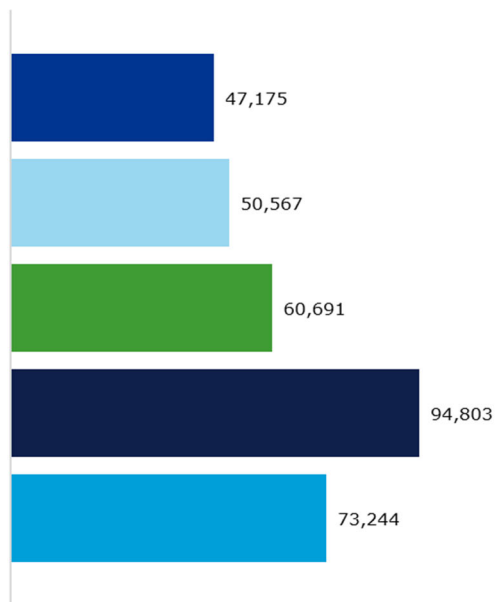
- The AC Cycling event season spans June 1 through September 30 on non-holiday weekdays.
 - 23 events.
 - For the first time a 2-hour event was called outside the normal event season, on October 2.
- In 2019 the program called

Category	2015	2016	2017	2018	2019
Total Program Cost (\$)	9,577,752	6,700,360	6,159,956	6,034,693	5,781,716
Total Program Participants (<i>adjusted</i>)	103,160	98,088	89,282	80,627	75,386
Demand Reduction at Peak Planning (<i>kW/participant</i>)	0.71	0.97	0.68	0.63	0.63
Dispatchable Peak Shaving Potential (<i>kW</i>)	73,244	94,803	60,691	50,567	47,175

EX-ANTE ESTIMATED PEAK SAVINGS KW PER PARTICIPANT



DISPATCHABLE PEAK SHAVING POTENTIAL KW



North Carolina

Docket #: E-22 Sub 545


RESIDENTIAL AC CYCLING


PROGRAM STARTED IN 2011
0.63 kW/participant in Ex Ante kW Estimates

Eligibility

- Eligible customers must reside in an owner-occupied single-family home, townhouse, or condominium.
- A participant is defined as one customer account but a participant may have multiple AC switches.

 3,061 participants in 2019

 0.63 kW estimated event-based load reduction at Dominion's peak planning conditions

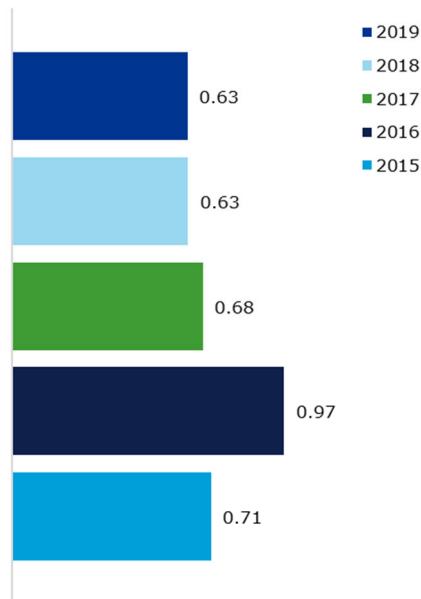
 Spent 51% of planned expenditures

Events

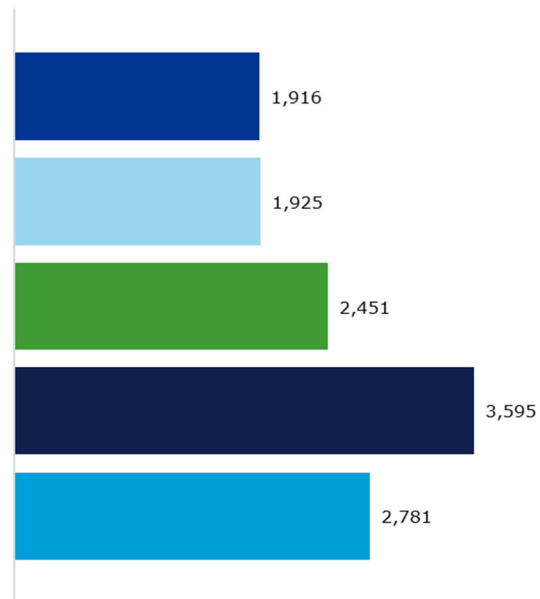
- The AC Cycling event season spans June 1 through September 30 on non-holiday weekdays.
 - 23 events.
 - For the first time a 2-hour event was called outside the normal event season, on October 2.
- In 2019 the program called

Category	2015	2016	2017	2018	2019
Total Program Cost (\$)	315,550	279,602	238,761	239,609	244,525
Total Program Participants (<i>adjusted</i>)	3,916	3,707	3,605	3,067	3,060
Demand Reduction at Peak Planning (<i>kW/participant</i>)	0.71	0.97	0.68	0.63	0.63
Dispatchable Peak Shaving Potential (<i>kW</i>)	2,781	3,595	2,451	1,925	1,916

EX-ANTE ESTIMATED PEAK SAVINGS
KW PER PARTICIPANT



DISPATCHABLE PEAK SHAVING POTENTIAL
KW



6.1.1 Program Description

The Residential AC Cycling Program, marketed as “Smart Cooling Rewards,” was implemented in 2010 in Virginia and 2011 in North Carolina, to provide the Company a supply resource by shaving summer peak electric demand. Residential customers living in an owner-occupied single-family home, townhouse, or condominium with central air conditioners or electric and dual fuel heat pumps are eligible to participate.



Participants receive a \$40 on-bill credit in the December billing cycle in exchange for allowing the Company to reduce the operating cycle of their central air conditioning and heat pumps. The AC Cycling event season spans June 1 through September 30 on non-holiday weekdays. Events typically last between two and four hours. Under the program, when AC cycling events

are called, a radiofrequency (RF) paging signal is broadcast throughout the Company’s service area. The signal is received by load curtailment switches installed on central air conditioners and heat pumps of participating residential customers. The dispatch of the RF signal to the load curtailment switch reduces the duty cycle of the registered AC units up to 50%.

6.1.2 Program Performance

The 2019 kW peak shaving potential for AC Cycling was 0.63 kW for both Virginia and North Carolina representing 93% of planned targets for Virginia and 72% for North Carolina.

The AC Cycling program called 23 events in 2019. For the first time since the start of the program, a two-hour event was called outside the normal event season, on October 2nd, because PJM declared a “Pre-Emergency Load Management Reduction Action” as temperatures in the mid-Atlantic and Northeast hovered around 98°F during an unusual heat event.⁷⁹

Virginia participation was 93% of the planned goal and North Carolina’s participation was 72% of plan goal. Consequently, program expenditures were also below plan. The program expenditures, number of participants, and load reduction impact estimates are compared to Dominion’s corresponding planning numbers in Table 6-3, Table 6-4, and Table 6-5. The annual impact evaluation of 2019’s dispatched events is included in Appendix R-1.

6.1.3 Methods for the Current Reporting Period

The evaluation methodology has remained consistent since the beginning of the program with two exceptions:

- In 2015 the evaluation switched to a customer-level regression model to develop the event day baselines
- Since 2016, the analysis has been conducted on the census of AMI-enabled customers instead of a random sample of AMI-enabled customers

A detailed description of the evaluation methodology can be found in Appendix R-1, Impact Evaluation of 2018 Dispatch Events.

⁷⁹ Events may be called after September 30 under extenuating circumstances.

6.1.4 STEP Manual Computation of Demand Reduction

For 2019 events, the ex ante kW impacts per participant were estimated to be 0.63 kW per participant. The regression parameters for 2019 are included in the DNV GL Energy Standard Tracking and Engineering Protocols (STEP) Manual (v 10).

6.1.5 Impact Analysis of 2019 Events

The following steps are taken to calculate the program impact estimates on the full census of AMI participants:



1. Half-hourly interval AMI consumption data for each participant are delivered to DNV GL monthly
2. AMI participant accounts are assigned weights based on the state, connected loads, and divisions of participants to ensure that the AMI analysis is representative of the program population. The assigned weights and methods used to extrapolate the AMI-enabled account impacts to the program population are included in Appendix R-1.
3. AMI interval consumption data are merged with the record of customers who participated in each event.

6.1.5.1 Ex ante Impact Regression Modeling

The ex ante estimates are calculated using a regression analysis of the ex post impacts for each event-hour with temperature humidity index (THI) as the predictor variable.⁸⁰ Ex ante results are the expected impacts extrapolated to a particular hour and THI and is the program metric for program impacts. The ex ante model is updated after each season to reflect the current year's ex post impacts. The 2019 ex ante results for all hours and temperature conditions are provided in Table 6-1.

The Dominion Energy peak condition for planning purposes is 95°F with 43% relative humidity for the hour ending 17 (83.4 THI). The ex ante demand reduction impacts were calculated with the following equation:

$$\text{Predicted Ex Ante kW Impact}_{17:00, \text{day}} = -0.22321 + 0.01018 * (83.4)$$

This method increases the reliability of the estimates of available program resources and peak shaving performance while taking into account that the kW resource is dependent on temperature, time, and load.

In 2019, the evaluated load impact for weather conditions observed during Dominion Energy's peak day conditions was 0.63 kW per participant.

⁸⁰ Temperature Humidity Index = THI = Td - (0.55 - 0.55*RH) * (Td - 58) where Td is dry bulb temperature and RH is relative humidity. Source: PJM Glossary: <http://www.pjm.com/Glossary.aspx>.

Table 6-1. 2019 Ex ante Impacts by THI and Hour Ending per Participant

Event Hour Ending					
THI	15	16	17	18	19
79	0.36	0.49	0.58	0.57	0.53
80	0.40	0.51	0.59	0.58	0.57
81	0.43	0.53	0.60	0.59	0.61
82	0.47	0.56	0.61	0.60	0.64
83	0.50	0.58	0.62	0.60	0.68
84	0.53	0.61	0.63	0.61	0.71
85	0.57	0.63	0.64	0.62	0.75
86	0.60	0.65	0.65	0.63	0.78
87	0.64	0.68	0.66	0.64	0.82
88	0.67	0.70	0.67	0.65	0.85

By interpolating between 83°F and 84°F at 17:00, the expected peak load reduction is 0.63 kW per participant for 23 AC Cycling events called in 2019.

6.1.5.2 Ex post Impact Regression Modeling

The ex post estimate, or what happened during the event, is the difference between the adjusted baseline during the event and the pre- and post-event baseline. Impacts are calculated for each event hour. The load reduction calculated for each event is aggregated and weighted to all participants to produce program level impact estimates. The ex poste results for 2019 are found in Table 6-7 and Table 6-8.

Table 6-2. AC Cycling Program Planning Assumptions

Assumption	Value
Target Market	Owner-occupied SF-family home, townhouse, or condominium
Measure Life (years)	15 years
Average Number of AC Switches/Premise	1.13

6.1.6 Assessment of Program Progress Towards Plan

Table 6-4 and Table 6-5 summarize the annual progress towards plan for key AC Cycling performance indicators in Virginia and North Carolina, respectively. The shaded cells are considered extraordinarily sensitive information. Detailed indicators by year and month are provided in Appendix A.15 (Virginia) and Appendix B.8 (North Carolina). Cumulative net reduction (kW) by year and month can be found in Appendix D.10.

6.1.6.1 Participants

Table 6-3 below shows the number of controlled participants in the summer of 2019 by connected load. Participants averaged 1.13 switches per household.

Table 6-3. Number of Participants by Connected Load (2019)

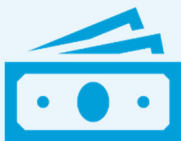
Connected Load (kW)	# of Participants
>3.5	32,169
<3.5	22,023
Not available	25,694
Total	79,886

6.1.6.2 Cumulative Indicators Over Time vs. Planned – Virginia and North Carolina



- The number of participants for Virginia and North Carolina reached 93% and 72% of the program planning estimates, respectively.
- Cumulative net participants and kW peak shaving potential were derived by subtracting cumulative participants from cumulative removals and deactivations (Table 6-4 and Table 6-5).
- The peak shaving impact estimates at hour ending 17 during the 23 AC Cycling events called in 2019 are summarized in Table 6-1.

- The average kW peak shaving potential was 0.63 kW per participant for Virginia and North Carolina at Dominion Energy’s peak condition.
- These peak shaving totals are 93% of the program planning estimates for Virginia and 72% for North Carolina.



- Key program cost data are found in the performance indicator summaries in Table 6-4 and Table 6-5.
- For the 2019 program year, Virginia’s expenditures were \$5,781,716, or 68% of the planned total. North Carolina expenditures were \$244,525 for the program year, or 51% of planned totals.

Table 6-4. Virginia Residential AC Cycling Program Performance Indicators (2010-2019)

Category	Item	2019	Program Total (2010-2019)
Operations and Management Costs (\$)	Direct Rebate		
	Direct Implementation		
	Direct EM&V		
	Indirect Other (Administrative)	\$244,347	\$4,487,844
Capital (\$)	Direct Implementation		
Total Costs (\$)	Total	\$5,781,716	\$77,280,866
	Planned	\$8,463,554	\$103,949,320
	Variance	\$-2,681,838	\$-26,668,454
	Cumulative % of Planned	68%	74%
Participants	Total (Cumulative @ End of Month)	154,787	154,787
	Removals (Uninstalled)/ Deactivations	-79,401	-79,401
	Net Participation	75,386	74,987
	Planned	80,765	80,765
	Variance	-5,379	-5,778
	Cum% toward planned total (Net basis)	93%	93%
	Removal (Uninstalled) /Deactivation Rate	-1.47%	-0.94%
	Connected Load kW	234,736	231,063
	Ex Ante Estimated kW	0.63	0.83
	Connected Load Per Participant (kW)	3.1	3.0
kW Potential	Peak Shaving Potential kW - Gross Participants	96,895	96,895
	Removed (Uninstalled) / Deactivated Peak Shaving Potential kW	-49,704	-49,704
	Dispatchable Peak Shaving Potential - Net Total kW	47,175	46,941
	Planned Demand	50,817	50,817
	% Toward Planned Total	93%	92%
Program Performance	\$Admin. per Participant (Gross)	\$29	\$29
	\$Admin. per kW (Gross)	\$46	\$44
	\$EM&V per Total Costs (\$)	2%	2%
	\$Rebate per Participant (Gross)	\$176	\$176

Table 6-5. North Carolina Residential AC Cycling Program Performance Indicators (2011-2019)

Category	Item	Program Total (2011-2019)	
		2019	Program Total (2011-2019)
Operations and Management Costs (\$)	Direct Rebate		
	Direct Implementation		
	Direct EM&V		
	Indirect Other (Administrative)	\$9,722	126,320
Capital (\$)	Direct Implementation		
Total Costs (\$)	Total	\$244,525	3,165,519
	Planned	\$484,114	5,197,579
	Variance	-\$239,589	-\$2,032,060
	Cumulative % of Planned	51%	61%
Participants	Total (Cumulative @ End of Month)	6,247	6,247
	Removals (Uninstalled)/ Deactivations	-3,186	-3,186
	Net Participation	3,061	3,056
	Planned	4,235	4,235
	Variance	-1,174	-1,179
	Cum% toward planned total (Net basis)	72%	72%
	Removal (Uninstalled) /Deactivation Rate	-1.28%	-0.99%
	Connected Load kW	11,479	12,785
	Ex Ante Estimated kW	0.63	0.81
	Connected Load Per Participant (kW)	3.75	3.74
kW Potential	Peak Shaving Potential kW - Gross Participants	3,911	3,911
	Removed (Uninstalled) / Deactivated Peak Shaving Potential kW	-1,994	-1,994
	Dispatchable Peak Shaving Potential - Net Total kW	1,916	1,913
	Planned Demand	2,664	2,664
	% Toward Planned Total	72%	72%
Program Performance	\$Admin. per Participant (Gross)	\$20	\$19
	\$Admin. per kW (Gross)	\$32	\$32
	\$EM&V per Total Costs (\$)	2%	2%
	\$Rebate per Participant (Gross)	\$170	\$190

Table 6-6. Disposition from Cumulative and Net Participants, and Peak Shaving Potential (kW) (through December 31, 2019)

Reduction Factor to Participants/Savings	Participants		Peak Shaving Potential (kW)	
	Virginia	North Carolina	Virginia	North Carolina
Cumulative Total	154,787	6,247	96,895	3,911
Reduction for Disenrollment	-79,401	-3,186	-49,704	-1,994
Net Total	74,987	3,061	46,941	1,913

Table 6-7. 2019 AC Cycling Ex Post Impacts by Event-Day and Hour (Jun 25–Jul 29)

Event Date	25-Jun	26-Jun	27-Jun	28-Jun	2-Jul	3-Jul	12-Jul	16-Jul	17-Jul	18-Jul	19-Jul	22-Jul	29-Jul
Consecutive Event-days	1	2	3	4	1	2	1	1	2	3	4	1	1
Opt Out Percentage	0.00%	0.02%	0.02%	0.05%	0.03%	0.03%	0.01%	0.02%	0.02%	0.02%	0.04%	0.02%	0.00%
Temperature Humidity Index	81	80	82	83	83	84	84	85	85	85	85	85	83
Daily High Temperature	89	93	95	92	95	97	90	93	97	95	94	97	94
15:00												0.56	
16:00			0.50	0.65		0.63		0.64	0.68	0.58	0.61	0.71	0.56
17:00	0.51	0.52	0.54	0.67	0.49	0.68	0.52	0.73	0.70	0.61	0.76	0.72	0.63
18:00	0.49	0.51	0.57	0.57	0.60	0.72	0.51	0.69	0.71	0.63	0.69		0.55
19:00		0.48			0.64			0.70					
Average Event Impact (kW)	0.50	0.50	0.54	0.63	0.58	0.68	0.52	0.69	0.70	0.60	0.69	0.66	0.58

Table 6-8. 2019 AC Cycling Impacts by Event-day and Hour (Jul 30–Oct 2)

Event Date	30-Jul	6-Aug	8-Aug	19-Aug	20-Aug	21-Aug	22-Aug	11-Sep	12-Sep	2-Oct
Consecutive Event-days	2	1	1	1	2	3	4	1	2	1
Opt-Out Percentage	0.00%	0.00%	0.01%	0.02%	0.01%	0.01%	0.01%	0.01%	0.03%	0.00%
Temperature Humidity Index	83	81	82	85	85	83	85	84	84	83
Daily High Temperature	94	88	92	97	95	90	95	94	97	97
15:00										0.43
16:00	0.36	0.46	0.42	0.68	0.66	0.42	0.55		0.52	0.52
17:00	0.66	0.45	0.45	0.76	0.71	0.49	0.66	0.51	0.59	
18:00	0.56	0.46	0.43	0.73	0.70	0.48	0.61	0.53	0.54	
19:00										
Average Event Impact (kW)	0.53	0.46	0.43	0.72	0.69	0.46	0.60	0.52	0.55	0.48

6.2 Non-residential Distributed Generation – Virginia

Virginia

Case #: PUE-2016-00111

NON-RESIDENTIAL DISTRIBUTED GENERATION

PROGRAM STARTED IN 2013
6.13 MW Enrolled with 113% Realization Rate in 2019

Eligibility

- Large non-residential customers with at least 200 kW of dispatchable generation.
- One participant is defined as 1 megawatt (MW) of enrolled capacity. A participating site may be counted as a fraction or more than one participant depending on enrolled generation.

Events

- When electric demand is high, DG sites operate backup generators to reduce load on the system.
- 25 events were called in 2019 – 23 in summer (April-September) and 2 in winter (October-March).



21 sites enrolled 6.13 MW, achieving 81% of planned



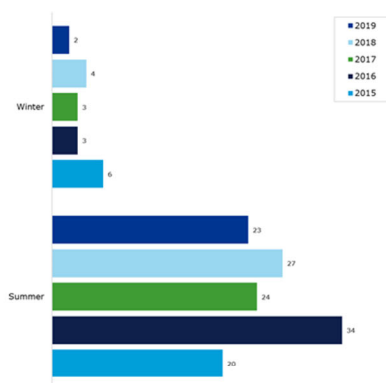
Achieved overall annual realization rate of 113%



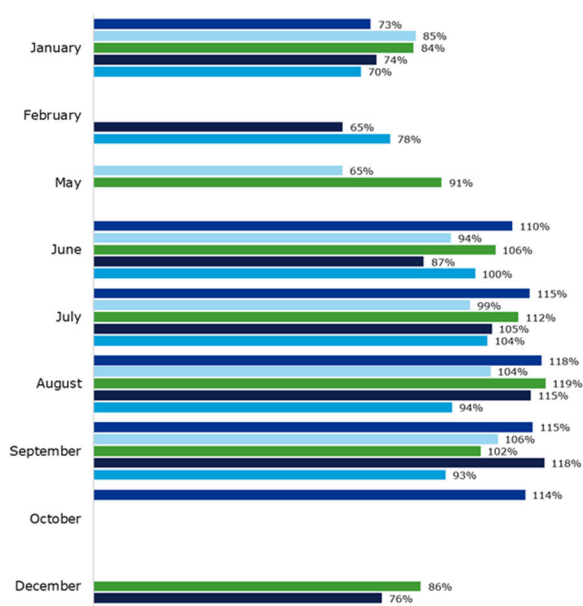
Spent 46% of planned expenditures

Category	2015	2016	2017	2018	2019
Total Program Cost (\$)	538,023	572,348	561,690	557,961	589,631
Total Program Participants (MW)	5.9	6.5	6.1	6.1	6.1
Total Demand Savings (kW)	5,875	5,740	5,548	6,130	6,130
Realization Rate (%)	93%	106%	108%	97%	113%

NUMBER OF EVENT DAYS
BY SEASON AND YEAR



REALIZATION RATE BY MONTH
MEASURED GENERATION / DISPATCHED GENERATION



6.2.1 Program Description

The DSM Phase II Non-residential DG program, marketed as the Commercial DG Program, provides qualifying customers with an incentive to curtail load by operating backup generation upon request. The program is implemented by a contractor who is responsible for enabling remote operation and monitoring the customer's power generators, and for dispatching load during curtailment events under the direction of the Company.

Non-residential customers with existing on-site generation capacity of at least 200 kW are eligible for the program. Each customer site commits to a targeted level of dispatchable power (kW) to be available to the Company for a total of up to 120 hours per year. The Company requests the implementation contractor to dispatch load up to 30 minutes prior to a curtailment event. The dispatched power is measured at each generator and compared against the site's enrolled commitment. The Company has the right to adjust the incentive amount based on evaluated performance if a site's dispatched load is less than 95% of its enrolled load.

The Non-residential DG Pilot was approved in January 2008, and the Non-residential DG Program was approved in 2012. When the program was approved in 2012, 19 of 27 pilot sites transitioned to the program. The remaining eight sites continued to participate in the pilot until it ended on December 31, 2014. In 2019, 21 enrolled sites participated in the program. Through the end of 2014, the pilot and program participants were evaluated together.

6.2.2 Methods for the Current Reporting Period

The evaluation methodology is defined by the DNV GL Energy Standard Tracking and Engineering Protocols (STEP) Manual and has remained consistent over the program's history. Program tracking and metered power production data are delivered to DNV GL, and reviewed upon receipt for quality, and the impact evaluation is conducted at the end of each calendar year.


Table 6-9 below outlines the Non-residential DG program planning assumptions which are compared against actual program performance in Section 6.2.5.

Table 6-9. Non-residential DG Program Planning Assumptions

Assumption	Value
Target Market	Non-residential customers with at least 200 kW of backup generation.
Participant Definition	1 participant=1,000 kW of enrolled generation. A site with 250 kW of generation has a participant value of 0.25.
NTG Factor	100%
Measure Life (years)	N/A
Average Demand Reduction (kW) per Participant	1,000 kW

6.2.3 STEP Manual Computation of Demand Reduction

The STEP Manual defines the methodology used to estimate demand reduction. The key performance indicator for the Non-residential DG program is measured kW generated during dispatch events. Power generation is measured at the participant site level, which is defined as an installed generator.



Site-level realization rates are created by comparing measured generation (kW) to the dispatched generation (kW). Realization rates are calculated for each participant site by event-hour and aggregated to the event and program level.

6.2.4 Impact Analysis of 2019 Dispatch Events

The Non-residential DG Program is evaluated annually using metered power production data to verify event based dispatched load. Summary results from the 2019 impact evaluation are presented in section 6.2.5.1. The complete 2019 impact evaluation results are presented in Appendix S-1. The objectives for the Non-residential DG impact evaluation are:

- to compute aggregate kW of load curtailment for one-hour intervals on each event day
- to compute realization rates for the Non-residential DG program comparing actual load curtailed to dispatched load
- to describe trends across event intervals related to program performance versus planned assumptions and to identify issues that should be addressed in program operation

6.2.5 Assessment of Program Progress Towards Plan

Table 6-10 below summarizes the annual progress towards plan for key program performance indicators in Virginia. The shaded cells are considered extraordinarily sensitive information. Detailed program indicators by month in 2019 are available in Appendix S-1. Detailed indicators by year and month are provided in Appendix A.16. Cumulative net reduction (kW) by year and month can be found in Appendix D.11.

Table 6-10. Virginia Non-residential Distributed Generation Program Performance Indicators (2012–2019)

Category	Item	2018	2019	Program Total (2012-2019)
Operations and Management Costs (\$)	Direct Rebate			
	Direct Implementation			
	Direct EM&V			
	Indirect Other (Administrative)	\$31,507	\$26,331	\$281,697
Total Costs (\$)	Total	\$557,961	\$589,631	\$5,106,245
	Planned	\$874,549	\$909,830	\$11,049,268
	Variance	-\$316,588	\$320,199	-\$5,302,626
	Cumulative % of Planned	64%	65%	46%
Participants	Total (Cumulative @ End of Month)	6.13	6.13	6.13
	Planned	8.15	7.59	7.59
	Variance	-2.02	-1.5	-1.5
	% Toward Planned Total (Net basis)	75%	81%	81%
kW Potential	Total (Cumulative @ End of Month)	6,130	6,130	6,130
	Realization Rate	97%	113%	113%
	Net kW	5,946	6,927	6,927
	Planned	8,149	7,592	7,592
	% Toward Planned Total (Net basis)	73%	91%	91%
	Avg. per Net Participant (Net kW)	970	1,130	892
Program Performance	\$Admin. per Participant (Gross)	\$5,140	\$4,295	\$4,295
	\$Admin. per kW (Gross)	\$5	\$4	\$4
	\$EM&V per Total Costs (\$)	13%	13%	13%
	\$Rebate per Participant (Gross)	\$577,089	\$651,772	\$651,772

6.2.5.1 Cumulative Indicators Over Time vs. Planned - Virginia

The total and average dispatched generation during the 2019 winter and summer event intervals ranged from 5,950 kW to 6,130 in winter (2 events) and between 320 and 6,130 in summer (23 events). The fully enrolled program capacity is 6,130 kW.

The average realization rates for winter and summer are provided in Table 6-11 and Table 6-12. Both show measured generation as a percentage of the dispatched generation for each event interval.

One of the winter event days met the 95% realization rate target (Table 6-11). This event was called on October 2. Lasting six hours, it was the longest event of the year. Although it was called during the winter season, this event performed more like a summer event than a typical winter event. It was called in the afternoon presumably as load associated with air conditioning approached a peak. Typical winter events are shorter and often occur in the morning (e.g., the January 31 event lasted two hours and ended at 8 a.m.).

22 of 23 summer event days (96%) met or exceeded the 95% target (Table 6-12). The highest performing summer event day occurred July 22, generating 131% of the dispatched load on that day. The lowest performing summer event day occurred on July 19, yielding a realization rate of 85%. Average realization rates that meet or exceed the 95% target are bolded in Table 6-11 and Table 6-12.

Table 6-11. 2019 Realization Rates by Event Day and Hour Ending-Winter

Realization Rate by Event Day and Hour Ending-Winter									
Hour Ending									
Event Day	7	8	14	15	16	17	18	19	Average
31-Jan-19	66%	79%							73%
2-Oct-19			116%	117%	114%	111%	110%	113%	114%

Table 6-12. 2019 Realization Rates by Event Day and Hour Ending-Summer

Realization Rate by Event Day and Hour Ending-Summer						
Hour Ending						
Event Day	15	16	17	18	19	Average
25-Jun-19			113%	113%		113%
26-Jun-19			108%	109%	108%	108%
27-Jun-19		110%	115%	109%		111%
28-Jun-19		111%	105%	103%		106%
29-Jun-19		114%	114%	112%		113%
2-Jul-19			115%	115%	113%	114%
3-Jul-19		122%	122%	120%	42%	101%
12-Jul-19			115%	110%		113%
15-Jul-19			108%	108%	107%	108%
16-Jul-19		119%	117%	115%	115%	117%
17-Jul-19		123%	122%	121%		122%
18-Jul-19		131%	129%	129%		130%
19-Jul-19		85%	85%	85%		85%
22-Jul-19	131%	131%	131%			131%

29-Jul-19	124%	117%	110%	117%
30-Jul-19	111%	114%	115%	113%
6-Aug-19	112%	112%	113%	112%
8-Aug-19	114%	113%	111%	113%
19-Aug-19	119%	120%	123%	121%
20-Aug-19	127%	123%	119%	123%
21-Aug-19	116%	116%	117%	116%
22-Aug-19	124%	121%	119%	121%
12-Sep-19	117%	115%	115%	115%

Table 6-13 and Table 6-14 show the average realization rates by participant site for each event day. Each site is assigned a unique identifier. If a participant site was not dispatched during an event, the corresponding cell is blank. Realization rates greater than or equal to 95% are highlighted green, less than 95% and greater than or equal to 50% are purple and rates less than 50% are highlighted in red.

Site IDs 8, 9, 10, 11, 13, and 20 met or exceeded the 95% target in every 2019 event. Table 6-15 shows the monthly average realization rate for each site. Ten sites achieved or exceeded the program target of 95% every month. Site 5 was the only site that did not reach the target of 95% in any month.

Table 6-13. Average Realization Rates by Site and Event Day (January 1-July 30, 2019)

Site ID	Jan			June							July								
	1	2	3	25	26	27	28	29	2	3	12	15	16	17	18	19	22	29	30
1	44%	88%	83%	83%	92%	89%	97%	90%	98%	96%	83%	99%	104%			0%			94%
2	57%	98%	102%	104%	104%	101%	105%	105%	107%	103%	103%	107%	107%	105%	109%	109%	112%	107%	106%
3	70%	104%	103%	118%	112%	118%	117%	116%	116%	114%	115%	119%	119%	117%	117%	117%	119%	52%	119%
4	49%	98%	100%	109%	109%	93%	110%	105%	111%	107%	106%	110%	109%	110%	112%	112%	102%	104%	104%
5	50%			84%	85%	85%	85%	83%	82%	85%	92%	88%	94%	94%	94%	93%	98%	80%	92%
6	62%	114%	110%	117%	117%	117%	118%		122%	116%	112%	113%	124%	124%	112%	115%	120%	114%	115%
7	71%		102%	114%	114%	117%	119%	117%	118%	115%	115%	113%	124%	124%	120%	121%	126%	113%	105%
8	132%	126%	128%	133%	118%	137%	137%	135%	143%	139%	135%	147%	144%	144%	138%	140%	146%	138%	138%
9	129%	106%	101%	104%	113%	110%	110%	106%	120%	109%	106%	104%	119%	135%	134%	138%	140%	139%	139%
10	132%	129%	120%	123%	128%	132%	132%	125%	127%	127%	135%	139%	134%	130%	139%	139%	133%	127%	126%
11	168%	221%	221%	232%	229%	238%	238%	237%	242%	227%	220%	214%	241%	241%	241%	235%	244%	234%	224%
12	78%	93%	91%	98%	94%	103%	103%	100%	104%	97%	97%	100%	106%	106%	105%	102%	99%	94%	94%
13	114%	136%	137%	142%	134%	141%	141%	143%	150%	138%	140%	142%	142%	141%	146%	146%	148%	142%	140%
14	97%	93%	96%	102%	103%	103%	93%	100%	105%	98%	99%	101%	111%	110%	114%	105%	105%	106%	106%
15	90%	121%	121%	131%	101%	148%	148%	156%	159%	151%		157%	135%	144%	159%	151%	136%	134%	134%
16	77%		81%	95%	92%	95%	95%	95%	100%	97%	95%	92%	115%	106%	106%	115%	104%	103%	103%
17	51%	94%	90%	93%	103%	103%	103%	104%	107%		98%	97%	104%	104%	103%	108%	102%	102%	102%
18	109%	162%	153%	160%	157%	146%	146%		148%	74%			168%	166%			73%		
19	144%	237%	230%	242%	242%	242%		244%	250%	255%	242%	240%							129%
20	114%	201%	193%	204%	199%	212%	212%	214%	220%	214%	209%	200%	217%	218%	208%	222%	201%	198%	198%
21		179%	182%	67%	0%			193%	199%			190%	206%	199%	197%	202%	194%	190%	190%

Legend
> 95%
< 95% ≥50%
< 50%
No event called

Table 6-14. Average Realization Rates by Site and Event Day (August 6-October 2, 2019)

Site ID	August			September					October	
	6	8	19	20	21	22	12	2	2	
1	96%	93%	107%	109%	100%	108%	101%	94%		
2	104%	103%	110%	105%	109%	108%	110%	110%		
3	113%	108%	109%	105%	107%	112%	109%	108%		
4	103%	103%	115%	112%	111%	110%	112%	111%		
5	88%	90%	93%	91%	87%	91%	0%	88%		
6	110%	110%	50%	115%	105%	107%	114%	110%		
7	117%	117%	122%	118%	115%	117%	118%	121%		
8	138%	133%	144%	146%	133%	142%	138%	136%		
9	115%	115%	124%	133%	132%	116%	128%	120%		
10	126%	121%	134%	131%	131%	130%	133%	134%		
11	223%	236%	243%	236%	228%	238%	237%	232%		
12	95%	90%	101%	103%	99%	94%	103%	94%		
13	141%	125%	140%	135%	135%	139%	138%	129%		
14	103%	103%	106%	97%	101%	103%	107%	102%		
15	144%	131%	156%	150%	131%	149%	155%	120%		
16	93%	97%	107%	103%	92%	105%	99%	95%		
17	98%	102%	106%	107%	101%	104%	103%	108%		
18							136%	128%		
19	238%	246%	257%	254%	250%	253%	250%	147%		
20	197%	198%	204%	214%	190%	211%	196%	211%		
21		185%	205%	199%	190%	198%	192%	187%		

Legend
> 95%
< 95% ≥50%
< 50%
No event called

Table 6-15. Average Realization Rates by Site and Event Month (2019)

Site ID	January	June	July	August	September	October
1	44%	90%	83%	102%	101%	94%
2	57%	102%	106%	107%	110%	110%
3	70%	111%	111%	109%	109%	108%
4	49%	102%	108%	109%	112%	111%
5	50%	85%	89%	90%	0%	88%
6	62%	115%	116%	100%	114%	110%
7	71%	113%	117%	118%	118%	121%
8	132%	129%	140%	139%	138%	136%
9	129%	107%	123%	123%	128%	120%
10	132%	126%	132%	129%	133%	134%
11	168%	229%	232%	234%	237%	232%
12	78%	96%	101%	97%	103%	94%
13	114%	138%	143%	136%	138%	129%
14	97%	98%	105%	102%	107%	102%
15	90%	125%	148%	144%	155%	120%
16	77%	91%	103%	99%	99%	95%
17	51%	97%	103%	103%	103%	108%
18	109%	155%	129%		136%	128%
19	144%	238%	226%	250%	250%	147%
20	114%	202%	211%	202%	196%	211%
21		100%	196%	195%	192%	187%

Legend
> 95%
< 95% ≥ 50%
< 50%
No event called

Table 6-16. Non-residential DG Program 2019 Monthly Average Performance Metrics

2019	Planned (MW)	Enrolled (MW)	Net kW Planned	Net kW Enrolled	Event Days	Average Dispatched (kW)	Average Generation (kW)	Average Realization Rate
Jan	7.59	5.95	7,592	6,130	1	5,950	4,335	73%
Feb			No events					
Mar			No events					
Apr			No events					
May			No events					
Jun	7.59	6.13	7,592	6,130	5	5,883	6,476	110%
Jul	7.59	6.13	7,592	6,130	11	5,202	5,964	115%
Aug	7.59	5.94	7,592	6,130	6	5,910	6,960	118%
Sept	7.59	6.13	7,592	6,130	1	6,130	7,077	115%
Oct	7.59	6.13	7,592	6,130	1	6,130	6,958	114%
Nov			No events					
Dec			No events					

7 CLOSED PROGRAMS

This section provides an overview of the DSM programs that have been closed in Virginia and North Carolina. Their past performance, and savings that are persisting are archived in Appendix A through Appendix D of this report.

1. Residential
 - a. DSM Phase I
 - i. Residential Lighting
 - ii. Residential Low-Income
 - b. DSM Phase II
 - i. Residential Heat Pump Upgrade
 - ii. Residential Heat Pump Tune-up
 - iii. Residential Duct Sealing
 - iv. Residential Home Energy Check-up
 - c. DSM Phase IV
 - i. Residential Appliance Recycling
2. Non-residential
 - a. DSM Phase I
 - i. Commercial Lighting
 - ii. Commercial HVAC
 - b. DSM Phase II
 - i. Non-residential Duct Testing and Sealing
 - ii. Non-residential Energy Audit

7.1 Residential Lighting (DSM Phase I)

The Residential Lighting Program closed in Virginia and North Carolina as originally planned at the end of 2011. In Virginia, it began in May 2010 and concluded on December 31, 2011. The program in North Carolina began in mid-2011 and concluded on December 31, 2011. A summary of key program indicators from program inception through December 2012 is provided in Appendix A.17 (VA) and Appendix B.9 (NC). Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.11, and cumulative net savings are in Appendix D.12.

7.2 Residential Low-Income (DSM Phase I)

In Virginia, the Residential Low-Income program spanned from April 2010 through December 2014. It spanned from April 2010 through December 2015, in North Carolina.

A summary of key program indicators from program inception through December 2015 is provided in Appendix A.18 (VA) and Appendix B.10 (NC). Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.12, and cumulative net savings are in Appendix D.13.

7.3 Residential Heat Pump Upgrade (DSM Phase II)

In Virginia, the Residential Heat Pump Upgrade Program spanned from August 2012 through December 2017. In North Carolina, it spanned from January 2014 through December 2017.

A summary of key program indicators from program inception through December 2017 is provided in Appendix A.19 (VA) and Appendix B.11 (NC). Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.13, and cumulative net savings are in Appendix D.14.

7.4 Residential Heat Pump Tune-up (DSM Phase II)

In Virginia, the Residential Heat Pump Tune-up Program spanned from August 2012 to December 31, 2017. It spanned from January 2014 to December 31, 2017, in North Carolina.

A summary of key program indicators from program inception through December 2017 is provided in Appendix A.20 (VA) and Appendix B.12 (NC). Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.14, and cumulative net savings are in Appendix D.15.

7.5 Residential Duct Sealing (DSM Phase II)

In Virginia, the Residential Duct Sealing program spanned from August 2012 through December 31, 2017. It spanned from January 1, 2015 through December 31, 2017, in North Carolina.

A summary of key program indicators from program inception through December 2017 is provided in Appendix A.21 (VA) and Appendix B.13 (NC). Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.15, and cumulative net savings are in Appendix D.16.

7.6 Residential Home Energy Check-up (DSM Phase II)

In Virginia, the Residential Home Energy Check-up Program spanned from August 1, 2012 through December 31, 2017. It spanned from February 1, 2015 through December 31, 2017, in North Carolina.

A summary of key program indicators from program inception through December 2017 is provided in Appendix A.22 (VA) and Appendix B.14 (NC). Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.16, and cumulative net savings are in Appendix D.17.

7.7 Residential Appliance Recycling (DSM Phase IV)

The Residential Appliance Recycling Program was only available in Virginia. It spanned from July 2015 to December 2017, with program spending lagging through to 2018 for program wrap-up activities.

A summary of key program indicators from program inception through December 2017 is provided in Appendix A.23 (VA). Cumulative savings (kWh and kW) by year and month can be found in Appendix C.17, and cumulative net savings are in Appendix D.18.

7.8 Commercial Lighting (DSM Phase I)

In Virginia, the Commercial Lighting Program spanned from May 2010 through December 2012. It spanned from December 2011 through December 2012, in North Carolina.

A summary of key program indicators from program inception through December 2012 is provided in Appendix A.24 (VA) and Appendix B.15 (NC). Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.19, and cumulative net savings are in Appendix D.20.

7.9 Commercial HVAC Upgrade (Virginia & North Carolina) (DSM Phase I)

In Virginia, the Commercial HVAC Program spanned from July 2010 through December 2012. It spanned from January 2012 through December 2012, in North Carolina.

A summary of key program indicators from program inception through December 2012 is provided in Appendix A.25 (VA) and Appendix B.16 (NC). Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.20, and cumulative net savings are in Appendix D.21.

7.10 Non-residential Duct Testing and Sealing – Virginia and North Carolina (DSM Phase II)

In Virginia, the Non-residential Duct Testing and Sealing Program spanned from July 1, 2012 through February 28, 2017. It spanned from April 1, 2014 through February 28, 2017, in North Carolina.

A summary of key program indicators from program inception through December 2017 is provided in Appendix A.26 (VA) and Appendix B.17 (NC). Cumulative savings (kWh and kW) by year and month can be found in Appendix C.21, and cumulative net savings are in Appendix D.22.

7.11 Non-residential Energy Audit (DSM Phase II)

In Virginia, the Non-residential Energy Audit Program spanned from July 1, 2012 through February 28, 2017. It spanned from January 1, 2014 through February 28, 2017, in North Carolina.

A summary of key program indicators from program inception through December 2017 is provided in Appendix A.27 (VA) and Appendix B.18 (NC). Cumulative gross savings (kWh and kW) by year and month can be found in Appendix C.22, and cumulative net savings are in Appendix D.23.




Appendix A. Program Performance Indicator Tables for Virginia Programs 2010–2019

A.1 Virginia Residential Income and Age Qualifying Home Improvement Program 2015-2019

A.1.1 2015-2019 VA Residential Income and Age Qualifying Home Improvement Annual Indicator Tables

VA- Residential Income and Age Qualifying Home Improvement Program		2015	2016	2017	2018	2019	2018-2019	2015-2019
Category	Indicator	Total	Total	Total ²	Total	Total	Extension Total	Program Total
O&M(\$)	Direct Rebate							
O&M(\$)	Direct Implementation							
O&M(\$)	Direct EM&V							
O&M(\$)	Indirect Other (Administrative)	\$48,256	\$191,950	\$199,872	\$80,889	\$166,845	\$247,733	\$687,812
Costs (\$)	Total	\$2,069,822	\$6,315,785	\$5,079,529	\$1,432,463	\$4,050,714	\$5,483,177	\$18,948,312
Costs (\$)	Planned	\$3,056,782	\$5,856,409	\$4,648,601	\$2,371,260	\$4,192,450	\$6,563,710	\$20,125,502
Costs (\$)	Variance	-\$986,960	\$459,376	\$430,927	-\$938,797	-\$141,736	-\$1,080,533	-\$1,177,190
	Annual % of Planned	68%	108%	109%	60%	97%	84%	94%
Participants ¹	Total (Gross)	1,523	8,403	5,970	1,141	5,897	7,038	22,934
	Planned (Gross)	1,849	3,843	3,846	2,000	4,218	6,218	15,756
	Variance	-326	4,560	2,124	-859	1,679	820	7,178
	Annual % of Planned (Gross)	82%	219%	155%	57%	140%	113%	146%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	984,230	3,575,492	2,431,737	447,775	1,453,805	1,901,580	8,893,039
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	984,230	3,575,492	2,431,737	447,775	1,453,805	1,901,580	8,893,039
80%	Net-To-Gross Adjustment (kWh/yr)	-196,846	-715,098	-486,347	-89,555	-290,761	-380,316	-1,778,608
	Net Adjusted Savings (kWh/yr)	787,384	2,860,394	1,945,390	358,220	1,163,044	1,521,264	7,114,432
	Planned Net Savings (kWh/yr)	1,810,380	998,136	765,945	175,247	728,300	903,547	4,478,008
	Annual % Toward Planned Net Savings (kWh)	43%	287%	254%	204%	160%	168%	159%
	Avg. Gross Savings Per Participant (kWh/yr)	646	426	407	392	247	270	388
	Avg. Net Savings Per Participant (kWh/yr)	517	340	326	314	197	216	310
Installed kW	Total Gross Demand Reduction (kW)	80.2	398.0	228.1	34.9	229.3	264.2	970.4
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	80.2	398.0	228.1	34.9	229.3	264.2	970.4
80%	Net-To-Gross Adjustment (kW)	-16.0	-79.6	-45.6	-7.0	-45.9	-52.8	-194.1
	Net Adjusted Demand Reduction (kW)	64.1	318.4	182.5	27.9	183.4	211.3	776.3
	Planned Net Demand Reduction (kW)	415.0	217.7	170.2	0.0	75.6	75.6	878.5
	Annual % Toward Planned Net Reduction (kW)	15%	146%	107%	N/A	243%	280%	88%
	Avg. Gross Demand Reduction Per Participant (kW)	0.05	0.05	0.04	0.03	0.04	0.04	0.04
	Avg. Net Demand Reduction Per Participant (kW)	0.04	0.04	0.03	0.02	0.03	0.03	0.03
Program Performance	Annual \$Admin. per Participant (Gross)	\$32	\$23	\$33	\$71	\$28	\$35	\$30
	Annual \$Admin. per kWh/year (Gross)	\$0.05	\$0.05	\$0.08	\$0.18	\$0.11	\$0.13	\$0.08
	Annual \$Admin. per kW (Gross)	\$602	\$482	\$876	\$2,318	\$728	\$938	\$709
	Annual \$EM&V per \$ Total	0.6%	1.4%	2.3%	6.8%	2.4%	3.5%	2.2%
	Annual \$Rebate per Participant (Gross)	\$582	\$612	\$644	\$626	\$518	\$536	\$595

CONFIDENTIAL INFORMATION REDACTED

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1. A participant is a unique account that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.
 2. The 2017 total gross deemed savings values reported in this table include adjustments of 12183 kWh/year and -1.1 kW made to the January 2017 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017. Specifically, the correction was in section 2.1.5 for "Low-Flow Showerhead" measures, to the " ΔT " variable, which is a measure of the change in temperature of the water used for shower and temperature entering the house ($\Delta T = T_{\text{shower}} - T_{\text{in house}}$). STEP Manual 7.0.0 reported the value as 44.9°F, but has been corrected to 44.1°F. This correction is reflected in STEP Manual version 8.0.0 in this EM&V report.

A.1.2 2019 VA Residential Income and Age Qualifying Home Improvement Monthly Indicator Tables

VA- Residential Income and Age Qualifying Home Improvement Program Category	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2015-2019 Program Total
Direct Rebate														
Direct Implementation	\$8,373	\$2,435	\$2,780	\$21,586	\$12,973	\$22,945	\$6,060	\$9,043	\$15,849	\$20,614	\$17,930	\$29,256	\$166,845	\$687,812
Direct EM&V														
Indirect Other (Administrative)														
Costs (\$)	\$89,077	\$40,368	\$46,688	\$37,882	\$215,073	\$380,407	\$179,310	\$267,564	\$468,939	\$609,898	\$530,500	\$865,608	\$4,050,714	\$18,948,312
Costs (\$)	\$358,761	\$358,761	\$358,761	\$358,761	\$358,761	\$358,761	\$358,761	\$358,761	\$358,761	\$358,761	\$358,761	\$358,761	\$358,761	\$3,399,980
Costs (\$)	\$269,684	\$318,393	\$312,673	\$880	\$143,688	\$21,646	-\$160,670	-\$72,417	\$128,959	\$269,918	\$190,520	\$525,627	-\$141,736	\$20,125,502
Variance	2%	3%	4%	15%	18%	27%	31%	38%	49%	63%	76%	97%	97%	94%
Annual % of Planned														
Participants¹	76	16	16	615	724	293	293	435	564	869	1,024	1,024	5,897	22,934
Planned (Gross)	352	352	352	352	352	352	351	351	351	351	351	351	4,218	15,756
Variance	-2.76	-3.36	-3.36	-2.63	-1.33	3.82	-58	84	213	518	685	673	1,679	7,178
Annual % of Planned (Gross)	2%	2%	3%	17%	22%	40%	47%	57%	70%	91%	116%	140%	140%	146%
Installed kWh/year	23,329	3,540	4,942	123,072	58,769	179,310	65,144	128,090	128,469	243,219	234,810	261,111	1,453,805	8,893,039
100%	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Realization Rate Adjustment (kWh/yr)	23,329	3,540	4,942	123,072	58,769	179,310	65,144	128,090	128,469	243,219	234,810	261,111	1,453,805	8,893,039
80%	-4,666	-708	-988	-24,614	-11,754	-33,862	-13,029	-25,618	-25,694	-48,644	-46,962	-53,222	-2,907,61	-1,778,608
Net-To-Gross Adjustment (kWh/yr)	18,663	2,832	3,953	98,457	47,015	145,448	52,115	102,472	102,775	194,575	187,848	208,889	1,163,044	7,114,432
Planned Net Savings (kWh/yr)	60,692	60,692	60,692	60,692	60,692	60,692	60,692	60,692	60,692	60,692	60,692	60,692	728,300	4,478,008
Annual % Toward Planned Net Savings (kWh)	3%	3%	3%	17%	23%	43%	50%	64%	79%	105%	131%	160%	160%	159%
Avg. Gross Savings Per Participant (kWh/yr)	307	221	309	200	268	244	222	294	228	280	227	255	247	388
Avg. Net Savings Per Participant (kWh/yr)	246	177	247	160	215	195	178	236	182	224	181	204	197	310
Installed kW	3.0	0.4	0.7	26.1	9.4	20.9	8.1	25.7	17.8	35.2	33.1	48.9	229.3	970.4
100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Realization Rate Adjustment (kW)	3.0	0.4	0.7	26.1	9.4	20.9	8.1	25.7	17.8	35.2	33.1	48.9	229.3	970.4
80%	-0.6	-0.1	-0.1	-5.2	-1.9	-4.2	-1.6	-5.1	-3.6	-7.0	-6.6	-9.8	-45.9	-194.1
Net Adjusted Demand Reduction (kW)	2.4	0.3	0.6	20.9	7.5	16.7	6.5	20.6	14.3	28.2	26.5	39.1	183.4	776.3
Planned Net Demand Reduction (kW)	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	75.6	878.5
Annual % Demand Reduction Per Participant (kW)	3%	4%	4%	32%	42%	64%	73%	100%	119%	156%	191%	243%	243%	88%
Avg. Gross Demand Reduction Per Participant (kW)	0.04	0.03	0.04	0.04	0.04	0.03	0.03	0.06	0.03	0.04	0.03	0.05	0.04	0.04
Avg. Net Demand Reduction Per Participant (kW)	0.03	0.02	0.04	0.03	0.03	0.02	0.02	0.05	0.03	0.03	0.03	0.04	0.03	0.03
Annual \$ Admin. per Participant (Gross)	\$71	\$85	\$98	\$45	\$48	\$41	\$38	\$35	\$33	\$31	\$28	\$28	\$28	\$30
Annual \$ Admin. per kWh/year (Gross)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.08
Annual \$ Admin. per kW (Gross)	\$1,820	\$2,312	\$2,991	\$1,067	\$1,141	\$1,127	\$1,083	\$883	\$884	\$813	\$763	\$728	\$728	\$709
Annual \$ EM&V per \$ Total	0.0%	3.1%	4.5%	1.5%	1.9%	2.3%	2.0%	2.6%	2.6%	2.2%	2.3%	2.4%	2.4%	2.2%
Annual \$ Rebate per Participant (Gross)	\$684	\$630	\$650	\$481	\$529	\$467	\$466	\$461	\$495	\$509	\$486	\$518	\$518	\$595

1. A participant is a unique account that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.

A.2 Virginia Residential Appliance Recycling Program 2019

A.2.1 2019 VA Residential Appliance Recycling Program Monthly Indicator Tables

VA- Residential Appliance Recycling Program		2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Category	Indicator	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Total	
O&M (\$)	Direct Rebate														
O&M (\$)	Direct Implementation														
O&M (\$)	Direct EM&V														
O&M (\$)	Indirect Other (Administrative)	\$0	\$0	\$0	\$0	\$0	\$0	\$159	\$312	\$2,943	\$3,645	\$3,673	\$2,276	\$13,009	
Capital (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Costs (\$)	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$4,697	\$9,233	\$87,087	\$107,846	\$108,680	\$67,342	\$384,884	
Costs (\$)	Planned	\$0	\$0	\$0	\$0	\$0	\$0	\$182,445	\$182,445	\$182,445	\$182,445	\$182,445	\$182,445	\$1,094,670	
Costs (\$)	Variance	\$0	\$0	\$0	\$0	\$0	\$0	-\$177,748	-\$173,212	-\$95,358	-\$74,599	-\$73,765	-\$115,103	-\$709,785	
	Annual % of Planned	0%	0%	0%	0%	0%	0%	0%	1%	9%	19%	29%	35%	35%	
Participants ¹	Total (Gross)	0	0	0	0	0	0	0	0	252	656	424	247	1,579	
	Planned (Gross)	435	435	435	435	435	435	435	436	436	436	436	436	5,225	
	Variance	-435	-435	-435	-435	-435	-435	-435	-436	-184	220	-12	-189	-3,646	
	Annual % of Planned (Gross)	0%	0%	0%	0%	0%	0%	0%	0%	5%	17%	25%	30%	30%	
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	0	0	0	0	0	0	0	185,483	484,720	375,901	209,409	1,255,513	
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	185,483	484,720	375,901	209,409	1,255,513	
60%	Net-To-Gross Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	-74,193	-193,888	-150,360	-83,764	-502,205	
	Net Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	111,290	290,832	225,541	125,645	753,308	
	Planned Net Savings (kWh/yr)	53,738	53,738	53,738	53,738	53,738	53,738	53,738	53,738	53,738	53,738	53,738	53,738	644,850	
	Annual % Toward Planned Net Savings (kWh)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	17.26%	62.36%	97.33%	116.82%	116.82%	
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	736	739	887	848	795	
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	442	443	532	509	477	
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.8	72.6	56.3	31.3	187.9	
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.8	72.6	56.3	31.3	187.9	
60%	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-11.1	-29.0	-22.5	-12.5	-75.2	
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	43.5	33.8	18.8	112.8	
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.1	0.1	0.13	0.12	
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1	0.1	0.1	0.08	0.07	
Program Performance	Annual \$Admin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$14	\$8	\$8	\$8	\$8	
	Annual \$Admin. per kWh/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0	\$0	\$0	\$0	\$0	
	Annual \$Admin. per kW (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$123	\$70	\$69	\$69	\$69	
	Annual SEM&V per \$Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0%	8%	12%	8%	7%	7%	
	Annual \$Rebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$20	\$20	\$20	\$20	\$20	

1. A participant is a unique account number.

A.3 Virginia Residential Efficiency Products Marketplace Program 2019

A.3.1 2019 VA Residential Efficiency Products Marketplace Monthly Indicator Tables

VA- Residential Efficient Products Marketplace		2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Category	Indicator	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Total
O&M (\$)	Direct Rebate													
O&M (\$)	Direct Implementation													
O&M (\$)	Direct EM&V													
O&M (\$)	Indirect Other (Administrative)	\$0	\$0	\$0	\$0	\$0	\$0	\$42	\$962	\$31,616	\$35,807	\$55,107	\$33,157	\$156,691
Capital (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Costs (\$)	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$1,233	\$28,462	\$935,440	\$1,059,427	\$1,630,472	\$981,016	\$4,636,049
Costs (\$)	Planned	\$0	\$0	\$0	\$0	\$0	\$0	\$1,143,482	\$1,143,482	\$1,143,482	\$1,143,482	\$1,143,482	\$1,143,482	\$6,860,889
Costs (\$)	Variance	\$0	\$0	\$0	\$0	\$0	\$0	-\$1,142,249	-\$1,115,020	-\$208,041	-\$84,055	\$486,990	-\$162,466	-\$2,224,840
	Annual % of Planned	0%	0%	0%	0%	0%	0%	0%	0%	14%	30%	53%	68%	68%
Participants ¹	Total (Gross)	0	0	0	0	0	0	0	145,184	484,071	593,243	640,871	643,896	2,507,265
	Planned (Gross)	247,706	247,706	247,706	247,706	247,706	247,706	247,706	247,706	247,706	247,707	247,707	247,707	2,972,475
	Variance	-247,706	-247,706	-247,706	-247,706	-247,706	-247,706	-247,706	-102,522	236,365	345,536	393,164	396,189	-465,210
	Annual % of Planned (Gross)	0%	0%	0%	0%	0%	0%	0%	5%	21%	41%	63%	84%	84%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	0	0	0	0	0	0	4,402,629	14,591,711	16,830,194	18,519,170	18,663,857	73,007,561
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	4,402,629	14,591,711	16,830,194	18,519,170	18,663,857	73,007,561
70%	Net-To-Gross Adjustment (kWh/yr)	0	0	0	0	0	0	0	-1,320,789	-4,377,513	-5,049,058	-5,555,751	-5,599,157	-21,902,268
	Net Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	3,081,840	10,214,198	11,781,136	12,963,419	13,064,700	51,105,293
	Planned Net Savings (kWh/yr)	1,341,524	1,341,524	1,341,524	1,341,524	1,341,524	1,341,524	1,341,524	1,341,524	1,341,524	1,341,524	1,341,524	1,341,524	16,098,286
	Annual % Toward Planned Net Savings (kWh)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	19.14%	82.59%	155.78%	236.30%	317.46%	317.46%
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	30	30	28	29	29	29
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21	21	20	20	20	20
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	402.8	1,334.9	1,539.7	1,694.2	1,707.5	6,679.1
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	402.8	1,334.9	1,539.7	1,694.2	1,707.5	6,679.1
70%	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-120.8	-400.5	-461.9	-508.3	-512.2	-2,003.7
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	281.9	934.4	1,077.8	1,186.0	1,195.2	4,675.4
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.0	0.0	0.0
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.0	0.0	0.0
Program Performance	Annual SAdmin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0	\$0	\$0	\$0	\$0	\$0.06
	Annual SAdmin. per kWh/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0	\$0	\$0	\$0	\$0	\$0.00
	Annual SAdmin. per kW (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$2	\$19	\$21	\$25	\$23	\$23
	Annual SEM&V per \$Total	N/A	N/A	N/A	N/A	N/A	N/A	0%	68%	5%	3%	2%	2%	1.9%
	Annual \$Rebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0	\$1	\$1	\$1	\$1	\$1.24

1. A participant is a unique account number.

A.4 Virginia Residential Home Energy Assessment Program 2019

A.4.1 2019 VA Residential Home Energy Assessment Program Monthly Indicator Tables

VA- Residential Home Assessment		2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Category	Indicator	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Total
O&M (\$)	Direct Rebate													
O&M (\$)	Direct Implementation													
O&M (\$)	Direct EM&V													
O&M (\$)	Indirect Other (Administrative)	\$0	\$0	\$0	\$0	\$0	\$0	\$63	\$81	\$6,411	\$5,549	\$5,473	\$6,594	\$24,171
Capital (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Costs (\$)	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$1,859	\$2,407	\$189,684	\$164,171	\$161,935	\$195,089	\$715,145
Costs (\$)	Planned	\$0	\$0	\$0	\$0	\$0	\$0	\$387,772	\$387,772	\$387,772	\$387,772	\$387,772	\$387,772	\$2,326,635
Costs (\$)	Variance	\$0	\$0	\$0	\$0	\$0	\$0	-\$385,913	-\$385,365	-\$198,088	-\$223,602	-\$225,838	-\$192,683	-\$1,611,489
	Annual % of Planned	0%	0%	0%	0%	0%	0%	0%	0%	8%	15%	22%	31%	31%
Participants ¹	Total (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planned (Gross)	919	919	919	919	919	919	919	919	919	919	920	920	11,030
	Variance	-919	-919	-919	-919	-919	-919	-919	-919	-919	-919	-920	-920	-11,030
	Annual % of Planned (Gross)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
80%	Net-To-Gross Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Net Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planned Net Savings (kWh/yr)	89,447	89,447	89,447	89,447	89,447	89,447	89,447	89,447	89,447	89,447	89,447	89,447	1,073,361
	Annual % Toward Planned Net Savings (kWh)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80%	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Program Performance	Annual \$Admin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual \$Admin. per kWh/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual \$Admin. per kW (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual \$EM&V per \$ Total	N/A	N/A	N/A	N/A	N/A	N/A	0%	7%	19%	13%	11%	14%	14%
	Annual \$Rebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A


1. A participant is a unique account number.

A.5 Virginia Non-residential Lighting Systems and Controls Program 2014-2019

A.5.1 2014-2019 VA Non-residential Lighting Systems and Controls Annual Indicator Tables

VA- Non-Residential Lighting Systems & Controls Program		2014	2015	2016	2017	2018	2019	2014-2019
Category	Indicator	Total	Total	Total ²	Total	Total	Total	Program Total
O&M(\$)	Direct Rebate							
O&M(\$)	Direct Implementation							
O&M(\$)	Direct EM&V							
O&M(\$)	Indirect Other (Administrative)	\$39,157	\$191,137	\$214,891	\$351,449	\$351,760	\$289,158	\$1,437,553
Costs (\$)	Total	\$1,295,925	\$6,608,836	\$7,070,615	\$8,931,669	\$6,229,352	\$4,806,213	\$34,942,609
Costs (\$)	Planned	\$3,048,223	\$5,355,067	\$5,349,167	\$5,268,411	\$6,289,779	\$100,294	\$25,410,941
Costs (\$)	Variance	-\$1,752,298	\$1,253,769	\$1,721,448	\$3,663,258	-\$60,427	\$4,705,918	\$9,531,668
	Annual % of Planned	43%	123%	132%	170%	99%	4792%	138%
Participants ¹	Total (Gross)	118	1,241	1,203	868	649	422	4,501
	Planned (Gross)	688	1,504	1,531	1,553	1,807	0	7,083
	Variance	-570	-263	-328	-685	-1,158	422	-2,582
	Annual % of Planned (Gross)	17%	83%	79%	56%	36%	N/A	64%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	4,749,693	50,828,062	65,876,985	71,024,607	45,157,541	41,988,907	279,625,795
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	4,749,693	50,828,062	65,876,985	71,024,607	45,157,541	41,988,907	279,625,795
70%	Net-To-Gross Adjustment (kWh/yr)	-1,424,908	-15,248,419	-19,763,096	-21,307,382	-13,547,262	-12,596,672	-83,887,739
	Net Adjusted Savings (kWh/yr)	3,324,785	35,579,643	46,113,890	49,717,225	31,610,279	29,392,235	195,738,057
	Planned Net Savings (kWh/yr)	12,317,239	27,461,536	24,119,220	33,214,031	40,368,376	0	137,480,402
	Annual % Toward Planned Net Savings (kWh)	27%	130%	191%	150%	78%	N/A	142%
	Avg. Gross Savings Per Participant (kWh/yr)	40,252	40,957	54,761	81,826	69,580	99,500	62,125
	Avg. Net Savings Per Participant (kWh/yr)	28,176	28,670	38,332	57,278	48,706	69,650	43,488
Installed kW	Total Gross Demand Reduction (kW)	998.5	10,674.2	15,380.0	11,958.2	7,222.3	5,637.5	51,870.7
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	998.5	10,674.2	15,380.0	11,958.2	7,222.3	5,637.5	51,870.7
70%	Net-To-Gross Adjustment (kW)	-299.5	-3,202.3	-4,614.0	-3,587.5	-2,166.7	-1,691.3	-15,561.2
	Net Adjusted Demand Reduction (kW)	698.9	7,472.0	10,766.0	8,370.8	5,055.6	3,946.3	36,309.5
	Planned Net Demand Reduction (kW)	3,228.9	7,670.4	4,089.4	5,486.3	7,269.0	0.0	27,744.0
	Annual % Toward Planned Net Reduction (kW)	22%	97%	263%	153%	70%	N/A	131%
	Avg. Gross Demand Reduction Per Participant (kW)	8.5	8.6	12.8	13.8	11.1	13.4	12
	Avg. Net Demand Reduction Per Participant (kW)	5.9	6.0	8.9	9.6	7.8	9.4	8
Program Performance	Annual \$Admin. per Participant (Gross)	\$332	\$154	\$179	\$405	\$542	\$685	\$319
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.00	\$0.00	\$0.00	\$0.01	\$0.01	\$0.01
	Annual \$Admin. per kW (Gross)	\$39	\$18	\$14	\$29	\$49	\$51	\$28
	Annual \$EM&V per \$Total	5.1%	1.8%	1.5%	1.1%	1.6%	1.3%	1.6%
	Annual \$Rebate per Participant (Gross)	\$4,355	\$4,487	\$5,025	\$8,725	\$7,668	\$9,892	\$6,410

CONFIDENTIAL INFORMATION REDACTED

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1. A participant is a unique account number.
 2. The 2016 total gross deemed savings values reported in this table differ from values in the May 1, 2017 EM&V report and have been reflled with the Commission. The adjustments totaled -14,862,478 kWh/year and 168 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 9.1.1. The adjustments were to waste heat factors (WHFe and WHFd) applied to lighting fixtures installed in 2016, where the program participant building HVAC systems were assumed to be heat pump heating and cooling systems, rather than the previous assumption of AC cool and non-electric heat systems. This adjustment was made in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. It is reflected in STEP Manual version 8.0.0 in this EM&V report.

A.5.2 2019 VA Non-residential Lighting Systems and Controls Monthly Indicator Tables

VA Non-Residential Lighting Systems & Controls Program Category	Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 July	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2014-2019 Program Total
O&M(\$)	Direct Rebate	\$96,242	\$114,726	\$72,222	\$3,523	\$529	\$974	-\$16	\$892	\$249	\$46	\$63	\$98	\$2,891,156	\$1,437,553
O&M(\$)	Direct Implementation	\$1,595,601	\$1,902,042	\$1,197,367	\$58,401	\$8,767	\$16,153	-\$466	\$14,854	\$7,371	\$1,374	\$1,854	\$2,894	\$4,806,213	\$3,942,609
O&M(\$)	Direct EM&V	\$8,583	\$8,583	\$8,583	\$8,583	\$8,583	\$8,583	\$8,133	\$8,133	\$8,133	\$8,133	\$8,133	\$8,133	\$100,294	\$25,410,941
O&M(\$)	Indirect Other (Administrative)	\$1,587,019	\$1,893,459	\$1,188,784	\$49,818	\$1,184	\$7,570	-\$8,599	\$6,721	-\$762	-\$6,759	-\$6,239	-\$5,239	\$4,705,918	\$9,531,668
	Annual % of Planned	1591%	3487%	4681%	4739%	4748%	4764%	4764%	4779%	4786%	4787%	4789%	4792%	4792%	138%
Participants ¹	Total (Gross)	161	176	85	0	0	0	0	0	0	0	0	0	422	4,501
	Planned (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	7,083	7,083
	Variance	161	176	85	0	0	0	0	0	0	0	0	0	422	-2,582
	Annual % of Planned (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	64%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	12,076,571	20,291,854	9,620,482	0	0	0	0	0	0	0	0	0	41,988,907	279,625,795
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	12,076,571	20,291,854	9,620,482	0	0	0	0	0	0	0	0	0	41,988,907	279,625,795
70%	Net-To-Gross Adjustment (kWh/yr)	-3,622,971	-6,087,556	-2,886,145	0	0	0	0	0	0	0	0	0	-12,596,672	-83,387,739
	Net Adjusted Savings (kWh/yr)	8,453,600	14,204,298	6,734,338	0	0	0	0	0	0	0	0	0	29,392,235	195,738,057
	Planned Net Savings (kWh)	0	0	0	0	0	0	0	0	0	0	0	0	0	137,480,402
	Annual % Toward Planned Net Savings (kWh)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	142%
	Avg. Gross Savings Per Participant (kWh/yr)	75,010	115,295	113,182	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	99,500	62,125
	Avg. Net Savings Per Participant (kWh/yr)	52,307	80,706	79,228	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	69,650	43,488
Installed kW	Total Gross Demand Reduction (kW)	1,947.1	2,408.5	1,282.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,637.5	51,870.7
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	1,947.1	2,408.5	1,282.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,637.5	51,870.7
70%	Net-To-Gross Adjustment (kW)	-584.1	-722.5	-384.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1,691.3	-15,561.2
	Net Adjusted Demand Reduction (kW)	1,363.0	1,685.9	897.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,946.3	36,309.5
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27,744.0
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	131%
	Avg. Gross Demand Reduction Per Participant (kW)	12	14	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.4	12
	Avg. Net Demand Reduction Per Participant (kW)	8	10	11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9.4	8
Program Performance	Annual \$ Admin. per Participant (Gross)	\$598	\$626	\$671	\$679	\$681	\$683	\$683	\$684	\$685	\$685	\$685	\$685	\$685	\$319
	Annual \$ Admin. per kWh/year (Gross)	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01
	Annual \$ Admin. per kW (Gross)	\$49	\$48	\$50	\$51	\$51	\$51	\$51	\$51	\$51	\$51	\$51	\$51	\$51	\$28
	Annual \$EM&V per \$ Total	0.0%	0.1%	0.2%	0.2%	0.4%	0.7%	0.7%	1.0%	1.1%	1.2%	1.2%	1.3%	1.3%	1.6%
	Annual \$ Rebate per Participant (Gross)	\$8,867	\$9,311	\$9,892	\$9,892	\$9,892	\$9,892	\$9,892	\$9,892	\$9,892	\$9,892	\$9,892	\$9,892	\$9,892	\$6,410

1. A participant is a unique account number.

A.6 Virginia Non-residential Lighting Systems & Controls (DSM Phase VII) 2019

A.6.1 2019 Non-residential Lighting Systems & Controls (DSM Phase VII) Monthly Indicator Tables

VA- Non-Residential Lighting Systems & Controls Program		2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Category	Indicator	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Total
O&M (\$)	Direct Rebate													
O&M (\$)	Direct Implementation													
O&M (\$)	Direct EM&V													
O&M (\$)	Indirect Other (Administrative)	\$0	\$0	\$0	\$0	\$0	\$0	\$50	\$173	\$4,989	\$4,676	\$4,719	\$5,415	\$20,021
Capital (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Costs (\$)	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$1,487	\$5,114	\$147,597	\$138,355	\$139,608	\$160,211	\$592,373
Costs (\$)	Planned	\$0	\$0	\$0	\$0	\$0	\$0	\$272,311	\$272,311	\$272,311	\$272,311	\$272,311	\$272,311	\$1,633,867
Costs (\$)	Variance	\$0	\$0	\$0	\$0	\$0	\$0	-\$270,824	-\$267,197	-\$124,714	-\$133,956	-\$132,703	-\$112,100	-\$1,041,495
	Annual % of Planned	0%	0%	0%	0%	0%	0%	0%	0%	9%	18%	26%	36%	36%
Participants ¹	Total (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planned (Gross)	28	28	28	28	28	28	28	28	28	27	27	27	333
	Variance	-28	-28	-28	-28	-28	-28	-28	-28	-28	-27	-27	-27	-333
	Annual % of Planned (Gross)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
70%	Net-To-Gross Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Net Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planned Net Savings (kWh/yr)	120,491	120,491	120,491	120,491	120,491	120,491	120,491	120,491	120,491	120,491	120,491	120,491	1,445,890
	Annual % Toward Planned Net Savings (kWh)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70%	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Program Performance	Annual \$Admin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual \$Admin. per kWh/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual \$Admin. per kW (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual SEM&V per \$Total	N/A	N/A	N/A	N/A	N/A	N/A	0%	31%	9%	6%	6%	8%	8%
	Annual \$Rebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A


1. A participant is a unique account number.

A.7 Virginia Non-residential Heating and Cooling Efficiency Program 2014-2019

A.7.1 2014-2019 VA Non-residential Heating and Cooling Efficiency Annual Indicator Tables

VA- Non-Residential Heating & Cooling Efficiency Program		2014	2015	2016	2017	2018	2019	2014-2019
Category	Indicator	Total	Total	Total ²	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate							
O&M (\$)	Direct Implementation							
O&M (\$)	Direct EM&V							
O&M (\$)	Indirect Other (Administrative)	\$14,267	\$38,982	\$41,094	\$69,115	\$98,564	\$37,916	\$299,938
Costs (\$)	Total	\$460,689	\$1,347,317	\$1,352,118	\$1,756,467	\$1,745,485	\$645,966	\$7,308,041
Costs (\$)	Planned	\$1,530,331	\$1,859,694	\$1,807,707	\$1,858,262	\$1,977,851	\$100,294	\$9,134,139
Costs (\$)	Variance	-\$1,069,642	-\$512,377	-\$455,589	-\$101,796	-\$232,365	\$545,672	-\$1,826,097
	Annual % of Planned	30%	72%	75%	95%	88%	644%	80%
Participants ¹	Total (Gross)	6	114	89	103	77	17	406
	Planned (Gross)	261	746	782	797	807	0	3,393
	Variance	-255	-632	-693	-694	-730	17	-2,987
	Annual % of Planned (Gross)	2%	15%	11%	13%	10%	N/A	12%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	1,456,991	11,129,837	13,647,306	7,526,876	9,818,796	3,328,123	46,907,929
	100% Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	1,456,991	11,129,837	13,647,306	7,526,876	9,818,796	3,328,123	46,907,929
70%	Net-To-Gross Adjustment (kWh/yr)	-437,097	-3,338,951	-4,094,192	-2,258,063	-2,945,639	-998,437	-14,072,379
	Net Adjusted Savings (kWh/yr)	1,019,894	7,790,886	9,553,114	5,268,813	6,873,157	2,329,686	32,835,550
	Planned Net Savings (kWh/yr)	3,299,301	9,430,186	24,119,220	38,355,947	31,003,178	0	106,207,832
	Annual % Toward Planned Net Savings (kWh)	31%	83%	40%	14%	22%	N/A	31%
	Avg. Gross Savings Per Participant (kWh/yr)	242,832	97,630	153,341	73,076	127,517	195,772	115,537
	Avg. Net Savings Per Participant (kWh/yr)	169,982	68,341	107,338	51,154	89,262	137,040	80,876
Installed kW	Total Gross Demand Reduction (kW)	510.1	2,777.0	2,084.3	1,946.7	568.8	198.8	8,085.6
	100% Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction(kW)	510.1	2,777.0	2,084.3	1,946.7	568.8	198.8	8,085.6
70%	Net-To-Gross Adjustment (kW)	-153.0	-833.1	-625.3	-584.0	-170.6	-59.6	-2,425.7
	Net Adjusted Demand Reduction (kW)	357.1	1,943.9	1,459.0	1,362.7	398.1	139.2	5,660.0
	Planned Net Demand Reduction (kW)	835.2	2,387.2	4,089.6	15,592.6	7,536.0	0.0	30,440.6
	Annual % Toward Planned Net Reduction (kW)	43%	81%	36%	9%	5%	N/A	19%
	Avg. Gross Demand Reduction Per Participant (kW)	85.0	24.4	23.4	18.9	7.4	11.7	19.9
	Avg. Net Demand Reduction Per Participant (kW)	59.5	17.1	16.4	13.2	5.2	8.2	13.9
Program Performance	Annual \$Admin. per Participant (Gross)	\$2,378	\$342	\$462	\$671	\$1,280	\$2,230	\$739
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.00	\$0.00	\$0.01	\$0.01	\$0.01	\$0.01
	Annual \$Admin. per kW (Gross)	\$28	\$14	\$20	\$36	\$173	\$191	\$37
	Annual \$EM&V per \$Total	5.6%	6.1%	8.6%	7.6%	7.3%	11.0%	7.6%
	Annual \$Rebate per Participant (Gross)	\$19,834	\$7,909	\$10,729	\$11,629	\$15,058	\$24,826	\$11,711

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1. A participant is a unique account number.
 2. The 2016 total gross deemed savings values reported in this table differ from values in the May 1, 2017 EM&V report, and have been refilled with the Commission. The adjustments totaled -154,576 kWh/year and 0 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 10. The adjustments were made to full load heating hours (FLHheat) in Tables 90 and 91 to be consistent with those in the Mid-Atlantic TRM v 6, in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. This affected multiple non-residential HVAC measures (e.g. heat pumps, variable refrigerant flow, mini split systems) that reference Table 90 and 91, in multiple non-residential programs. This adjustment is reflected in STEP Manual version 8.0.0 in this EM&V report.

A.7.2 2019 VA Non-residential Heating and Cooling Efficiency Monthly Indicator Tables

VA- Non-Residential Heating & Cooling Efficiency Program Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2014-2019 Program Total
Category	\$4,622	\$11,912	\$16,976	\$1,778	\$474	\$820	\$1	\$734	\$221	\$51	\$105	\$22	\$37,916	\$299,938
Direct Rebate														
O&M (\$)	\$76,634	\$197,491	\$281,451	\$29,483	\$7,857	\$13,588	\$40	\$21,713	\$6,536	\$1,523	\$3,096	\$6,555	\$645,966	\$7,308,041
O&M (\$)	\$8,583	\$8,583	\$8,583	\$8,583	\$8,583	\$8,583	\$8,133	\$8,133	\$8,133	\$8,133	\$8,133	\$8,133	\$100,294	\$9,134,139
Direct EM&V	\$68,052	\$188,909	\$272,868	\$20,901	\$726	\$5,005	\$8,093	\$13,579	\$1,598	\$610	\$5,037	\$1,578	\$545,672	\$1,826,097
Indirect Other (Administrative)														
Annual % of Planned	76%	27%	55%	58%	59%	60%	60%	62%	63%	64%	65%	64%	64%	80%
Total (Gross)	4	10	3	0	0	0	0	0	0	0	0	0	17	406
Planned (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Variance	4	10	3	0	0	0	0	0	0	0	0	0	17	406
Annual % of Planned (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12%
Total Gross Demand Savings (kWh/yr)	182,035	645,916	2,500,172	0	0	0	0	0	0	0	0	0	3,328,123	46,907,929
100%														
Realization Rate Adjusted (kWh/yr)	182,035	645,916	2,500,172	0	0	0	0	0	0	0	0	0	3,328,123	46,907,929
70%														
Net-To-Gross Adjustment (kWh/yr)	-54,611	-193,775	-750,052	0	0	0	0	0	0	0	0	0	-998,437	-14,072,379
Net Adjusted Savings (kWh/yr)	127,425	452,141	1,750,120	0	0	0	0	0	0	0	0	0	2,329,686	32,835,550
Planned Net Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	106,207,832
Annual % Toward Planned Net Savings (kWh)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	31%
Avg. Gross Savings Per Participant (kWh/yr)	45,509	64,592	83,391	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	195,772	115,537
Avg. Net Savings Per Participant (kWh/yr)	31,856	45,214	58,373	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	137,040	80,876
Total Gross Demand Reduction (kW)	36.2	40.8	121.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	198.8	8,085.6
100%														
Realization Rate Adjusted (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70%														
Net-To-Gross Adjustment (kW)	-10.9	-12.2	-36.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-59.6	-2,425.7
Net Adjusted Demand Reduction (kW)	25.3	28.6	85.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	139.2	5,660.0
Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30,440.6
Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19%
Avg. Gross Demand Reduction Per Participant (kW)	9.0	4.1	40.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11.7	19.9
Avg. Net Demand Reduction Per Participant (kW)	6.3	2.9	28.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.2	13.9
Annual \$Admin. per Participant (Gross)	\$1,156	\$1,181	\$1,971	\$2,076	\$2,104	\$2,152	\$2,152	\$2,195	\$2,208	\$2,211	\$2,217	\$2,230	\$2,230	\$739
Annual \$Admin. per kWh/year (Gross)	\$0.03	\$0.02	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01
Annual \$Admin. per kW (Gross)	\$128	\$125	\$169	\$178	\$180	\$184	\$184	\$188	\$189	\$189	\$190	\$191	\$191	\$37
Annual \$EM&V per \$ Total	0.0%	3.2%	2.3%	2.2%	3.4%	5.4%	5.4%	8.3%	9.5%	9.7%	10.1%	11.0%	11.0%	7.6%
Annual \$Rebate per Participant (Gross)	\$10,756	\$13,600	\$24,826	\$24,826	\$24,826	\$24,826	\$24,826	\$24,826	\$24,826	\$24,826	\$24,826	\$24,826	\$24,826	\$11,711

1. A participant is a unique account number.

A.8 Virginia Non-Residential Heating and Cooling Efficiency (DSM Phase VII) 2019

A.8.1 2019 VA Non-Residential Heating and Cooling Efficiency (DSM Phase VII) Monthly Indicator Tables

VA- Non-Residential Heating and Cooling Efficiency Program Category	Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total
O&M(S)	Direct Rebate													
O&M(S)	Direct Implementation													
O&M(S)	Direct EM&V													
O&M(S)	Indirect Other (Administrative)	\$0	\$0	\$0	\$0	\$0	\$0	\$47	\$247	\$2,897	\$2,632	\$2,759	\$2,984	\$11,566
Capital (S)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Costs (S)	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$1,381	\$7,294	\$85,717	\$77,886	\$81,625	\$88,290	\$342,194
Costs (S)	Planned	\$0	\$0	\$0	\$0	\$0	\$0	\$188,466	\$188,466	\$188,466	\$188,466	\$188,466	\$188,466	\$1,130,793
Costs (S)	Variance	\$0	\$0	\$0	\$0	\$0	\$0	-\$187,085	-\$181,172	-\$102,748	-\$110,579	-\$106,840	-\$100,175	-\$788,599
	Annual % of Planned	0%	0%	0%	0%	0%	0%	0%	1%	8%	15%	22%	30%	30%
Participants ¹	Total (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planned (Gross)	29	29	29	29	29	29	29	29	29	29	30	30	350
	Variance	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-30	-30	-350
	Annual % of Planned (Gross)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
70%	Net-To-Gross Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Net Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planned Net Savings (kWh/yr)	84,551	84,551	84,551	84,551	84,551	84,551	84,551	84,551	84,551	84,551	84,551	84,551	1,014,615
	Annual % Toward Planned Net Savings (kWh)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70%	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Program Performance	Annual SAdmin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual SAdmin. per kWh/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual SAdmin. per kW (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual SEM&V per \$Total	N/A	N/A	N/A	N/A	N/A	N/A	0%	58%	17%	11%	10%	11%	11%
	Annual SRebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

1. A participant is a unique account number.

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A.9 Virginia Non-residential Window Film Program

A.9.1 2014-2019 VA Non-residential Window Film Annual Indicator Tables

VA- Non-Residential Window Film Program		2014	2015	2016	2017	2018	2019	2014-2019
Category	Indicator	Total	Total	Total	Total	Total	Total	Program Total
O&M(S)	Direct Rebate							
O&M(S)	Direct Implementation							
O&M(S)	Direct EM&V							
O&M(S)	Indirect Other (Administrative)	\$11,980	\$12,457	\$13,085	\$21,659	\$20,852	\$5,421	\$85,454
Capital (S)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Costs (S)	Total	\$382,712	\$400,634	\$430,529	\$550,444	\$369,265	\$103,090	\$2,236,675
Costs (S)	Planned	\$705,718	\$1,240,249	\$1,712,877	\$1,921,714	\$2,237,336	\$60,177	\$7,878,071
Costs (S)	Variance	-\$323,005	-\$839,615	-\$1,282,348	-\$1,371,270	-\$1,868,072	\$42,913	-\$5,641,396
	Annual % of Planned	54%	32%	25%	29%	17%	171%	28%
Participants ¹	Total Participants	3	22	70	59	91	8	253
	Total Square Feet	53,021	97,121	57,228	231,634	33,461	3,913	476,378
	Planned Square Feet	133,086	681,000	1,148,077	1,371,237	1,454,781	0	4,788,181
	Variance	-80,065	-583,879	-1,090,849	-1,139,603	-1,421,320	3,913	-4,311,803
	Annual % of Planned (Gross)	40%	14%	5%	17%	2%	N/A	10%
Square feet	Total Square Feet	53,021	97,121	57,228	231,634	33,461	3,913	476,378
	North Facing	11,663	23,535	13,931	48,150	2,090	1,104	100,473
	East Facing	14,597	24,260	8,105	61,663	7,387	424	116,436
	West Facing	15,090	22,836	15,826	62,196	12,254	713	128,915
	South Facing	11,671	26,490	19,366	59,625	11,730	1,672	130,554
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	1,152,476	3,077,815	464,794	1,734,665	170,954	8,956	6,609,660
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	1,152,476	3,077,815	464,794	1,734,665	170,954	8,956	6,609,660
80%	Net-To-Gross Adjustment (kWh/yr)	-230,495	-615,563	-92,959	-346,933	-34,191	-1,791	-1,321,932
	Net Adjusted Savings (kWh/yr)	921,980	2,462,252	371,835	1,387,732	136,764	7,165	5,287,728
	Planned Net Savings (kWh/yr)	2,395,548	12,258	15,842,639	15,209,376	10,484,938	0	43,944,759
	Annual % Toward Planned Net Savings (kWh)	38%	20087%	2%	9%	1%	N/A	12%
	Avg. Gross Savings Per Participant (kWh/yr)	384,159	139,901	6,640	29,401	1,879	1,119	26,125
	Avg. Gross Savings Per Square Foot (kWh/yr)	22	32	8	7	5	2	14
	Avg. Net Savings Per Participant (kWh/yr)	307,327	111,921	5,312	23,521	1502.90	895.56	20,900
	Avg. Net Savings Per Square Foot (kWh/yr)	17	25	6	6	4	2	11
Installed kW	Total Gross Demand Reduction (kW)	233.1	626.6	139.7	471.5	57.6	2.5	1,531.0
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	233.1	626.6	139.7	471.5	57.6	2.5	1,531.0
80%	Net-To-Gross Adjustment (kW)	-46.6	-125.3	-27.9	-94.3	-11.5	-0.5	-306.2
	Net Adjusted Demand Reduction (kW)	186.5	501.2	111.8	377.2	46.1	2.0	1,224.8
	Planned Net Demand Reduction (kW)	532.3	2.4	14,497.4	13,692.8	9,627.0	0.0	38,351.9
	Annual % Toward Planned Net Reduction (kW)	35%	20885%	1%	3%	0.5%	N/A	3%
	Avg. Gross Demand Reduction Per Participant (kW)	78	28	2	8	0.6	0	6
	Avg. Gross Demand Reduction Per Square Foot (kW)	0.004	0.006	0.002	0.002	0.002	0.001	0.003
	Avg. Net Demand Reduction Per Participant (kW)	62	23	2	6	0.5	0	5
	Avg. Net Demand Reduction Per Square Foot (kW)	0.004	0.005	0.002	0.002	0.00	0.00	0
Program Performance	Annual \$Admin. per Participant (Gross)	\$3,993	\$566	\$187	\$367	\$229	\$678	\$338
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.00	\$0.03	\$0.01	\$0.12	\$0.61	\$0.01
	Annual \$Admin. per kW (Gross)	\$51	\$20	\$94	\$46	\$362.0	\$2,182.7	\$56
	Annual \$EM&V per \$ Total	22%	17%	26%	16%	22%	54%	22%
	Annual \$Rebate per Participant (Gross)	\$6,090	\$512	\$667	\$3,284	\$285	\$406	\$1,182

1. A participant is a unique account number.

A.9.2 2019 VA Non-residential Window Film Monthly Indicator Tables

VA- Non-Residential Window Film Program Category	Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2014-2019 Program Total
O&M (\$)	Direct Rebate	\$1,164	\$1,770	\$272	\$0	\$326	\$874	-\$1	\$600	\$294	\$19	\$31	\$71	\$5,421	\$85,454
O&M (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
O&M (\$)	Direct EM&V	\$19,302	\$29,346	\$4,507	\$0	\$5,406	\$14,483	-\$21	\$17,764	\$8,711	\$574	\$905	\$2,113	\$103,090	\$2,236,675
O&M (\$)	Indirect Other (Administrative)	\$5,150	\$5,150	\$5,150	\$5,150	\$5,150	\$4,880	\$4,880	\$4,880	\$4,880	\$4,880	\$4,880	\$4,880	\$40,177	\$7,878,071
Capital (\$)	Direct Implementation	\$14,153	\$24,196	-\$642	-\$5,150	\$256	\$9,333	-\$4,901	\$12,885	\$3,831	-\$4,306	-\$3,975	-\$2,766	\$42,913	-\$5,641,396
	Annual % of Planned	32%	81%	88%	88%	97%	121%	121%	151%	168%	166%	168%	171%	171%	28%
Participants ¹	Total Participants	4	4	0	0	0	0	0	0	0	0	0	0	0	8
	Total Square Feet	1,471	2,442	0	0	0	0	0	0	0	0	0	0	3,913	476,378
	Planned Square Feet	0	0	0	0	0	0	0	0	0	0	0	0	0	4,788,181
	Variance	1,471	2,442	0	0	0	0	0	0	0	0	0	0	3,913	-4,311,803
	Annual % of Planned (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10%
Square feet	Total Square Feet	1,471	2,442	0	0	0	0	0	0	0	0	0	0	3,913	476,378
	North Facing	918	186	0	0	0	0	0	0	0	0	0	0	1,104	100,473
	East Facing	26	198	0	0	0	0	0	0	0	0	0	0	424	116,436
	West Facing	184	529	0	0	0	0	0	0	0	0	0	0	713	128,915
	South Facing	143	1,529	0	0	0	0	0	0	0	0	0	0	1,672	130,554
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	3,114	5,841	0	0	0	0	0	0	0	0	0	0	8,956	6,609,660
	100% Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Realization Rate Adjustment Savings (kWh/yr)	3,114	5,841	0	0	0	0	0	0	0	0	0	0	8,956	6,609,660
	80% Net-To-Gross Adjustment (kWh/yr)	-633	-1,088	0	0	0	0	0	0	0	0	0	0	-1,721	-1,321,932
	Net Adjusted Savings (kWh/yr)	2,481	4,673	0	0	0	0	0	0	0	0	0	0	7,165	5,287,728
	Planned Net Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	43,944,759
	Annual % Toward Planned Net Savings (kWh)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12%
	Avg. Gross Savings Per Participant (kWh/yr)	779	1,400	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,119	26,125
	Avg. Gross Savings Per Square Foot (kWh/yr)	2	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14
	Avg. Net Savings Per Participant (kWh/yr)	623	1,168	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	895.56	20,900
	Avg. Net Savings Per Square Foot (kWh/yr)	1.7	1.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2
Installed kW	Total Gross Demand Reduction (kW)	1.1	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1,531.0
	100% Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjustment (kW)	1.1	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1,531.0
	80% Net-To-Gross Adjustment (kW)	-0.2	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.5	-306.2
	Net Adjusted Demand Reduction (kW)	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1,224.8
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38,351.9
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3%
	Avg. Gross Demand Reduction Per Participant (kW)	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6
	Avg. Gross Demand Reduction Per Square Foot (kW)	0.001	0.001	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.001	0.003
	Avg. Net Demand Reduction Per Participant (kW)	0.2	0.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	Avg. Net Demand Reduction Per Square Foot (kW)	0.001	0.001	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
Program Performance	Annual \$ Admin. per Participant (Gross)	\$291	\$367	\$401	\$401	\$442	\$551	\$551	\$626	\$662	\$665	\$669	\$678	\$678	\$338
	Annual \$ Admin. per kWh/year (Gross)	\$1,099	\$1,181	\$1,291	\$1,291	\$1,422	\$1,774	\$2,015	\$2,134	\$2,142	\$2,154	\$2,183	\$2,183	\$2,182.7	\$0.01
	Annual \$ EM&V per \$ Total	0%	9%	14%	21%	36%	48%	52%	53%	52%	53%	54%	54%	54%	22%
	Annual \$ Rebate per Participant (Gross)	\$293	\$406	\$406	\$406	\$406	\$406	\$406	\$406	\$406	\$406	\$406	\$406	\$406	\$1,182

1. A participant is a unique account number.

A.10 Virginia Non-Residential Window Film (DSM Phase VII) 2019

A.10.1 2019 VA Non-Residential Window Film (DSM Phase VII) Monthly Indicator Tables

VA- Non-Residential Window Film Program		2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Category	Indicator	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	
O&M (\$)	Direct Rebate														
O&M (\$)	Direct Implementation														
O&M (\$)	Direct EM&V														
O&M (\$)	Indirect Other (Administrative)	\$0	\$0	\$0	\$0	\$0	\$0	\$7	\$51	\$1,730	\$1,556	\$1,425	\$1,725	\$6,494	
Capital (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Costs (\$)	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$212	\$1,524	\$51,193	\$46,025	\$42,168	\$51,024	\$192,146	
Costs (\$)	Planned	\$0	\$0	\$0	\$0	\$0	\$0	\$52,931	\$52,931	\$52,931	\$52,931	\$52,931	\$52,931	\$317,588	
Costs (\$)	Variance	\$0	\$0	\$0	\$0	\$0	\$0	-\$52,719	-\$51,408	-\$1,738	-\$6,906	-\$10,763	-\$1,907	-\$125,441	
	Annual % of Planned	0%	0%	0%	0%	0%	0%	0%	1%	17%	31%	44%	61%	61%	
Participants ¹	Total (Gross)													0	
	Total Square Feet													0	
	Planned Square Feet	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,700	68,400	
	Variance	-5,700	-5,700	-5,700	-5,700	-5,700	-5,700	-5,700	-5,700	-5,700	-5,700	-5,700	-5,700	-68,400	
	Annual % of Planned (Gross)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Square Feet	Total Square Feet	0	0	0	0	0	0	0	0	0	0	0	0	0	
	North Facing													0	
	East Facing													0	
	West Facing													0	
	South Facing													0	
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)													0	
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
80%	Net-To-Gross Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Net Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Planned Net Savings (kWh/yr)	14,234	14,234	14,234	14,234	14,234	14,234	14,234	14,234	14,234	14,234	14,234	14,234	170,812	
	Annual % Toward Planned Net Savings (kWh)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Gross Savings Per Square Foot (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Net Savings Per Square Foot (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Installed kW	Total Gross Demand Reduction (kW)													0.0	
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
80%	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Gross Demand Reduction Per Square Foot (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Net Demand Reduction Per Square Foot (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Program Performance	Annual SAdmin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual SAdmin. per kWh/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual SAdmin. per kW (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual SEM&V per \$ Total	N/A	N/A	N/A	N/A	N/A	N/A	0%	5%	20%	16%	13%	15%	15%	
	Annual SRebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

1. A participant is a unique account number.


CONFIDENTIAL INFORMATION REDACTED

A.11 Virginia Non-residential Small Business Improvement Program 2016-2019

A.11.1 2016-2019 VA Non-residential Small Business Improvement Annual Indicator Tables

VA- Small Business Improvement Program		2016	2017	2018	2019	2016-2019
Category	Indicator	Total ²	Total	Total	Total	Program Total
O&M(\$)	Direct Rebate					
O&M(\$)	Direct Implementation					
O&M(\$)	Direct EM&V					
O&M(\$)	Indirect Other (Administrative)	\$21,431	\$150,600	\$190,612	\$162,502	\$525,145
Costs (\$)	Total	\$705,139	\$3,827,332	\$3,375,566	\$3,446,135	\$11,354,171
Costs (\$)	Planned	\$2,306,687	\$5,322,647	\$6,548,890	\$7,784,513	\$21,962,738
Costs (\$)	Variance	-\$1,601,548	-\$1,495,315	-\$3,173,324	-\$4,338,378	-\$10,608,566
	Annual % of Planned	30.6%	71.9%	51.5%	44.3%	51.7%
Participants ¹	Total (Gross)	67	937	510	503	2,017
	Planned (Gross)	216	635	780	928	2,559
	Variance	-149	302	-270	-425	-542
	Annual % of Planned (Gross)	31.0%	147.6%	65.4%	54.2%	78.8%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	656,801	14,699,005	15,998,914	11,648,664	43,003,384
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	656,801	14,699,005	15,998,914	11,648,664	43,003,384
93%	Net-To-Gross Adjustment (kWh/yr)	-45,976	-1,028,930	-1,119,924	-815,407	-3,010,237
	Net Adjusted Savings (kWh/yr)	610,825	13,670,074	14,878,990	10,833,258	39,993,147
	Planned Net Savings (kWh/yr)	1,255,549	4,323,476	5,760,927	9,774,740	21,114,692
	Annual % Toward Planned Net Savings (kWh)	48.7%	316.2%	258.3%	110.8%	189.4%
	Avg. Gross Savings Per Participant (kWh/yr)	9,803	15,687	31,370	23,158	21,320
	Avg. Net Savings Per Participant (kWh/yr)	9,117	14,589	29,174	21,537	19,828
Installed kW	Total Gross Demand Reduction (kW)	131.5	3,098.0	3,475.7	2,553.5	9,258.8
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	131.5	3,098.0	3,475.7	2,553.5	9,258.8
93%	Net-To-Gross Adjustment (kW)	-9.2	-216.9	-243.3	-178.7	-648.1
	Net Adjusted Demand Reduction (kW)	122.3	2,881.2	3,232.4	2,374.8	8,610.7
	Planned Net Demand Reduction (kW)	308.0	660.7	1,135.0	1,930.3	4,034.1
	Annual % Toward Planned Net Reduction (kW)	39.7%	436.1%	284.8%	123.0%	213.4%
	Avg. Gross Demand Reduction Per Participant (kW)	2.0	3.3	6.8	5.1	4.6
	Avg. Net Demand Reduction Per Participant (kW)	1.8	3.1	6.3	4.7	4.3
Program Performance	Annual \$Admin. per Participant (Gross)	\$320	\$161	\$374	\$323	\$260
	Annual \$Admin. per kWh/year (Gross)	\$0.03	\$0.01	\$0.01	\$0.01	\$0.01
	Annual \$Admin. per kW (Gross)	\$163	\$49	\$54.84	\$63.64	\$57
	Annual \$EM&V per \$Total	6.5%	2.9%	3.3%	2.2%	3.0%
	Annual \$Rebate per Participant (Gross)	\$1,364	\$2,686	\$4,180	\$4,510	\$3,475

CONFIDENTIAL INFORMATION REDACTED

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1. A participant is a unique account number.
 2. The 2016 total gross deemed savings values reported in this table differ from values in the May 1, 2017 EM&V report, and have been refilled with the Commission. The adjustments totaled -171,768 kWh/year and 3 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 15. The adjustments were to waste heat factors (WHFe and WHFd) applied to lighting fixtures installed in 2016, where the program participant building HVAC systems were assumed to be heat pump heating and cooling systems, rather than the previous assumption of AC cool and non-electric heat systems. This adjustment was made in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. It is reflected in STEP Manual version 8.0.0 in this EM&V report.

A.11.2.2019 VA Non-residential Small Business Improvement Monthly Indicator Tables

VA- Small Business Improvement Program	Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2016-2019 Program Total
O&M (\$)	Direct Rebate	\$15,447	\$19,474	\$18,407	\$19,626	\$17,444	\$14,292	\$11,799	\$10,268	\$8,734	\$9,651	\$8,936	\$8,824	\$162,502	\$525,145
O&M (\$)	Direct Implementation	\$286,093	\$322,859	\$305,168	\$325,379	\$289,212	\$236,949	\$349,090	\$303,789	\$238,411	\$285,559	\$264,384	\$249,243	\$3,446,135	\$11,354,171
O&M (\$)	Direct EM&V	\$666,145	\$666,145	\$666,145	\$666,145	\$666,145	\$666,145	\$666,145	\$666,145	\$666,145	\$666,145	\$666,145	\$666,145	\$7,784,513	\$21,962,738
O&M (\$)	Indirect Other (Administrative)	\$410,052	\$343,287	\$360,977	\$340,707	\$376,934	\$429,196	\$282,183	\$322,485	\$372,863	\$345,714	\$366,889	\$382,031	\$4,338,378	\$10,608,566
	Annual % of Planned	3.9%	7.4%	11.4%	15.5%	19.3%	22.3%	26.8%	30.7%	34.0%	37.7%	41.1%	44.3%	44.3%	51.7%
Participants ¹	Total (Gross)	36	31	55	48	32	30	55	44	44	53	36	39	503	2,017
	Planned (Gross)	77	77	77	77	77	77	77	77	78	78	78	78	928	2,559
	Variance	-41	-46	-22	-29	-45	-47	-22	-33	-34	-25	-42	-39	-435	-842
	Annual % of Planned (Gross)	3.9%	7.2%	13.1%	18.3%	21.8%	25.0%	30.9%	35.7%	40.4%	46.7%	50.0%	54.2%	54.2%	78.8%
Installed kW/year	Total Gross Deemed Savings (kW/yr)	995,474	1,460,419	1,132,541	554,903	961,008	866,093	967,427	1,207,679	1,023,522	915,117	1,132,482	711,999	11,648,664	43,003,384
100%	Realization Rate Adjustment (kW/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kW/yr)	995,474	1,460,419	1,132,541	554,903	961,008	866,093	967,427	1,207,679	1,023,522	915,117	1,132,482	711,999	11,648,664	43,003,384
93%	Net-To-Gross Adjustment (kW/yr)	-69,683	-102,229	-79,278	-38,843	-67,271	-41,026	-67,720	-84,538	-71,647	-64,058	-79,274	-99,840	-815,407	-3,010,237
	Net Adjusted Savings (kW/yr)	925,791	1,358,190	1,053,263	516,060	893,738	825,066	899,707	1,123,141	951,876	851,059	1,053,208	662,159	10,833,258	39,993,147
	Planned Net Savings (kW/yr)	814,562	814,562	814,562	814,562	814,562	814,562	814,562	814,562	814,562	814,562	814,562	814,562	9,774,740	21,114,692
	Annual % Toward Planned Net Savings (kW/yr)	9.3%	23.4%	34.1%	39.4%	48.6%	54.1%	63.3%	74.8%	84.6%	93.3%	104.1%	110.8%	110.8%	189.4%
	Avg. Gross Savings Per Participant (kW/yr)	27,652	47,110	20,592	11,560	30,032	19,536	17,590	27,447	23,262	17,266	31,458	18,256	23,158	21,320
	Avg. Net Savings Per Participant (kW/yr)	25,716	43,813	19,150	10,751	27,929	18,169	16,358	25,526	21,634	16,658	29,256	16,978	21,537	19,823
Installed kW	Total Gross Demand Reduction (kW)	228.5	337.5	267.4	157.2	203.1	83.8	201.4	228.9	229.3	216.3	244.9	153.3	2,553.5	9,258.8
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	228.5	337.5	267.4	157.2	203.1	83.8	201.4	228.9	229.3	216.3	244.9	153.3	2,553.5	9,258.8
93%	Net-To-Gross Adjustment (kW)	-16.0	-23.6	-18.7	-11.0	-14.2	-5.9	-14.1	-16.0	-16.1	-15.1	-17.1	-10.9	-178.7	-648.1
	Net Adjusted Demand Reduction (kW)	212.5	313.9	248.7	146.2	188.9	77.9	187.3	212.9	213.3	201.1	227.7	144.4	2,374.8	8,610.7
	Planned Net Demand Reduction (kW)	160.9	160.9	160.9	160.9	160.9	160.9	160.9	160.9	160.9	160.9	160.9	160.9	1,930.3	4,034.1
	Annual % Toward Planned Net Reduction (kW)	11.0%	27.3%	40.2%	47.7%	57.5%	61.5%	71.3%	82.3%	93.3%	103.3%	115.5%	123.0%	123.0%	213.4%
	Avg. Gross Demand Reduction Per Participant (kW)	6.3	10.9	4.9	3.3	6.3	2.8	3.7	5.2	5.2	4.1	6.8	4.0	5.1	4.6
	Avg. Net Demand Reduction Per Participant (kW)	5.9	10.1	4.5	3.0	5.9	2.6	3.4	4.8	4.8	3.8	6.3	3.7	4.7	4.3
Program Performance	Annual \$Admin. per Participant (Gross)	\$429	\$521	\$437	\$429	\$448	\$451	\$406	\$383	\$361	\$339	\$332	\$323	\$323	\$260
	Annual \$Admin. per kW/yr (Gross)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.01	\$0.01
	Annual \$Admin. per kW (Gross)	\$68	\$62	\$64	\$74	\$76	\$82	\$79	\$74	\$70	\$67	\$64	\$64	\$63.64	\$57
	Annual \$EM&V per \$ Total	0.0%	0.8%	1.0%	0.7%	0.9%	1.3%	1.1%	1.3%	1.3%	1.5%	1.6%	2.2%	2.2%	3.0%
	Annual \$Rebate per Participant (Gross)	\$4,933	\$5,758	\$4,800	\$4,776	\$4,962	\$4,906	\$4,876	\$4,850	\$4,729	\$4,579	\$4,594	\$4,510	\$4,510	\$3,475


1. A participant is a unique account number.

A.12 Virginia Non-residential Prescriptive Program 2017-2019

A.12.1 2017-2019 VA Prescriptive Program Annual Indicator Tables

VA- Nonresidential Prescriptive Program		2017	2018	2019	2017-2019
Category	Indicator	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate				
O&M (\$)	Direct Implementation				
O&M (\$)	Direct EM&V				
O&M (\$)	Indirect Other (Administrative)	\$28,898	\$381,096	\$281,598	\$691,591
Costs (\$)	Total	\$734,410	\$6,748,855	\$5,887,581	\$13,370,846
Costs (\$)	Planned	\$3,735,349	\$6,246,114	\$6,354,082	\$16,335,545
Costs (\$)	Variance	-\$3,000,939	\$502,740	-\$466,501	-\$2,964,700
	Annual % of Planned	20%	108%	93%	82%
Participants ¹	Total (Gross)	4	865	666	1,535
	Planned (Gross)	266	427	427	1,120
	Variance	-262	438	239	415
	Annual % of Planned (Gross)	2%	203%	156%	137%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	699	7,023,169	4,403,947	11,427,816
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	699	7,023,169	4,403,947	11,427,816
85%	Net-To-Gross Adjustment (kWh/yr)	-105	-1,053,475	-660,592	-1,714,172
	Net Adjusted Savings (kWh/yr)	594	5,969,694	3,743,355	9,713,643
	Planned Net Savings (kWh/yr)	5,959,948	26,839,364	1,672,489	34,471,800
	Annual % Toward Planned Net Savings (kWh)	0.01%	22%	224%	28%
	Avg. Gross Savings Per Participant (kWh/yr)	175	8,119	6,613	7,445
	Avg. Net Savings Per Participant (kWh/yr)	149	6,901	5,621	6,328
Installed kW	Total Gross Demand Reduction (kW)	0.1	3,366.4	3,385.2	6,751.7
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.1	3,366.4	3,385.2	6,751.7
85%	Net-To-Gross Adjustment (kW)	0.0	-505.0	-507.8	-1,012.7
	Net Adjusted Demand Reduction (kW)	0.1	2,861.4	2,877.4	5,738.9
	Planned Net Demand Reduction (kW)	0.0	4,296.0	684.7	4,980.7
	Annual % Toward Planned Net Reduction (kW)	N/A	66.6%	420%	115.2%
	Avg. Gross Demand Reduction Per Participant (kW)	0.02	3.9	5.1	4.4
	Avg. Net Demand Reduction Per Participant (kW)	0.02	3.3	4.3	3.7
Program Performance	Annual \$Admin. per Participant (Gross)	\$7,225	\$441	\$423	\$451
	Annual \$Admin. per kWh/year (Gross)	\$41	\$0.05	\$0.06	\$0.06
	Annual \$Admin. per kW (Gross)	\$351,557	\$113	\$83	\$102
	Annual \$EM&V per \$Total	11%	2.0%	2%	2.4%
	Annual \$Rebate per Participant (Gross)	\$157	\$5,315	\$6,099	\$5,641

CONFIDENTIAL INFORMATION REDACTED

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1. A participant is a unique account number.
 2. 2018 Total Gross Deemed Savings changed as a result of an error correction made in this report (May 1, 2020). The correction assigns a full 5% savings to records with refrigerant charge adjustments completed during their HVAC tune-up activities. Previously, those records were not being assigned savings for refrigerant charge adjustments, which was incorrect. The correction resulted in a savings increase of 273,003 kWh/year (gross) in Virginia for program year 2018, from what was previously reported (in the May 1, 2019 EM&V report) as 6,750,166 kWh/year (gross). This change resulted in a 20% increase in 2018 total installed gross energy savings (kWh/year). The Total Gross Deemed Demand also increased from 3,083.6 kW (gross) to 3,366.4 kW (gross) for program year 2018, which was a 10% increase.

A.12.2.2019 VA Prescriptive Program Monthly Indicator Tables

VA - Nonresidential Prescriptive Program Category	Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2017-2019 Program Total	
O&M (\$)	Direct Rebate															
	Direct Incentive															
	Direct Incentive															
	Indirect O&M (Admins Incentive)															
	Total	\$5,527	\$27,920	\$79,613	\$23,591	\$27,667	\$23,591	\$143,415	\$13,834	\$13,834	\$8,252	\$17,689	\$22,562	\$17,055	\$281,598	\$691,591
	Costs (\$)	\$91,638	\$462,679	\$1,139,901	\$391,121	\$458,358	\$391,121	\$423,544	\$409,318	\$409,318	\$244,157	\$523,367	\$666,554	\$804,622	\$5,887,581	\$13,370,846
	Planned	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$543,739	\$5,437,390
	Variance	-\$482,101	-\$800,860	-\$776,162	-\$152,618	-\$885,381	-\$152,618	-\$91,731	-\$105,957	-\$105,957	-\$271,117	-\$8,092	-\$15,229	-\$10,084	-\$6,544,082	-\$1,635,545
	Annual % of Planned	1%	9%	29%	36%	43%	49%	56%	62%	62%	66%	74%	85%	93%	93%	82%
	Total (Gross)	5	36	73	38	66	39	40	39	39	38	103	108	59	666	1,535
Planned (Gross)	36	36	36	36	36	36	36	36	36	35	35	35	35	427	1,120	
Variance	-31	4	37	24	30	3	4	4	4	3	68	73	24	239	415	
Annual % of Planned (Gross)	1%	10%	27%	41%	50%	65%	75%	84%	84%	93%	117%	142%	156%	156%	137%	
Participants ¹	Total Gross Deemed Savings (kWh/yr)	5,787	378,971	855,564	248,494	465,834	170,702	443,679	454,278	299,003	414,148	490,258	176,328	4,403,947	11,427,816	
	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Realization Rate Adjustment (kWh/yr)	5,787	378,971	855,564	248,494	465,834	170,702	443,679	454,278	299,003	414,148	490,258	176,328	4,403,947	11,427,816	
	Net-To-Gross Adjustment (kWh/yr)	-868	-56,848	-128,335	-37,274	-49,975	-25,665	-66,532	-81,442	-81,442	-44,985	-52,122	-73,339	-26,449	-460,592	-1,714,173
	Net Adjusted Savings (kWh/yr)	4,919	322,123	727,229	211,220	395,959	145,037	377,147	368,137	368,137	254,017	352,026	416,919	149,879	3,743,355	9,713,643
	Planned Net Savings (kWh/yr)	139,374	139,374	139,374	139,374	139,374	139,374	139,374	139,374	139,374	139,374	139,374	139,374	139,374	1,672,489	34,471,800
	Annual % Toward Planned Net Savings (kWh)	0%	20%	65%	76%	92%	105%	133%	154%	154%	169%	196%	215%	246%	244%	28%
	Avg. Gross Savings Per Participant (kWh/yr)	157	10,527	11,720	4,146	7,038	4,577	11,092	11,681	11,681	7,822	4,031	4,539	2,589	6,013	7,445
	Avg. Net Savings Per Participant (kWh/yr)	884	8,948	9,942	3,250	5,999	3,320	9,428	9,428	9,428	6,308	3,415	3,539	2,540	5,621	6,528
	Total Gross Demand Reduction (kW)	2.0	173.5	1,470.5	156.3	377.5	138.6	172.7	163.4	163.4	80.3	193.2	343.0	112.3	3,385.2	6,751.7
Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Realization Rate Adjustment (kW)	2.0	173.5	1,470.5	156.3	377.5	138.6	172.7	163.4	163.4	80.3	193.2	343.0	112.3	3,385.2	6,751.7	
Net-To-Gross Adjustment (kW)	-0.3	-26.0	-220.6	-23.4	-58.6	-20.8	-25.9	-24.5	-24.5	-12.0	-29.3	-51.4	-16.9	-507.8	-1,012.7	
Net Adjusted Demand Reduction (kW)	1.7	147.5	1,249.9	132.8	320.9	117.8	146.8	138.8	138.8	68.3	163.9	291.5	95.6	2,877.4	5,738.9	
Planned Net Demand Reduction (kW)	57.1	57.1	57.1	57.1	57.1	57.1	57.1	57.1	57.1	57.1	57.1	57.1	57.1	684.7	4,980.7	
Annual % Toward Planned Net Reduction (kW)	0%	22%	204%	224%	271%	288%	309%	309%	309%	339%	366%	406%	420%	420%	115.2%	
Avg. Gross Demand Reduction Per Participant (kW)	0.4	4.8	20.1	2.6	4.2	3.0	3.7	3.7	3.7	2.1	1.9	3.2	1.9	5.1	4.4	
Avg. Net Demand Reduction Per Participant (kW)	0.3	4.1	17.1	2.2	4.9	3.0	3.7	3.6	3.6	1.8	1.6	2.7	1.6	4.3	3.7	
Program Performance	Annual \$ Admin. per Participant (Gross)	\$1,105	\$816	\$992	\$785	\$685	\$675	\$634	\$603	\$566	\$485	\$436	\$423	\$423	\$413	
	Annual \$ Admin. per kWh/yr (Gross)	\$0.96	\$0.69	\$0.89	\$0.69	\$0.69	\$0.69	\$0.69	\$0.69	\$0.69	\$0.69	\$0.69	\$0.69	\$0.69	\$0.69	
	Annual \$ Admin. per kWh (Gross)	\$2,823	\$191	\$609	\$76	\$75	\$81	\$81	\$81	\$81	\$82	\$83	\$83	\$83	\$83	
	Annual \$ Admin. per \$ Total	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	
	Annual \$ Rebate per Participant (Gross)	\$1,111	\$8,114	\$12,321	\$9,685	\$8,191	\$7,894	\$7,842	\$7,711	\$7,711	\$7,346	\$6,652	\$6,376	\$6,099	\$6,099	\$5,641

1. A participant is a unique account number.

A.13 Virginia Non-Residential Small Manufacturing 2019

A.13.1 2019 VA Non-Residential Small Manufacturing Monthly Indicator Tables

VA- Non-residential Small Manufacturing		2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Category	Indicator	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Total	
O&M(\$)	Direct Rebate														
O&M(\$)	Direct Implementation														
O&M(\$)	Direct EM&V														
O&M(\$)	Indirect Other (Administrative)	\$0	\$0	\$0	\$0	\$0	\$0	\$11	\$453	\$2,921	\$2,607	\$2,673	\$3,749	\$12,414	
Capital (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Costs (\$)	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$319	\$13,390	\$86,439	\$77,147	\$79,083	\$110,919	\$367,297	
Costs (\$)	Planned	\$0	\$0	\$0	\$0	\$0	\$0	\$143,823	\$143,823	\$143,823	\$143,823	\$143,823	\$143,823	\$862,936	
Costs (\$)	Variance	\$0	\$0	\$0	\$0	\$0	\$0	-\$143,504	-\$130,433	-\$57,384	-\$66,675	-\$64,739	-\$32,904	-\$495,639	
	Annual % of Planned	0%	0%	0%	0%	0%	0%	0%	2%	12%	21%	30%	43%	43%	
Participants ¹	Total (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Planned (Gross)	3	3	3	3	3	3	3	3	3	3	3	2	35	
	Variance	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-2	-2	-35	
	Annual % of Planned (Gross)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
90%	Net-To-Gross Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Net Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Planned Net Savings (kWh/yr)	29,295	29,295	29,295	29,295	29,295	29,295	29,295	29,295	29,295	29,295	29,295	29,295	351,539	
	Annual % Toward Planned Net Savings (kWh)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
90%	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Program Performance	Annual SAdmin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual SAdmin. per kWh/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual SAdmin. per kW (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual SEM&V per \$Total	N/A	N/A	N/A	N/A	N/A	N/A	0%	88%	27%	19%	16%	21%	21%	
	Annual SRebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

1. A participant is a unique account number.

A.14 Virginia Non-Residential Office 2019

A.14.1 2019 VA Non-Residential Office Monthly Indicator Tables

VA- Non-residential Office Category	Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total
O&M (\$)	Direct Rebate													
O&M (\$)	Direct Implementation													
O&M (\$)	Direct EM&V													
O&M (\$)	Indirect Other (Administrative)	\$0	\$0	\$0	\$0	\$0	\$0	\$11	\$302	\$3,166	\$2,992	\$2,821	\$4,414	\$13,706
Capital (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Costs (\$)	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$319	\$8,922	\$93,667	\$88,536	\$83,473	\$130,590	\$405,507
Costs (\$)	Planned	\$0	\$0	\$0	\$0	\$0	\$0	\$138,788	\$138,788	\$138,788	\$138,788	\$138,788	\$138,788	\$832,726
Costs (\$)	Variance	\$0	\$0	\$0	\$0	\$0	\$0	-\$138,469	-\$129,865	-\$45,120	-\$50,252	-\$55,314	-\$8,198	-\$427,218
	Annual % of Planned	0%	0%	0%	0%	0%	0%	0%	1%	12%	23%	33%	49%	49%
Participants ¹	Total (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planned (Gross)	4	4	4	4	4	4	3	3	3	3	3	3	42
	Variance	-4	-4	-4	-4	-4	-4	-3	-3	-3	-3	-3	-3	-42
	Annual % of Planned (Gross)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
90%	Net-To-Gross Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Net Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planned Net Savings (kWh/yr)	49,536	49,536	49,536	49,536	49,536	49,536	49,536	49,536	49,536	49,536	49,536	49,536	594,427
	Annual % Toward Planned Net Savings (kWh)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90%	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Program Performance	Annual \$Admin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual \$Admin. per kWh/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual \$Admin. per kW (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Annual \$EM&V per \$Total	N/A	N/A	N/A	N/A	N/A	N/A	0%	65%	26%	21%	18%	26%	26%
	Annual \$Rebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

1. A participant is a unique account number.

A.15 Virginia Residential Air Conditioner Cycling Program 2010-2019

A.15.1 2010-2019 VA Residential Air Conditioner Cycling Program Annual Indicator Tables

VA - Residential AC Cycling Program		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2010-2019
Category	Indicator	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate											
O&M (\$)	Direct Implementation											
O&M (\$)	Direct EM&V											
O&M (\$)	Indirect Other (Administrative)	\$872,470	\$763,964	\$681,876	\$668,850	\$301,103	\$196,693	\$186,752	\$238,408	\$333,382	\$244,347	\$4,487,844
Capital (\$)	Direct Implementation	\$1,438,489	\$4,533,310	\$4,926,335	\$2,315,954	\$2,989,751	\$1,971,786	\$555,622	\$101,100	\$130,800	\$160,575	\$19,123,723
Costs (\$)	Total	\$3,700,433	\$9,446,533	\$11,124,610	\$9,178,194	\$9,576,619	\$9,577,752	\$6,700,360	\$6,159,956	\$6,034,693	\$5,781,716	\$77,280,866
Costs (\$)	Planned	\$4,817,708	\$9,883,136	\$17,373,951	\$12,543,660	\$11,497,670	\$11,449,561	\$9,764,999	\$9,506,708	\$8,648,373	\$8,463,554	\$103,949,320
Costs (\$)	Variance	-\$1,117,275	-\$436,603	-\$6,249,341	-\$3,365,466	-\$1,921,050	-\$1,871,809	-\$3,064,639	-\$3,346,752	-\$2,613,680	-\$2,681,838	-\$26,668,454
	Cum. % toward planned total	77%	96%	64%	73%	83%	84%	69%	65%	70%	68%	74%
Participants	Total (Cumulative @ End of Month)	10,900	36,545	66,890	91,280	115,083	140,022	147,723	149,219	151,798	154,787	154,787
	Removals (Uninstalled) / Deactivations	-90	-2,606	-5,516	-12,370	-23,145	-36,769	-49,635	-59,937	-71,171	-79,401	-79,401
	Opt-outs	98	309	18	16	18	93	353	30	27	26	399
	Adjusted Participants (Cum.)	10,712	33,630	61,356	78,894	91,920	103,160	98,088	89,282	80,627	75,386	74,987
0%	Net to gross adjustment (Cum.)	0	0	0	0	0	0	0	0	0	0	0
96%	In Service Rate Adjustment (Cum.)	-436	-1,462	-2,454	-3,156	-3,677	0	0	0	0	0	0
	Net Participation (Cum.)	10,276	32,168	58,901	75,738	88,243	103,160	98,088	89,282	80,627	75,386	74,987
	Planned (Cum.)	9,244	33,996	73,598	96,706	115,702	103,915	103,253	97,037	90,267	80,765	80,765
	Variance (Cum.)	1,032	-1,828	-14,695	-20,968	-27,459	-755	-1,165	-7,755	-9,640	-5,379	-5,778
	Cum % toward planned total (Net basis)	111%	95%	80%	78%	76%	99%	95%	92%	89%	93%	93%
	Removal (Uninstalled) / Deactivation Rate	-0.22%	-0.82%	-0.48%	-0.81%	-1.02%	-1.15%	-1.05%	-0.92%	-1.11%	-1.47%	-0.94%
	Average % Opt-outs (rate)	0.91%	0.91%	0.03%	0.02%	0.02%	0.09%	0.36%	0.03%	0.03%	0.03%	0.17%
	Realization Rate	96%	111%	99%	78%	93%	100%	100%	100%	100%	100%	98%
	Connected Load kW	17,841	92,798	208,834	264,998	296,859	304,177	291,199	267,857	247,443	234,736	231,063
	Ex-Ante Estimated kW	0.94	0.96	1.09	0.95	0.78	0.71	0.97	0.68	0.63	0.63	0.83
	Connected Load Per Participant (kW)	1.74	2.88	3.55	3.50	3.36	2.95	2.97	3.00	3.07	3.11	3.01
kW Potential	Peak Shaving Potential kW - Gross Participants	11,990.0	40,199.5	73,579.0	100,408.0	80,558.1	99,415.6	143,291.3	101,468.9	95,236.4	96,895.3	96,895.3
	Removed (Uninstalled) / Deactivated Peak Shaving Potential kW	-99.0	-2,866.6	-6,067.6	-13,607.0	-16,201.5	-26,106.0	-48,146.0	-40,757.2	-44,651.9	-49,704.3	-49,704.3
	Less Opt-outs (kW)	108.2	339.7	20.3	17.4	12.9	66.0	342.5	20.6	17.2	16.0	249.5
	Dispatchable Peak Shaving Potential - Total kW	11,782.8	36,993.2	67,491.1	86,783.6	64,343.7	73,243.7	94,802.8	60,691.1	50,567.3	47,174.9	46,941.4
0%	Less Free Ridership Factor (Cum.)	0	0	0	0	0	0	0	0	0	0	0
96%	In Service Rate Adjustment (Cum.)	-471	-1,480	-2,700	-3,471	-2,574	0	0	0	0	0	0
	Adjustment for Realization Rate	-430	3,906	-389	-18,195	-4,633	0	0	0	0	0	0
	Net Demand (Cum.)	10,880	39,420	64,403	65,117	57,137	73,244	94,803	60,691	50,567	47,175	46,941
	Planned Demand (Cum.)	8,782	32,293	69,786	91,774	110,390	103,915	73,838	95,027	61,419	50,817	50,817
	Cum. % toward planned total (Net basis)	124%	122%	92%	71%	52%	69%	128%	64%	82%	93%	92%
	Dispatchable Peak Shaving Potential kW per Participant	1.06	1.23	1.09	0.86	0.65	0.71	0.97	0.68	0.63	0.63	0.63
Program Performance	Cum. \$Admin. per Cum. Participant	\$80	\$45	\$22	\$33	\$29	\$25	\$25	\$26	\$28	\$29	\$29
	Cum. \$Admin. per Cum. Gross kW	\$73	\$41	\$20	\$30	\$41	\$40	\$26	\$39	\$45	\$46	\$44
	Cum. \$EM&V per Cum. \$Total	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%	2%
	Cum. \$Rebate per Cum. Participant	\$16	\$37	\$52	\$70	\$86	\$99	\$118	\$141	\$159	\$176	\$176.41

1. A participant is a unique account number.

CONFIDENTIAL INFORMATION REDACTED

A.16 Virginia Non-residential Distributed Generation Program 2012-2019

A.16.1 2012-2019 VA Non-residential Distributed Generation Program Annual Indicator Tables

VA - Non-Residential Distributed Generation Program		2012	2013	2014	2015	2016	2017	2018	2019	2012 - 2019
Category	Indicator	Total	Total	Total	Total	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate									
O&M (\$)	Direct Implementation									
O&M (\$)	Direct EM&V									
O&M (\$)	Indirect Other (Administrative)	\$45,196	\$70,742	\$55,136	\$14,914	\$17,395	\$20,476	\$31,507	\$26,331	\$281,697
Capital (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Costs (\$)	Total	\$474,517	\$704,695	\$1,107,382	\$538,023	\$572,348	\$561,690	\$557,961	\$589,631	\$5,106,245
Costs (\$)	Planned	\$2,261,356	\$2,464,188	\$2,011,074	\$947,030	\$851,134	\$730,107	\$874,549	\$909,830	\$11,049,268
Costs (\$)	Variance	-\$1,786,840	-\$1,759,493	-\$903,692	-\$409,007	-\$278,787	-\$168,417	-\$316,588	-\$320,199	-\$5,943,023
	Cum. % toward planned total	21%	29%	55%	57%	67%	77%	64%	65%	46%
Participants ¹	Total (Cumulative @ End of Month)	19.0	19.4	18.6	5.9	6.5	6.1	6.1	6.1	6.1
	Planned (Cum.)	23.0	28.0	35.0	13.0	7.0	7.4	8.1	7.6	7.6
	Variance (Cum.)	-4.0	-8.6	-16.4	-7.1	-0.5	-1.3	-2.0	-1.5	-1.5
	Cum % Toward Planned Total (Net basis)	83%	69%	53%	45%	93%	82%	75%	81%	81%
kW Potential	Total (Cumulative @ End of Month)	19,040	19,410	18,580	5,875	5,740	5,548	6,130	6,130	6,130
	Realization Rate	70%	77%	78%	93%	106%	108%	97%	113%	113%
	Adjustment for Realization Rate	-2,989	-3,300	-4,088	-411	344	444	-184	797	797
	Net kW (Cum.)	16,051	16,110	14,492	5,457	4,348	5,992	5,946	6,927	6,927
	Planned (Cum.)	23,000	28,000	35,000	13,000	7,000	7,394	8,149	7,592	7,592
	Cum % Toward Planned Total (Net basis)	70%	58%	41%	42%	62%	86%	73%	91%	91%
	Avg. per Net Participant (Net kW)	843	830	780	929	669	982	970	1,130	892
Program Performance	Annual Cum. \$Admin. per Cum. Participant	\$2,374	\$5,973	\$9,207	\$9,294	\$9,589	\$3,357	\$5,140	\$4,295	\$4,295
	Annual Cum. \$Admin. per Cum. Gross kW	\$2	\$6	\$9	\$9	\$10	\$3	\$5	\$4	\$4
	Cum. \$EM&V per Cum. \$Total	3.3%	7.5%	8.8%	9.5%	11.6%	12.5%	13.3%	13.4%	13.4%
	Cum. \$Rebate per Cum. Participant	\$21,366	\$47,494	\$99,549	\$376,393	\$418,435	\$513,179	\$577,089	\$651,772	\$651,772

1. A participant is equal to one megawatt (MW) available to Dominion for dispatch through the Commercial Distributed Generation program.

A.16.2 2019 VA Non-residential Distributed Generation Program Monthly Indicator Tables

VA - Non-Residential Distributed Generation Program Category	Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 July	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2012 - 2019 Program Total
O&M (\$)	Direct Rebate	\$2,261	\$1,875	\$1,102	\$3,229	\$1,863	\$4,131	\$1,815	\$2,798	\$2,031	\$1,141	\$1,201	\$2,783	\$26,331	\$281,697
O&M (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
O&M (\$)	Direct EM&V	\$37,491	\$31,090	\$18,277	\$55,194	\$30,886	\$68,487	\$53,692	\$82,787	\$60,091	\$33,763	\$35,524	\$82,351	\$589,631	\$5,106,245
O&M (\$)	Indirect Other (Administrative)	\$121,457	\$46,714	\$9,343	\$46,714	\$140,143	\$102,771	\$88,538	\$61,976	\$106,245	\$44,269	\$61,976	\$79,684	\$909,830	\$11,049,268
O&M (\$)	Direct Implementation	-\$83,966	-\$15,624	\$8,934	\$8,479	-\$109,257	-\$34,284	-\$34,846	\$20,811	-\$46,154	-\$10,506	-\$26,452	\$2,667	-\$320,199	-\$5,943,023
Capital (\$)	Cum. % toward planned total	4%	8%	10%	16%	19%	27%	32%	42%	48%	52%	56%	65%	65%	46%
Participants ¹	Total (Cumulative @ End of Month)	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
	Planned (Cum.)	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
	Variance (Cum.)	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
	Cum % Toward Planned Total (Net basis)	81%	81%	81%	81%	81%	81%	81%	81%	81%	81%	81%	81%	81%	81%
kW Potential	Total (Cumulative @ End of Month)	6,130	6,130	6,130	6,130	6,130	6,130	6,130	6,130	6,130	6,130	6,130	6,130	6,130	6,130
	Realization Rate	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
	Adjustment for Realization Rate	797	797	797	797	797	797	797	797	797	797	797	797	797	797
	Net kW (Cum.)	6,927	6,927	6,927	6,927	6,927	6,927	6,927	6,927	6,927	6,927	6,927	6,927	6,927	6,927
	Planned (Cum.)	7,592	7,592	7,592	7,592	7,592	7,592	7,592	7,592	7,592	7,592	7,592	7,592	7,592	7,592
	Cum % Toward Planned Total (Net basis)	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%
	Avg. per Net Participant (Net kW)	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	892
Program Performance	Annual Cum. \$ Admin. per Cum. Participant	\$369	\$675	\$855	\$1,398	\$1,702	\$2,376	\$2,672	\$3,128	\$3,459	\$3,645	\$3,841	\$4,295	\$4,295	\$4,295
	Annual Cum. \$ Admin. per Cum. Gross kW	\$0	\$1	\$1	\$2	\$2	\$2	\$3	\$3	\$3	\$3	\$4	\$4	\$4	\$4
	Cum. \$EM&V per Cum. \$Total	13.2%	13.2%	13.2%	13.1%	13.1%	13.2%	13.1%	13.2%	13.1%	13.0%	13.0%	13.4%	13.4%	13.4%
	Cum. \$Rebate per Cum. Participant	\$582,785	\$586,520	\$588,695	\$596,871	\$600,506	\$608,538	\$616,799	\$626,416	\$635,267	\$639,467	\$644,352	\$651,772	\$651,772	\$651,772

1. A participant is equal to one megawatt (MW) available to Dominion for dispatch through the Commercial Distributed Generation program.

A.17 Virginia Residential Lighting Program 2010-2012

VA- Residential Lighting Program		2010	2011	2012	2010-2012
Category	Indicator	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate				
O&M (\$)	Direct Implementation				
O&M (\$)	Direct EM&V				
O&M (\$)	Indirect Other (Administrative)	\$857,229	\$297,373	\$3,259	\$1,157,861
Costs (\$)	Total	\$3,572,757	\$3,608,825	\$41,017	\$7,222,598
Costs (\$)	Planned	\$5,343,451	\$4,151,099	\$64,063	\$9,558,613
Costs (\$)	Variance	-\$1,770,694	-\$542,275	-\$23,046	-\$2,336,015
	Cum. % toward planned total	66.9%	86.9%	64.0%	75.6%
Participants	Total bulbs (Gross)	2,016,479	2,206,030	0	4,222,509
	Planned (Gross)	2,013,600	2,001,784	0	4,015,384
	Variance	2,879	204,246	0	207,125
	Cum % toward planned total (Gross)	100.1%	110.2%	0.0%	105.2%
kWh	Total Gross Deemed Savings	101,640,578	116,730,747	0	218,371,325
84%	Realization Rate Adjustment	-16,262,492	-18,676,920	0	-34,939,412
	Adjusted Gross Savings	85,378,086	98,053,827	0	183,431,913
65%	Net-To-Gross Adjustment	-29,882,330	-34,318,840	0	-64,201,170
	Net Adjusted Savings	55,495,756	63,734,988	0	119,230,743
	Planned Savings (Net)	53,544,280	53,229,979	0	106,774,259
	Cum. % Toward Planned Savings (Net)	103.6%	119.7%	0.0%	111.7%
	Avg. Savings Per Participant (Net)	28	29	0	28
kW	Total Gross Deemed Demand	11,056	12,700	0	23,756
84%	Realization Rate Adjustment	-1,769	-2,032	0	-3,801
	Adjusted Gross Demand	9,287	10,668	0	19,955
65%	Net-To-Gross Adjustment	-3,250	-3,734	0	-6,984
	Net Adjusted Demand	6,037	6,934	0	12,971
	Planned Demand (Net)	4,685	4,657	0	9,342
	Cum. % Toward Planned Demand (Net)	128.8%	148.9%	0.0%	138.8%
	Avg. Demand Per Participant (Net)	0.003	0.003	0.000	0.003
Program Performance	Cum. \$Admin. per Cum. Bulb (Gross)	\$0.4	\$0.1		\$0.3
	Cum. \$Admin. per Cum. kWh (Gross)	\$0.008	\$0.00		\$0.005
	Cum. \$Admin. per Cum. kW (Gross)	\$78	\$23		\$49
	Cum. \$EM&V per Cum Total Costs (\$)	0.7%	3.5%	89.1%	2.6%
	Cum. \$Rebate per Cum. Bulb (Gross)	\$0.78	\$1.00		\$0.90

1. Program closed end of 2012.

A.18 Virginia Residential Low-income Program 2010-2014

VA- Residential Low-income Program		2010*	2011*	2012	2013	2014	2010-2014
Category	Indicator	Total	Total	Total	Total	Total	Program Total
O&M(\$)	Direct Rebate						
O&M(\$)	Direct Implementation						
O&M(\$)	Direct EM&V						
O&M(\$)	Indirect Other (Administrative)	\$825,883	\$386,039	\$388,331	\$273,011	\$126,173	\$1,999,436
Capital (\$)		\$0	\$0	\$0	\$0	\$0	\$0
Costs (\$)	Total	\$2,698,543	\$4,799,288	\$3,363,405	\$2,600,289	\$2,432,463	\$15,893,988
Costs (\$)	Planned	\$3,409,892	\$6,679,625	\$10,513,733	\$3,566,022	\$2,975,592	\$27,144,863
Costs (\$)	Variance	-\$711,349	-\$1,880,337	-\$7,150,328	-\$965,733	-\$543,128	-\$11,250,875
	Cum. % toward planned total	79.1%	71.8%	32.0%	72.9%	81.7%	58.6%
Participants	Total (Gross)	1,431	3,913	2,380	1,883	1,880	11,487
	Planned (Gross)	1,414	3,789	6,062	2,467	1,872	15,604
	Variance	17	124	-3,682	-584	8	-4,117
	Cum % toward planned total (Gross)	101.2%	103.3%	39.3%	76.3%	100.4%	73.6%
Installed kWh/year	Total Gross Deemed Savings	1,743,349	4,490,516	2,596,580	1,668,643	1,740,993	12,240,081
62%	Realization Rate Adjustment	-923,975	-2,379,974	-1,376,187	-417,161	-661,577	-5,758,874
	Adjusted Gross Savings	819,374	2,110,543	1,220,392	1,251,482	1,079,416	6,481,207
93.6%	Net-To-Gross Adjustment	-52,440	-135,075	-78,105	-80,095	-69,083	-414,797
	Net Adjusted Savings	766,934	1,975,468	1,142,287	1,171,388	1,010,333	6,066,410
	Planned Savings (Net)	554,704	554,704	554,704	554,704	1,560,401	3,779,217
	Cum. % Toward Planned Savings (Net)	138.3%	356.1%	205.9%	211.2%	64.7%	160.5%
	Avg. Savings Per Participant (Net)	536	505	480	622	537	528
Installed kW	Total Gross Deemed Demand	691	1,443	508	346	336	3,323
62%	Realization Rate Adjustment	-366.4	-764.7	-269.3	-86.4	-127.6	-1,614
	Adjusted Gross Demand	325	678	239	259	208	1,709
93.6%	Net-To-Gross Adjustment	-21	-43	-15	-17	-13	-109
	Net Adjusted Demand	304	635	223	243	195	1,600
	Planned (Net)	102	274	436	396	246	1,454
	Cum. % toward planned total (Net)	298.1%	231.6%	51.3%	61.3%	79.3%	110.1%
	Avg. per Participant (Net)	0.0	0.2	0.1	0.1	0.1	0.1
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$577	\$99	\$163	\$145	\$67	\$174
	Cum. \$Admin. per Cum. kWh (Gross)	\$0.5	\$0.1	\$0.1	\$0.2	\$0.1	\$0.2
	Cum. \$Admin. per Cum. kW (Gross)	\$1,195	\$268	\$764	\$790	\$376	\$602
	Cum. \$EM&V per Cum Total Costs (\$)	1.0%	3.2%	3.2%	4.0%	3.4%	3.0%
	Cum. \$Rebate per Cum. Participant (Gross)	\$1,086	\$1,019	\$1,065	\$1,016	\$951	\$1,025.22

1. Program closed end of 2014.

A.19 Virginia Residential Heat Pump Upgrade Program 2012-2017

VA - Residential Heat Pump Upgrade Program		2012	2013	2014	2015	2016	2017	2012 - 2017
Category	Indicator	Total	Total	Total	Total	Total	Total	Program Total
O&M(\$)	Direct Rebate							
O&M(\$)	Direct Implementation							
O&M(\$)	Direct EM&V							
O&M(\$)	Indirect Other (Administrative)	\$126,049	\$202,451	\$101,388	\$76,038	\$78,750	\$29,454	\$614,131
Costs (\$)	Total	\$1,146,122	\$2,046,264	\$1,894,946	\$2,465,610	\$2,591,140	\$748,544	\$10,892,625
Costs (\$)	Planned	\$2,219,762	\$4,060,927	\$5,335,095	\$5,744,102	\$6,313,961	\$526,099	\$24,199,946
Costs (\$)	Variance	-\$1,073,640	-\$2,014,663	-\$3,440,149	-\$3,278,493	-\$3,722,821	\$222,445	-\$13,307,321
	Annual % of Planned	52%	50%	36%	43%	41%	142%	45%
Participants ¹	Total (Gross)	86	3,295	3,649	4,210	5,395	1,149	17,784
	Planned (Gross)	4,396	11,992	18,221	18,221	3,748	0	56,578
	Variance	-4,310	-8,697	-14,572	-14,011	1,647	1,149	-38,794
	Annual % of Planned (Gross)	2%	27%	20%	23%	144%		31%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	199,447	6,665,695	5,667,002	2,405,953	3,072,240	553,935	18,564,272
78%	Realization Rate Adjustment (kWh/yr)	13,363	446,602	379,689	-538,933	-688,182	-124,081	-511,543
	Realization Rate Adjusted Savings (kWh/yr)	212,810	7,112,296	6,046,691	1,867,020	2,384,058	429,854	18,052,729
45%	Net-To-Gross Adjustment (kWh/yr)	-31,922	-1,066,844	-907,004	-1,024,994	-1,308,848	-235,990	-4,575,601
	Net Adjusted Savings (kWh/yr)	180,889	6,045,452	5,139,687	842,026	1,075,210	193,864	13,477,128
	Planned Net Savings (kWh/yr)	3,207,000	8,724,528	15,761,165	15,761,165	742,316	0	44,196,174
	Annual % Toward Planned Net Savings (kWh)	6%	69%	33%	5%	145%		30%
	Avg. Gross Savings Per Participant (kWh/yr)	2,319	2,023	1,553	571	569	482	1,044
	Avg. Net Savings Per Participant (kWh/yr)	2,103	1,835	1,409	200	199	169	758
Installed kW	Total Gross Demand Reduction (kW)	59	2,394	2,169	472	624	130	5,848
89%	Realization Rate Adjustment (kW)	-10	-405	-367	-53	-70	-15	-918
	Realization Rate Adjusted Gross Demand Reduction (kW)	49	1,989	1,802	419	554	115	4,930
45%	Net-To-Gross Adjustment (kW)	-7	-298	-270	-230	-304	-63	-1,174
	Net Adjusted Demand Reduction (kW)	42	1,691	1,532	189	250	52	3,756
	Planned Net Demand Reduction (kW)	1,068	2,904	5,284	5,284	267	0	14,807
	Annual % Toward Planned Net Reduction (kW)	4%	58%	29%	4%	94%		25%
	Avg. Gross Demand Reduction Per Participant (kW)	0.69	0.73	0.59	0.11	0.12	0.11	0.33
	Avg. Net Demand Reduction Per Participant (kW)	0.49	0.51	0.42	0.04	0.05	0.05	0.21
Program Performance	Annual \$Admin. per Participant (Gross)	\$1,466	\$61	\$28	\$18	\$15	\$26	\$35
	Annual \$Admin. per kWh/year (Gross)	\$0.63	\$0.03	\$0.02	\$0.03	\$0.03	\$0.05	\$0.03
	Annual \$Admin. per kW (Gross)	\$2,125	\$85	\$47	\$161	\$126	\$227	\$105
	Annual \$EM&V per \$Total	1.6%	15.1%	13.5%	18.5%	11.0%	18.8%	13.4%
	Annual \$Rebate per Participant (Gross)	\$219	\$218	\$217	\$219	\$218	\$218	\$218

1. Program closed end of 2017.
2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.
3. Realization Rate Adjustment occurred in 2015. Prior to 2012-2014 kWh realization rate was 106.7%, kW realization rate was 83.1%, and Net to Gross rate was 85%. From the start of 2015 forward kWh realization rate was 78%, kW realization rate was 89%, and Net to Gross rate was 45%.

A.20 Virginia Residential Heat Pump Tune-Up Program 2012-2017

VA - Residential Heat Pump Tune Up Program Category	Indicator	2012 Total	2013 Total	2014 Total	2015 Total	2016 Total	2017 Total	2012 - 2017 Program Total
O&M (\$)	Direct Rebate	\$179,541	\$339,952	\$229,172	\$124,325	\$103,917	\$26,250	\$1,003,156
O&M (\$)	Direct Implementation							
O&M (\$)	Direct FM&V							
O&M (\$)	Indirect Other (Administrative)							
Costs (\$)	Total	\$1,570,652	\$3,220,440	\$4,388,028	\$3,953,516	\$3,419,197	\$667,118	\$17,218,951
Costs (\$)	Planned	\$2,601,223	\$4,655,778	\$6,022,741	\$6,579,027	\$6,868,318	\$847,759	\$27,574,846
Costs (\$)	Variance	-\$1,030,571	-\$1,435,338	-\$1,634,713	-\$2,625,511	-\$3,449,121	-\$180,641	-\$10,355,894
	Annual % of Planned	60%	69%	73%	60%	50%	79%	62%
Participants ¹	Total (Gross)	1,209	15,636	24,687	24,114	19,008	2,472	87,126
	Planned (Gross)	10,203	27,830	42,293	42,293	22,958	0	145,577
	Variance	-8,994	-12,194	-17,606	-18,179	-3,950	2,472	-58,451
	Annual % of Planned (Gross)	12%	56%	58%	57%	83%		60%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	364,856	4,605,801	6,269,989	5,067,124	4,035,338	500,799	20,843,906
99%	Realization Rate Adjustment (kWh/yr)	-2,919	-36,846	-50,160	-40,537	-32,283	-4,006	-166,751
	Realization Rate Adjusted Savings (kWh/yr)	361,937	4,568,954	6,219,829	5,026,587	4,003,055	496,793	20,677,155
90%	Net-To-Gross Adjustment (kWh/yr)	-36,194	-456,895	-621,983	-502,659	-400,306	-49,679	-2,067,715
	Net Adjusted Savings (kWh/yr)	325,743	4,112,059	5,597,846	4,523,928	3,602,750	447,114	18,609,439
	Planned Net Savings (kWh/yr)	7,024,000	19,102,880	32,227,266	32,227,266	25,955,483	0	93,176,895
	Annual % Toward Planned Net Savings (kWh)	5%	22%	17%	14%	139%		20%
	Avg. Gross Savings Per Participant (kWh/yr)	302	295	254	210	212	203	239
	Avg. Net Savings Per Participant (kWh/yr)	269	263	227	188	190	181	214
Installed kW	Total Gross Demand Reduction (kW)	250	3,160	3,198	5,435	3,003	391	15,437
99%	Realization Rate Adjustment (kW)	-2	-25	-26	-43	-24	-3	-123
	Realization Rate Adjusted Gross Demand Reduction (kW)	248	3,135	3,173	5,392	2,979	387	15,313
90%	Net-To-Gross Adjustment (kW)	-25	-314	-317	-539	-298	-39	-1,531
	Net Adjusted Demand Reduction (kW)	223	2,822	2,855	4,852	2,681	349	13,782
	Planned Net Demand Reduction (kW)	2,053	5,585	9,727	9,727	869	0	27,962
	Annual % Toward Planned Net Reduction (kW)	11%	51%	29%	50%	309%		49%
	Avg. Gross Demand Reduction Per Participant (kW)	0.21	0.20	0.13	0.23	0.16	0.16	0.18
	Avg. Net Demand Reduction Per Participant (kW)	0.18	0.18	0.12	0.20	0.14	0.14	0.16
Program Performance	Annual \$Admin. per Participant (Gross)	\$149	\$22	\$9	\$5	\$5	\$11	\$12
	Annual \$Admin. per kWh/year (Gross)	\$0.49	\$0.07	\$0.04	\$0.02	\$0.03	\$0.05	\$0.05
	Annual \$Admin. per kW (Gross)	\$719	\$108	\$72	\$23	\$35	\$67	\$65
	Annual \$FM&V per \$Total	1%	3%	2%	2%	3%	10%	3%
	Annual \$Rebate per Participant (Gross)	\$90	\$90	\$90	\$90	\$91	\$90	\$90

1. Program closed end of 2017.
2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.

A.21 Virginia Residential Duct Sealing Program 2012-2017


VA - Residential Duct Sealing Program		2012	2013	2014	2015	2016	2017	2012 - 2017
Category	Indicator	Total	Total	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate							
O&M (\$)	Direct Implementation							
O&M (\$)	Direct EM&V							
O&M (\$)	Indirect Other (Administrative)	\$107,619	\$88,535	\$47,393	\$29,028	\$21,206	\$12,428	\$306,208
Costs (\$)	Total	\$898,451	\$868,778	\$995,573	\$932,972	\$697,755	\$315,834	\$4,709,363
Costs (\$)	Planned	\$1,078,863	\$1,517,606	\$1,760,434	\$1,656,434	\$1,765,492	\$287,296	\$8,066,125
Costs (\$)	Variance	-\$180,412	-\$648,828	-\$764,861	-\$723,462	-\$1,067,737	\$28,538	-\$3,356,761
	Annual % of Planned	83%	57%	57%	56%	40%	109.9%	58.4%
Participants ¹	Total (Gross)	8	108	401	1,860	658	264	3,299
	Planned (Gross)	1,267	3,456	5,249	5,249	1,499	0	16,720
	Variance	-1,259	-3,348	-4,848	-3,389	-841	264	-13,421
	Annual % of Planned (Gross)	1%	3%	8%	35%	44%		19.7%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	10,093	120,772	264,570	1,024,299	369,325	145,638	1,934,698
49%	Realization Rate Adjustment (kWh/yr)	-5,107	-61,111	-133,872	-518,295	-186,879	-73,693	-978,957
	Realization Rate Adjusted Savings (kWh/yr)	4,986	59,661	130,697	506,004	182,447	71,945	955,741
80%	Net-To-Gross Adjustment (kWh/yr)	-997	-11,932	-26,139	-101,201	-36,489	-14,389	-191,148
	Net Adjusted Savings (kWh/yr)	3,989	47,729	104,558	404,803	145,957	57,556	764,592
	Planned Net Savings (kWh/yr)	533,000	1,449,268	2,750,476	2,750,476	178,861	0	7,662,081
	Annual % Toward Planned Net Savings (kWh)	1%	3%	4%	15%	82%		10%
	Avg. Gross Savings Per Participant (kWh/yr)	1,262	1,118	660	551	561	552	586
	Avg. Net Savings Per Participant (kWh/yr)	499	442	261	218	222	218	232
Installed kW	Total Gross Demand Reduction (kW)	12	138	217	839	302	119	1,627
43%	Realization Rate Adjustment (kW)	-7	-79	-125	-483	-174	-69	-936
	Realization Rate Adjusted Gross Demand Reduction (kW)	5	59	92	357	129	51	692
80%	Net-To-Gross Adjustment (kW)	-1	-12	-18	-71	-26	-10	-138
	Net Adjusted Demand Reduction (kW)	4	47	74	285	103	41	553
	Planned Net Demand Reduction (kW)	330	898	1,732	1,732	60	0	4,752
	Annual % Toward Planned Net Reduction (kW)	1%	5%	4%	16%	172%		12%
	Avg. Gross Demand Reduction Per Participant (kW)	1.45	1.28	0.54	0.45	0.46	0.45	0.49
	Avg. Net Demand Reduction Per Participant (kW)	0.49	0.43	0.18	0.15	0.16	0.15	0.17
Program Performance	Annual \$Admin. per Participant (Gross)	\$13,452	\$820	\$118	\$16	\$32	\$47	\$93
	Annual \$Admin. per kWh/year (Gross)	\$10.66	\$0.7	\$0.2	\$0.03	\$0.06	\$0.09	\$0.16
	Annual \$Admin. per kW (Gross)	\$9,287	\$642	\$219	\$97	\$70	\$104	\$188
	Annual SEM&V per \$Total	2.1%	13.5%	18.6%	15.0%	15.4%	21.1%	12.0%
	Annual \$Rebate per Participant (Gross)	\$125	\$125	\$133	\$126	\$125	\$125	\$125

1. Program closed end of 2017.
2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.

A.22 Virginia Residential Home Energy Check-Up Program 2012-2017

VA - Residential Home Energy Check-Up Program		2012	2013	2014	2015	2016	2017	2012 - 2017
Category	Indicator	Total	Total	Total	Total	Total	Total ²	Program Total
O&M (\$)	Direct Rebate							
O&M (\$)	Direct Implementation							
O&M (\$)	Direct EM&V							
O&M (\$)	Indirect Other (Administrative)	\$45,900	\$107,979	\$302,076	\$142,892	\$152,251	\$27,969	\$779,066
Costs (\$)	Total	\$388,827	\$1,139,455	\$6,664,393	\$4,530,926	\$5,009,540	\$710,794	\$18,443,934
Costs (\$)	Planned	\$579,767	\$1,147,655	\$1,316,844	\$1,390,384	\$1,461,234	\$948,379	\$6,844,262
Costs (\$)	Variance	-\$190,940	-\$8,200	\$5,347,549	\$3,140,542	\$3,548,306	-\$237,585	\$11,599,672
	Annual % of Planned	67%	99%	506%	326%	343%	75%	269%
Participants ¹	Total (Gross)	31	1,569	19,702	13,860	15,252	1,500	51,914
	Planned (Gross)	602	1,605	2,427	2,427	2,427	0	9,488
	Variance	-571	-36	17,275	11,433	12,825	1,500	42,426
	Annual % of Planned (Gross)	5%	98%	812%	571%	628%		547%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	24,484	1,156,888	10,573,042	6,834,001	6,803,477	827,576	26,219,469
154%	Realization Rate Adjustment (kWh/yr)	13,099	618,935	5,656,578	3,656,191	3,639,860	442,753	14,027,416
	Realization Rate Adjusted Savings (kWh/yr)	37,583	1,775,823	16,229,620	10,490,192	10,443,338	1,270,330	40,246,885
82%	Net-To-Gross Adjustment (kWh/yr)	-7,517	-355,165	-3,245,924	-1,898,725	-1,890,244	-229,930	-7,627,504
	Net Adjusted Savings (kWh/yr)	30,066	1,420,658	12,983,696	8,591,467	8,553,094	1,040,400	32,619,381
	Planned Net Savings (kWh/yr)	492,000	1,306,356	2,468,259	2,468,259	4,593,678	0	11,328,552
	Annual % Toward Planned Net Savings (kWh)	6%	109%	526%	348%	186%		288%
	Avg. Gross Savings Per Participant (kWh/yr)	790	737	537	493	446	552	505
	Avg. Net Savings Per Participant (kWh/yr)	970	905	659	620	561	694	628
Installed kW	Total Gross Demand Reduction (kW)	3	140	1,106	695	693	76	2,713
154%	Realization Rate Adjustment (kW)	2	75	592	372	371	41	1,452
	Realization Rate Adjusted Gross Demand Reduction(kW)	5	215	1,698	1,066	1,064	117	4,165
82%	Net-To-Gross Adjustment (kW)	-1	-43	-340	-193	-193	-21	-790
	Net Adjusted Demand Reduction (kW)	4	172	1,358	873	871	96	3,374
	Planned Net Demand Reduction (kW)	85	225	437	437	1,002	0	2,186
	Annual % Toward Planned Net Reduction (kW)	4%	76%	311%	200%	87%		154%
	Avg. Gross Demand Reduction Per Participant (kW)	0.1	0.1	0.1	0.05	0.05	0.05	0.05
	Avg. Net Demand Reduction Per Participant (kW)	0.1	0.1	0.1	0.06	0.06	0.06	0.07
Program Performance	Annual \$Admin. per Participant (Gross)	\$1,481	\$69	\$15	\$10	\$10	\$19	\$15
	Annual \$Admin. per kWh/year (Gross)	\$2	\$0	\$0.03	\$0.02	\$0	\$0	\$0.03
	Annual \$Admin. per kW (Gross)	\$14,840	\$771	\$273	\$206	\$220	\$366	\$287
	Annual \$EM&V per \$Total	4.9%	9.7%	0.8%	2.6%	3.2%	12.1%	3.0%
	Annual \$Rebate per Participant (Gross)	\$220	\$226	\$226	\$206	\$208	\$217	\$215

CONFIDENTIAL INFORMATION REDACTED

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1. Program closed end of 2017.
 2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.
 3. The 2017 total gross deemed savings values reported in this table include adjustments of -2.1 kWh/year and -0.00044 kW made to the January 2017 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017. Specifically, the correction was in section 2.1.5 for "Low-Flow Showerhead" measures, to the " ΔT " variable, which is a measure of the change in temperature of the water used for shower and temperature entering the house ($\Delta T = T_{\text{shower}} - T_{\text{in house}}$). STEP Manual 7.0.0 reported the value as 44.9°F, but has been corrected to 44.1°F. This correction is reflected in STEP Manual version 8.0.0 in this EM&V report.
 4. Realization Rate Adjustment occurred in 2015. 2012-2014 Net to Gross Adjustment was 80.0%. From 2015 forward Net to Gross Adjustment was 82% and Realization Rate as adjusted to 154%.

A.23 Virginia Residential Appliance Recycling Program 2015-2018

VA- Residential Appliance Recycling Program		2015	2016	2017	2018	2015-2018
Category	Indicator	Total	Total	Total	Total	Program Total
O&M(\$)	Direct Rebate					
O&M(\$)	Direct Implementation					
O&M(\$)	Direct EM&V					
O&M(\$)	Indirect Other (Administrative)	\$21,660	\$65,648	\$38,635	\$3,094	\$129,037
Costs (\$)	Total	\$929,051	\$2,160,027	\$981,865	\$54,790	\$4,125,733
Costs (\$)	Planned	\$1,102,158	\$2,072,738	\$1,086,648	\$10,474	\$4,272,019
Costs (\$)	Variance	-\$173,107	\$87,289	-\$104,783	\$44,316	-\$146,286
	Annual % of Planned	84%	104%	90%	523%	97%
Participants ¹	Total (Gross)	3,206	7,735	3,131	0	14,072
	Planned (Gross)	3,750	7,500	3,000	0	14,250
	Variance	-544	235	131	0	-178
	Annual % of Planned (Gross)	85%	103%	104%		99%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	3,618,359	7,552,110	3,016,432	0	14,186,901
	100% Realization Rate Adjustment (kWh/yr)	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	3,618,359	7,552,110	3,016,432	0	14,186,901
77%	Net-To-Gross Adjustment (kWh/yr)	-832,223	-1,736,985	-693,779	0	-3,262,987
	Net Adjusted Savings (kWh/yr)	2,786,136	5,815,125	2,322,653	0	10,923,914
	Planned Net Savings (kWh/yr)	6,564,000	3,736,801	1,346,206	0	11,647,008
	Annual % Toward Planned Net Savings (kWh)	42%	156%	173%		94%
	Avg. Gross Savings Per Participant (kWh/yr)	1,129	976	963		1,008
	Avg. Net Savings Per Participant (kWh/yr)	869	752	742		776
Installed kW	Total Gross Demand Reduction (kW)	541.6	1,130.4	451.5	0.0	2,123.5
	100% Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	541.6	1,130.4	451.5	0.0	2,123.5
77%	Net-To-Gross Adjustment (kW)	-124.6	-260.0	-103.8	0.0	-488.4
	Net Adjusted Demand Reduction (kW)	417.0	870.4	347.7	0.0	1,635.1
	Planned Net Demand Reduction (kW)	1,220.7	559.4	201.5	0.0	1,981.6
	Annual % Toward Planned Net Reduction (kW)	34%	156%	173%		83%
	Avg. Gross Demand Reduction Per Participant (kW)	0.17	0.15	0.14		0.15
	Avg. Net Demand Reduction Per Participant (kW)	0.13	0.11	0.11		0.12
Program Performance	Annual \$Admin. per Participant (Gross)	\$7	\$8	\$12		\$9
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.01	\$0.01		\$0.01
	Annual \$Admin. per kW (Gross)	\$40	\$58	\$86		\$61
	Annual SEM&V per \$Total	1.1%	4.5%	7.3%	93.6%	5.6%
	Annual \$Rebate per Participant (Gross)	\$51	\$50	\$50		\$50

1. Program closed end of 2017.
2. A participant is a unique account number.

A.24 Virginia Commercial Lighting Program 2010-2012

VA- Commercial Lighting Program		2010	2011	2012	2010-2012
Category	Indicator	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate				
O&M (\$)	Direct Implementation				
O&M (\$)	Direct EM&V				
O&M (\$)	Indirect Other (Administrative)	\$574,965	\$419,642	\$310,152	\$1,304,759
Costs (\$)	Total	\$1,896,257	\$5,239,777	\$2,682,806	\$9,818,840
Costs (\$)	Planned	\$1,683,194	\$6,018,217	\$9,231,456	\$16,932,868
Costs (\$)	Variance	\$213,062	-\$778,440	-\$6,548,651	-\$7,114,028
	Cum. % toward planned total	112.7%	87.1%	29.1%	58.0%
Participants	Total (Gross)	399	1,307	703	2,409
	Planned (Gross)	26	146	32	204
	Variance	373	1,161	671	2,205
	Cum % toward planned total (Gross)	1534.6%	895.2%	2196.9%	1180.9%
kWh	Total Gross Deemed Savings	13,533,989	42,212,316	23,709,597	79,455,902
	178.0% Realization Rate Adjustment ¹	10,581,378	32,807,324	18,502,140	61,890,842
	Adjusted Gross Savings	24,115,366	75,019,641	42,211,737	141,346,744
	50.0% Net-To-Gross Adjustment	-12,057,683	-37,509,820	-21,105,869	-70,673,372
	Net Adjusted Savings	12,057,683	37,509,820	21,105,869	70,673,372
	Planned Savings (Net)	6,364,934	35,764,075	7,716,991	49,846,000
	Cum. % Toward Planned Savings (Net)	189.4%	104.9%	273.5%	141.8%
Avg. Savings Per Participant (Net)	30,220	28,699	30,023	29,337	
kW	Total Gross Deemed Demand	3,049	9,553	5,450	18,052
	98.0% Realization Rate Adjustment	-61.0	-191.1	-109.0	
	Adjusted Gross Demand	2,988	9,362	5,341	
	50.0% Net-To-Gross Adjustment	-1,494	-4,681	-2,670	-8,845
	Net Adjusted Demand	1,494	4,681	2,670	8,845
	Planned Demand (Net)	798	4,490	969	6,257
	Cum. % Toward Planned Demand (Net)	187.2%	104.3%	275.6%	141.4%
Avg. Demand Per Participant (Net)	4	4	4	6,257	
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$1,441	\$321	\$441	\$542
	Cum. \$Admin. per Cum. kWh (Gross)	\$0.04	\$0.01	\$0.01	\$0.02
	Cum. \$Admin. per Cum. kW (Gross)	\$189	\$44	\$57	\$72
	Cum. \$EM&V per Cum Total Costs (\$)	1.3%	5.9%	1.8%	3.9%
	Cum. \$Rebate per Cum. Participant (Gross)	\$2,445	\$2,829	\$2,681	\$2,722

1. Program closed July 31, 2012.
2. Realization rate is 177% January 1st through May 30th, 179% June 1st through September 30th, and 177% October 1st through December 31st.

A.25 Virginia Commercial HVAC Program 2010-2012


VA- Commercial HVAC Program		2010	2011	2012	2010-2012
Category	Indicator	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate				
O&M (\$)	Direct Implementation				
O&M (\$)	Direct EM&V				
O&M (\$)	Indirect Other (Administrative)	\$109,504	\$109,822	\$68,630	\$287,956
Costs (\$)	Total	\$396,225	\$1,375,897	\$641,660	\$2,413,782
Costs (\$)	Planned	\$355,499	\$1,149,943	\$1,719,050	\$3,224,492
Costs (\$)	Variance	\$40,726	\$225,954	-\$1,077,390	-\$810,710
	Cum. % toward planned total	111.5%	119.6%	37.3%	74.9%
Participants	Total (Gross)	28	59	36	123
	Planned (Gross)	36	199	44	279
	Variance	-8	-140	-8	-156
	Cum % toward planned total (Gross)	77.8%	29.6%	81.8%	44.1%
kWh	Total Gross Deemed Savings	2,125,025	17,330,556	4,489,128	23,944,709
63.3%	Realization Rate Adjustment 1	-1,057,231	-7,280,807	-2,661,321	-10,999,359
	Adjusted Gross Savings	1,067,795	10,049,749	1,827,807	12,945,351
45.0%	Net-To-Gross Adjustment	-587,287	-5,527,362	-1,005,294	-7,119,943
	Net Adjusted Savings	480,508	4,522,387	822,513	5,825,408
	Planned Savings (Net)	993,361	5,481,166	1,209,473	7,684,000
	Cum. % Toward Planned Savings (Net)	48.4%	82.5%	68.0%	75.8%
	Avg. Savings Per Participant (Net)	17,161	76,651	22,848	47,361
kW	Total Gross Deemed Demand	281	1,629	568	2,477
97.0%	Realization Rate Adjustment	110	555	316	981
	Adjusted Gross Demand	390	2,184	884	3,458
45.0%	Net-To-Gross Adjustment	-215	-1,201	-486	-1,902
	Net Adjusted Demand	176	983	398	1,556
	Planned Demand (Net)	401	2,210	488	3,099
	Cum. % Toward Planned Demand (Net)	43.8%	44.5%	81.5%	50.2%
	Avg. Demand Per Participant (Net)	6	17	11	13
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$3,911	\$1,861	\$1,906	\$2,341
	Cum. \$Admin. per Cum. kWh (Gross)	\$0.05	\$0.01	\$0.02	\$0.01
	Cum. \$Admin. per Cum. kW (Gross)	\$390	\$67	\$121	\$116
	Cum. \$EM&V per Cum Total Costs (\$)	6.3%	19.0%	19.1%	16.9%
	Cum. \$Rebate per Cum. Participant (Gross)	\$5,120	\$11,274	\$3,946	\$8,883

1. Program closed July 31, 2012.
2. Realization rate is 63% January 1st through May 30th, 35% June 1st through September 30th, and 63% October 1st through December 31st.

A.26 Virginia Non-residential Duct Testing and Sealing Program 2012-2017

VA - Non-Residential Duct Sealing and Testing Program		2012	2013	2014	2015	2016	2017	2012-2017
Category	Indicator	Total	Total	Total	Total	Total ²	Total	Program Total
O&M (\$)	Direct Rebate							
O&M (\$)	Direct Implementation							
O&M (\$)	Direct EM&V							
O&M (\$)	Indirect Other (Administrative)	\$71,464	\$202,348	\$393,299	\$219,936	\$171,043	\$69,478	\$1,127,568
Costs (\$)	Total	\$608,554	\$2,267,525	\$8,935,038	\$7,280,638	\$5,627,877	\$1,765,692	\$26,485,324
Costs (\$)	Planned	\$1,799,295	\$4,387,635	\$5,595,842	\$5,700,026	\$5,960,859	\$1,122,254	\$24,565,911
Costs (\$)	Variance	-\$1,190,740	-\$2,120,110	\$3,339,197	\$1,580,612	-\$332,983	\$643,437	\$1,919,413
	Annual % of Planned	34%	52%	160%	128%	94%	157%	108%
Participants ¹	Total (Gross)	11	357	1,700	1,655	640	81	4,444
	Planned (Gross)	112	299	472	472	578	0	1,933
	Variance	-101	58	1,228	1,183	62	81	-2,511
	Annual % of Planned (Gross)	10%	119%	360%	351%	111%		230%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	77,742	1,765,683	28,470,361	20,488,106	26,352,640	4,251,334	81,405,866
87%	Realization Rate Adjustment (kWh/yr)	-10,106	-229,539	-3,701,147	-2,663,454	-3,425,843	-552,673	-10,582,763
	Realization Rate Adjusted Savings (kWh/yr)	67,635	1,536,144	24,769,214	17,824,652	22,926,796	3,698,661	70,823,104
97%	Net-To-Gross Adjustment (kWh/yr)	-1,894	-43,012	-693,538	-499,090	-641,950	-103,563	-1,983,047
	Net Adjusted Savings (kWh/yr)	65,742	1,493,132	24,075,676	17,325,562	22,284,846	3,595,098	68,840,057
	Planned Net Savings (kWh/yr)	3,324,000	8,826,223	15,569,864	15,569,864	3,432,339	0	46,722,290
	Annual % Toward Planned Net Savings (kWh)	2%	17%	155%	111%	649%		147%
	Avg. Gross Savings Per Participant (kWh/yr)	7,067	4,946	16,747	12,380	41,176	52,486	18,318
	Avg. Net Savings Per Participant (kWh/yr)	5,977	4,182	14,162	10,469	34,820	44,384	15,491
Installed kW	Total Gross Demand Reduction (kW)	8	508	2,051	2,514	2,594	695	8,370
94%	Realization Rate Adjustment (kW)	0	-29	-119	-146	-150	-40	-485
	Realization Rate Adjusted Gross Demand Reduction(kW)	8	478	1,932	2,368	2,444	655	7,884
97%	Net-To-Gross Adjustment (kW)	0	-13	-54	-66	-68	-18	-221
	Net Adjusted Demand Reduction (kW)	7	465	1,878	2,301	2,375	637	7,663
	Planned Net Demand Reduction (kW)	737	1,963	3,479	3,479	1,409	0	11,066
	Annual % Toward Planned Net Reduction (kW)	1%	24%	54%	66%	169%		69%
	Avg. Gross Demand Reduction Per Participant (kW)	0.73	1.42	1.21	1.52	4.05	8.58	1.88
	Avg. Net Demand Reduction Per Participant (kW)	0.67	1.30	1.10	1.39	3.71	7.86	1.72
Program Performance	Annual \$Admin. per Participant (Gross)	\$6,497	\$567	\$231	\$133	\$267	\$858	\$254
	Annual \$Admin. per kWh/year (Gross)	\$0.92	\$0.11	\$0.01	\$0.01	\$0.01	\$0.02	\$0.01
	Annual \$Admin. per kW (Gross)	\$8,904	\$398	\$192	\$88	\$66	\$100	\$135
	Annual \$EM&V per \$Total	11.8%	2.8%	4.1%	1.1%	2.0%	4.5%	2.9%
	Annual \$Rebate per Participant (Gross)	\$1,203	\$4,313	\$4,388	\$3,846	\$7,622	\$18,095	\$4,888

CONFIDENTIAL INFORMATION REDACTED

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1. Program ended in 2017.
 2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.
 3. The 2016 total gross deemed savings values reported in this table differ from values in the May 1, 2017 EM&V report, and have been refilled with the Commission. The adjustments totaled -30,849,970 kWh/year and 0 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 12. The adjustments were made to full load heating hours (FLHheat) in Tables 90 and 91 to be consistent with those in the Mid-Atlantic TRM v 6, in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. This affected multiple non-residential HVAC measures (e.g. heat pumps, variable refrigerant flow, mini split systems) that reference Table 90 and 91, in multiple non-residential programs. This adjustment is reflected in STEP Manual version 8.0.0 in this EM&V report.

A.27 Virginia Non-residential Energy Audit Program 2012-2017

VA - Non-Residential Energy Audit Program		2012	2013	2014	2015	2016	2017	2012-2017
Category	Indicator	Total	Total	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate							
O&M (\$)	Direct Implementation							
O&M (\$)	Direct EM&V							
O&M (\$)	Indirect Other (Administrative)	\$67,698	\$151,749	\$309,322	\$15,730	\$74,888	\$10,321	\$629,710
Costs (\$)	Total	\$565,256	\$1,714,452	\$5,649,367	\$453,753	\$2,464,067	\$262,302	\$11,109,197
Costs (\$)	Planned	\$841,286	\$1,848,339	\$2,175,831	\$1,868,401	\$1,936,926	\$304,034	\$8,974,818
Costs (\$)	Variance	-\$276,030	-\$133,887	\$3,473,536	-\$1,414,648	\$527,140	-\$41,732	\$2,134,379
	Annual % of Planned	67%	93%	260%	24%	127%	86%	124%
Audits	Total (Gross)	8	514	22	69	118	4	735
Participants ¹	Total (Gross)	1	302	1,116	73	125	15	1,632
	Planned (Gross)	138	373	589	589	721	0	2,410
	Variance	-137	-71	527	-516	-596	15	-778
	Annual % of Planned (Gross)	1%	81%	189%	12%	17%		68%
Installed kWh/year	Total (Gross)	35,433	4,498,061	31,588,249	667,407	6,765,468	196,549	43,751,165
	Attribution Rate weighted by Measure	100%	98%	99%	84%	99%	95%	93%
	Realization Rate weighted by Measure	97%	72%	93%	97%	92%	86%	91%
	Adjusted (Net) by Realization Rate and Attribution Rate	34,538	3,168,993	29,013,666	546,608	6,211,917	162,456	39,138,178
	Planned (Net)	3,401,000	9,140,494	17,399,649	17,399,649	4,818,529	0	52,159,321
	Annual % Toward Planned Net Savings (kWh)	1.0%	35%	167%	3%	129%		75%
	Avg. Gross Savings Per Participant (kWh/yr)	35,433	14,894	28,305	9,143	54,124	13,103	26,808
	Avg. Net Savings Per Participant (kWh/yr)	34,538	10,493	25,998	7,488	49,695	10,830	23,982
Installed kW	Total (Gross)	10	956	2,104	9	765	24	3,868
	Attribution Rate weighted by Measure	100%	98%	99%	94%	99%	93%	99%
	Realization Rate weighted by Measure	97%	78%	83%	66%	92%	86%	84%
	Adjusted (Net) by Realization Rate and Attribution Rate	10	733	1,724	7	701	19	3,195
	Planned (Net)	600	1,614	15,040	6,390	740	0	24,384
	Annual % Toward Planned Net Reduction (kW)	2%	45%	11%	0%	95%		13%
	Avg. Gross Demand Reduction Per Participant (kW)	10.0	3.2	1.9	0.1	6.1	1.6	2.4
	Avg. Net Demand Reduction Per Participant (kW)	9.8	2.4	1.5	0.1	5.6	1.3	2.0
Program Performance	Annual \$Admin. per Participant (Gross)	\$67,698	\$502	\$277	\$215	\$599	\$688	\$386
	Annual \$Admin. per kWh/year (Gross)	\$1.91	\$0.03	\$0.01	\$0.02	\$0.01	\$0.05	\$0.01
	Annual \$Admin. per kW (Gross)	\$6,737	\$159	\$147	\$1,846	\$98	\$422	\$0.01
	Annual \$EM&V per \$Total	17.6%	4.9%	6.7%	19.5%	4.5%	41.1%	7.8%
	Annual \$Rebate per Participant (Gross)	\$7,413	\$3,605	\$3,953	\$564	\$15,359	\$4,456	\$4,617

1. Program closed end of 2017.
2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.



Appendix B. Program Performance Indicator Tables for North Carolina Programs 2011–2019




B. PROGRAM PERFORMANCE INDICATOR TABLES FOR NORTH CAROLINA

B.1 North Carolina Residential Income and Age Qualifying Home Improvement Program 2014-2019

B.1.1 2016-2019 NC Residential Income and Age Qualifying Home Improvement Annual Indicator Tables

NC- Residential Income and Age Qualifying Home Improvement Program		2016	2017	2018	2019	2018-2019	2016-2019
Category	Indicator	Total	Total ²	Total	Total	Extension Total	Program Total
O&M (\$)	Direct Rebate						
O&M (\$)	Direct Implementation						
O&M (\$)	Direct EM&V						
O&M (\$)	Indirect Other (Administrative)	\$8,999	\$12,899	\$1,949	\$8,131	\$10,080	\$31,978
Costs (\$)	Total	\$296,086	\$327,806	\$34,521	\$205,018	\$239,540	\$863,432
Costs (\$)	Planned	\$393,347	\$306,440	\$152,200	\$268,230	\$420,430	\$1,120,216
Costs (\$)	Variance	-\$97,261	\$21,366	-\$117,679	-\$63,211	-\$180,890	-\$256,785
	Annual % of Planned	75%	107%	23%	76%	57%	77%
Participants ¹	Total (Gross)	157	130	1	132	133	420
	Planned (Gross)	257	254	0	282	282	793
	Variance	-100	-124	1	-150	-149	-373
	Annual % of Planned (Gross)	61%	51%	N/A	47%	47%	53%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	106,379	109,794	723	64,879	65,602	281,776
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	106,379	109,794	723	64,879	65,602	281,776
80%	Net-To-Gross Adjustment (kWh/yr)	-21,276	-21,959	-145	-12,976	-13,120	-56,355
	Net Adjusted Savings (kWh/yr)	85,103	87,835	579	51,903	52,482	225,421
	Planned Net Savings (kWh/yr)	67,040	51,199	0	48,691	48,691	166,930
	Annual % Toward Planned Net Savings (kWh)	127%	172%	N/A	107%	108%	135%
	Avg. Gross Savings Per Participant (kWh/yr)	678	845	723	492	493	671
	Avg. Net Savings Per Participant (kWh/yr)	542	676	579	393	395	537
Installed kW	Total Gross Demand Reduction (kW)	10.6	9.1	0.1	18.9	19.0	38.7
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	10.6	9.1	0.1	18.9	19.0	38.7
80%	Net-To-Gross Adjustment (kW)	-2.1	-1.8	0.0	-3.8	-3.8	-7.7
	Net Adjusted Demand Reduction (kW)	8.5	7.3	0.0	15.1	15.2	31.0
	Planned Net Demand Reduction (kW)	15.0	11.4	0.0	5.1	5.1	31.4
	Annual % Toward Planned Net Reduction (kW)	57%	64%	N/A	299%	300%	99%
	Avg. Gross Demand Reduction Per Participant (kW)	0.07	0.07	0.06	0.14	0.14	0.09
	Avg. Net Demand Reduction Per Participant (kW)	0.05	0.06	0.05	0.11	0.11	0.07
Program Performance	Annual \$Admin. per Participant (Gross)	\$57	\$99	\$1,949	\$62	\$76	\$76
	Annual \$Admin. per kWh/year (Gross)	\$0.08	\$0.12	\$2.70	\$0.13	\$0.15	\$0.11
	Annual \$Admin. per kW (Gross)	\$847	\$1,415	\$31,929	\$430	\$532	\$826
	Annual \$EM&V per \$Total	2.0%	2.3%	18.2%	3.0%	5.2%	3.0%
	Annual \$Rebate per Participant (Gross)	\$1,442	\$1,939	\$1,763	\$1,161	\$1,165	\$1,508

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1. A participant is a unique account that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.
 2. The 2017 total gross deemed savings values reported in this table include adjustments of -307 kWh/year and -0.026 kW made to the January 2017 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017. Specifically, the correction was in section 2.1.5 for "Low-Flow Showerhead" measures, to the " ΔT " variable, which is a measure of the change in temperature of the water used for shower and temperature entering the house ($\Delta T = T_{\text{shower}} - T_{\text{in house}}$). STEP Manual 7.0.0 reported the value as 44.9°F, but has been corrected to 44.1°F. This correction is reflected in STEP Manual version 8.0.0 in this EM&V report.

B.1.2 2019 NC Residential Income and Age Qualifying Home Improvement Monthly Indicator Tables

Category	Indicator	2019												2019 Total	2016-2019 Program Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
O&M (\$)	Direct Rebate	\$95	\$94	\$123	\$601	\$43	\$1,777	\$2,734	\$1,433	\$960	\$86	\$50	\$136	\$8,131	\$31,978
O&M (\$)	Direct Implementation	\$1,581	\$1,563	\$2,034	\$9,961	\$716	\$29,458	\$80,885	\$42,402	\$28,391	\$2,540	\$1,471	\$4,016	\$205,018	\$863,432
O&M (\$)	Direct EM&V	\$22,953	\$22,953	\$22,953	\$22,953	\$22,953	\$22,953	\$21,752	\$21,752	\$21,752	\$21,752	\$21,752	\$21,752	\$268,230	\$1,120,216
O&M (\$)	Indirect Other (Administrative)	-\$21,372	-\$21,390	-\$20,920	-\$12,992	-\$22,238	\$6,505	\$59,133	\$20,651	\$6,639	-\$19,211	-\$20,380	-\$17,735	-\$63,211	-\$256,785
Costs (\$)	Total	1%	1%	2%	6%	6%	17%	47%	63%	73%	74%	75%	76%	76%	77%
Costs (\$)	Planned	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Costs (\$)	Variance	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Participants	Annual % of Planned	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Planned (Gross)	24	24	24	24	24	24	23	23	23	23	23	23	282	793
	Variance	-24	-24	-24	-18	-24	1	54	-19	-3	-23	-23	-23	-150	-373
	Annual % of Planned (Gross)	0%	0%	0%	2%	2%	11%	38%	40%	47%	47%	47%	47%	47%	53%
Installed kWh/yr	Total Gross Deemed Savings (kWh/yr)	0	0	0	2,613	0	6,897	43,170	1,612	10,587	0	0	0	64,879	281,776
	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	2,613	0	6,897	43,170	1,612	10,587	0	0	0	64,879	281,776
	Net-To-Gross Adjustment (kWh/yr)	0	0	0	-523	0	-1,379	-8,634	-322	-2,117	0	0	0	-12,976	-56,355
	Net Adjusted Savings (kWh/yr)	0	0	0	2,090	0	5,518	34,536	1,289	8,469	0	0	0	51,903	225,421
	Planned Net Savings (kWh/yr)	4,058	4,058	4,058	4,058	4,058	4,058	4,058	4,058	4,058	4,058	4,058	4,058	48,691	166,930
	Annual % Toward Planned Net Savings (kWh)	0%	0%	0%	4%	4%	16%	87%	89%	107%	107%	107%	107%	107%	135%
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	435	N/A	276	561	403	529	N/A	N/A	N/A	492	671
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	N/A	348	N/A	221	449	322	423	N/A	N/A	N/A	393	537
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	1.0	0.0	1.8	12.6	0.5	3.1	0.0	0.0	0.0	18.9	38.7
	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	1.0	0.0	1.8	12.6	0.5	3.1	0.0	0.0	0.0	18.9	38.7
	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	-0.2	0.0	-0.4	-2.5	-0.1	-0.6	0.0	0.0	0.0	-3.8	-7.7
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.8	0.0	1.4	10.1	0.4	2.5	0.0	0.0	0.0	15.1	31.0
	Planned Net Demand Reduction (kW)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	5.1	11.4
	Annual % Toward Planned Net Reduction (kW)	0%	0%	0%	15%	15%	43%	243%	251%	299%	299%	299%	299%	299%	99%
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	0.16	N/A	0.07	0.16	0.12	0.15	N/A	N/A	N/A	0.14	0.09
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	0.13	N/A	0.06	0.13	0.10	0.12	N/A	N/A	N/A	0.11	0.07
Program Performance	Annual \$ Admin. per Participant (Gross)	N/A	N/A	N/A	\$152	\$159	\$88	\$51	\$62	\$60	\$60	\$61	\$62	\$62	\$76
	Annual \$ Admin. per kWh/year (Gross)	N/A	N/A	N/A	\$0.35	\$0.37	\$0.29	\$0.10	\$0.13	\$0.12	\$0.12	\$0.12	\$0.13	\$0.13	\$0.11
	Annual \$ Admin. per kW (Gross)	N/A	N/A	N/A	\$956	\$1,001	\$356	\$416	\$436	\$416	\$420	\$423	\$430	\$430	\$426
	Annual \$ EM&V per \$ Total	0.0%	0.0%	9.7%	3.3%	5.6%	2.0%	0.7%	1.6%	1.3%	1.8%	1.8%	3.0%	3.0%	3.0%
	Annual \$ Rebate per Participant (Gross)	N/A	N/A	N/A	\$1,175	\$1,149	\$971	\$898	\$1,163	\$1,161	\$1,161	\$1,161	\$1,161	\$1,161	\$1,508

1. A participant is a unique account that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.

B.2 North Carolina Residential Retail LED Program 2017-2018

B.2.1 2017-2019 NC Residential Retail LED Program Annual Indicator Tables

NC- Residential LED Program		2017	2018	2019	2017-2019
Category	Indicator	Total ²	Total	Total	Program Total
O&M(\$)	Direct Rebate				
O&M(\$)	Direct Implementation				
O&M(\$)	Direct EM&V				
O&M(\$)	Indirect Other (Administrative)	\$26,160	\$73,173	\$11,032	\$110,366
Costs (\$)	Total	\$664,838	\$1,295,830	\$190,393	\$2,151,061
Costs (\$)	Planned	\$1,088,516	\$1,171,147	\$92,757	\$2,352,420
Costs (\$)	Variance	-\$423,678	\$124,683	\$97,636	-\$201,359
	Annual % of Planned	61.1%	110.6%	205.3%	91.4%
Participants ¹	Total (Gross)	70,261	264,236	0	334,497
	Planned (Gross)	165,000	220,000	0	385,000
	Variance	-94,739	44,236	0	-50,503
	Annual % of Planned (Gross)	42.6%	120.1%	N/A	86.9%
Purchased kWh/year	Total Gross Deemed Savings (kWh/yr)	2,215,073	5,918,263	0	8,133,336
	100%	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	2,215,073	5,918,263	0	8,133,336
85%	Net-To-Gross Adjustment (kWh/yr)	-332,261	-887,739	0	-1,220,000
	Net Adjusted Savings (kWh/yr)	1,882,812	5,030,524	0	6,913,336
	Planned Net Savings (kWh/yr)	2,250,789	3,874,754	0	6,125,543
	Annual % Toward Planned Net Savings (kWh)	83.7%	129.8%	N/A	112.9%
	Avg. Gross Savings Per Participant (kWh/yr)	32	22	N/A	24
	Avg. Net Savings Per Participant (kWh/yr)	27	19	N/A	21
Purchased kW	Total Gross Demand Reduction (kW)	242.4	606.0	0.0	848.5
	100%	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	242.4	606.0	0.0	848.5
85%	Net-To-Gross Adjustment (kW)	-36.4	-90.9	0.0	-127.3
	Net Adjusted Demand Reduction (kW)	206.1	515.1	0.0	721.2
	Planned Net Demand Reduction (kW)	331.1	433.0	0.0	764.1
	Annual % Toward Planned Net Reduction (kW)	62.2%	119.0%	N/A	94.4%
	Avg. Gross Demand Reduction Per Participant (kW)	0.0	0.0	N/A	0.0
	Avg. Net Demand Reduction Per Participant (kW)	0.0	0.0	N/A	0.0
Program Performance	Annual \$Admin. per Participant (Gross)	\$0.37	\$0.28	N/A	\$0.33
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.01	N/A	\$0.01
	Annual \$Admin. per kW (Gross)	\$108	\$121	N/A	\$130
	Annual \$EM&V per \$Total	6.8%	6.6%	17.7%	7.7%
	Annual \$Rebate per Participant (Gross)	\$1.87	\$2.68	N/A	\$2.76

1. A participant is a unique account number.

B.2.2 2019 NC Residential Retail LED Program Monthly Indicator Tables

NC-Residential LED Program Category	Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2017-2019 Program Total	
O&M(S)	Direct Rebate															
	Direct Implementation															
	Direct EM&V															
	Direct O&M															
	Indirect Other (Administrative)															
	Total	\$4,413	\$5,181	\$277	\$0	\$173	\$412	\$466	\$71	\$39	\$0	\$0	\$0	\$11,032	\$110,366	
	Costs (\$)	\$73,161	\$85,893	\$4,999	\$0	\$2,873	\$6,838	\$0	\$13,779	\$2,086	\$1,163	\$0	\$0	\$0	\$190,393	\$2,151,061
	Costs (\$)	\$40,899	\$40,899	\$5,479	\$5,479	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$92,757	\$2,332,220
	Variance	\$32,262	\$44,994	\$880	\$5,479	\$2,873	\$6,838	\$0	\$13,779	\$2,086	\$1,163	\$0	\$0	\$0	\$97,636	\$520,159
	Annual % of Planned	67%	14.6%	15.0%	15.0%	15.3%	15.9%	15.9%	17.2%	17.4%	17.5%	17.5%	17.5%	17.5%	20.53%	91.4%
Participants	Total (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	0	3,344,497	
	Planned (Gross)	0	0	0	0	0	0	0	0	0	0	0	0	0	3,855,000	
	Variance	0	0	0	0	0	0	0	0	0	0	0	0	0	-50,503	
	Annual % of Planned (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	86.5%	
	Total Gross Dismed Savings (kW/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	8,133,336	
	Realization Rate Adjusted (kW/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Realization Rate Adjusted Savings (kW/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	8,133,336	
	Net-to-Gross Adjusted (kW/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	-1,220,000	
	Net Adjusted Savings (kW/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	6,913,336	
	Planned Net Savings (kW/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	6,125,543	
Annual % Toward Planned Net Savings (kW/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	112.5%		
Avg. Gross Savings Per Participant (kW/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24	
Avg. Net Savings Per Participant (kW/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21	
Purchased kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	848.5	
	Realization Rate Adjusted (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	848.5	
	Net-to-Gross Adjusted (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-127.3	
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	721.2	
	Planned Net Demand Reduction (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	764.1	
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	94.4%	
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0
	Annual \$Admin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0.33
Annual \$Admin. per kW/yr (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$0.01	
Annual \$Admin. per kW (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$1.30	
Annual SEM&V per \$ Total	N/A	0.0%	2.4%	5.0%	5.0%	6.5%	10.0%	10.0%	16.4%	17.3%	17.7%	17.7%	17.7%	17.7%	7.7%	
Annual SREbate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$2.76	


1. A participant is a unique account number.

B.3 North Carolina Non-residential Lighting Systems and Controls (DSM Phase III) Program 2015-2019

B.3.1 2015-2019 NC Non-residential Lighting Systems and Controls Annual Indicator Tables

NC- Non-Residential Lighting Systems & Controls Program		2015	2016	2017	2018	2019	2014-2019
Category	Indicator	Total	Total ²	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate						
O&M (\$)	Direct Implementation						
O&M (\$)	Direct EM&V						
O&M (\$)	Indirect Other (Administrative)	\$3,511	\$11,956	\$9,940	\$14,072	\$22,295	\$61,775
Capital (\$)	Direct Implementation	\$0	\$0	\$0	\$0	\$0	
Costs (\$)	Total	\$122,739	\$393,406	\$252,605	\$249,209	\$413,562	\$1,431,520
Costs (\$)	Planned	\$357,955	\$359,278	\$347,298	\$403,711	\$230,531	\$1,698,773
Costs (\$)	Variance	-\$235,216	\$34,128	-\$94,693	-\$154,502	\$183,030	-\$267,254
	Annual % of Planned	34%	109%	73%	62%	179%	84%
Participants ¹	Total (Gross)	13	43	23	43	62	184
	Planned (Gross)	96	102	104	119	43	464
	Variance	-83	-59	-81	-76	19	-280
	Annual % of Planned (Gross)	14%	42%	22%	36%	144%	40%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	564,326	3,333,527	1,738,121	5,172,076	3,030,032	13,838,082
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	564,326	3,333,527	1,738,121	5,172,076	3,030,032	13,838,082
70%	Net-To-Gross Adjustment (kWh/yr)	-169,298	-1,000,058	-521,436	-1,551,623	-909,010	-4,151,425
	Net Adjusted Savings (kWh/yr)	395,028	2,333,469	1,216,685	3,620,453	2,121,023	9,686,657
	Planned Net Savings (kWh/yr)	1,752,864	1,619,973	2,220,165	2,661,116	1,213,184	9,467,302
	Annual % Toward Planned Net Savings (kWh)	23%	144%	55%	136%	175%	102%
	Avg. Gross Savings Per Participant (kWh/yr)	43,410	77,524	75,570	120,281	48,871	75,207
	Avg. Net Savings Per Participant (kWh/yr)	30,387	54,267	52,899	84,197	34,210	52,645
Installed kW	Total Gross Demand Reduction (kW)	104.6	743.2	334.5	1,109.9	594.3	2,886.6
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	104.6	743.2	334.5	1,109.9	594.3	2,886.6
70%	Net-To-Gross Adjustment (kW)	-31.4	-223.0	-100.4	-333.0	-178.3	-866.0
	Net Adjusted Demand Reduction (kW)	73.2	520.2	234.2	777.0	416.0	2,020.6
	Planned Net Demand Reduction (kW)	490.2	274.7	366.7	479.0	218.5	1,829.1
	Annual % Toward Planned Net Reduction (kW)	15%	189%	64%	162%	190%	110%
	Avg. Gross Demand Reduction Per Participant (kW)	8.0	17.3	14.5	25.8	10	16
	Avg. Net Demand Reduction Per Participant (kW)	5.6	12.1	10.2	18.1	7	11
Program Performance	Annual \$Admin. per Participant (Gross)	\$270	\$278	\$432	\$327	\$360	\$336
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.00	\$0.01	\$0.00	\$0.01	\$0.00
	Annual \$Admin. per kW (Gross)	\$34	\$16	\$30	\$12.68	\$38	\$21
	Annual \$EM&V per \$Total	6.4%	1.8%	2.6%	2.5%	0.9%	2.2%
	Annual \$Rebate per Participant (Gross)	\$5,260	\$7,742	\$8,251	\$4,310	\$5,205	\$3,6%

CONFIDENTIAL INFORMATION REDACTED


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1. A participant is a unique account number.
 2. The 2016 total gross deemed savings values reported in this table differ from values in the May 1, 2017 EM&V report, and have been reflled with the Commission. The adjustments totaled -481,137 kWh/year and 26 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 9.1.1. The adjustment was to waste heat factors (WHFe and WHFd) applied to lighting fixtures installed in 2016, where the program participant building HVAC systems were assumed to be heat pump heating and cooling systems, rather than the previous assumption of AC cool and non-electric heat systems. This adjustment was made in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. It is reflected in STEP Manual version 8.0.0 in this EM&V report.

B.4 North Carolina Non-residential Heating and Cooling Efficiency Program 2015-2019

B.4.1 2015-2019 NC Non-residential Heating and Cooling Efficiency Annual Indicator Tables

NC- Non-Residential Heating & Cooling Efficiency Program		2015	2016	2017	2018	2019	2015-2019
Category	Indicator	Total	Total ²	Total	Total	Total	Program Total
O&M(\$)	Direct Rebate						
O&M(\$)	Direct Implementation						
O&M(\$)	Direct EM&V						
O&M(\$)	Indirect Other (Administrative)	\$1,360	\$1,610	\$2,353	\$4,390	\$2,934	\$12,647
Costs (\$)	Total	\$40,347	\$52,963	\$59,792	\$77,749	\$57,884	\$288,735
Costs (\$)	Planned	\$124,310	\$121,415	\$122,498	\$126,949	\$101,892	\$597,064
Costs (\$)	Variance	-\$83,963	-\$68,452	-\$62,706	-\$49,200	-\$44,007	-\$308,329
	Annual % of Planned	32%	44%	49%	61%	57%	48%
Participants ¹	Total (Gross)	3	6	3	3	1	16
	Planned (Gross)	48	52	53	53	12	218
	Variance	-45	-46	-50	-50	-11	-202
	Annual % of Planned (Gross)	6%	12%	6%	6%	8%	7%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	91,144	289,500	82,971	225,775	83,099	772,489
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	91,144	289,500	82,971	225,775	83,099	772,489
70%	Net-To-Gross Adjustment (kWh/yr)	-27,343	-86,850	-24,891	-67,732	-24,930	-231,747
	Net Adjusted Savings (kWh/yr)	63,801	202,650	58,080	158,042	58,170	540,742
	Planned Net Savings (kWh/yr)	606,768	1,619,973	2,563,872	2,043,754	168,545	7,002,913
	Annual % Toward Planned Net Savings (kWh)	11%	13%	2%	8%	35%	8%
	Avg. Gross Savings Per Participant (kWh/yr)	30,381	48,250	27,657	75,258	83,099	48,281
	Avg. Net Savings Per Participant (kWh/yr)	21,267	33,775	19,360	52,681	58,170	33,796
Installed kW	Total Gross Demand Reduction (kW)	26.9	93.2	-40.3	84.7	13.3	177.9
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction(kW)	26.9	93.2	-40.3	84.7	13.3	177.9
70%	Net-To-Gross Adjustment (kW)	-8.1	-28.0	12.1	-25.4	-4.0	-53.4
	Net Adjusted Demand Reduction (kW)	18.8	65.3	-28.2	59.3	9.3	124.5
	Planned Net Demand Reduction (kW)	154.2	274.7	1,042.3	497.0	41.0	2,009.1
	Annual % Toward Planned Net Reduction (kW)	12.2%	23.8%	-2.7%	11.9%	22.8%	6.2%
	Avg. Gross Demand Reduction Per Participant (kW)	9.0	15.5	-13.4	28.2	13.3	11.1
	Avg. Net Demand Reduction Per Participant (kW)	6.3	10.9	-9.4	19.8	9.3	7.8
Program Performance	Annual \$Admin. per Participant (Gross)	\$453	\$268	\$784	\$1,463	\$2,934	\$790
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.01	\$0.03	\$0.02	\$0.04	\$0.02
	Annual \$Admin. per kW (Gross)	\$51	\$17	-\$58	\$52	\$220	\$71
	Annual \$EM&V per \$Total	14%	15%	15%	11%	7.8%	12%
	Annual \$Rebate per Participant (Gross)	\$2,728	\$3,404	\$6,996	\$11,613	\$21,728	\$6,635

CONFIDENTIAL INFORMATION REDACTED

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1. A participant is a unique account number.
 2. The 2016 total gross deemed savings values reported in this table differ from values in the May 1, 2017 EM&V report, and have been refilled with the Commission. The adjustments totaled -22,904 kWh/year and 0 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 10. The adjustments were made to full load heating hours (FLHheat) in Tables 90 and 91 to be consistent with those in the Mid-Atlantic TRM v 6, in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. This affected multiple non-residential HVAC measures (e.g. heat pumps, variable refrigerant flow, mini split systems) that reference Table 90 and 91, in multiple non-residential programs. This adjustment is reflected in STEP Manual version 8.0.0 in this EM&V report.

B.4.2 2018 NC Non-residential Heating and Cooling Efficiency Monthly Indicator Tables

Category	Indicator	2019												2015-2019 Program Total	
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		Total
NC-Non-Residential Heating & Cooling Efficiency Program	Direct Rebate	\$358	\$6	\$203	\$1,340	\$179	\$148	\$81	\$156	\$192	\$100	\$81	\$102	\$2,934	\$12,647
O&M (\$)	Planned	\$5,939	-\$101	\$3,370	\$2,216	\$2,964	\$2,461	\$2,393	\$4,608	\$5,677	\$2,959	\$2,393	\$5,006	\$57,884	\$288,735
O&M (\$)	Variance	\$8,719	\$8,719	\$8,719	\$8,719	\$8,719	\$8,719	\$8,263	\$8,263	\$8,263	\$8,263	\$8,263	\$8,263	\$101,892	\$597,064
O&M (\$)	Annual % of Planned	6%	6%	9%	31%	34%	36%	39%	43%	49%	52%	54%	57%	57%	48%
Participants ¹	Total (Gross)	0	0	1	0	0	0	0	0	0	0	0	0	1	16
	Planned (Gross)	1	1	1	1	1	1	1	1	1	1	1	1	1	218
	Variance	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-202
	Annual % of Planned (Gross)	0%	0%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	7%
Installed kW/year	Total Gross Deemed Savings (kWh/yr)	0	0	177	61,281	0	0	0	0	21,641	0	0	0	83,099	772,489
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70%	Realization Rate Adjusted Savings (kWh/yr)	0	0	177	61,281	0	0	0	0	21,641	0	0	0	83,099	772,489
	Net-To-Gross Adjustment (kWh/yr)	0	0	-53	-18,384	0	0	0	0	-6,492	0	0	0	-24,930	-231,747
	Net Adjusted Savings (kWh/yr)	0	0	124	42,897	0	0	0	0	15,149	0	0	0	58,170	540,742
	Planned Net Savings (kWh)	14,045	14,045	14,045	14,045	14,045	14,045	14,045	14,045	14,045	14,045	14,045	14,045	168,545	7,002,913
	Annual % Toward Planned Net Savings (kWh)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	35%	8%
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	177	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	83,099	48,281
	Avg. Net Savings Per Participant (kWh/yr)	N/A	N/A	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	58,170	33,796
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.1	11.4	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	13.3	177.9
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70%	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.1	11.4	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	13.3	177.9
	Net-To-Gross Adjustment (kW)	0.0	0.0	-3.4	-3.4	0.0	0.0	0.0	0.0	-0.5	0.0	0.0	0.0	-4.0	-53.4
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.1	8.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	9.3	124.5
	Planned Net Demand Reduction (kW)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	41.0	2,009.1
	Annual % Toward Planned Net Reduction (kW)	0.0%	0.0%	0.2%	19.7%	0.0%	0.0%	0.0%	0.0%	22.8%	0.0%	0.0%	0.0%	22.8%	6.2%
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.3	11.1
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9.3	7.8
Program Performance	Annual \$Admin. per Participant (Gross)	N/A	N/A	\$555	\$1,895	\$2,074	\$2,223	\$2,303	\$2,459	\$2,651	\$2,751	\$2,832	\$2,934	\$2,934	\$790
	Annual \$Admin. per kW/year (Gross)	N/A	N/A	\$3.13	\$0.03	\$0.04	\$0.04	\$0.04	\$0.04	\$0.03	\$0.03	\$0.03	\$0.04	\$0.04	\$0.02
	Annual \$EM&V per kW (Gross)	N/A	N/A	\$4,146	\$164	\$180	\$193	\$200	\$213	\$199	\$206	\$213	\$220	\$220	\$71
	Annual \$EM&V per \$ Total	0.0%	0.0%	8.8%	2.6%	3.7%	3.5%	3.3%	2.8%	2.6%	2.5%	2.5%	2.5%	2.5%	1.2%
	Annual \$Rebate per Participant (Gross)	N/A	N/A	\$180	\$18,900	\$18,900	\$18,900	\$18,900	\$18,900	\$21,728	\$21,728	\$21,728	\$21,728	\$21,728	\$6,635

1. A participant is a unique account number.

B.5 North Carolina Non-residential Window Film Program 2015-2019

B.5.1 2015-2019 NC Non-residential Window Film Annual Indicator Tables

Category	Indicator	2015 Total	2016 Total	2017 Total	2018 Total	2019 Total	2015-2019 Program Total
O&M(\$)	Direct Rebate		\$799	\$870	\$984	\$344	\$3,849
O&M(\$)	Direct Implementation		\$0	\$0	\$0	\$0	\$0
O&M(\$)	Direct EM&V		\$26,289	\$22,104	\$17,432	\$6,937	\$97,455
O&M(\$)	Indirect Other (Adminstrative)		\$115,046	\$126,681	\$143,604	\$3,850	\$472,084
Capital (\$)	Direct Implementation	\$851	\$0	\$0	\$0	\$0	\$0
Costs (\$)	Total	\$24,693	\$26,289	\$22,104	\$17,432	\$6,937	\$97,455
Costs (\$)	Planned	\$82,903	\$115,046	\$126,681	\$143,604	\$3,850	\$472,084
Costs (\$)	Variance	-\$58,211	-\$88,757	-\$104,577	-\$126,172	\$3,087	-\$374,629
	Annual % of Planned	30%	23%	17%	12%	180%	21%
Participants ¹	Total Participants	0	0	0	1	0	1
	Total Square Feet	0	0	0	402	0	402
	Planned Square Feet	48,000	76,742	91,659	95,900	0	312,301
	Variance	-48,000	-76,742	-91,659	-95,498	0	-311,899
	Annual % of Planned (Gross)	0%	0%	0%	0%	N/A	0%
Square feet	Total Square Feet	0	0	0	402	0	402
	North Facing	0	0	0	0	0	0
	East Facing	0	0	0	402	0	402
	West Facing	0	0	0	0	0	0
	South Facing	0	0	0	0	0	0
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	0	0	4,516	0	4,516
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0
80%	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	4,516	0	4,516
	Net-To-Gross Adjustment (kWh/yr)	0	0	0	-903	0	-903
	Net Adjusted Savings (kWh/yr)	0	0	0	3,613	0	3,613
	Planned Net Savings (kWh/yr)	864	1,064,075	1,016,658	691,176	0	2,772,773
	Annual % Toward Planned Net Savings (kWh)	0%	0%	0%	1%	N/A	0%
	Avg. Gross Savings Per Participant (kWh/yr)				4,516	N/A	4,516
	Avg. Gross Savings Per Square Foot (kWh/yr)				11	N/A	11
	Avg. Net Savings Per Participant (kWh/yr)				3,612.77	N/A	3,612.77
	Avg. Net Savings Per Square Foot (kWh/yr)				9	N/A	8.99
Installed kW	Total Gross Demand Reduction (kW)	0.0	0.0	0.0	0.7	0	0.7
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0	0.0
80%	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	0.0	0.0	0.7	0	0.7
	Net-To-Gross Adjustment (kW)	0.0	0.0	0.0	-0.1	0	-0.1
	Net Adjusted Demand Reduction (kW)	0.0	0.0	0.0	0.6	0	0.6
	Planned Net Demand Reduction (kW)	0.2	973.7	915.3	635.0	0	2,524.2
	Annual % Toward Planned Net Reduction (kW)	0%	0%	0%	0.1%	N/A	0.02%
	Avg. Gross Demand Reduction Per Participant (kW)				0.7	N/A	0.7
	Avg. Gross Demand Reduction Per Square Foot (kW)				0.002	N/A	0.002
	Avg. Net Demand Reduction Per Participant (kW)				0.6	N/A	0.6
	Avg. Net Demand Reduction Per Square Foot (kW)				0.001	N/A	0.001
Program Performance	Annual \$ Admin. per Participant (Gross)				\$984.4	N/A	\$3,849
	Annual \$ Admin. per kWh/year (Gross)				\$0.22	N/A	\$0.85
	Annual \$ Admin. per kW (Gross)				\$1,337.1	N/A	\$5,227
	Annual \$ EM&V per \$ Total	18%	29%	25%	29%	51%	27%
	Annual \$ Rebate per Participant (Gross)				\$342	N/A	\$342

1. A participant is a unique account number.

B.5.2 2019 NC Non-residential Window Film Annual Monthly Indicator Tables

NC-Non-Residential Window Film Program		2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2015-2019 Program Total	
Category	Indicator															
O&M (\$)	Direct Rebate	\$202	-\$3	\$30	\$0	\$21	-\$1	\$68	\$0	\$20	\$0	\$6	\$0	\$344	\$3,849	
	Direct Implementation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Direct EM&Y	\$3,350	-\$56	\$505	\$348	\$329	\$329	-\$15	\$2,023	\$0	\$590	\$0	\$192	\$6,937	\$97,455	
	Indirect Other (Administrative)	\$3,020	-\$329	\$329	\$329	\$329	\$329	\$312	\$312	\$312	\$312	\$312	\$312	\$3,850	\$472,084	
	Direct Implementation	\$3,020	-\$385	\$176	-\$329	\$19	-\$329	-\$327	\$1,711	-\$312	\$277	-\$312	-\$121	\$3,087	-\$374,629	
	Total	87%	86%	99%	108%	108%	108%	107%	160%	160%	175%	180%	180%	180%	180%	21%
	Planned															
	Variance															
	Annual % of Planned															
	Participants ¹	Total Participants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Square Feet		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Planned Square Feet		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Variance		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Annual % of Planned (Gross)		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Total Square Feet		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
North Facing		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
East Facing		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
West Facing		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
South Facing		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Realization Rate Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Net-To-Gross Adjustment (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Net Adjusted Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Planned Net Savings (kWh/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Annual % Toward Planned Net Savings (kWh)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Gross Savings Per Participant (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Gross Savings Per Square Foot (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Net Savings Per Square Foot (kWh/yr)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Installed kW	Total Gross Demand Reduction (kW)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Realization Rate Adjustment (kW)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Realization Rate Adjusted Gross Demand Reduction (kW)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Net-To-Gross Adjustment (kW)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Net Adjusted Demand Reduction (kW)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Planned Net Demand Reduction (kW)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Annual % Toward Planned Net Reduction (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Gross Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Gross Demand Reduction Per Square Foot (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Avg. Net Demand Reduction Per Participant (kW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Program Performance	Annual Admin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual Admin. per kW/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual Admin. per \$/Total	0%	0%	13%	19%	19%	19%	19%	45%	49%	49%	49%	51%	51%	27%	
	Annual \$EM&V per \$/Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual \$Rebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual \$Admin. per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual \$Admin. per kW/year (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Annual \$EM&V per \$/Total	0%	0%	13%	19%	19%	19%	19%	45%	49%	49%	49%	51%	51%	27%	
	Annual \$Rebate per Participant (Gross)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

1. A participant is a unique account number.

B.6 North Carolina Non-residential Small Business Improvement Program 2017-2019

B.6.1 2017-2019 NC Non-residential Small Business Improvement Annual Indicator Tables

Category	Indicator	2016 Total	2017 Total	2018 Total	2019 Total	2017-2019 Program Total
O&M (\$)	Direct Rebate	\$0	\$3,870	\$10,216	\$7,730	\$21,816
O&M (\$)	Direct Implementation	\$0	\$98,352	\$180,923	\$156,020	\$435,296
O&M (\$)	Direct EM&V	\$0	\$350,873	\$420,342	\$498,047	\$1,269,262
O&M (\$)	Indirect Other (Administrative)	\$0	-\$252,521	-\$239,419	-\$342,027	-\$833,967
	Annual % of Planned		28.0%	43.0%	31.3%	34.3%
Costs (\$)	Total	0	7	36	27	70
Costs (\$)	Planned (Gross)	0	42	53	62	157
Costs (\$)	Variance	0	-35	-17	-35	-87
	Annual % of Planned (Gross)		16.7%	67.9%	43.5%	44.6%
Participants ¹	Total (Gross)	0	7	36	27	70
	Planned (Gross)	0	42	53	62	157
	Variance	0	-35	-17	-35	-87
	Annual % of Planned (Gross)		16.7%	67.9%	43.5%	44.6%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	166,507	1,000,716	695,521	1,862,743
100%	Realization Rate Adjustment (kWh/yr)	0	0	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	0	166,507	1,000,716	695,521	1,862,743
93%	Net-To-Gross Adjustment (kWh/yr)	0	-11,655	-70,050	-48,686	-130,392
	Net Adjusted Savings (kWh/yr)	0	154,851	930,665	646,835	1,732,351
	Planned Net Savings (kWh/yr)	0	288,232	384,890	653,054	1,326,175
	Annual % Toward Planned Net Savings (kWh)		53.7%	24.8%	99.0%	130.6%
	Avg. Gross Savings Per Participant (kWh/yr)		23,787	27,798	25,760	26,611
	Avg. Net Savings Per Participant (kWh/yr)		22,122	25,852	23,957	24,748
Installed kW	Total Gross Demand Reduction (kW)	0.0	32.6	219.1	140.2	391.9
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	0.0	32.6	219.1	140.2	391.9
93%	Net-To-Gross Adjustment (kW)	0.0	-2.3	-15.3	-9.8	-27.4
	Net Adjusted Demand Reduction (kW)	0.0	30.3	203.8	130.4	364.5
	Planned Net Demand Reduction (kW)	0.0	43.7	76.0	129.0	248.7
	Annual % Toward Planned Net Reduction (kW)		69.4%	268.2%	101.1%	146.6%
	Avg. Gross Demand Reduction Per Participant (kW)		4.7	6.1	5.2	5.6
	Avg. Net Demand Reduction Per Participant (kW)		4.3	5.7	4.8	5.2
Program Performance	Annual \$ Admin. per Participant (Gross)		\$553	\$284	\$286	\$312
	Annual \$ Admin. per kWh/year (Gross)		\$0.02	\$0.01	\$0.01	\$0.01
	Annual \$ Admin. per kW (Gross)		\$119	\$47	\$55	\$56
	Annual \$EM&V per \$Total		7.4%	3.9%	3.1%	4.4%
	Annual \$Rebate per Participant (Gross)		\$3,778	\$2,791	\$3,050	\$2,989

1. A participant is a unique account number.

B.6.2 2019 NC Non-residential Small Business Improvement Monthly Indicator Tables

NC- Small Business Improvement Program Category	Indicator	2019 Jan	2019 Feb	2019 Mar	2019 Apr	2019 May	2019 June	2019 Jul	2019 Aug	2019 Sept	2019 Oct	2019 Nov	2019 Dec	2019 Total	2017-2019 Program Total
O&M(S)	Direct Rebate														
O&M(S)	Direct Implementation														
O&M(S)	Indirect Other (Administrative)														
Costs (\$)	Total	\$930	\$1,459	\$509	\$1,359	\$326	\$1,006	\$333	\$211	\$610	\$224	\$507	\$257	\$7,730	\$21,816
Costs (\$)	Planned	\$15,420	\$24,195	\$8,438	\$22,530	\$5,401	\$16,655	\$9,865	\$6,247	\$18,050	\$6,637	\$14,988	\$7,994	\$156,020	\$435,296
Costs (\$)	Variance	-\$27,199	-\$18,462	-\$4,182	-\$20,089	-\$37,218	-\$23,965	-\$30,523	-\$34,141	-\$22,338	-\$33,751	-\$25,401	-\$32,293	-\$49,047	\$1,269,262
	Annual % of Planned	3.1%	8.0%	9.6%	14.2%	15.3%	18.6%	20.6%	21.8%	25.5%	26.8%	29.8%	31.3%	31.3%	34.3%
Participants ¹	Total (Gross)	3	2	1	6	0	4	3	0	4	0	3	1	27	70
	Planned (Gross)	5	5	5	5	5	5	5	5	5	5	6	6	62	157
	Variance	-2	-3	-4	1	-5	-1	-2	-5	-1	-5	-3	-5	-35	-87
	Annual % of Planned (Gross)	4.8%	8.1%	9.7%	19.4%	19.4%	25.8%	30.6%	30.6%	37.1%	37.1%	41.9%	43.5%	43.5%	44.6%
Installed kW/year	Total Gross Deemed Savings (kW/yr)	92,532	162,249	1,232	107,191	0	83,588	36,183	0	122,309	4,145	79,737	6,356	695,521	1,862,743
100%	Realization Rate Adjustment (kW/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93%	Realization Rate Adjusted Savings (kW/yr)	92,532	162,249	1,232	107,191	0	83,588	36,183	0	122,309	4,145	79,737	6,356	695,521	1,862,743
	Net-To-Gross Adjustment (kW/yr)	-6,477	-11,357	-86	-7,503	0	-5,851	-2,533	0	-8,562	-290	-5,582	-443	-48,686	-130,392
	Net Adjusted Savings (kW/yr)	86,055	150,891	1,146	99,688	0	77,737	33,650	0	113,748	3,855	74,155	5,911	646,835	1,732,351
	Planned Net Savings (kW/yr)	54,421	54,421	54,421	54,421	54,421	54,421	54,421	54,421	54,421	54,421	54,421	54,421	653,054	1,326,175
	Annual % Toward Planned Net Savings (kW/yr)	13.2%	36.3%	36.5%	51.7%	51.7%	63.6%	68.8%	68.8%	86.2%	86.8%	98.1%	99.0%	99.0%	130.6%
	Avg. Gross Savings Per Participant (kW/yr)	30,844	81,124	1,232	17,865	N/A	20,897	12,061	N/A	30,577	N/A	26,579	6,356	25,760	26,611
	Avg. Net Savings Per Participant (kW/yr)	28,685	75,446	1,146	16,615	N/A	19,444	11,217	N/A	28,457	N/A	24,718	5,911	23,957	24,748
Installed kW	Total Gross Demand Reduction (kW)	20.6	37.6	0.4	19.0	0.0	16.9	6.4	0.0	22.0	0.6	15.3	1.4	140.2	391.9
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
93%	Realization Rate Adjusted Gross Demand Reduction (kW)	20.6	37.6	0.4	19.0	0.0	16.9	6.4	0.0	22.0	0.6	15.3	1.4	140.2	391.9
	Net-To-Gross Adjustment (kW)	-1.4	-2.6	0.0	-1.3	0.0	-1.2	-0.4	0.0	-1.5	0.0	-1.1	-0.1	-9.8	-27.4
	Net Adjusted Demand Reduction (kW)	19.2	35.0	0.4	17.6	0.0	15.7	6.0	0.0	20.4	0.6	14.2	1.3	130.4	364.5
	Planned Net Demand Reduction (kW)	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	129.0	248.7
	Annual % Toward Planned Net Reduction (kW)	14.9%	42.0%	42.3%	56.0%	56.0%	68.1%	72.8%	72.8%	88.6%	89.0%	100.1%	101.1%	101.1%	146.6%
	Avg. Gross Demand Reduction Per Participant (kW)	6.9	18.8	0.4	3.2	N/A	4.2	2.1	N/A	5.5	N/A	5.1	1.4	5.2	5.6
	Avg. Net Demand Reduction Per Participant (kW)	6.4	17.5	0.4	2.9	N/A	3.9	2.0	N/A	5.1	N/A	4.7	1.3	4.8	5.2
Program Performance	Annual \$Admin. per Participant (Gross)	\$310	\$478	\$483	\$355	\$382	\$349	\$312	\$323	\$293	\$303	\$287	\$286	\$286	\$312
	Annual \$Admin. per kW/year (Gross)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.1
	Annual \$Admin. per kW (Gross)	\$45	\$41	\$49	\$55	\$59	\$59	\$59	\$61	\$55	\$56	\$54	\$55	\$55	\$56
	Annual \$DM&V per \$ Total	0.0%	0.0%	1.2%	0.8%	1.1%	0.9%	0.8%	1.8%	1.6%	2.1%	1.9%	3.1%	3.1%	4.4%
	Annual \$Rebate per Participant (Gross)	\$3,183	\$5,283	\$4,751	\$3,682	\$3,682	\$3,432	\$3,123	\$3,123	\$3,123	\$3,121	\$3,148	\$3,141	\$3,050	\$2,989

1. A participant is a unique account number.

B.7 North Carolina Non-residential Prescriptive Program 2019

B.7.1 2018-2019 NC Non-residential Prescriptive Annual Indicator Tables

NC- Nonresidential Prescriptive Program Category	Indicator	2018 Total	2019 Total	2018-2019 Program Total
O&M(\$)	Direct Rebate			
O&M(\$)	Direct Implementation			
O&M(\$)	Direct EM&V			
O&M(\$)	Indirect Other (Administrative)	\$10,172	\$10,038	\$20,210
Costs (\$)	Total	\$180,139	\$189,380	\$369,519
Costs (\$)	Planned	\$400,909	\$406,529	\$807,438
Costs (\$)	Variance	-\$220,770	-\$217,149	-\$437,919
	Annual % of Planned	45%	47%	46%
Participants ¹	Total (Gross)	21	36	57
	Planned (Gross)	29	29	58
	Variance	-8	7	-1
	Annual % of Planned (Gross)	72%	124%	98%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	221,779	227,788	449,567
100%	Realization Rate Adjustment (kWh/yr)	0	0	0
	Realization Rate Adjusted Savings (kWh/yr)	221,779	227,788	449,567
85%	Net-To-Gross Adjustment (kWh/yr)	-33,267	-34,168	-67,435
	Net Adjusted Savings (kWh/yr)	188,512	193,620	382,132
	Planned Net Savings (kWh/yr)	1,822,814	1,936,402	1,936,402
	Annual % Toward Planned Net Savings (kWh)	10%	170%	20%
	Avg. Gross Savings Per Participant (kWh/yr)	10,561	6,327	7,887
	Avg. Net Savings Per Participant (kWh/yr)	8,977	5,378	6,704
Installed kW	Total Gross Demand Reduction (kW)	25.3	30.4	55.6
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0
	Realization Rate Adjusted Gross Demand Reduction (kW)	25.3	30.4	55.6
85%	Net-To-Gross Adjustment (kW)	-3.8	-4.6	-8.3
	Net Adjusted Demand Reduction (kW)	21.5	25.8	47.3
	Planned Net Demand Reduction (kW)	292.0	46.5	338.5
	Annual % Toward Planned Net Reduction (kW)	7.4%	55.5%	14.0%
	Avg. Gross Demand Reduction Per Participant (kW)	1.2	0.8	1.0
	Avg. Net Demand Reduction Per Participant (kW)	1.0	0.7	0.8
Program Performance	Annual \$ Admin. per Participant (Gross)	\$484	\$279	\$355
	Annual \$ Admin. per kW/year (Gross)	\$0.05	\$0.04	\$0.04
	Annual \$ Admin. per kW (Gross)	\$403	\$330	\$363
	Annual \$EM&V per \$Total	5%	3.8%	4%
	Annual \$ Rebate per Participant (Gross)	\$3,919	\$2,208	\$2,838

1. A participant is a unique account number.

B.7.2 2019 NC Non-residential Prescriptive Monthly Indicator Tables

NC Non-residential Prescriptive Program Category	Indicator	2019												2018-2019 Program Total	
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		Total
O&MS	Direct Rebate	\$1,091	\$2,853	\$1,552	\$1,196	\$626	\$344	\$186	\$265	\$183	\$524	\$368	\$238	\$10,338	\$20,210
	Direct Implementation	\$28,040	\$4,740	\$25,797	\$19,836	\$10,537	\$5,709	\$5,311	\$9,844	\$5,404	\$15,515	\$10,889	\$7,055	\$189,280	\$3,095,419
	Costs (S)	\$28,040	\$4,740	\$25,797	\$19,836	\$10,537	\$5,709	\$5,311	\$9,844	\$5,404	\$15,515	\$10,889	\$7,055	\$189,280	\$3,095,419
	Costs (I)	\$28,040	\$4,740	\$25,797	\$19,836	\$10,537	\$5,709	\$5,311	\$9,844	\$5,404	\$15,515	\$10,889	\$7,055	\$189,280	\$3,095,419
	Costs (T)	\$56,080	\$9,480	\$51,594	\$39,672	\$21,074	\$11,418	\$10,622	\$19,688	\$10,808	\$31,030	\$21,778	\$14,110	\$378,560	\$6,190,838
Participants ¹	Annual % of Planned	7%	19%	28%	30%	32%	34%	38%	37%	38%	42%	45%	47%	47%	
	Total (Gross)	3	16	6	2	1	0	0	0	0	2	1	0	36	57
	Planned (Gross)	2	2	2	2	2	2	2	3	3	3	3	3	29	58
	Variance	1	14	4	5	-1	-2	-3	-3	-3	-1	-2	-3	7	-1
	Annual % of Planned (Gross)	10%	66%	86%	110%	114%	114%	114%	114%	114%	121%	124%	124%	124%	98%
Installed kW/year	Total Gross Demand Reduction (kW/yr)	78,754	72,810	39,779	24,898	462	0	0	0	0	10,233	853	0	227,788	449,567
	Realization Rate Adjustment (kW/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Net To-Gross Adjusted Savings (kW/yr)	78,754	72,810	39,779	24,898	462	0	0	0	0	10,233	853	0	227,788	449,567
	Net To-Gross Adjustment (kW/yr)	-11,813	-10,921	-5,967	-3,735	-69	0	0	0	0	-15,335	-128	0	0	-34,168
	Net Adjusted Savings (kW/yr)	66,941	61,888	33,812	21,163	392	0	0	0	0	8,698	725	0	193,620	382,132
85%	Planned Net Savings (kW/yr)	9,466	9,466	9,466	9,466	9,466	9,466	9,466	9,466	9,466	9,466	9,466	9,466	112,588	1,936,002
	Annual % Toward Planned Net Savings (kW/yr)	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	7%
	Avg. Gross Savings Per Participant (kW/yr)	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
	Avg. Net Savings Per Participant (kW/yr)	3,868	3,868	3,868	3,868	3,868	3,868	3,868	3,868	3,868	3,868	3,868	3,868	43,349	5,238
	Total Gross Demand Reduction (kW)	83	83	4.5	2.9	0.1	0.0	0.0	0.0	0.0	4.5	1.1	0.0	30.4	55.6
100%	Realization Rate Adjustment (kW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Net To-Gross Adjusted Demand Reduction (kW)	83	83	4.5	2.9	0.1	0.0	0.0	0.0	0.0	4.5	1.1	0.0	30.4	55.6
	Net To-Gross Adjustment (kW)	-1.3	-1.3	-0.7	-0.4	0.0	0.0	0.0	0.0	0.0	-0.7	-0.2	0.0	0.0	-4.6
	Planned Net Demand Reduction (kW)	7.6	7.1	3.9	2.4	0.0	0.0	0.0	0.0	0.0	3.9	1.0	0.0	25.8	47.3
	Annual % Toward Planned Net Reduction (kW)	16.3%	31.5%	39.8%	45.1%	45.2%	45.2%	45.2%	45.2%	45.2%	53.5%	55.5%	55.5%	55.5%	38.5%
Program Performance	Avg. Gross Demand Reduction Per Participant (kW)	3.0	0.5	0.8	0.4	0.1	0.0	0.0	0.0	0.0	2.3	1.1	0.0	7.0	1.0
	Avg. Net Demand Reduction Per Participant (kW)	2.5	0.4	0.6	0.3	0.0	0.0	0.0	0.0	0.0	1.9	0.8	0.0	5.2	0.8
	Annual \$/kWh per Participant (Gross)	\$564	\$239	\$344	\$238	\$246	\$241	\$246	\$246	\$246	\$246	\$246	\$246	\$279	\$345
	Annual \$/kWh per kW Year (Gross)	\$190	\$263	\$286	\$296	\$321	\$335	\$342	\$353	\$360	\$372	\$379	\$380	\$404	\$464
	Annual \$/kWh per \$100k (Gross)	0.0%	0.0%	0.8%	0.6%	0.8%	0.8%	0.7%	0.8%	0.8%	2.0%	2.7%	2.8%	3.8%	4%
Annual \$/kWh per Participant (Gross)	\$6,702	\$2,559	\$2,363	\$2,177	\$2,122	\$2,122	\$2,122	\$2,122	\$2,122	\$2,184	\$2,208	\$2,208	\$2,208	\$2,838	

1. A participant is a unique account number.

B.8 North Carolina Residential Air Conditioner Cycling Program 2011-2019

B.8.1 2011-2019 NC Residential Air Conditioner Cycling Program Annual Indicator Tables

NC - Residential AC Cycling Program		2011	2012	2013	2014	2015	2016	2017	2018	2019	2011-2019
Category	Indicator	Total	Total	Total	Total	Total	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate										
O&M (\$)	Direct Implementation										
O&M (\$)	Direct EM&V										
O&M (\$)	Indirect Other (Administrative)	\$20,344	\$16,948	\$28,964	\$13,341	\$6,734	\$7,646	\$9,349	\$13,272	\$9,722	\$126,320
Capital (\$)	Direct Implementation	\$0	\$536,949	\$120,863	\$103,000	\$46,303	\$28,034	\$1,175	\$4,575	\$19,125	\$860,024
Costs (\$)	Total	\$269,383	\$696,052	\$440,722	\$441,315	\$315,550	\$279,602	\$238,761	\$239,609	\$244,525	\$3,165,519
Costs (\$)	Planned	\$403,525	\$800,702	\$662,709	\$609,423	\$649,694	\$549,799	\$584,160	\$453,453	\$484,114	\$5,197,579
Costs (\$)	Variance	-\$134,142	-\$104,650	-\$221,987	-\$168,108	-\$334,143	-\$270,197	-\$345,400	-\$213,844	-\$239,589	-\$2,032,060
	Cum. % toward planned total	67%	87%	67%	72%	49%	51%	41%	53%	51%	61%
Participants	Total (Cumulative @ End of Month)	1,003	2,853	4,144	5,260	5,631	5,863	5,891	5,969	6,247	6,247
	Removals (Uninstalled) / Deactivations	-1	-260	-608	-1,082	-1,711	-2,143	-2,285	-2,901	-3,186	-3,186
	Opt-outs	9	1	1	1	4	13	1	1	1	5
	Adjusted Participants (Cum.)	993	2,592	3,535	4,177	3,916	3,707	3,605	3,067	3,060	3,056
0%	Net to gross adjustment (Cum.)	0	0	0	0	0	0	0	0	0	0
96%	In Service Rate Adjustment (Cum.)	-40	104	-141	-167	0	0	0	0	0	0
	Net Participation (Cum.)	953	2,489	3,394	4,010	3,916	3,707	3,605	3,067	3,061	3,056
	Planned (Cum.)	1,230	3,198	5,090	6,094	4,840	3,920	5,963	4,733	4,235	4,235
	Variance (Cum.)	-277	-720	-1,696	-2,084	-924	-1,943	-2,358	-1,666	-1,174	-1,179
	Cum % toward planned total (Net basis)	77.5%	77.5%	66.7%	65.8%	80.9%	94.6%	60%	65%	72%	72%
	Removal (Uninstalled) / Deactivation Rate	-0.02%	-0.8%	-1.03%	-1.03%	-1.30%	-0.94%	-0.33%	-1.58%	-1.28%	-0.99%
	Average % Opt-outs (rate)	0.9%	0.03%	0.02%	0.02%	0.09%	0.36%	0.03%	0.03%	0.03%	0.17%
	Realization Rate	111%	99%	78%	93%	100%	100%	100%	100%	100%	98%
	Connected load	2,084	11,398	12,957	15,572	15,654	14,187	13,419	12,069	11,479	12,785
	Ex-Ante kW estimates	1.00	1.09	0.95	0.78	0.71	0.97	0.68	0.63	0.63	0.81
	Connected Load per Participant	2.19	4.58	3.82	3.88	4.00	3.83	3.72	3.94	3.75	3.74
Installed kW	Peak Shaving Potential kW - Gross Participants	1,103.3	3,138.3	4,558.4	4,076.5	3,998.0	5,687.1	4,005.9	3,744.9	3,910.6	3,910.6
	Removed (Uninstalled) / Deactivated Peak Shaving Potential kW	-1.0	-286.0	-668.8	-838.6	-1,214.8	-2,078.7	-1,553.8	-1,820.1	-1,994.4	-1,994.4
	Less Opt-outs (kW)	10.0	1.0	0.8	0.6	2.5	13.0	0.8	0.7	0.7	3.3
	Dispatchable Peak Shaving Potential - Total kW	1,092	2,851	3,889	2,924	2,781	3,595	2,451	1,925	1,916	1,913
0%	Less Free Ridership Factor (Cum.)	0	0	0	0	0	0	0	0	0	0
96%	In Service Rate Adjustment (Cum.)	-44	114	-156	-117	0	0	0	0	0	0
	Adjustment for Realization Rate	115	16	-815	-211	0	0	0	0	0	0
	Net Demand (Cum.)	1,164	2,721	2,918	2,597	2,781	3,595	2,451	1,925	1,916	1,916
	Planned Demand (Cum.)	1,168	3,032	4,830	5,814	4,840	4,157	5,392	3,220	2,664	2,664
	Cum. % toward planned total (Net basis)	100%	90%	60%	45%	57%	86%	45%	60%	72%	72%
	Dispatchable Peak Shaving Potential kW per Participant	1.22	1.09	0.86	0.65	0.71	0.97	0.68	0.63	0.63	0.63
Program Performance	Cum. \$Admin. per Cum. Participant	\$20	\$13	\$16	\$15	\$15	\$16	\$18	\$20	\$20	\$19.01
	Cum. \$Admin. per Cum. Gross kW	\$18	\$12	\$15	\$21	\$22	\$17	\$26	\$31	\$32	\$32
	Cum. \$EM&V per Cum. \$Total	1%	1%	1%	1%	1%	2%	2%	2%	2%	2%
	Cum. \$Rebate per Cum. Participant	\$1	\$36	\$55	\$74	\$96	\$116	\$140	\$158	\$170	\$190

1. A participant is a unique account number.

B.9 North Carolina Residential Lighting Program 2011-2012

NC- Residential Lighting Program Category	Indicator	2011 Total	2012 Total	2011-2012 Program Total
O&M(\$)	Direct Rebate			
O&M(\$)	Direct Implementation			
O&M(\$)	Direct EM&V			
O&M(\$)	Indirect Other (Administrative)	\$5,847	\$1,066	\$6,913
Costs (\$)	Total	\$77,419	\$9,705	\$87,124
Costs (\$)	Planned	\$125,612	\$20,779	\$146,391
Costs (\$)	Variance	-\$48,193	-\$11,074	-\$59,267
	Cum. % toward planned total	61.6%	46.7%	59.5%
Participants	Total bulbs (Gross)	37,120	0	37,120
	Planned (Gross)	127,975		127,975
	Variance	-90,855	0	-90,855
	Cum % toward planned total (Gross)	29.0%		29.0%
Instal led kWh/year	Total (Gross)	1,882,829	0	1,882,829
84%	Realization Rate Adjustment	-301,253	0	-301,253
	Adjusted Gross Savings	1,581,577	0	1,581,577
65%	Net-To-Gross Adjustment	-553,552	0	-553,552
	Net Adjusted Savings	1,028,025	0	1,028,025
	Planned (Net)	3,585,903		3,585,903
	Cum. % toward planned total (Net)	28.7%		28.7%
	Avg. per Bulb (Net)	28		28
Installed kW	Total (Gross)	205	0	205
84%	Realization Rate Adjustment	-33	0	-33
	Adjusted Gross Demand	172	0	172
65%	Net-To-Gross Adjustment	-60	0	-60
	Net Adjusted Demand	112	0	112
	Planned (Net)	298		298
	Cum. % toward planned total (Net)	37.5%		37.5%
	Avg. per Bulb (Net)	0.003		0.003
Program Performance	Cum. \$Admin. per Cum. Bulb (Gross)	\$0.2		\$0.2
	Cum. \$Admin. per Cum. kWh (Gross)	\$0.00		\$0.00
	Cum. \$Admin. per Cum. kW (Gross)	\$29		\$34
	Cum. \$EM&V per Cum Total Costs (\$)	3.7%	17.4%	5.2%
	Cum. \$Rebate per Cum. Bulb (Gross)	\$1		\$1

1. Program closed end of 2012.

B.10 North Carolina Residential Low-income Program 2011-2015


NC- Residential Low-income Program		2011*	2012	2013	2014	2015	2011-2015
Category	Indicator	Total	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate						
O&M (\$)	Direct Implementation						
O&M (\$)	Direct EM&V						
O&M (\$)	Indirect Other (Administrative)	\$20,601	\$22,730	\$15,525	\$9,060	\$24,980	\$92,895
Costs (\$)	Total	\$260,176	\$193,154	\$164,591	\$175,888	\$800,616	\$1,594,425
Costs (\$)	Planned	\$296,979	\$540,333	\$229,609	\$195,488	\$1,041,930	\$2,304,338
Costs (\$)	Variance	-\$36,803	-\$347,179	-\$65,018	-\$19,599	-\$241,314	-\$709,913
	Cum. % toward planned total	87.6%	35.7%	71.7%	90.0%	76.8%	69.2%
	Audits	207	156	120	120	647	1,250
Participants	Total (Gross)	207	156	120	120	653	1,256
	Planned (Gross)	325	519	33	132	600	1,609
	Variance	-118	-363	87	-12	53	-353
	Cum % toward planned total (Gross)	63.7%	30.1%	363.6%	90.9%	108.8%	78.1%
Installed kWh/year	Total Gross Deemed Savings	200,471	183,162	106,895	102,596	537,503	1,130,626
62%	Realization Rate Adjustment	-106,249	-97,076	-26,724	-38,986	-204,251	-473,286
	Adjusted Gross Savings	94,221	86,086	80,171	63,609	333,252	657,340
93.6%	Net-To-Gross Adjustment	-6,030	-5,510	-5,131	-4,071	-21,328	-42,070
	Net Adjusted Savings	88,191	80,576	75,040	59,538	311,924	615,270
	Planned Savings (Net)	134,347	195,653	85,480	106,694	1,170,600	1,692,774
	Cum. % Toward Planned Savings (Net)	65.6%	41.2%	87.8%	55.8%	26.6%	36.3%
	Avg. Savings Per Participant (Net)	426	517	625	496	478	490
Installed kW	Total Gross Deemed Demand	61	36	27	23	128	275
62%	Realization Rate Adjustment	-32.3	-19.2	-6.7	-8.7	-48.5	-115
	Adjusted Gross Demand	29	17	20	14	79	159
93.6%	Net-To-Gross Adjustment	-2	-1	-1	-1	-5	-10
	Net Adjusted Demand	27	16	19	13	74	149
	Planned Demand (Net)	23	38	16	16	55	148
	Cum. % Toward Planned Demand (Net)	116.6%	41.9%	117.4%	83.2%	135.7%	100.9%
	Avg. Demand Per Participant (Net)	0.1	0.1	0.2	0.1	0.1	0.1
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$100	\$146	\$129	\$76	\$38	\$74
	Cum. \$Admin. per Cum. kWh (Gross)	\$0.10	\$0.12	\$0.15	\$0.09	\$0.05	\$0.08
	Cum. \$Admin. per Cum. kW (Gross)	\$338	\$627	\$580	\$395	\$196	\$338
	Cum. \$EM&V per Cum Total Costs (\$)	2.3%	2.7%	4.7%	3.0%	0.4%	1.7%
	Cum. \$Rebate per Cum. Participant (Gross)	\$1,067	\$989	\$1,011	\$1,043	\$1,090	\$1,062

1. Program closed end of 2015.

B.11 North Carolina Residential Heat Pump Upgrade Program 2014-2017

NC - Residential Heat Pump Upgrade Program		2014	2015	2016	2017	2014-2017
Category	Indicator	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate					
O&M (\$)	Direct Implementation					
O&M (\$)	Direct EM&V					
O&M (\$)	Indirect Other (Administrative)	\$1,847	\$7,845	\$8,235	\$2,527	\$20,454
Costs (\$)	Total	\$47,447	\$269,195	\$270,955	\$64,223	\$651,821
Costs (\$)	Planned	\$350,500	\$383,960	\$424,079	\$33,581	\$1,192,119
Costs (\$)	Variance	-\$303,052	-\$114,764	-\$153,124	\$30,643	-\$540,298
	Annual % of Planned	14%	70%	64%	191%	55%
Participants ¹	Total (Gross)	44	597	665	118	1,424
	Planned (Gross)	1,200	1,200	252	0	2,652
	Variance	-1,156	-603	413	118	-1,228
	Annual % of Planned (Gross)	4%	50%	264%		54%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	72,449	282,170	317,574	63,092	735,286
78%	Realization Rate Adjustment (kWh/yr)	4,854	-63,206	-71,137	-14,133	-143,621
	Realization Rate Adjusted Savings (kWh/yr)	77,303	218,964	246,438	48,960	591,665
45%	Net-To-Gross Adjustment (kWh/yr)	-11,595	-120,211	-135,294	-26,879	-293,980
	Net Adjusted Savings (kWh/yr)	65,708	98,753	111,143	22,081	297,685
	Planned Net Savings (kWh/yr)	1,038,000	1,038,000	49,858	0	2,125,858
	Annual % Toward Planned Net Savings (kWh)	6%	10%	223%		14%
	Avg. Gross Savings Per Participant (kWh/yr)	1,647	473	478	535	516
	Avg. Net Savings Per Participant (kWh/yr)	1,493	165	167	187	209
Installed kW	Total Gross Demand Reduction (kW)	19	58	69	14	160
89%	Realization Rate Adjustment (kW)	-3	-6	-8	-2	-19
	Realization Rate Adjusted Gross Demand Reduction (kW)	16	51	61	13	141
45%	Net-To-Gross Adjustment (kW)	-2	-28	-33	-7	-71
	Net Adjusted Demand Reduction (kW)	14	23	27	6	70
	Planned Net Demand Reduction (kW)	348	348	18	0	714
	Annual % Toward Planned Net Reduction (kW)	4%	7%	153%		10%
	Avg. Gross Demand Reduction Per Participant (kW)	0.44	0.10	0.10	0.12	0.11
	Avg. Net Demand Reduction Per Participant (kW)	0.31	0.04	0.04	0.05	0.05
Program Performance	Annual \$Admin. per Participant (Gross)	\$42	\$13	\$12	\$21	\$14
	Annual \$Admin. per kWh/year (Gross)	\$0.03	\$0.03	\$0.03	\$0.04	\$0.03
	Annual \$Admin. per kW (Gross)	\$96	\$136	\$120	\$174	\$127.89
	Annual \$EM&V per \$Total	34%	11%	7%	14%	12%
	Annual \$Rebate per Participant (Gross)	\$223	\$212	\$222	\$225	\$218

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1. Program closed end of 2017.
 2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.
 3. Realization Rate Adjustment occurred in 2015. Prior to 2012-2014 kWh realization rate was 106.7%, kW realization rate was 83.1%, and Net to Gross rate was 85%. From the start of 2015 forward kWh realization rate was 78%, kW realization rate was 89%, and Net to Gross rate was 45%.

B.12 North Carolina Residential Heat Pump Tune-up Program 2014-2017

NC - Residential Heat Pump Tune-Up Program		2014	2015	2016	2017	2014-2017
Category	Indicator	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate					
O&M (\$)	Direct Implementation					
O&M (\$)	Direct EM&V					
O&M (\$)	Indirect Other (Administrative)	\$3,186	\$15,540	\$6,321	\$2,018	\$27,065
Costs (\$)	Total	\$99,944	\$467,762	\$207,995	\$51,288	\$826,988
Costs (\$)	Planned	\$395,676	\$439,770	\$461,312	\$54,112	\$1,350,870
Costs (\$)	Variance	-\$295,732	\$27,992	-\$253,318	-\$2,825	-\$523,882
	Annual % of Planned	25%	106%	45%	95%	61%
Participants ¹	Total (Gross)	581	3,307	1,274	125	5,287
	Planned (Gross)	2,777	2,777	1,542	0	7,096
	Variance	-2,196	530	-268	125	-1,809
	Annual % of Planned (Gross)	21%	119%	83%		75%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	154,857	843,691	322,679	32,050	1,353,277
	99% Realization Rate Adjustment (kWh/yr)	-1,239	-6,750	-2,581	-256	-10,826
	Realization Rate Adjusted Savings (kWh/yr)	153,618	836,942	320,098	31,793	1,342,451
	90% Net-To-Gross Adjustment (kWh/yr)	-15,362	-83,694	-32,010	-3,179	-134,245
	Net Adjusted Savings (kWh/yr)	138,256	753,248	288,088	28,614	1,208,206
	Planned Net Savings (kWh/yr)	2,116,074	2,116,074	174,326	0	4,406,474
	Annual % Toward Planned Net Savings (kWh)	7%	36%	165%		27%
	Avg. Gross Savings Per Participant (kWh/yr)	267	255	253	256	256
	Avg. Net Savings Per Participant (kWh/yr)	238	228	226	229	229
Installed kW	Total Gross Demand Reduction (kW)	80	625	241	25	971
	99% Realization Rate Adjustment (kW)	-1	-5	-2	0	-8
	Realization Rate Adjusted Gross Demand Reduction(kW)	79	620	239	25	963
	90% Net-To-Gross Adjustment (kW)	-8	-62	-24	-2	-96
	Net Adjusted Demand Reduction (kW)	71	558	215	22	867
	Planned Net Demand Reduction (kW)	639	639	58	0	1,336
	Annual % Toward Planned Net Reduction (kW)	11%	87%	368%		65%
	Avg. Gross Demand Reduction Per Participant (kW)	0.14	0.19	0.19	0.20	0.18
	Avg. Net Demand Reduction Per Participant (kW)	0.12	0.17	0.17	0.18	0.16
Program Performance	Annual \$Admin. per Participant (Gross)	\$5	\$5	\$5	\$16	\$5
	Annual \$Admin. per kWh/year (Gross)	\$0.02	\$0.02	\$0.02	\$0.06	\$0.02
	Annual \$Admin. per kW (Gross)	\$40	\$25	\$26	\$81	\$28
	Annual \$EM&V per \$Total	6%	1%	3%	8%	3%
	Annual \$Rebate per Participant (Gross)	\$90	\$90	\$89	\$90	\$90

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1. Program closed end of 2017.
 2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.

B.13 North Carolina Residential Duct Sealing Program 2014-2017


NC - Residential Duct Sealing Program		2014	2015	2016	2017	2014-2017
Category	Indicator	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate					
O&M (\$)	Direct Implementation					
O&M (\$)	Direct EM&V					
O&M (\$)	Indirect Other (Administrative)	\$951	\$3,700	\$4,363	\$690	\$9,704
Costs (\$)	Total	\$21,105	\$102,470	\$143,554	\$17,533	\$284,662
Costs (\$)	Planned	\$115,655	\$110,723	\$118,580	\$18,338	\$363,296
Costs (\$)	Variance	-\$94,550	-\$8,253	\$24,974	-\$805	-\$78,634
	Annual % of Planned	18%	93%	121%	96%	78%
Participants ¹	Total (Gross)	0	323	217	14	554
	Planned (Gross)	346	346	101	0	793
	Variance	-346	-23	116	14	-239
	Annual % of Planned (Gross)	0%	93%	215%		70%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	201,495	129,136	8,003	338,633
49%	Realization Rate Adjustment (kWh/yr)	0	-101,956	-65,343	-4,049	-171,348
	Realization Rate Adjusted Savings (kWh/yr)	0	99,538	63,793	3,953	167,285
80%	Net-To-Gross Adjustment (kWh/yr)	0	-19,908	-12,759	-791	-33,457
	Net Adjusted Savings (kWh/yr)	0	79,631	51,034	3,163	133,828
	Planned Net Savings (kWh/yr)	181,304	181,304	12,013	0	374,621
	Annual % Toward Planned Net Savings (kWh)	0%	44%	425%		36%
	Avg. Gross Savings Per Participant (kWh/yr)		624	595	572	611
	Avg. Net Savings Per Participant (kWh/yr)		247	235	226	242
Installed kW	Total Gross Demand Reduction (kW)	0	148	95	6	249
43%	Realization Rate Adjustment (kW)	0	-85	-55	-3	-143
	Realization Rate Adjusted Gross Demand Reduction (kW)	0	63	40	2	106
80%	Net-To-Gross Adjustment (kW)	0	-13	-8	0	-21
	Net Adjusted Demand Reduction (kW)	0	50	32	2	85
	Planned Net Demand Reduction (kW)	114	114	4	0	232
	Annual % Toward Planned Net Reduction (kW)	0%	44%	802%		36%
	Avg. Gross Demand Reduction Per Participant (kW)		0.46	0.44	0.42	0.45
	Avg. Net Demand Reduction Per Participant (kW)		0.16	0.15	0.14	0.15
Program Performance	Annual \$Admin. per Participant (Gross)		\$11	\$20	\$49	\$18
	Annual \$Admin. per kWh/year (Gross)		\$0.02	\$0.03	\$0.09	\$0.03
	Annual \$Admin. per kW (Gross)		\$25	\$46	\$117	\$39
	Annual \$EM&V per \$Total	41%	5%	5%	25%	9%
	Annual \$Rebate per Participant (Gross)		\$125	\$125	\$125	\$125

1. Program closed end of 2017.
2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.

B.14 North Carolina Residential Home Energy Check-up Program 2014-2017

NC - Residential Home Energy Check-Up Program		2014	2015	2016	2017	2014-2017
Category	Indicator	Total	Total	Total	Total ²	Program Total
O&M (\$)	Direct Rebate					
O&M (\$)	Direct Implementation					
O&M (\$)	Direct EM&V					
O&M (\$)	Indirect Other (Administrative)	\$654	\$11,982	\$658	\$1,086	\$14,380
Costs (\$)	Total	\$14,345	\$351,877	\$21,660	\$27,588	\$415,470
Costs (\$)	Planned	\$86,513	\$92,939	\$98,144	\$60,535	\$338,131
Costs (\$)	Variance	-\$72,168	\$258,938	-\$76,484	-\$32,946	\$77,339
	Annual % of Planned	17%	379%	44%	46%	123%
Participants ¹	Total (Gross)	0	996	4	49	1,049
	Planned (Gross)	160	160	881	0	1,201
	Variance	-160	836	-877	49	-152
	Annual % of Planned (Gross)	0%	623%	0%		87%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	0	593,172	1,495	35,051	629,718
	154% Realization Rate Adjustment (kWh/yr)	0	317,347	800	18,752	336,899
	Realization Rate Adjusted Savings (kWh/yr)	0	910,520	2,294	53,803	966,617
	82% Net-To-Gross Adjustment (kWh/yr)	0	-164,804	-415	-9,738	-174,958
	Net Adjusted Savings (kWh/yr)	0	745,716	1,879	44,065	791,659
	Planned Net Savings (kWh/yr)	162,720	162,720	308,536	0	633,976
	Annual % Toward Planned Net Savings (kWh)	0%	458%	1%		125%
	Avg. Gross Savings Per Participant (kWh/yr)		596	374	715	600
	Avg. Net Savings Per Participant (kWh/yr)		749	470	899	755
Installed kW	Total Gross Demand Reduction (kW)	0	52	0	2	55
	154% Realization Rate Adjustment (kW)	0	28	0	1	29
	Realization Rate Adjusted Gross Demand Reduction(kW)	0	80	0	4	84
	82% Net-To-Gross Adjustment (kW)	0	-14	0	-1	-15
	Net Adjusted Demand Reduction (kW)	0	65	0	3	69
	Planned Net Demand Reduction (kW)	29	29	67	0	125
	Annual % Toward Planned Net Reduction (kW)	0%	227%	1%		55%
	Avg. Gross Demand Reduction Per Participant (kW)		0.05	0.04	0.05	0.05
	Avg. Net Demand Reduction Per Participant (kW)		0.07	0.05	0.06	0.07
Program Performance	Annual \$Admin. per Participant (Gross)		\$12	\$165	\$22	\$14
	Annual \$Admin. per kWh/year (Gross)		\$0.02	\$0.44	\$0.03	\$0.02
	Annual \$Admin. per kW (Gross)		\$230	\$3,983	\$443	\$263
	Annual \$EM&V per \$Total	24.8%	2.3%	50.0%	20.2%	6.7%
	Annual \$Rebate per Participant (Gross)		\$221	\$200	\$193	\$220

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1. Program closed end of 2017.
 2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.
 3. The 2017 total gross deemed savings values reported in this table include adjustments of -2.1 kWh/year and -0.00044 kW made to the January 2017 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017. Specifically, the corrections were in section 2.1.5 for "Low-Flow Showerhead" measures, to the "ΔT" variable, which is a measure of the change in temperature of the water used for shower and temperature entering the house ($\Delta T = T_{\text{shower}} - T_{\text{in house}}$). STEP Manual 7.0.0 reported the value as 44.9°F, but has been corrected to 44.1°F. This correction is reflected in STEP Manual version 8.0.0 in this EM&V report.
 4. Realization Rate Adjustment occurred in 2015. 2012-2014 Net to Gross Adjustment was 80.0%. From 2015 forward Net to Gross Adjustment was 82% and Realization Rate as adjusted to 154%.

B.15 North Carolina Commercial Lighting Program 2011-2012

NC- Commercial Lighting Program		2011	2012	2013	2011-2014
Category	Indicator	Total	Total	Total	Program Total
O&M(\$)	Direct Rebate				
O&M(\$)	Direct Implementation				
O&M(\$)	Direct EM&V				
O&M(\$)	Indirect Other (Administrative)	\$16,336	\$7,585	\$5,209	\$35,758
Capital (\$)		\$0	\$0	\$0	\$0
Costs (\$)	Total	\$216,305	\$85,178	\$51,201	\$485,059
Costs (\$)	Planned	\$294,641	\$546,511	\$206,515	\$1,251,849
Costs (\$)	Variance	-\$78,336	-\$461,332	-\$155,314	-\$766,790
	Cum. % toward planned total	73.4%	15.6%	24.8%	38.7%
Participants	Total (Gross)	1	25	0	47
	Planned (Gross)	2	9	0	15
	Variance	-1	16	0	32
	Cum % toward planned total (Gross)	50.0%	277.8%		313.3%
Installed kWh/year	Total Gross Deemed Savings	1,787,400	409,819	0	3,092,876
178.0%	Realization Rate Adjustment ¹	1,376,298	320,111	0	2,394,058
	Adjusted Gross Savings	3,163,699	729,930	0	5,486,934
50.0%	Net-To-Gross Adjustment	-1,581,849	-364,965	0	-2,743,467
	Net Adjusted Savings	1,581,849	364,965	0	2,743,467
	Planned Savings (Net)	515,922	2,172,078	0	2,825,967
	Cum. % Toward Planned Savings (Net)	306.6%	16.8%		97.1%
	Avg. Savings Per Participant (Net)	1,581,849	14,599		58,372
Installed kW	Total Gross Deemed Demand	682	110	0	1,027
98.0%	Realization Rate Adjustment	-13.6	-2	0	-21
	Adjusted Gross Demand	668	108	0	1,006
50.0%	Net-To-Gross Adjustment	-334	-54	0	-503
	Net Adjusted Demand	334	54	0	503
	Planned Demand (Net)	62	275	0	337
	Cum. % Toward Planned Demand (Net)	538.7%	19.6%		149.3%
	Avg. Demand Per Participant (Net)	334.0	2.2		10.7
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$16,336	\$303		\$761
	Cum. \$Admin. per Cum. kWh (Gross)	\$0.01	\$0.02		\$0.01
	Cum. \$Admin. per Cum. kW (Gross)	\$23.96	\$69.04		\$34.82
	Cum. \$EM&V per Cum Total Costs (\$)	4.62%	2.21%	0.00%	6.5%
	Cum. \$Rebate per Cum. Participant (Gross)	\$158,605	\$1,726		\$5,465

1. Program closed end of 2014.
2. Realization rate is 177% January 1st through May 30th, 179% June 1st through September 30th, and 177% October 1st through December 31st.

B.16 North Carolina Commercial HVAC Program 2011-2013


NC- Commercial HVAC Program		2011	2012	2013	2011-2014
Category	Indicator	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate				
O&M (\$)	Direct Implementation				
O&M (\$)	Direct EM&V				
O&M (\$)	Indirect Other (Administrative)	\$1,140	\$7,812	\$5,177	\$18,219
Capital (\$)		\$0	\$0	\$0	\$0
Costs (\$)	Total	\$15,093	\$73,854	\$50,910	\$220,106
Costs (\$)	Planned	\$55,015	\$103,728	\$97,195	\$357,665
Costs (\$)	Variance	-\$39,922	-\$29,875	-\$46,285	-\$137,559
	Cum. % toward planned total	27.4%	71.2%	52.4%	61.5%
Participants	Total (Gross)	0	4	0	4
	Planned (Gross)	2	11	0	18
	Variance	-2	-7	0	-14
	Cum % toward planned total (Gross)	0.0%	36.4%		22.2%
Installed kWh/year	Total Gross Deemed Savings	0	388,155	0	388,155
	63.3% Realization Rate Adjustment ¹	0	-142,453	0	-142,453
	Adjusted Gross Savings	0	245,702	0	245,702
	45.0% Net-To-Gross Adjustment	0	-135,136	0	-135,136
	Net Adjusted Savings	0	110,566	0	110,566
	Planned Savings (Net)	58,153	299,847	0	525,666
	Cum. % Toward Planned Savings (Net)	0.0%	36.9%		21.0%
	Avg. Savings Per Participant (Net)		27,641		27,641
Installed kW	Total Gross Deemed Demand	0	73	0	73
	97.0% Realization Rate Adjustment	0.0	-2	0	-2
	Adjusted Gross Demand	0	71	0	71
	45.0% Net-To-Gross Adjustment	0	-39	0	-39
	Net Adjusted Demand	0	32	0	32
	Planned Demand (Net)	22	122	0	144
	Cum. % Toward Planned Demand (Net)	0.0%	26.2%		22.2%
	Avg. Demand Per Participant (Net)		8		8
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)		\$1,953		\$4,555
	Cum. \$Admin. per Cum. kWh (Gross)		\$0.02		\$0.05
	Cum. \$Admin. per Cum. kW (Gross)		\$107		\$249
	Cum. \$EM&V per Cum Total Costs (\$)	81.6%	17.5%	0.0%	20.1%
	Cum. \$Rebate per Cum. Participant (Gross)		\$6,323		\$6,323

1. Program closed end of 2014.
2. Realization rate is 63% January 1st through May 30th, 35% June 1st through September 30th, and 63% October 1st through December 31st.

B.17 North Carolina Non-residential Duct Testing and Sealing Program 2014-2017

NC - Non-Residential Duct Sealing and Testing Program		2014	2015	2016	2017	2014-2017
Category	Indicator	Total	Total	Total ²	Total	Program Total
O&M (\$)	Direct Rebate					
O&M (\$)	Direct Implementation					
O&M (\$)	Direct EM&V					
O&M (\$)	Indirect Other (Administrative)	\$8,090	\$28,601	\$11,032	\$5,524	\$53,248
Costs (\$)	Total	\$253,157	\$746,482	\$362,980	\$140,392	\$1,503,010
Costs (\$)	Planned	\$367,630	\$381,014	\$400,363	\$71,633	\$1,220,640
Costs (\$)	Variance	-\$114,474	\$365,468	-\$37,383	\$68,758	\$282,370
	Annual % of Planned	69%	196%	91%	196%	123%
Participants ¹	Total (Gross)	60	152	33	5	250
	Planned (Gross)	30	30	39	0	99
	Variance	30	122	-6	5	149
	Annual % of Planned (Gross)	200%	507%	85%		253%
Installed kWh/year	Total Gross Deemed Savings (kWh/yr)	595,895	2,400,813	550,135	184,255	3,731,098
	87% Realization Rate Adjustment (kWh/yr)	-77,466	-312,106	-71,518	-23,953	-485,043
	Realization Rate Adjusted Savings (kWh/yr)	518,428	2,088,707	478,618	160,302	3,246,055
	97% Net-To-Gross Adjustment (kWh/yr)	-14,516	-58,484	-13,401	-4,488	-90,890
	Net Adjusted Savings (kWh/yr)	503,912	2,030,224	465,216	155,813	3,155,166
	Planned Net Savings (kWh/yr)	989,610	989,610	230,534	0	2,209,754
	Annual % Toward Planned Net Savings (kWh)	51%	205%	202%		143%
	Avg. Gross Savings Per Participant (kWh/yr)	9,932	15,795	16,671	36,851	14,924
	Avg. Net Savings Per Participant (kWh/yr)	8,399	13,357	14,097	31,163	12,621
Installed kW	Total Gross Demand Reduction (kW)	65	292	160	54	570
	94% Realization Rate Adjustment (kW)	-4	-17	-9	-3	-33
	Realization Rate Adjusted Gross Demand Reduction (kW)	61	275	150	51	537
	97% Net-To-Gross Adjustment (kW)	-2	-8	-4	-1	-15
	Net Adjusted Demand Reduction (kW)	60	267	146	49	522
	Planned Net Demand Reduction (kW)	221	221	95	0	537
	Annual % Toward Planned Net Reduction (kW)	27%	121%	154%		97%
	Avg. Gross Demand Reduction Per Participant (kW)	1.08	1.92	4.84	10.77	2.28
	Avg. Net Demand Reduction Per Participant (kW)	0.99	1.76	4.43	9.86	2.09
Program Performance	Annual \$Admin. per Participant (Gross)	\$135	\$188	\$334	\$1,105	\$213
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.01	\$0.02	\$0.03	\$0.01
	Annual \$Admin. per kW (Gross)	\$124	\$98	\$69	\$103	\$93.42
	Annual SEM&V per \$Total	9.3%	0.7%	2.0%	3.7%	2.8%
	Annual \$Rebate per Participant (Gross)	\$3,015	\$4,265	\$9,551	\$23,994	\$5,058

CONFIDENTIAL INFORMATION REDACTED

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1. Program closed end of 2017.
 2. A participant is the first instance of unique account number that has been installed and rebated. A unique account number that may have multiple approved rebates in two or more different months is counted as a single participant.
 3. The 2016 total gross deemed savings values reported in this table differ from values in the May 1, 2017 EM&V report, and have been refilled with the Commission. The adjustments totaled -83,464 kWh/year and 0 kW for 2016 reported savings. The adjustments account for corrections to STEP Manual version 7.0.0 issued on May 1, 2017, in section 12. The adjustments were made to full load heating hours (FLHheat) in Tables 90 and 91 to be consistent with those in the Mid-Atlantic TRM v 6, in response to requests by the North Carolina Public Staff Utilities Commission Re: Docket No. E-22, Sub 545, on October 23, 2017. This affected multiple non-residential HVAC measures (e.g. heat pumps, variable refrigerant flow, mini split systems) that reference Table 90 and 91, in multiple non-residential programs. This adjustment is reflected in STEP Manual version 8.0.0 in this EM&V report. Another adjustment was made to correct the full load cooling hours in North Carolina for this program. The code that calculated this savings did not match the STEP Manual v 7.0.0.

B.18 North Carolina Non-residential Energy Audit Program 2014-2017

NC - Non-Residential Energy Audit Program		2014	2015	2016	2017	2014-2017
Category	Indicator	Total	Total	Total	Total	Program Total
O&M (\$)	Direct Rebate					
O&M (\$)	Direct Implementation					
O&M (\$)	Direct EM&V					
O&M (\$)	Indirect Other (Administrative)	\$6,487	\$3,164	\$3,088	\$3,936	\$16,675
Costs (\$)	Total	\$199,201	\$130,744	\$101,589	\$100,018	\$531,553
Costs (\$)	Planned	\$142,946	\$124,892	\$130,094	\$19,406	\$417,338
Costs (\$)	Variance	\$56,255	\$5,852	-\$28,505	\$80,612	\$114,215
	Annual % of Planned	139%	105%	78%	515%	127%
Audits	Total (Gross)	16	81	14	0	111
Participants ¹	Total (Gross)	16	78	12	2	108
	Planned (Gross)	37	37	48	0	122
	Variance	-21	41	-36	2	-14
	Annual % of Planned (Gross)	43%	211%	25%		89%
Installed kWh/year	Total (Gross)	495,669	225,418	270,829	825,840	1,817,756
	Attribution Rate weighted by Measure	99%	99%	99%	76%	89%
	Realization Rate weighted by Measure	99%	69%	94%	79%	85%
	Adjusted (Net) by Realization Rate and Attribution Rate	487,729	153,498	253,571	491,719	1,386,517
	Planned (Net)	1,093,017	827,170	323,638	0	2,243,824
	Annual % Toward Planned Net Savings (kWh)	45%	19%	78%		62%
	Avg. Gross Savings Per Participant (kWh/yr)	30,979	2,890	22,569	412,920	16,831
	Avg. Net Savings Per Participant (kWh/yr)	30,483	1,968	21,131	245,859	12,838
Installed kW	Total (Gross)	57	30	31	147	264
	Attribution Rate weighted by Measure	99%	99%	99%	76%	86%
	Realization Rate weighted by Measure	99%	64%	94%	79%	83%
	Adjusted kW (Net)	55	20	29	80	184
	Planned (Net)	195	179	50	0	424
	Annual % Toward Planned Net Reduction (kW)	28.5%	11.3%	58%		43%
	Avg. Gross Demand Reduction Per Participant (kW)	3.6	0.4	2.5	73.6	2.4
	Avg. Net Demand Reduction Per Participant (kW)	3.5	0.3	2.4	39.9	1.7
Program Performance	Annual \$Admin. per Participant (Gross)	\$405	\$41	\$257	\$1,968	\$154
	Annual \$Admin. per kWh/year (Gross)	\$0.01	\$0.01	\$0.01	\$0.00	\$0.01
	Annual \$Admin. per kW (Gross)	\$114	\$106	\$101	\$27	\$63
	Annual \$EM&V per \$ Total	12.2%	4.5%	7.2%	7.0%	8.4%
	Annual \$Rebate per Participant (Gross)	\$8,988	\$916	\$6,886	\$18,631	\$3,103

1. Program closed end of 2017.
2. A participant is a single unit that has been installed and rebated. A unique account number may represent multiple participants if that account had multiple units installed and rebated.