

- Air-source/ground-source heat pump units
- Packaged terminal AC and heat pump
- Variable refrigerant flow
- Water- and air-cooled chillers
- Variable frequency drive 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 SCC approved the DSM Phase III programs on April 29, 2014 (Case No. PUE-2013-00072). The NCUC approved the DSM Phase III programs on October 27, 2014 (Docket No. E-22, Sub 507). Upon approval, the Company worked to finalize data systems, build contractor networks, and finalize implementation details. Following program initiation activities, customer enrollment in the programs began in the Fall of 2014.

As previously mentioned, this program uses a contractor network to implement the programs. Based on lessons learned from DSM Phase II programs, this program provided customers with the option to allow customers to reassign the rebate to the vendor. As shown in Table 5-5, however, this option is rarely used.

Table 5-5. Proportion of 2018 Non-residential Heating and Cooling Efficiency Participant Rebate Recipients

| State | Percent of Rebates Given to Customers | Percent of Rebates Given to Vendors |
|----------------|---------------------------------------|-------------------------------------|
| VA | 92% | 8% |
| NC | 94% | 6% |
| Overall | 92% | 8% |

5.2.1 Methods for the Current Reporting Period

DNV GL developed an EM&V Plan for this program that is included in Appendix J. 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 5-6 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 5-6. Non-residential Heating and Cooling Efficiency Program Customer Participation Planning Assumptions System-wide

| Item | Description |
|---------------|---------------------------|
| Target Market | Non-residential customers |

| Item | Description |
|---|-------------------------------------|
| NTG Factor | 70% |
| Measure Life | 15 years |
| Average Energy Savings (kWh) per Participant per Year | 12,641 kWh per participant per year |
| Average Peak Demand Reduction (kW) per Participant | 3.2 kW per participant per year |
| Average Rebate (US \$) per Participant | \$1,653 per participant |

5.2.2 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.

5.2.2.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2018 are provided below. Following this summary, Table 5-7 provides performance indicator data from May 1, 2014 through December 31, 2018. Detailed program indicators by year and month are provided in Appendix A.4.



- In Virginia, the number of participants decreased from 103 in 2017 to 77 in 2018.
- There have been 389 participants since the start of the program in 2014.²⁹

²⁹ All program lifetime total values presented in this section (5.2) are preliminary—additional applications may be approved during the first two months of 2019.

- The net annual energy savings increased between 2017 and 2018—from 5,268,813 kWh to 6,873,157 kWh.
- The net demand reduction decreased between 2017 and 2018 from 1,362.7 kW to 398.1 kW.
- On a per-participant basis, the gross annual energy savings increased from 2017 to 2018 by 74% from 73,076 kWh to 127,517 kWh in 2018.
- On a per-participant basis, from 2017 to 2018 the gross demand reduction per participant decreased from 18.9 kW to 7.4 kW.
- Cumulatively, since the program's inception in 2014 and through the end of 2018,²⁹ the program has achieved a total net energy savings of 30,505,864 kWh (29% of planned) and a total demand reduction of 5,520.8 kW (18% of planned) for a total of 389 participants (11% of planned).
- Over the lifetime of the program, the average gross annual energy savings per participant is 112,030 kWh (planned: 12,641 kWh/year-participant) and the average gross demand reduction per participant is 20.3 kW (planned: 3.2 kW/participant).



- Annual program costs in 2018 were 88% of those planned.
- Total program costs over the life of the program were 74% of those planned.

Table 5-7. VA Non-residential Heating and Cooling Efficiency Program Performance Indicators (2014-2018)

| Category | Item | Virginia | | | | | |
|--------------------------------------|---|-----------|------------|--------------------|------------|--------------------|---------------------------|
| | | 2014 | 2015 | 2016 ³⁰ | 2017 | 2018 ²⁹ | Program Total (2014-2018) |
| Operations and Management Costs (\$) | Direct Rebate | | | | | | |
| | Direct Implementation | | | | | | |
| | Direct EM&V | | | | | | |
| | Indirect Other (Administrative) | \$14,267 | \$38,982 | \$41,094 | \$69,115 | \$98,564 | \$262,021 |
| Total Costs (\$) | Total | | | | | | |
| | Planned | | | | | | |
| | Variance | | | | | | |
| | Annual % of Planned | 30% | 72% | 75% | 95% | 88% | 74% |
| Participants | Total (Gross) | 6 | 114 | 89 | 103 | 77 | 389 |
| | Planned (Gross) | 261 | 746 | 782 | 797 | 807 | 3,393 |
| | Variance | -255 | -632 | -693 | -694 | -730 | -3,004 |
| | Annual % of planned (Gross) | 2% | 15% | 11% | 13% | 10% | 11% |
| Installed Energy Savings (kWh/year) | Total Gross Deemed Savings | 1,456,991 | 11,129,837 | 13,647,306 | 7,526,876 | 9,818,796 | 43,579,806 |
| | Realization Rate Adjustment (100%) | 0 | 0 | 0 | 0 | 0 | 0 |
| | Adjusted Gross Savings | 1,456,991 | 11,129,837 | 13,647,306 | 7,526,876 | 9,818,796 | 43,579,806 |
| | Net-to-Gross Adjustment (70%) ³¹ | -437,097 | -3,338,951 | -4,094,192 | -2,258,063 | -2,945,639 | -13,073,942 |
| | Net Adjusted Savings | 1,019,894 | 7,790,886 | 9,553,114 | 5,268,813 | 6,873,157 | 30,505,864 |

³⁰ 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 refiled 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.

³¹ The program implementation vendor has listed 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 DNV GL. See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation approaches.

| Category | Item | Virginia | | | | | |
|---------------------------------|---|-----------|-----------|--------------------|------------|--------------------|---------------------------|
| | | 2014 | 2015 | 2016 ³⁰ | 2017 | 2018 ²⁹ | Program Total (2014-2018) |
| | Planned Savings (Net) | 3,299,301 | 9,430,186 | 24,119,220 | 38,355,947 | 31,003,178 | 106,207,832 |
| | Annual % Toward Planned Savings (Net) | 31% | 83% | 40% | 14% | 22% | 29% |
| | Avg. Savings per Participant (Gross) | 242,832 | 97,630 | 153,341 | 73,076 | 127,517 | 112,030 |
| | Avg. Savings per Participant (Net) | 169,982 | 68,341 | 107,338 | 51,154 | 89,262 | 78,421 |
| Installed Demand Reduction (kW) | Total Gross Deemed Demand | 510.1 | 2,777.0 | 2,084.3 | 1,946.7 | 568.8 | 7,886.9 |
| | Realization Rate Adjustment (100%) | 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 | 7,886.9 |
| | Net-to-Gross Adjustment (70%) ³² | -153.0 | -833.1 | -625.3 | -584.0 | -170.6 | -2,366.1 |
| | Net Adjusted Demand | 357.1 | 1,943.9 | 1,459.0 | 1,362.7 | 398.1 | 5,520.8 |
| | Planned Demand (Net) | 835.2 | 2,387.2 | 4,089.6 | 15,592.6 | 7,536.0 | 30,440.6 |
| | Annual % Toward Planned Demand (Net) | 43% | 81% | 36% | 9% | 5% | 18% |
| | Avg. Demand per Participant (Gross) | 85.0 | 24.4 | 23.4 | 18.9 | 7.4 | 20.3 |
| | Avg. Demand per Participant (Net) | 59.5 | 17.1 | 16.4 | 13.2 | 5.2 | 14.2 |
| Program Performance | Annual \$Admin. per Participant (Gross) | \$2,378 | \$342 | \$462 | \$671 | \$1,280 | \$674 |
| | Annual \$Admin. per kWh/year (Gross) | \$0.01 | \$0.00 | \$0.00 | \$0.01 | \$0.01 | \$0.01 |
| | Annual \$Admin. per kW (Gross) | \$28 | \$14 | \$20 | \$36 | \$173 | \$33 |
| | Annual \$EM&V per Total Costs (\$) | 5.6% | 6.1% | 8.6% | 7.6% | 7.3% | 7.3% |
| | Annual \$Rebate per Participant (Gross) | \$19,834 | \$7,909 | \$10,729 | \$11,629 | \$15,058 | \$11,138 |

³² Ibid.

5.2.2.2 Key North Carolina Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for North Carolina in 2018 are provided below. Following this summary, Table 5-8 provides performance indicator data from May 1, 2014 through December 31, 2018. Detailed program indicators by year and month are provided in Appendix B.4.



- In North Carolina, the number of participants was three in both 2017 and 2018.
- Over the life of the program, the number of participants reached 15 (47% of planned).

- The net annual energy savings increased from 58,080 kWh/year in 2017 to 158,042 kWh in 2018.
- The net demand reduction also increased from -28.2 kW to 59.3 kW.
- On a per-participant basis, the average gross annual energy savings increased from 27,657 kWh/year in 2017 to 75,258 kWh/year in 2018.
- The average gross demand reduction per participant increased from -13.4 kW to 28.2 kW.
- Cumulatively, since the program's inception in 2015 and through the end of 2018, the program has achieved a total of 482,573 kWh/year of net annual energy savings (7% of planned) and a total of 115.2 kW of net demand reduction (6% of planned) through a total of 15 participants (7% of planned).²⁹
- Over the lifetime of the program, the average gross annual energy savings per participant were 45,959 kWh (12,641 kWh/year·participant planned).
- Over the lifetime of the program, the average gross demand reduction per participant was 11.0 kW (3.2 kW/participant planned).



- Program costs in 2018 were 61% of those planned.
- Total program costs over the life of the program have been 47% of those planned.

Table 5-8. NC Non-residential Heating and Cooling Efficiency Program Performance Indicators (2015-2018)

| Category | Item | North Carolina | | | | |
|--------------------------------------|---|----------------|--------------------|---------|--------------------|---------------------------|
| | | 2015 | 2016 ³³ | 2017 | 2018 ²⁹ | Program Total (2015-2018) |
| Operations and Management Costs (\$) | Direct Rebate | | | | | |
| | Direct Implementation | | | | | |
| | Direct EM&V | | | | | |
| | Indirect Other (Administrative) | \$1,360 | \$1,610 | \$2,353 | \$4,390 | \$9,713 |
| Total Costs (\$) | Total | | | | | |
| | Planned | | | | | |
| | Variance | | | | | |
| | Annual % of Planned | 32% | 44% | 49% | 61% | 47% |
| Participants | Total (Gross) | 3 | 6 | 3 | 3 | 15 |
| | Planned (Gross) | 48 | 52 | 53 | 53 | 206 |
| | Variance | -45 | -46 | -50 | -50 | -191 |
| | Annual % of planned (Gross) | 6% | 12% | 6% | 6% | 7% |
| Installed Energy Savings (kWh/year) | Total Gross Deemed Savings | 91,144 | 289,500 | 82,971 | 225,775 | 689,390 |
| | Realization Rate Adjustment (100%) | 0 | 0 | 0 | 0 | 0 |
| | Adjusted Gross Savings | 91,144 | 289,500 | 82,971 | 225,775 | 689,390 |
| | Net-to-Gross Adjustment (70%) ³⁴ | -27,343 | -86,850 | -24,891 | -67,732 | -206,817 |

³³ 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 refiled 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.

³⁴ The program implementation vendor has listed 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

| Category | Item | North Carolina | | | | |
|---------------------------------|---|----------------|--------------------|-----------|--------------------|------------------------------|
| | | 2015 | 2016 ³³ | 2017 | 2018 ²⁹ | Program Total (2015-2018) |
| | Net Adjusted Savings | 63,801 | 202,650 | 58,080 | 158,042 | 482,573 |
| | Planned Savings (Net) | 606,768 | 1,619,973 | 2,563,872 | 2,043,754 | 6,834,368 |
| | Annual % Toward Planned Savings (Net) | 11% | 13% | 2% | 8% | 7% |
| | Avg. Savings per Participant (Gross) | 30,381 | 48,250 | 27,657 | 75,258 | 45,959 |
| | Avg. Savings per Participant (Net) | 21,267 | 33,775 | 19,360 | 52,681 | 32,172 |
| Installed Demand Reduction (kW) | Total Gross Deemed Demand | 26.9 | 93.2 | -40.3 | 84.7 | 164.5 |
| | Realization Rate Adjustment (100%) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Adjusted Gross Demand | 26.9 | 93.2 | -40.3 | 84.7 | 164.5 |
| | Net-to-Gross Adjustment (70%) ³⁵ | -8.1 | -28.0 | 12.1 | -25.4 | -49.4 |
| | Net Adjusted Demand | 18.8 | 65.3 | -28.2 | 59.3 | 115.2 |
| | Planned Demand (Net) | 154.2 | 274.7 | 1,042.3 | 497.0 | 1,968.1 |
| | Annual % Toward Planned Demand (Net) | 12% | 24% | -3% | 12% | 6% |
| | Avg. Demand per Participant (Gross) | 9.0 | 15.5 | -13.4 | 28.2 | 11.0 |
| | Avg. Demand per Participant (Net) | 6.3 | 10.9 | -9.4 | 19.8 | 7.7 |
| Program Performance | Annual \$Admin. per Participant (Gross) | \$453 | \$268 | \$784 | \$1,463 | \$648 |
| | Annual \$Admin. per kWh/year (Gross) | \$0.01 | \$0.01 | \$0.03 | \$0.02 | \$0.01 |
| | Annual \$Admin. per kW (Gross) | \$51 | \$17 | -\$58 | \$52 | \$59 |
| | Annual \$EM&V per Total Costs (\$) | 14% | 15% | 15% | 11% | 13% |
| | Annual \$Rebate per Participant (Gross) | \$2,728 | \$3,404 | \$6,996 | \$11,613 | \$5,629 |

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.

³⁵ Ibid

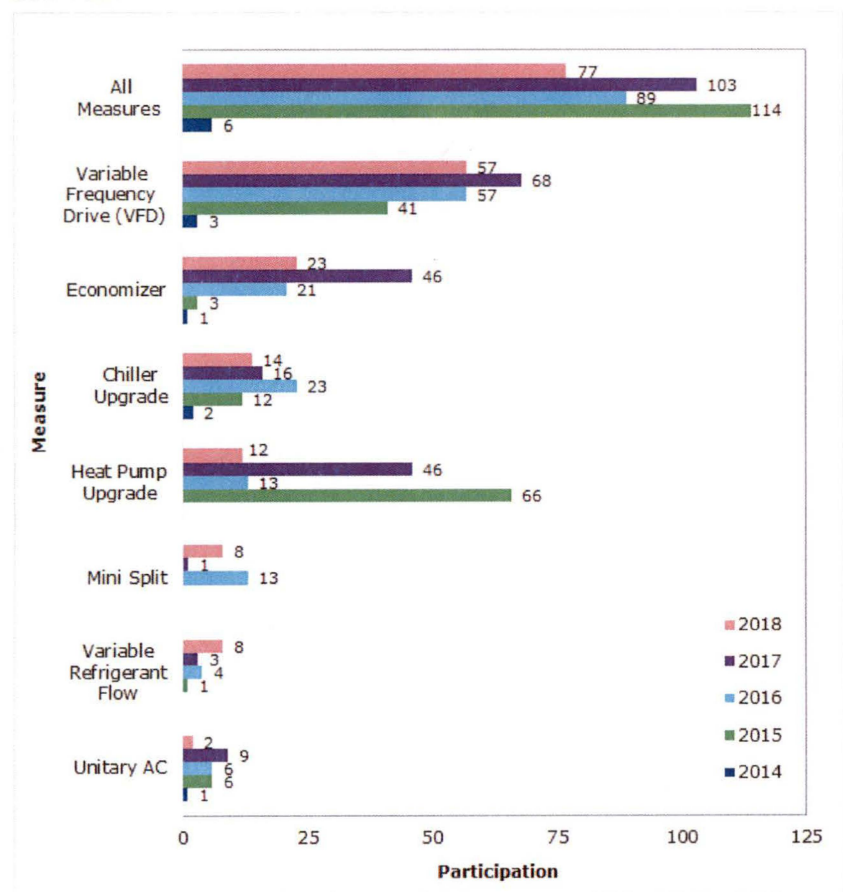
5.2.2.3 Additional Virginia Program Data

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 the "All Measures" and "All Building Types" categories in these figures represents the participation and/or savings from all new program participants, regardless of the measures installed and/or building types those measures were installed in. A participant in the "All Measure" and "All Building Type" categories 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 a new participant, though their savings are, in the "All Measures" and "All Building Types" categories. This differs from how participants are counted at a specific measure type or building type level in these figures, across years. For example, should a participant implement the same measure in multiple years, they are counted as a unique participant in each year, regardless of participation in prior or subsequent years.

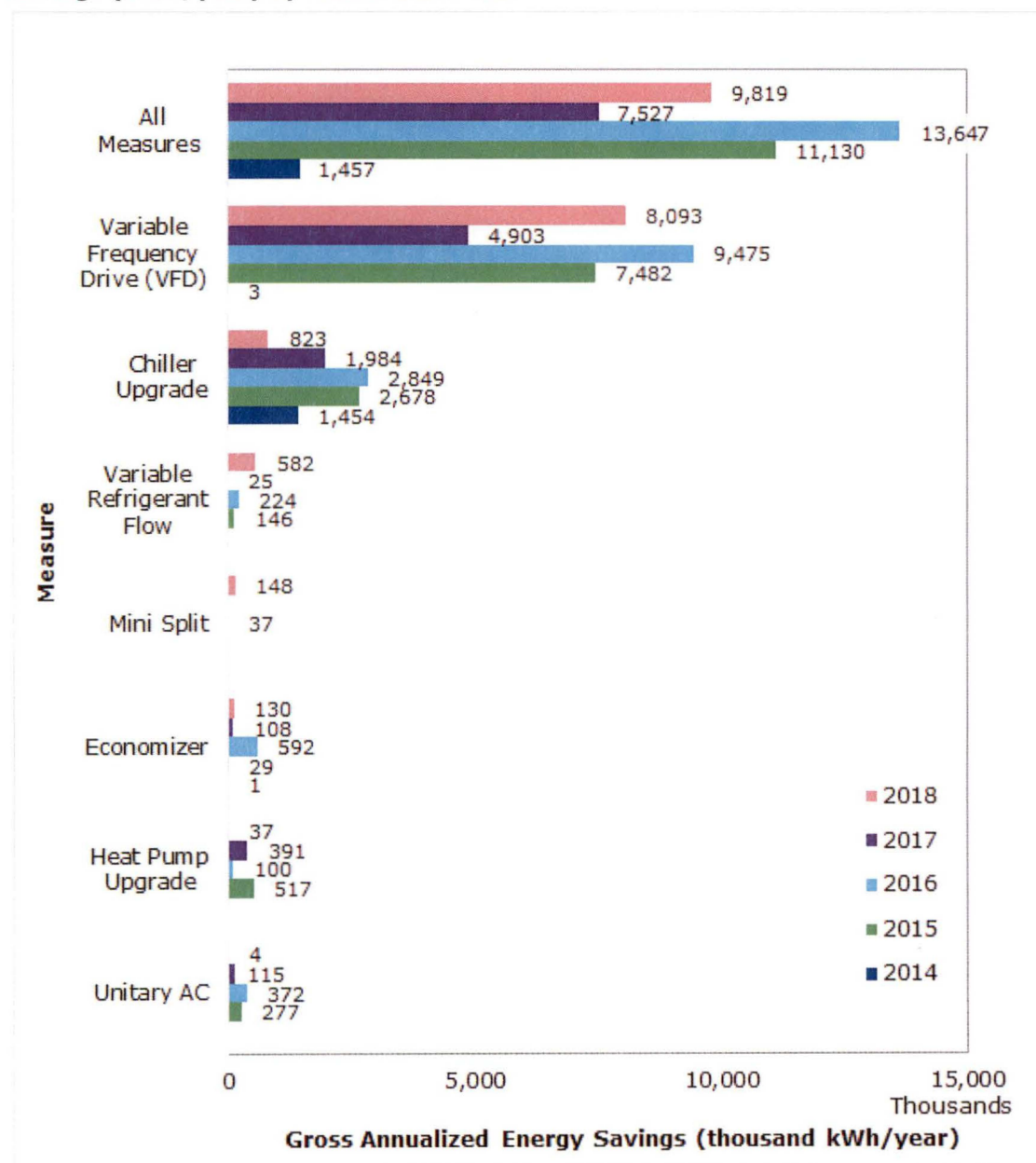
Figure 5-19 shows the annual number of new participants that installed the various measures offered through the program in Virginia. There were 77 new participants in 2018. Most of them installed variable frequency drives (VFDs), and about one third installed economizers.

Figure 5-19. VA Non-residential Heating and Cooling Efficiency Program Participation by Measure and Year



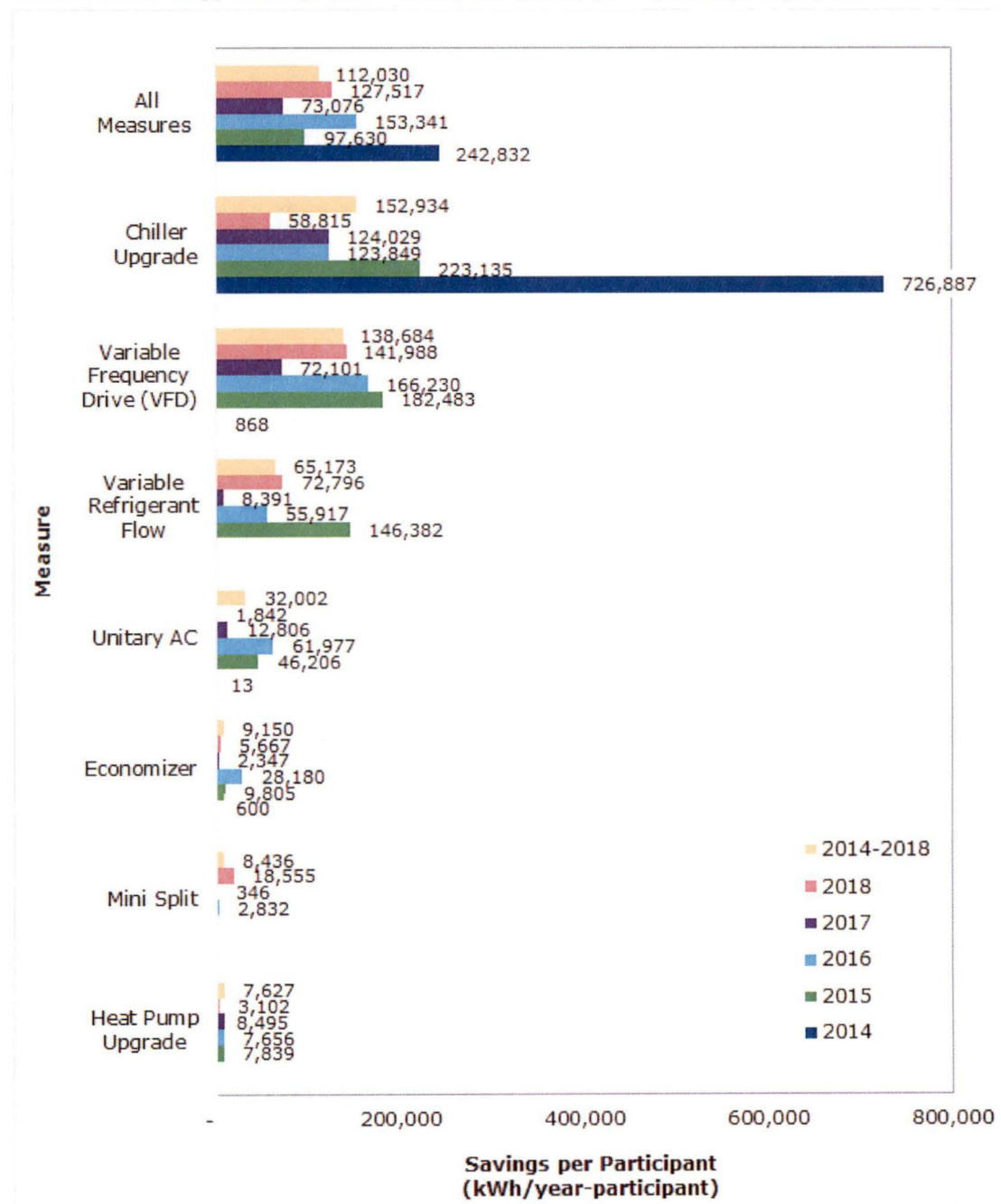
In Figure 5-20, the gross annualized savings for each program year are presented by measure category. To date, the VFD measure has yielded the most savings and is followed by the chiller upgrade measure.

Figure 5-20. VA Non-residential Heating and Cooling Efficiency Program Gross Annualized Energy Savings (MWh/year) by Measure and Year



In Figure 5-21, 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 112 MWh/year per participant.

Figure 5-21. VA 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. Figure 5-22. shows that the building types with the largest number of participants are mercantile retail spaces (not mall), large offices, and other. In Figure 5-23., the largest share of gross annualized savings occurs at hospitals (inpatient health care facilities) followed by large office buildings. As shown in Figure 5-24., the highest average per-participant energy savings (gross, annualized) was yielded at hospitals (inpatient health care facilities), lodging, and large offices.

Figure 5-22. VA Non-residential Heating and Cooling Efficiency Program Participation by Building Type and Year

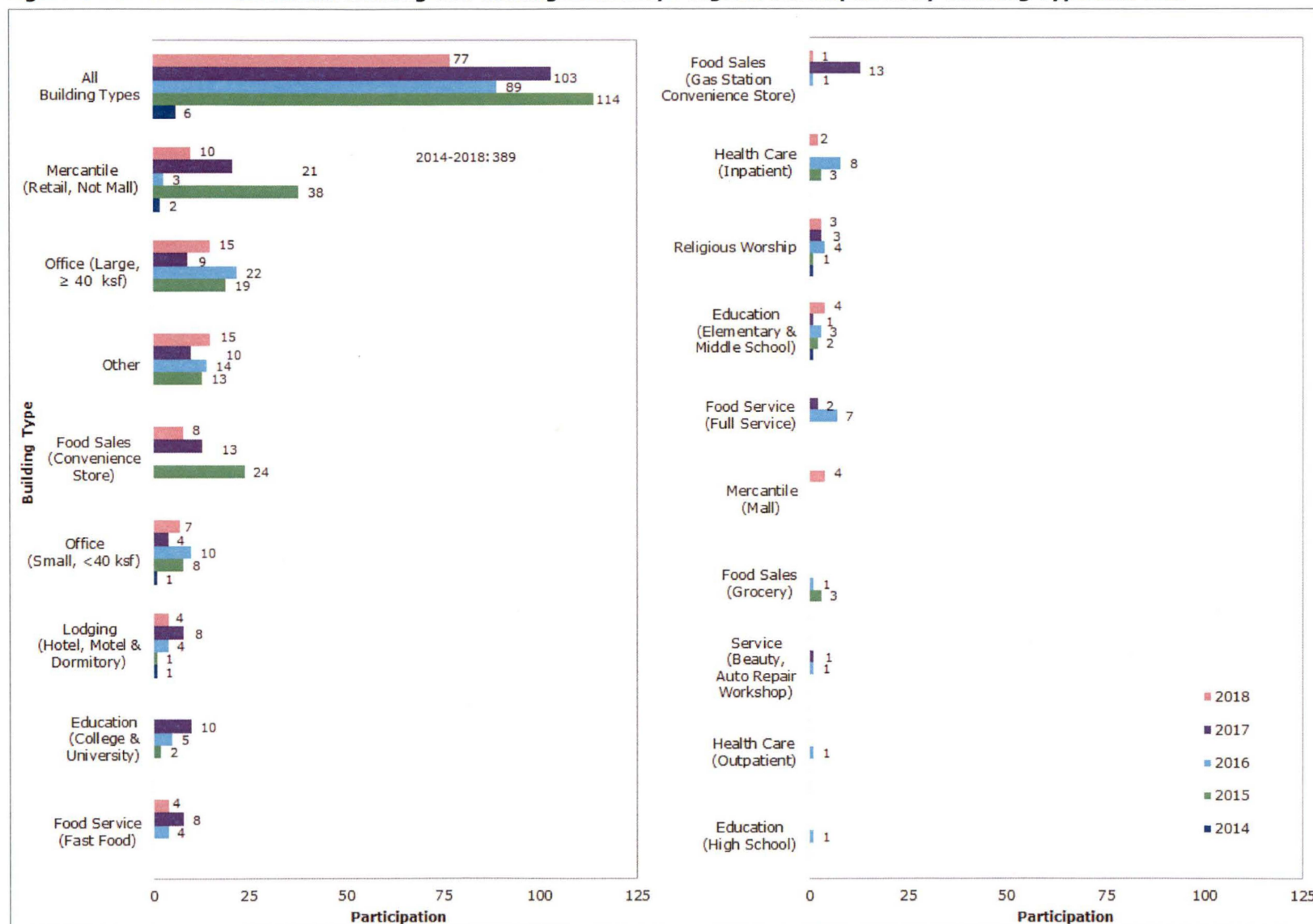


Figure 5-23. VA Non-residential Heating and Cooling Efficiency Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year

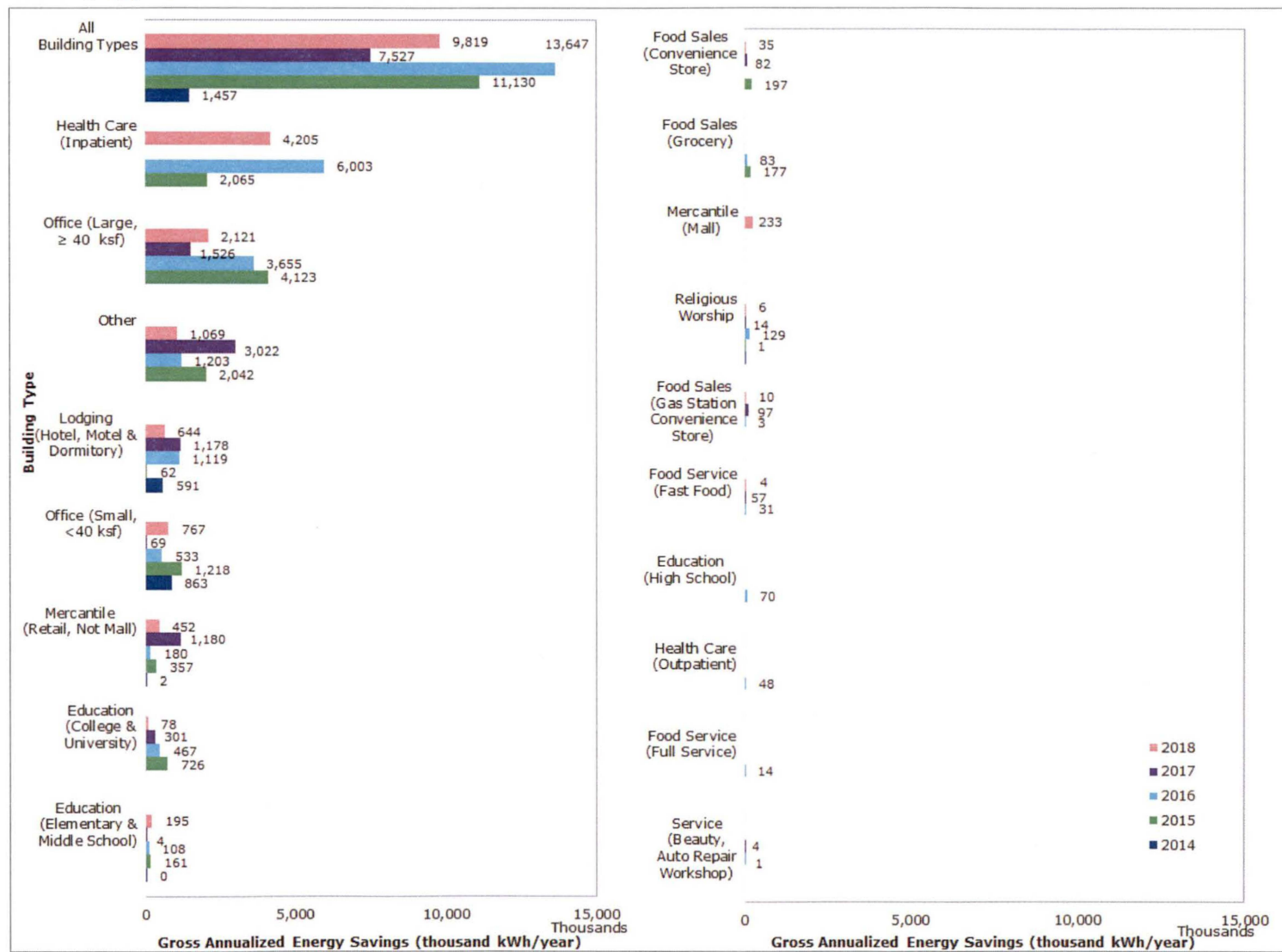
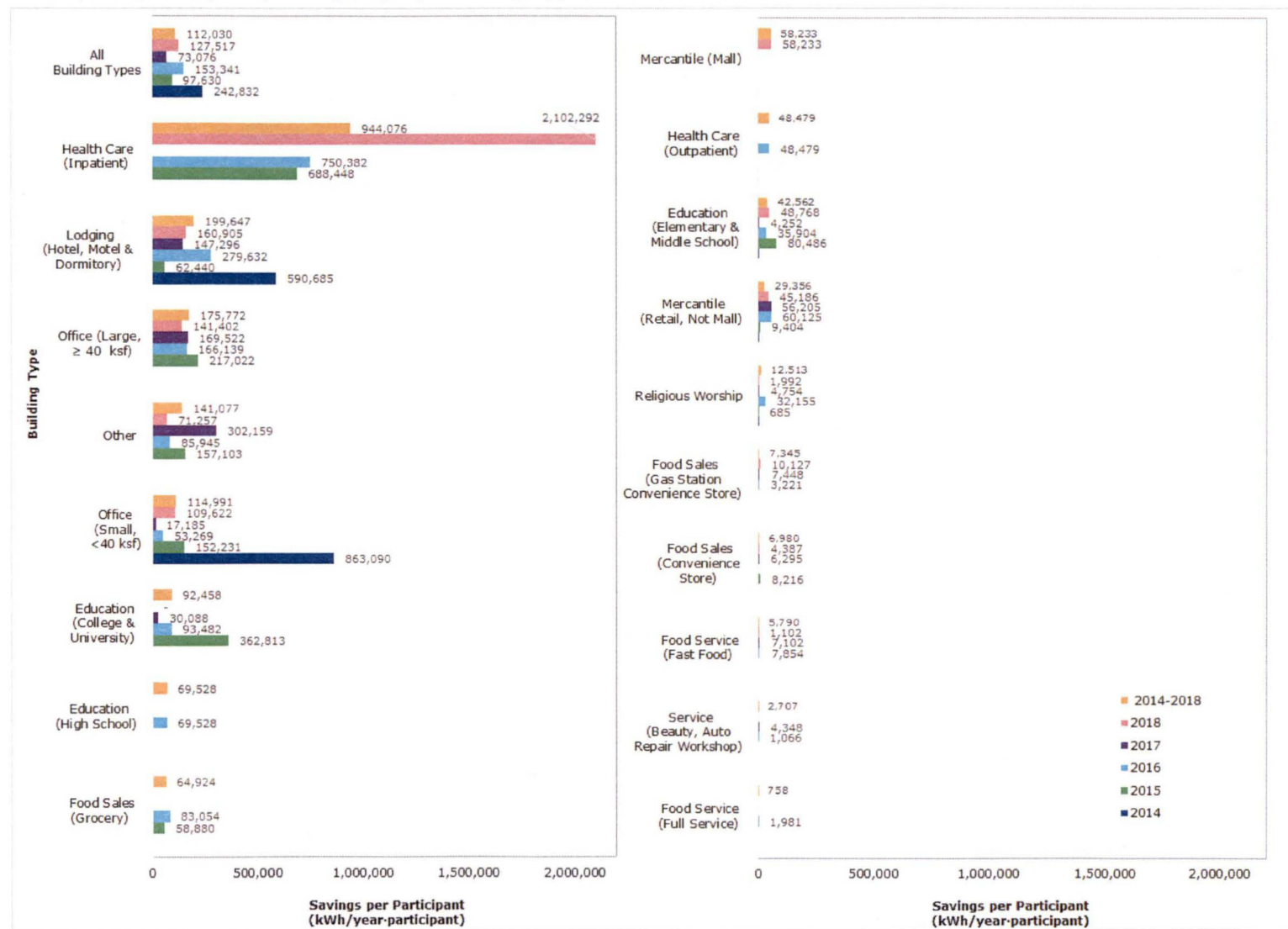


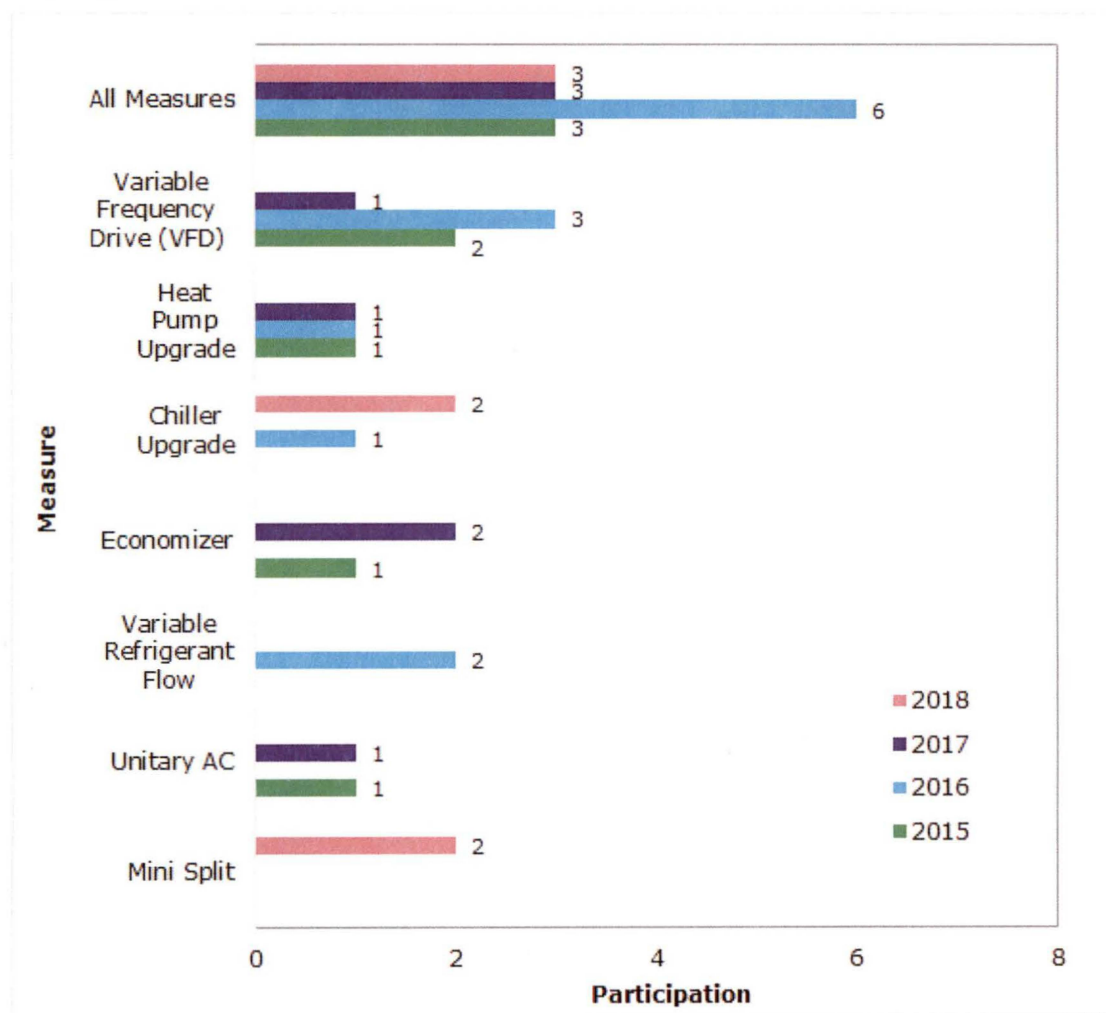
Figure 5-24. VA Non-residential Heating and Cooling Efficiency Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year



5.2.2.4 Additional North Carolina Program Data

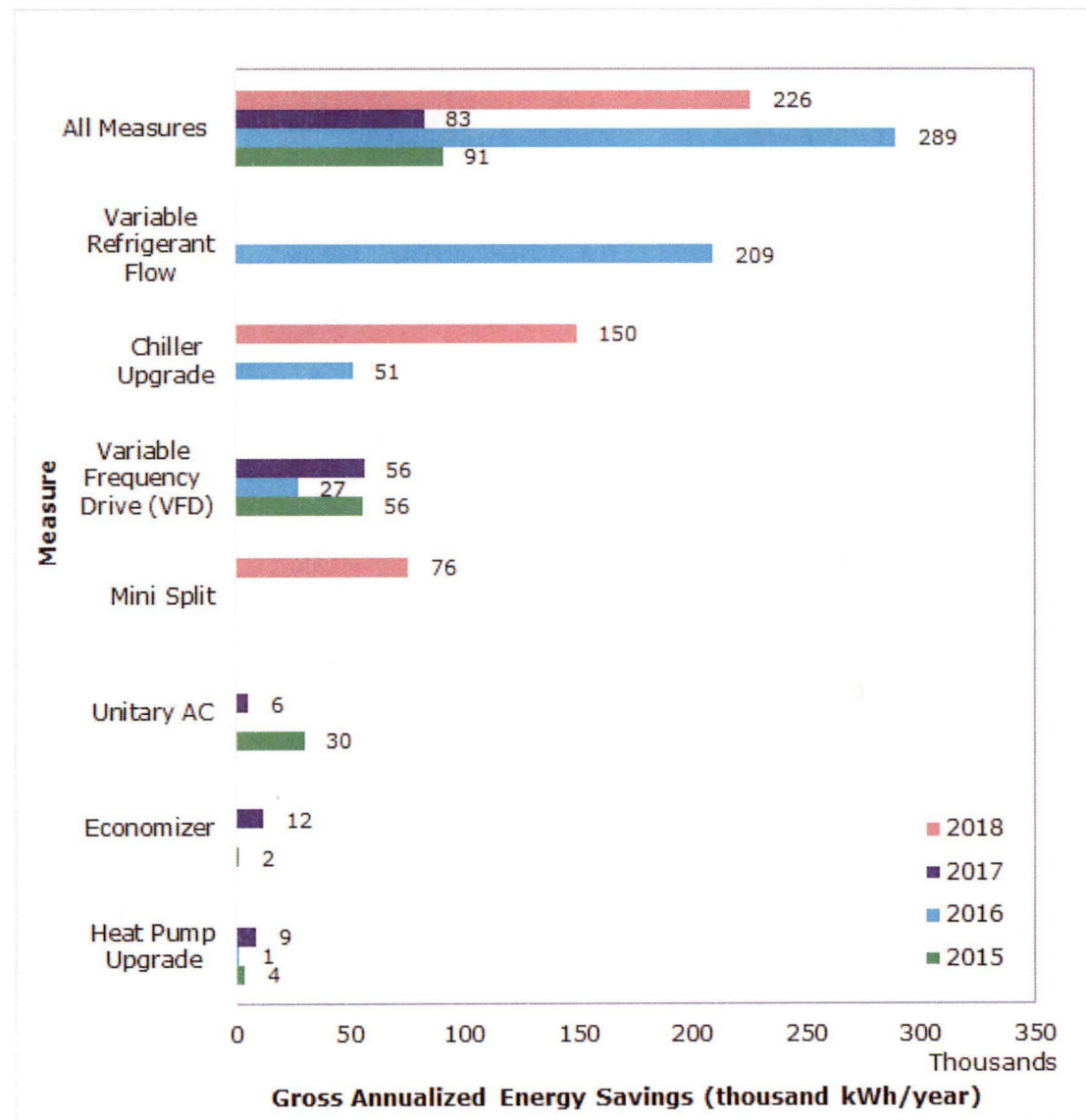
This section provides a series of charts to show the program performance over the life of the program in North Carolina, by year, by measure type, and by building type. Figure 5-25 shows the number of new participants that install the various measures offered through the program. They are shown for each year and overall. Although the number of participants is low, VFDs were implemented by the most participants, of all the measures offered.

Figure 5-25. NC Non-residential Heating and Cooling Efficiency Program Participation by Measure and Year



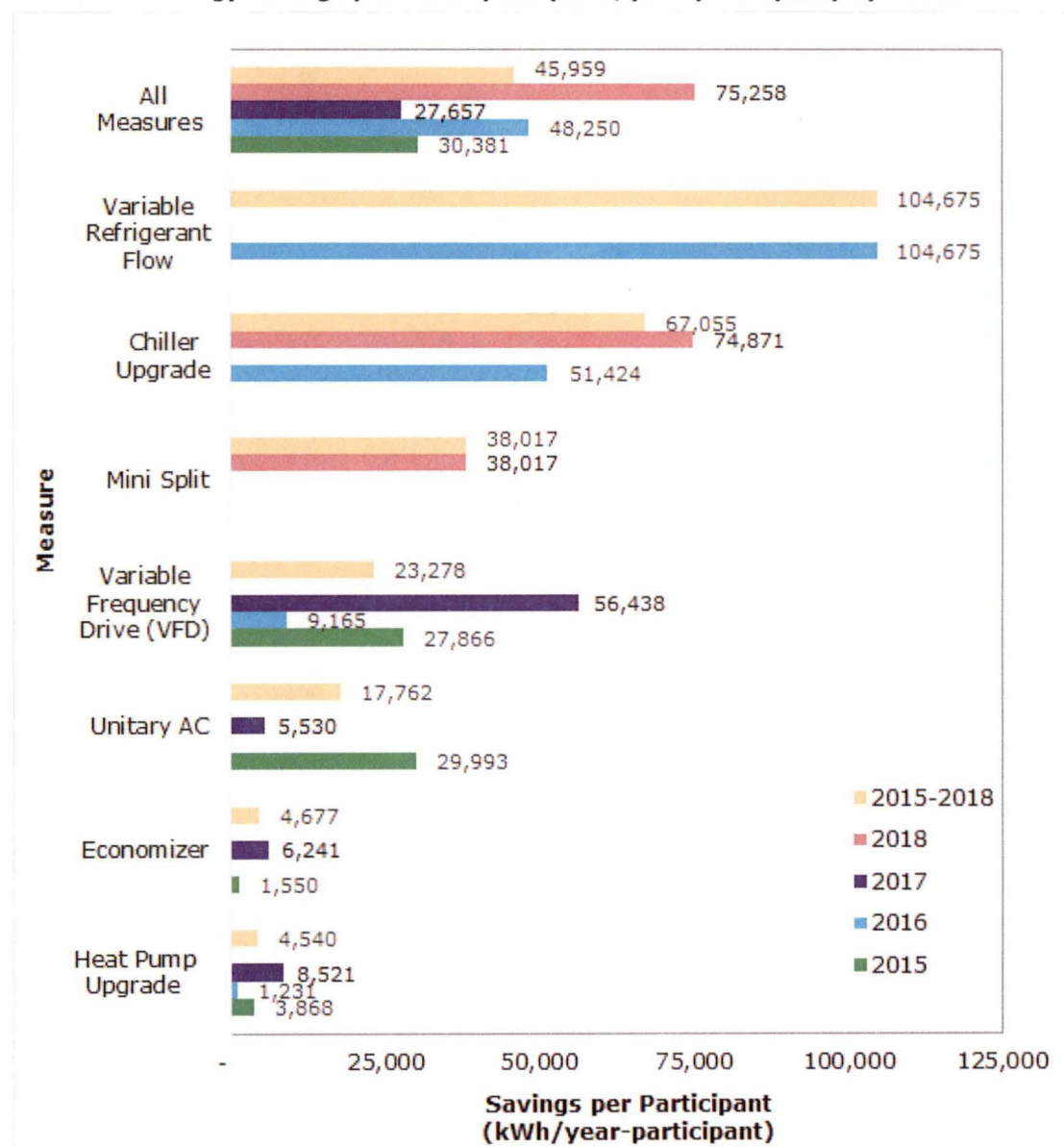
In Figure 5-26, the gross annualized savings for each program year are presented by measure category. In 2018, chiller upgrades yielded the most annual savings and were followed by mini-split systems. Since program inception in North Carolina, the variable refrigeration flow (VRF) system measure has yielded the most savings (all in 2016) and was followed by chiller upgrades.

Figure 5-26. NC Non-residential Heating and Cooling Efficiency Program Gross Annualized Energy Savings (MWh/year) by Measure Type



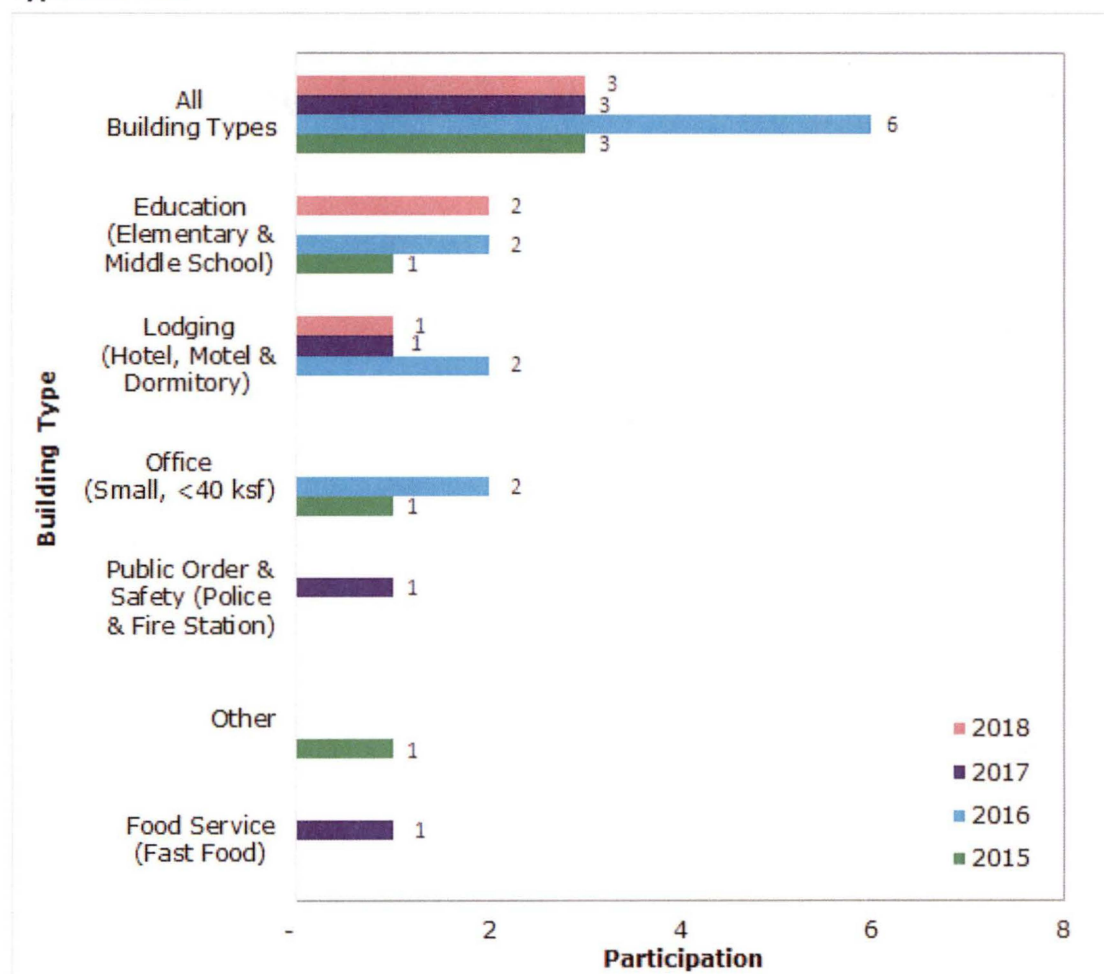
In Figure 5-27, the average energy savings per participant (gross annualized) are shown for each measure category, by year and overall. In 2018, chiller upgrades yielded the highest average savings per participant and were followed by mini-split systems.

Figure 5-27. NC Non-residential Heating and Cooling Efficiency Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure and Year



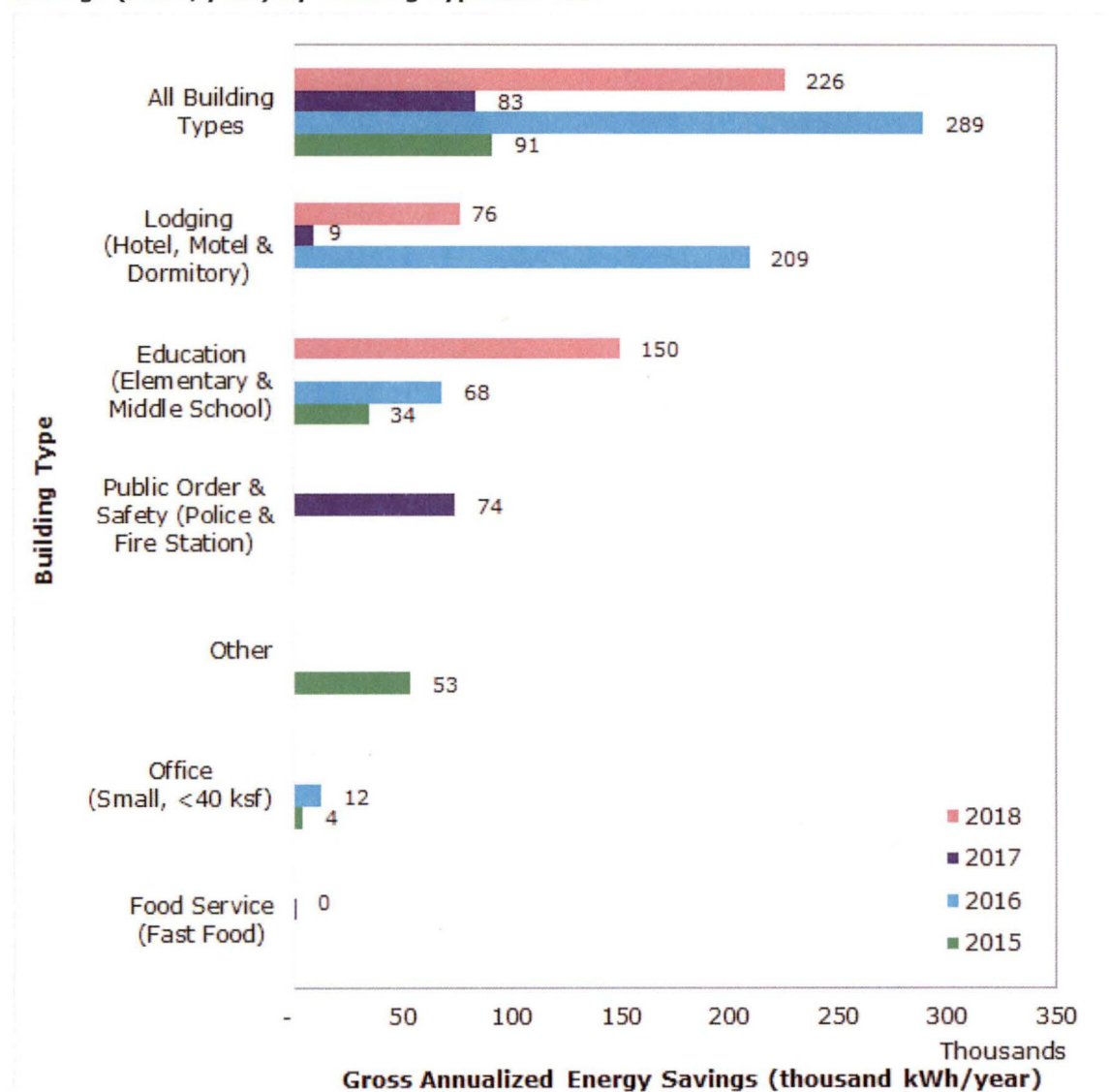
According to Figure 5-28, the leading building types involved in the program in 2018—and the life of the program—were elementary/middle schools as well as lodging.

Figure 5-28. NC Non-residential Heating and Cooling Efficiency Program Participation by Building Type and Year



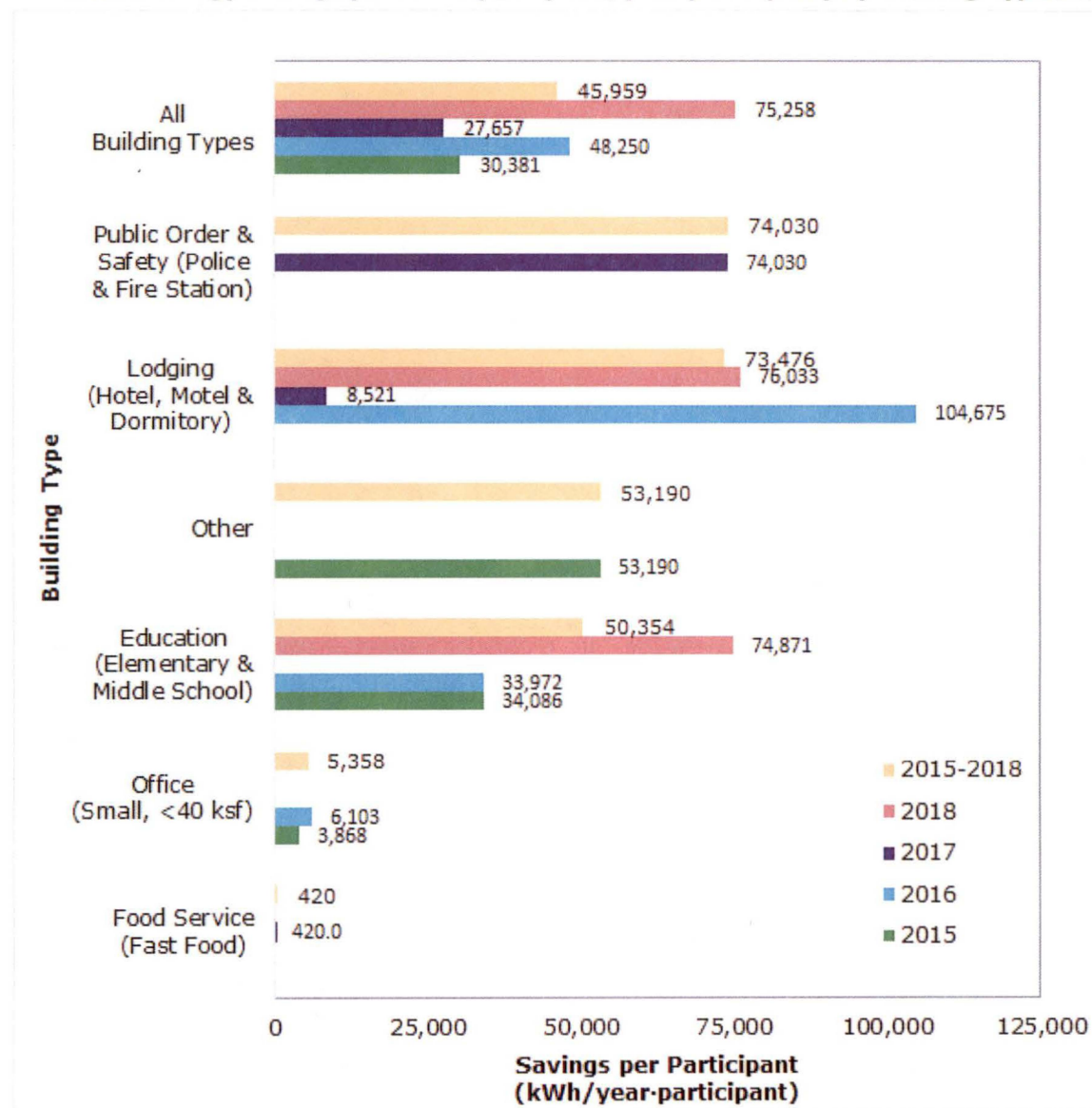
According to Figure 5-29, the leading building types to realize energy savings in 2018 included elementary/middle schools and lodging. Since the beginning of the program, however, lodging facilities have yielded the most savings.

Figure 5-29. NC Non-residential Heating and Cooling Efficiency Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year



In 2018, the highest average energy savings per participant (gross, annualized) were yielded at lodging and elementary/middle schools (see Figure 5-30). Over the life of the program, however, the highest average energy savings per participant were yielded at police/fire stations.

Figure 5-30. NC Non-residential Heating and Cooling Efficiency Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year



5.3 Non-residential Window Film – Virginia & North Carolina

The Non-residential Window Film Program was approved by the SCC for five years in April 2014. The program was launched in Virginia in May 2014 and North Carolina in January 2015. 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.

5.3.1 Methods for the Current Reporting Period

Table 5-9 outlines Dominion Energy's initial program planning assumptions that were used to design the program.

Table 5-9. Non-residential Window Film Program Planning Assumptions

| Item | Description |
|--|-----------------------------------|
| Target Market | Non-residential customers |
| NTG Factor | 80% |
| Measure Life | 10 years |
| Average Energy Savings (kWh) per Square Foot | 18 kWh per square foot per year |
| Average Peak Demand Reduction (kW) per Participant | 0.004 kW per participant per year |
| Average Rebate (US \$) per Participant | \$0.91 per sq. ft. |

5.3.2 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.

5.3.2.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2018 are provided below. Following this summary, Table 5-10 provides performance indicator data from 2014 through December 31, 2018. Detailed program indicators by year and month are provided in Appendix A.5.



- From program inception through 2018, the program enrolled 10% of planned square feet.
- Since year one, program participation grew year-over-year, with the exception of 2017.

- From program inception through 2018, the program achieved 12% of planned energy savings and 3% of planned demand reduction.
- At a per-square foot basis, the net savings was approximately 61% of initial planned assumptions (planned: 18 kWh/sf).



From program implementation through 2018, the program spent 27% of planned spending.

Table 5-10. VA Non-residential Window Film Program Performance Indicators (2014-2018)

| Category | Item | Virginia | | | | | |
|--------------------------------------|------------------------------------|-----------|-----------|------------|------------|------------|---------------------------|
| | | 2014 | 2015 | 2016 | 2017 | 2018 | Program Total (2014-2018) |
| Operations and Management Costs (\$) | Direct Rebate | | | | | | |
| | Direct Implementation | | | | | | |
| | Direct EM&V | | | | | | |
| | Indirect Other (Administrative) | \$11,980 | \$12,457 | \$13,085 | \$21,659 | \$20,852 | \$80,033 |
| Total Costs (\$) | Total | | | | | | |
| | Planned | | | | | | |
| | Variance | | | | | | |
| | Annual % of Planned | 54% | 32% | 25% | 29% | 17% | 27% |
| Participants | Total Participants | 3 | 22 | 70 | 59 | 91 | 245 |
| | Total Square Feet | 53,021 | 97,121 | 57,228 | 231,634 | 33,461 | 472,465 |
| | Planned Square Feet | 133,086 | 681,000 | 1,148,077 | 1,371,237 | 1,454,781 | 4,788,181 |
| | Variance | -80,065 | -583,879 | -1,090,849 | -1,139,603 | -1,421,320 | -4,315,716 |
| | Annual % Toward Planned Total | 40% | 14% | 5% | 17% | 2% | 10% |
| Square feet | Total Square Feet | 53,021 | 97,121 | 57,228 | 231,634 | 33,461 | 472,465 |
| | North Facing | 11,663 | 23,535 | 13,931 | 48,150 | 2,090 | 99,369 |
| | East Facing | 14,597 | 24,260 | 8,105 | 61,663 | 7,387 | 116,012 |
| | West Facing | 15,090 | 22,836 | 15,826 | 62,196 | 12,254 | 128,202 |
| | South Facing | 11,671 | 26,490 | 19,366 | 59,625 | 11,730 | 128,882 |
| Installed Energy | Total Gross Deemed Savings | 1,152,476 | 3,077,815 | 464,794 | 1,734,665 | 170,954 | 6,600,704 |
| | Realization Rate Adjustment (100%) | 0 | 0 | 0 | 0 | 0 | 0 |

| Category | Item | Virginia | | | | | |
|--|--|-----------|-----------|------------|------------|------------|------------------------------|
| | | 2014 | 2015 | 2016 | 2017 | 2018 | Program Total (2014-2018) |
| Savings (kWh/year) | Adjusted Gross Savings | 1,152,476 | 3,077,815 | 464,794 | 1,734,665 | 170,954 | 6,600,704 |
| | Net-to-Gross Adjustment (80%) ³⁶ | -230,495 | -615,563 | -92,959 | -346,933 | -34,191 | -1,320,141 |
| | Net Adjusted Savings | 921,980 | 2,462,252 | 371,835 | 1,387,732 | 136,764 | 5,280,563 |
| | Planned Savings (Net) | 2,395,548 | 12,258 | 15,842,639 | 15,209,376 | 10,484,938 | 43,944,759 |
| | Annual % Toward Planned Savings (Net) | 38% | 20087% | 2% | 9% | 1% | 12% |
| | Avg. Savings per Participant (Gross) | 384,159 | 139,901 | 6,640 | 29,401 | 1,879 | 26,942 |
| | Avg. Savings per Square Foot (Gross) | 22 | 32 | 8 | 7 | 5 | 14 |
| | Avg. Savings per Participant (Net) | 307,327 | 111,921 | 5,312 | 23,521 | 1502.90 | 21,553 |
| | Avg. Savings per Square Foot (Net) | 17 | 25 | 6 | 6 | 4 | 11 |
| Installed Demand Reduction (kW) | Total Gross Deemed Demand | 233 | 627 | 140 | 471 | 58 | 1,528 |
| | Realization Rate Adjustment (100%) | 0 | 0 | 0 | 0 | 0 | 0 |
| | Adjusted Gross Demand | 233 | 627 | 140 | 471 | 58 | 1,528 |
| | Net-to-Gross Adjustment (80%) ³⁷ | -47 | -125 | -28 | -94 | -12 | -306 |
| | Net Adjusted Demand | 187 | 501 | 112 | 377 | 46 | 1,223 |
| | Planned Demand (Net) | 532 | 2 | 14,497 | 13,693 | 9,627 | 38,352 |

³⁶ The program implementation vendor has listed 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.

³⁷ Ibid.

| Category | Item | Virginia | | | | | |
|---------------------|---|----------|--------|--------|---------|---------|---------------------------|
| | | 2014 | 2015 | 2016 | 2017 | 2018 | Program Total (2014-2018) |
| | Annual % Toward Planned Demand (Net) | 35% | 20885% | 1% | 3% | 0% | 3% |
| | Avg. Demand per Participant (Gross) | 77.7 | 28.5 | 2.0 | 8.0 | 0.6 | 6.2 |
| | Avg. Demand Reduction per Square Foot (Gross) | 0.004 | 0.006 | 0.002 | 0.002 | 0.002 | 0.003 |
| | Avg. Demand per Participant (Net) | 62.2 | 22.8 | 1.6 | 6.4 | 0.5 | 5.0 |
| | Avg. Demand Reduction per Square Foot (Net) | 0.004 | 0.005 | 0.002 | 0.002 | 0.001 | 0.003 |
| Program Performance | Annual \$Admin. per Participant (Gross) | \$3,993 | \$566 | \$187 | \$367 | \$229 | \$327 |
| | Annual \$Admin. per kWh/year (Gross) | \$0.01 | \$0.00 | \$0.03 | \$0.01 | \$0.12 | \$0.01 |
| | Annual \$Admin. per kW (Gross) | \$51 | \$20 | \$93.7 | \$45.9 | \$362.0 | \$52 |
| | Annual \$EM&V per Total Costs (\$) | 22% | 17% | 26% | 16% | 22% | 20% |
| | Annual \$Rebate per Participant (Gross) | \$6,090 | \$512 | \$667 | \$3,284 | \$285 | \$1,208 |

5.3.2.2 Key North Carolina Program Data

Key data highlights for enrollment, square feet of installed window film, energy savings, demand reduction and program costs for North Carolina in 2018 are provided below. Following this summary, Table 5-11 provides performance indicator data from 2014 through December 31, 2018. Detailed program indicators by year and month are provided in Appendix B.5.



From program launch through 2018, the program has enrolled one participant (in 2018).

In 2018, the program achieved less than 1% of planned energy savings and demand reduction.



From program implementation through 2018, the program spent 19% of planned spending.

Table 5-11. NC Window Film Program Performance Indicators (2015-2018)

| Category | Item | North Carolina | | | | |
|--------------------------------------|---------------------------------|----------------|---------|---------|---------|---------------------------|
| | | 2015 | 2016 | 2017 | 2018 | Program Total (2015-2018) |
| Operations and Management Costs (\$) | Direct Rebate | | | | | |
| | Direct Implementation | | | | | |
| | Direct EM&V | | | | | |
| | Indirect Other (Administrative) | \$851 | \$799 | \$870 | \$984 | \$3,504 |
| Total Costs (\$) | Total | | | | | |
| | Planned | | | | | |
| | Variance | | | | | |
| | Annual % of Planned | 30% | 23% | 17% | 12% | 19% |
| Participants | Total Participants | 0 | 0 | 0 | 1 | 1 |
| | Total Square Feet | 0 | 0 | 0 | 402 | 402 |
| | Planned Square Feet | 48,000 | 76,742 | 91,659 | 95,900 | 312,301 |
| | Variance | -48,000 | -76,742 | -91,659 | -95,498 | -311,899 |
| | Annual % Toward Planned Total | 0% | 0% | 0% | 0% | 0% |
| Square feet | Total Square Feet | 0 | 0 | 0 | 402 | 402 |
| | North Facing | 0 | 0 | 0 | 0 | 0 |
| | East Facing | 0 | 0 | 0 | 402 | 402 |
| | West Facing | 0 | 0 | 0 | 0 | 0 |
| | South Facing | 0 | 0 | 0 | 0 | 0 |

| Category | Item | North Carolina | | | | |
|-------------------------------------|---|----------------|-----------|-----------|---------|---------------------------|
| | | 2015 | 2016 | 2017 | 2018 | Program Total (2015-2018) |
| Installed Energy Savings (kWh/year) | Total Gross Deemed Savings | 0 | 0 | 0 | 4,516 | 4,516 |
| | Realization Rate Adjustment (100%) | 0 | 0 | 0 | 0 | 0 |
| | Adjusted Gross Savings | 0 | 0 | 0 | 4,516 | 4,516 |
| | Net-to-Gross Adjustment (80%) ³⁸ | 0 | 0 | 0 | -903 | -903 |
| | Net Adjusted Savings | 0 | 0 | 0 | 3,613 | 3,613 |
| | Planned Savings (Net) | 864 | 1,064,075 | 1,016,658 | 691,176 | 2,772,773 |
| | Annual % Toward Planned Savings (Net) | 0% | 0% | 0% | 1% | 0% |
| | Avg. Savings per Participant (Gross) | N/A | N/A | N/A | 4,516 | 4,516 |
| | Avg. Savings per Square Foot (Gross) | N/A | N/A | N/A | 11 | 11 |
| | Avg. Savings per Participant (Net) | N/A | N/A | N/A | 3,613 | 3,613 |
| | Avg. Savings per Square Foot (Net) | N/A | N/A | N/A | 9 | 9 |
| Installed Demand Reduction (kW) | Total Gross Deemed Demand | 0.0 | 0.0 | 0.0 | 0.7 | 0.7 |
| | Realization Rate Adjustment (100%) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Adjusted Gross Demand | 0.0 | 0.0 | 0.0 | 0.7 | 0.7 |
| | Net-to-Gross Adjustment (80%) | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 |
| | Net Adjusted Demand | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 |
| | Planned Demand (Net) | 0.2 | 973.7 | 915.3 | 635.0 | 2,524.2 |
| | Annual % Toward Planned Demand (Net) | 0% | 0% | 0% | 0% | 0% |
| | Avg. Demand per Participant (Gross) | N/A | N/A | N/A | 0.7 | 0.7 |
| | Avg. Demand per Square Foot (Gross) | N/A | N/A | N/A | 0.0 | 0.0 |
| | Avg. Demand per Participant (Net) | N/A | N/A | N/A | 0.6 | 0.6 |

³⁸ The program implementation vendor has listed 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.

| Category | Item | North Carolina | | | | |
|---------------------|---|----------------|------|------|---------|---------------------------|
| | | 2015 | 2016 | 2017 | 2018 | Program Total (2015-2018) |
| | Avg. Demand per Square Foot (Net) | N/A | N/A | N/A | 0.001 | 0.001 |
| Program Performance | Annual \$Admin. per Participant (Gross) | N/A | N/A | N/A | \$984 | \$3,504 |
| | Annual \$Admin. per kWh/year (Gross) | N/A | N/A | N/A | \$0.22 | \$0.78 |
| | Annual \$Admin. per kW (Gross) | N/A | N/A | N/A | \$1,337 | \$4,760 |
| | Annual \$EM&V per Total Costs (\$) | 18% | 29% | 25% | 29% | 25% |
| | Annual \$Rebate per Participant (Gross) | N/A | N/A | N/A | \$342 | \$342 |

5.3.2.3 Additional Virginia Program Data

The graphs in this subsection show the participation and gross energy savings, each program year for Virginia, aggregated by key tracking data. The key tracking data either help determine deemed savings inputs or correlate to the estimated energy savings.

Note the "All Measures" and "All Building Types" categories in these figures represents the participation and/or savings from all new program participants, regardless of the measures installed and/or building types those measures were installed in. A participant in the "All Measure" and "All Building Type" categories 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 a new participant, though their savings are, in the "All Measures" and "All Building Types" categories. This differs from how participants are counted at a specific measure type or building type level in these figures, across years. For example, should a participant implement the same measure in multiple years, they are counted as a unique participant in each year, regardless of participation in prior or subsequent years.

Figure 5-31 shows the average gross energy savings per participant by the window orientation. In 2018, west facing windows averaged 3MWh/year per participant (or 2,839 kWh/year per participant), the highest per-participant level average savings for all window orientations.

Figure 5-31. VA Non-residential Window Film Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) Who Installed Window Film by Window Orientation and Year

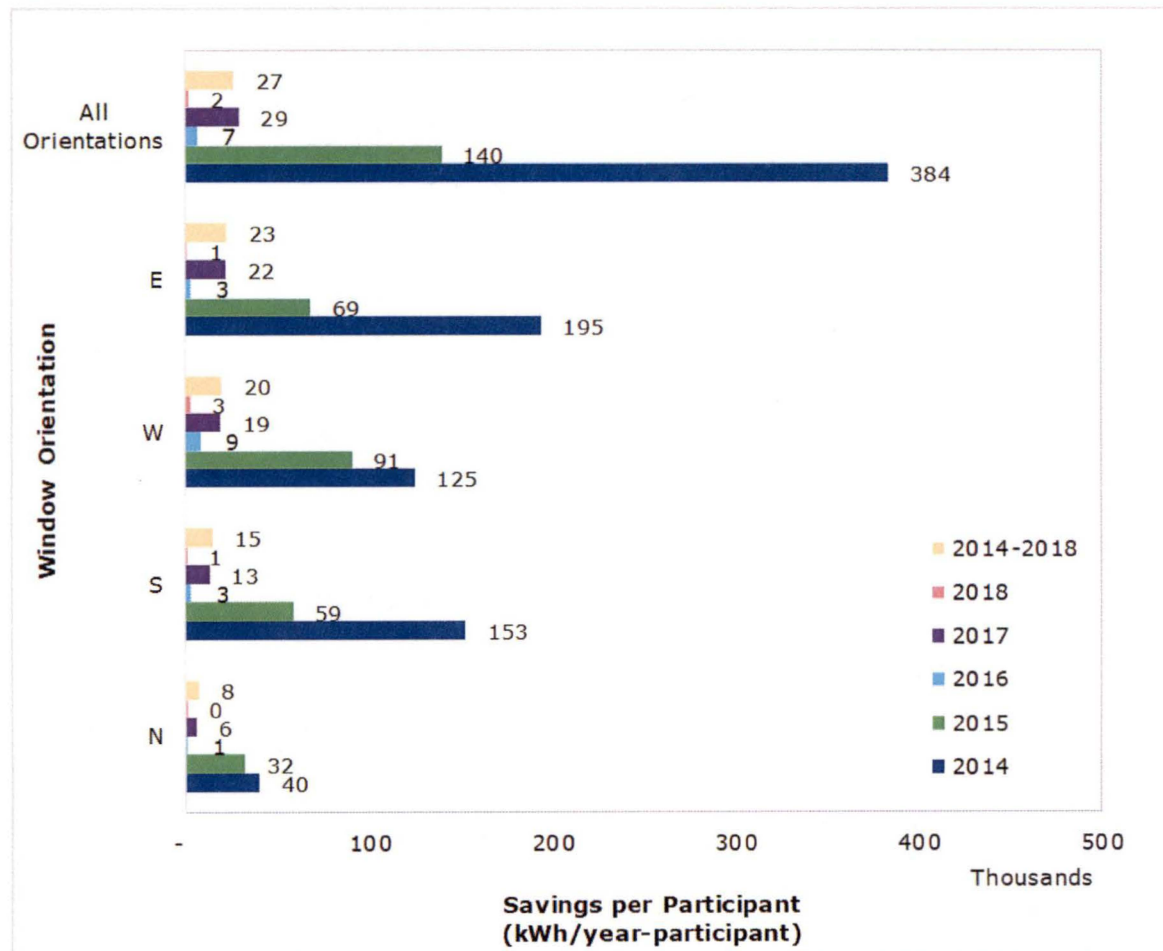


Figure 5-32 shows the number of participants by building type. In 2018, small offices (less than 40,000 square feet) and "other" building types participated most frequently in the program, totaling 18 participants each and combining to make up 40% of participants.

Figure 5-32. VA Non-residential Window Film Program Participation by Building Type and Year

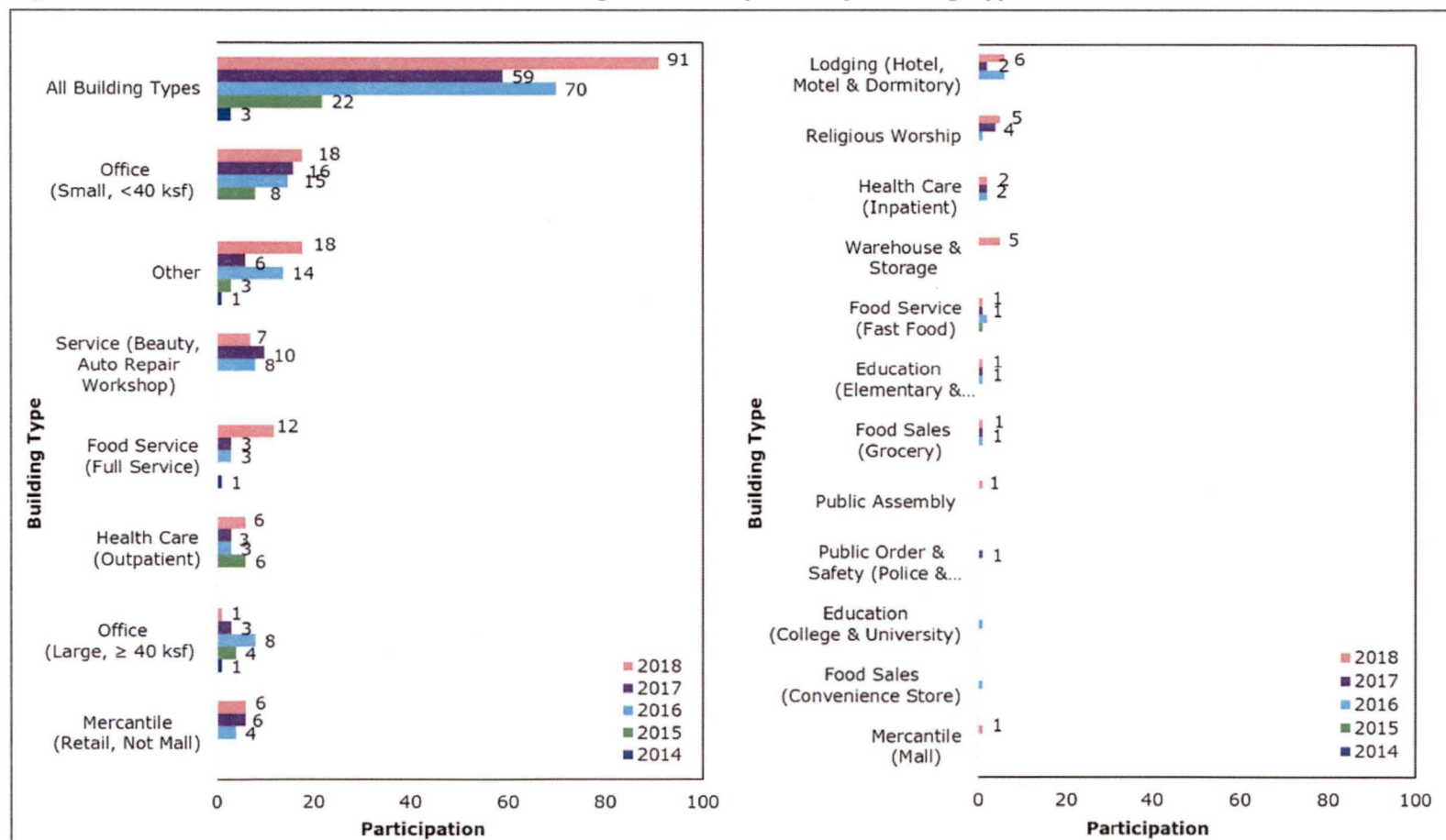


Figure 5-33 shows the total gross savings, by building type, for each program year and cumulatively for the program. In 2018, like each past year, large offices accounted for the most (42%) gross energy savings compared to all other building types.

Figure 5-33. VA Non-residential Window Film Program Gross Annualized Energy Savings (kWh/year) by Building Type and Year

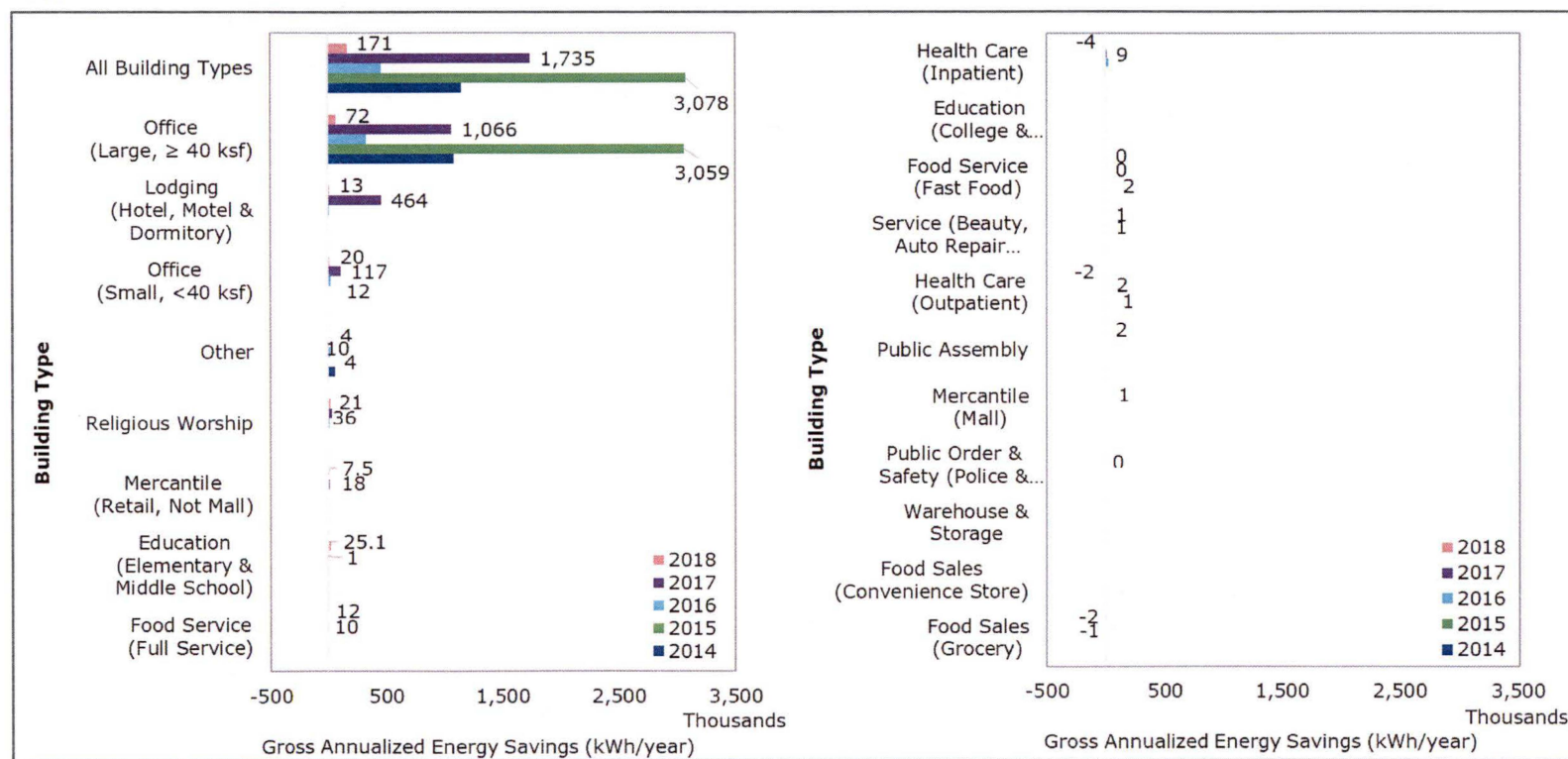
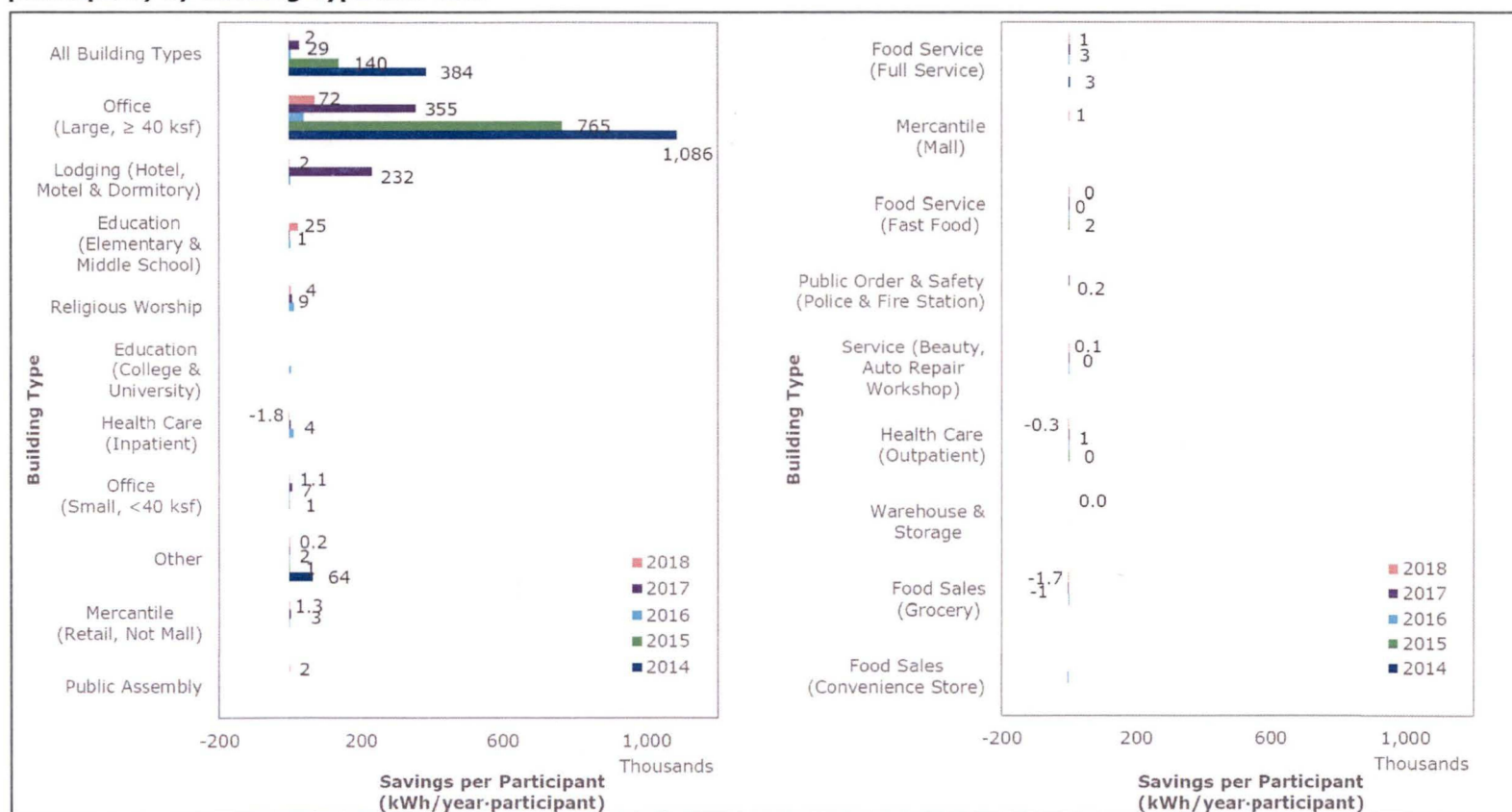


Figure 5-34 shows the average savings per participant by building type. In 2018, large offices (greater than 40,000 square feet) averaged the highest gross savings per participant.

Figure 5-34. VA Non-residential Window Film Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year



5.3.2.4 Additional North Carolina Program Data

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

5.4 Non-residential Small Business Improvement



In the Non-residential Small Business Improvement Program, qualifying customers are eligible to receive an on-site energy assessment by a participating contractor in Dominion Energy's Small Business contractor network. To qualify, 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 eligible 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 L.

After an energy assessment, the customer receives a personalized report showing the projected energy and cost savings anticipated from the implementation of those 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 vendor 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 EE measures designed to decrease energy consumption through replacement of inefficient equipment, installation of new equipment that exceeds current code efficiency standards or recommissioning of existing equipment. Measures eligible to receive a rebate through this program include those shown in Table 5-12.

As a result of the Virginia SCC's June 2017 Final Order, one of the SBI Program's major measures (retro-commissioning refrigeration) was no longer deemed eligible for a program incentive. These measures were later approved in the Company's Non-residential Prescriptive Program.

Table 5-12. 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 ³⁹ | 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 |

5.4.1 Methods for the Current Reporting Period

Table 5-13 outlines Dominion Energy's initial program planning assumptions used to design the program. As previously described, 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 Small Business Improvement Program Planning Assumptions
System-wide

| Item | Description |
|---|---|
| Target Market | Non-residential, small business customers |
| NTG Factor | 93% |
| Measure Life | 14 years |
| Average Energy Savings (kWh) per Participant per Year | 17,717 kWh per participant per year |
| Average Peak Demand Reduction (kW) per Participant | 5.08 kW per participant per year |
| Average Rebate (US \$) per Participant | \$6,304 per participant |

³⁹ 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.

5.4.2 Assessment of Program Progress Towards Plan

The next subsection provides the tables summarizing the key indicators of the Non-residential Small Business Improvement Program progress in Virginia. The next subsection thereafter provides charts to show the types of participant buildings involved and the types of measures implemented.

5.4.2.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2018 are provided below. Following this summary, Figure 5-14 provides performance indicator data from July 1, 2016 through December 31, 2018. Detailed program indicators by year and month are provided in Appendix A.6.



- In Virginia, the number of participants decreased from 937 in 2017 to 510 in 2018.
- Cumulatively, the program has reached a total of 1,514 participants (93% of planned).

- The net annual energy savings increased year-over-year from 13,670,074 kWh to 14,878,990 kWh (258% of planned). The net demand reduction also increased year-over-year from 2,881.2 kW to 3,232.4 kW (285% of planned).
- On a per-participant basis, the average gross annual energy savings increased from 15,687 kWh in 2017 to 31,370 kWh in 2018 (planned: 17,717 kWh/year-participant). The average gross demand reduction per participant increased from 3.3 kW to 6.8 kW (planned: 5.08 kW/participant).
- Cumulatively, the program has achieved a total of 29,159,889 kWh of net annual energy savings (257% of planned) and a total of 6,235.9 kW of net demand reduction (296% of planned).



- Total annual program costs in 2018 decreased year-over-year to 52% of planned.
- Total program costs over the life of the program have been 56% of planned.

Table 5-14. VA Non-residential Small Business Improvement Program Performance Indicators (2016-2018)

| Category | Item | Virginia | | | |
|--------------------------------------|---|--------------------|------------|------------|---------------------------|
| | | 2016 ⁴⁰ | 2017 | 2018 | Program Total (2016-2018) |
| Operations and Management Costs (\$) | Direct Rebate | | | | |
| | Direct Implementation | | | | |
| | Direct EM&V | | | | |
| | Indirect Other (Administrative) | \$21,431 | \$150,600 | \$190,612 | \$362,643 |
| Total Costs (\$) | Total | | | | |
| | Planned | | | | |
| | Variance | | | | |
| | Annual % of Planned | 31% | 72% | 52% | 56% |
| Participants | Total (Gross) | 67 | 937 | 510 | 1,514 |
| | Planned (Gross) | 216 | 635 | 780 | 1,631 |
| | Variance | -149 | 302 | -270 | (117) |
| | Annual % of Planned (Gross) | 31% | 148% | 65% | 93% |
| Installed Energy Savings (kWh/year) | Total Gross Deemed Savings | 656,801 | 14,699,005 | 15,998,914 | 31,354,720 |
| | Realization Rate Adjustment (100%) | 0 | 0 | 0 | 0 |
| | Adjusted Gross Savings | 656,801 | 14,699,005 | 15,998,914 | 31,354,720 |
| | Net-to-Gross Adjustment (93%) ⁴¹ | -45,976 | -1,028,930 | -1,119,924 | -2,194,830 |
| | Net Adjusted Savings | 610,825 | 13,670,074 | 14,878,990 | 29,159,889 |

⁴⁰ 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 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 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.

⁴¹ The program implementation vendor has listed 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 DNV GL. See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation approaches.

| Category | Item | Virginia | | | |
|---------------------------------|---|--------------------|-----------|-----------|---------------------------|
| | | 2016 ⁴⁰ | 2017 | 2018 | Program Total (2016-2018) |
| | Planned Savings (Net) | 1,255,549 | 4,323,476 | 5,760,927 | 11,339,952 |
| | Annual % Toward Planned Savings (Net) | 49% | 316% | 258% | 257% |
| | Avg. Savings per Participant (Gross) | 9,803 | 15,687 | 31,370 | 20,710 |
| | Avg. Savings per Participant (Net) | 9,117 | 14,589 | 29,174 | 19,260 |
| Installed Demand Reduction (kW) | Total Gross Deemed Demand | 131.5 | 3,098.0 | 3,475.7 | 6,705.3 |
| | Realization Rate Adjustment (100%) | 0.0 | 0.0 | 0.0 | 0.0 |
| | Adjusted Gross Demand | 131.5 | 3,098.0 | 3,475.7 | 6,705.3 |
| | Net-to-Gross Adjustment (93%) ⁴² | -9.2 | -216.9 | -243.3 | -469.4 |
| | Net Adjusted Demand | 122.3 | 2,881.2 | 3,232.4 | 6,235.9 |
| | Planned Demand (Net) | 308.0 | 660.7 | 1,135.0 | 2,103.8 |
| | Annual % Toward Planned Reduction (Net) | 40% | 436% | 285% | 296% |
| | Avg. Demand per Participant (Gross) | 2.0 | 3.3 | 6.8 | 4.4 |
| | Avg. Demand per Participant (Net) | 1.8 | 3.1 | 6.3 | 4.1 |
| Program Performance | Annual \$Admin. per Participant (Gross) | \$320 | \$161 | \$374 | \$240 |
| | Annual \$Admin. per kWh/year (Gross) | \$0.03 | \$0.01 | \$0.01 | \$0.01 |
| | Annual \$Admin. per kW (Gross) | \$163 | \$49 | \$54.84 | \$54 |
| | Annual \$EM&V per Total Costs (\$) | 6.5% | 2.9% | 3.3% | 3.4% |
| | Annual \$Rebate per Participant (Gross) | \$1,364 | \$2,686 | \$4,180 | \$3,131 |

⁴² Ibid.

5.4.2.2 Key North Carolina Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for North Carolina in 2018 are provided below. Following this summary, Figure 5-15 provides performance indicator data from 2017 through December 31, 2018. Detailed program indicators by year and month are provided in Appendix B.6.



- In North Carolina, the number of participants increased from 7 in 2017 to 36 in 2018.
- Cumulatively, the program has reached a total of 43 participants (45% of planned).

- The net annual energy savings increased year-over-year from 154,851 kWh to 930,665 kWh (242% of planned). The net demand reduction also increased year-over-year from 30.3 kW to 203.8 kW (268% of planned).
- On a per-participant basis, the average gross annual energy savings increased from 23,787 kWh in 2017 to 27,798 kWh in 2018 (planned: 17,717 kWh/year participant). The average gross demand reduction per participant increased from 4.7 kW to 6.1 kW (planned: 5.08 kW/participant).
- Cumulatively, the program has achieved a total of 1,085,517 kWh of net annual energy savings (161% of planned) and a total of 234.1 kW of net demand reduction (196% of planned).



- Total annual program costs in 2018 increased year-over-year to 43% of planned.
- Total program costs over the life of the program have been 36% of planned.

Table 5-15. NC Non-residential Small Business Improvement Program Performance Indicators (2017-2018)

| Category | Item | North Carolina | | |
|--------------------------------------|---|----------------|-----------|---------------------------|
| | | 2017 | 2018 | Program Total (2017-2018) |
| Operations and Management Costs (\$) | Direct Rebate | | | |
| | Direct Implementation | | | |
| | Direct EM&V | | | |
| | Indirect Other (Administrative) | \$3,870 | \$10,216 | \$14,086 |
| | | | | |
| Total Costs (\$) | Total | | | |
| | Planned | | | |
| | Variance | | | |
| | Annual % of Planned | 28% | 43% | 36% |
| | | | | |
| Participants | Total (Gross) | 7 | 36 | 43 |
| | Planned (Gross) | 42 | 53 | 95 |
| | Variance | -35 | -17 | -52 |
| | Annual % of Planned (Gross) | 17% | 68% | 45% |
| | | | | |
| Installed Energy Savings (kWh/year) | Total Gross Deemed Savings | 166,507 | 1,000,716 | 1,167,222 |
| | Realization Rate Adjustment (100%) | 0 | 0 | 0 |
| | Adjusted Gross Savings | 166,507 | 1,000,716 | 1,167,222 |
| | Net-to-Gross Adjustment (93%) ⁴³ | -11,655 | -70,050 | -81,706 |
| | Net Adjusted Savings | 154,851 | 930,665 | 1,085,517 |
| | Planned Savings (Net) | 288,232 | 384,890 | 673,122 |
| | Annual % Toward Planned Savings (Net) | 54% | 242% | 161% |
| | Avg. Savings per Participant (Gross) | 23,787 | 27,798 | 27,145 |
| | Avg. Savings per Participant (Net) | 22,122 | 25,852 | 25,245 |

⁴³ The program implementation vendor has listed 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 DNV GL. See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation approaches.

| Category | Item | North Carolina | | |
|------------------------------------|---|----------------|---------|------------------------------|
| | | 2017 | 2018 | Program Total (2017-2018) |
| Installed Demand Reduction (kW) | Total Gross Deemed Demand | 32.6 | 219.1 | 251.8 |
| | Realization Rate Adjustment (100%) | 0.0 | 0.0 | 0.0 |
| | Adjusted Gross Demand | 32.6 | 219.1 | 251.8 |
| | Net-to-Gross Adjustment (93%) ⁴⁴ | -2.3 | -15.3 | -17.6 |
| | Net Adjusted Demand | 30.3 | 203.8 | 234.1 |
| | Planned Demand (Net) | 43.7 | 76.0 | 119.7 |
| | Annual % Toward Planned Demand (Net) | 69% | 268% | 196% |
| | Avg. Demand per Participant (Gross) | 4.7 | 6.1 | 5.9 |
| | Avg. Demand per Participant (Net) | 4.3 | 5.7 | 5.4 |
| Program Performance | Annual \$Admin. per Participant (Gross) | \$553 | \$284 | \$328 |
| | Annual \$Admin. per kWh/year (Gross) | \$0.02 | \$0.01 | \$0.01 |
| | Annual \$Admin. per kW (Gross) | \$119 | \$47 | \$56 |
| | Annual \$EM&V per Total Costs (\$) | 7.4% | 3.9% | 5.1% |
| | Annual \$Rebate per Participant (Gross) | \$3,778 | \$2,791 | \$2,951 |

⁴⁴ Ibid

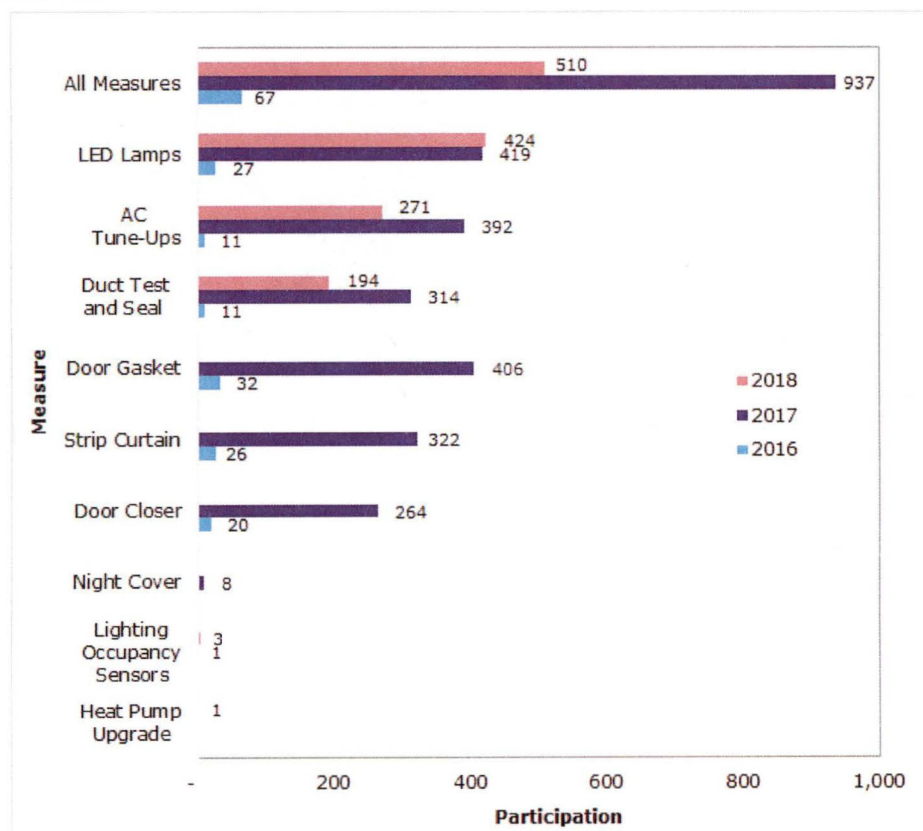
5.4.2.3 Additional Virginia Program Data

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 the program did not begin implementation until August 2016.

Note the "All Measures" and "All Building Types" categories in these figures represents the participation and/or savings from all new program participants, regardless of the measures installed and/or building types those measures were installed in. A participant in the "All Measure" and "All Building Type" categories 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 a new participant, though their savings are, in the "All Measures" and "All Building Types" categories. This differs from how participants are counted at a specific measure type or building type level in these figures, across years. For example, should a participant implement the same measure in multiple years, they are counted as a unique participant in each year, regardless of participation in prior or subsequent years.

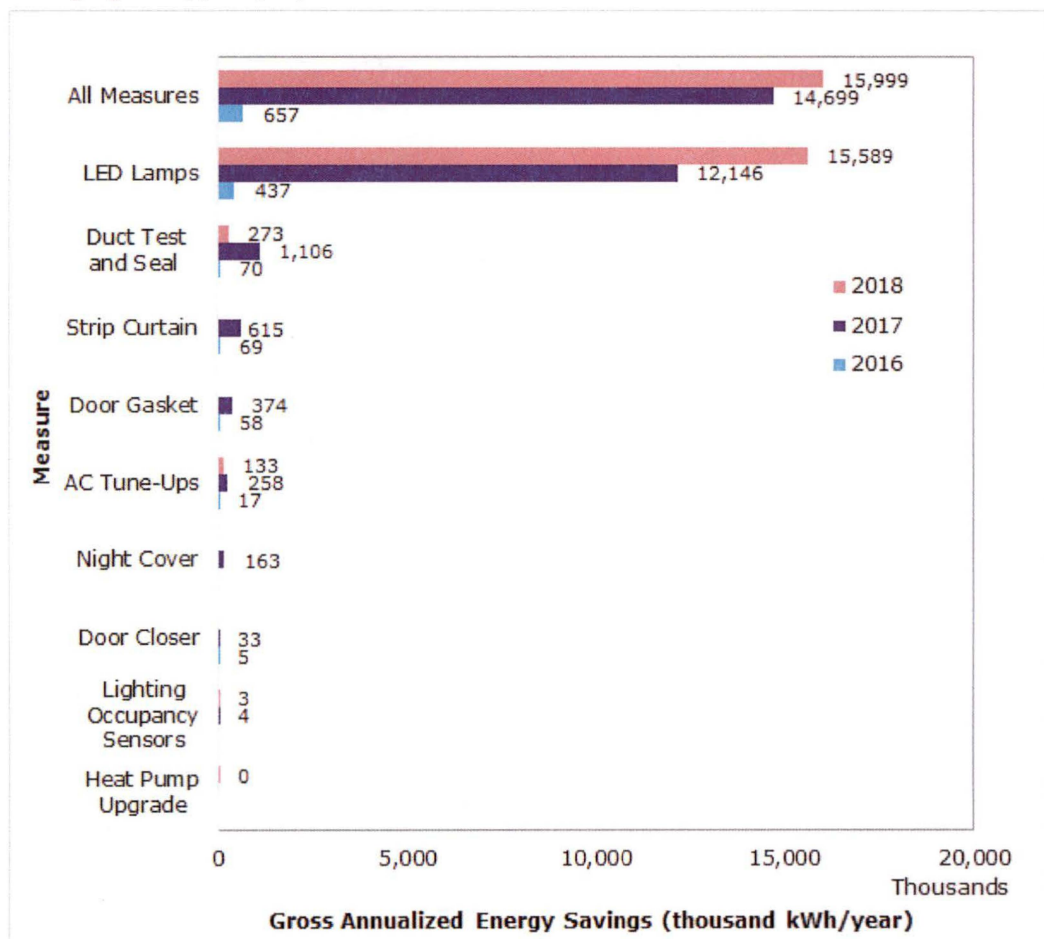
In Figure 5-35, it can be seen that LED lamp, AC tune-ups and duct test and seal measures dominated the 2018 program activity. As previously indicated, refrigeration measures were discontinued midway through 2017 and are gradually being overtaken by other measures.

Figure 5-35. VA Non-residential Small Business Improvement Program Participation by Measure and Year



In Figure 5-36, it is clear that the savings due to LED lamps dominated the program, with duct testing and sealing energy savings coming in at a distant second.

Figure 5-36. VA Non-residential Small Business Improvement Program Gross Annualized Energy Savings (MWh/year) by Measure and Year



In Figure 5-37, the average energy savings per participant (gross annualized) are shown for each measure category, by year and overall. Every year of the program, LED lamps have yielded the highest average savings per participant. The average savings per participant was 31,370 kWh/year in 2018.

Figure 5-37. VA Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure

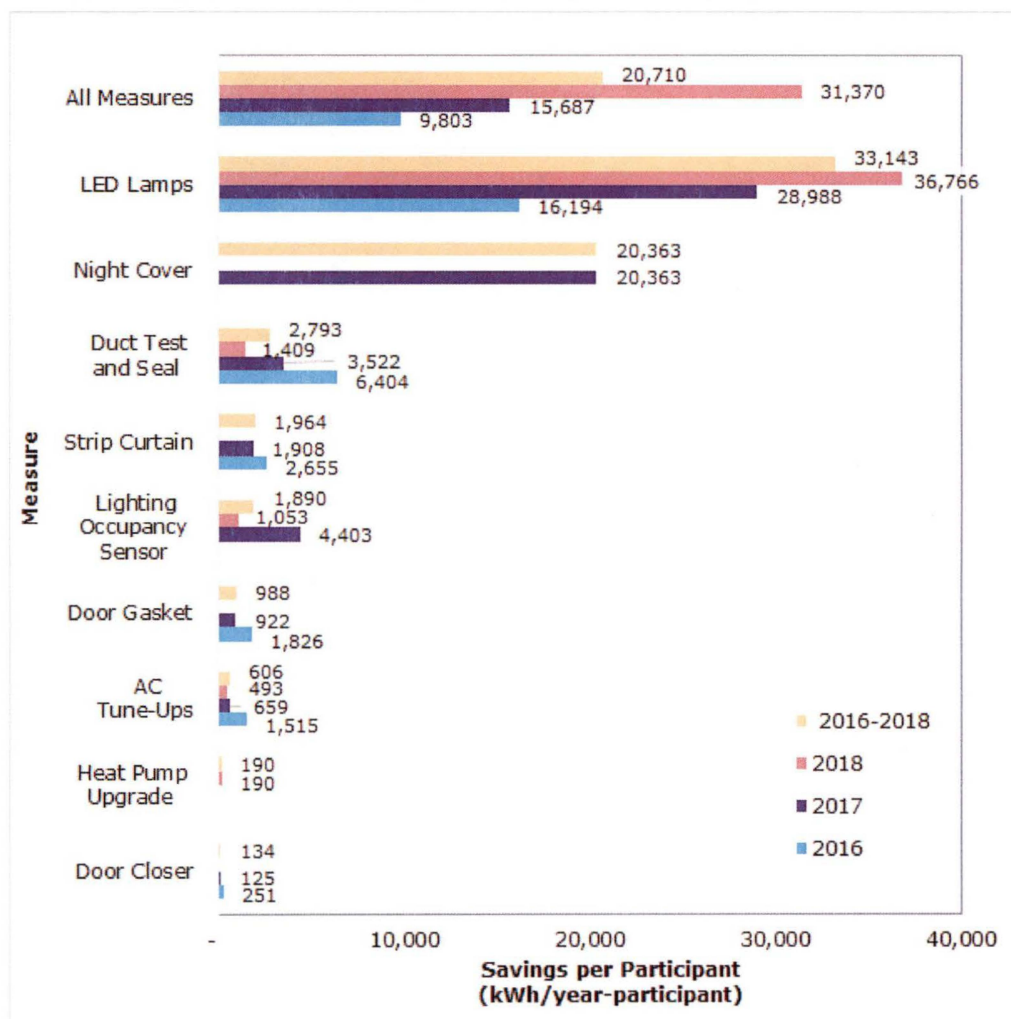


Figure 5-38 shows the building types at which program measures were implemented over the life of the program. In 2017, the "Other" building type was used to describe the second-largest number of participant facilities. Since this is a rather high ranking, it might be useful to verify whether any of these sites should actually have been categorized as one of the designated building type categories used by the program. DNV GL will consider this for future reports.

Figure 5-38. VA Non-residential Small Business Improvement Program Participation by Building Type and Year

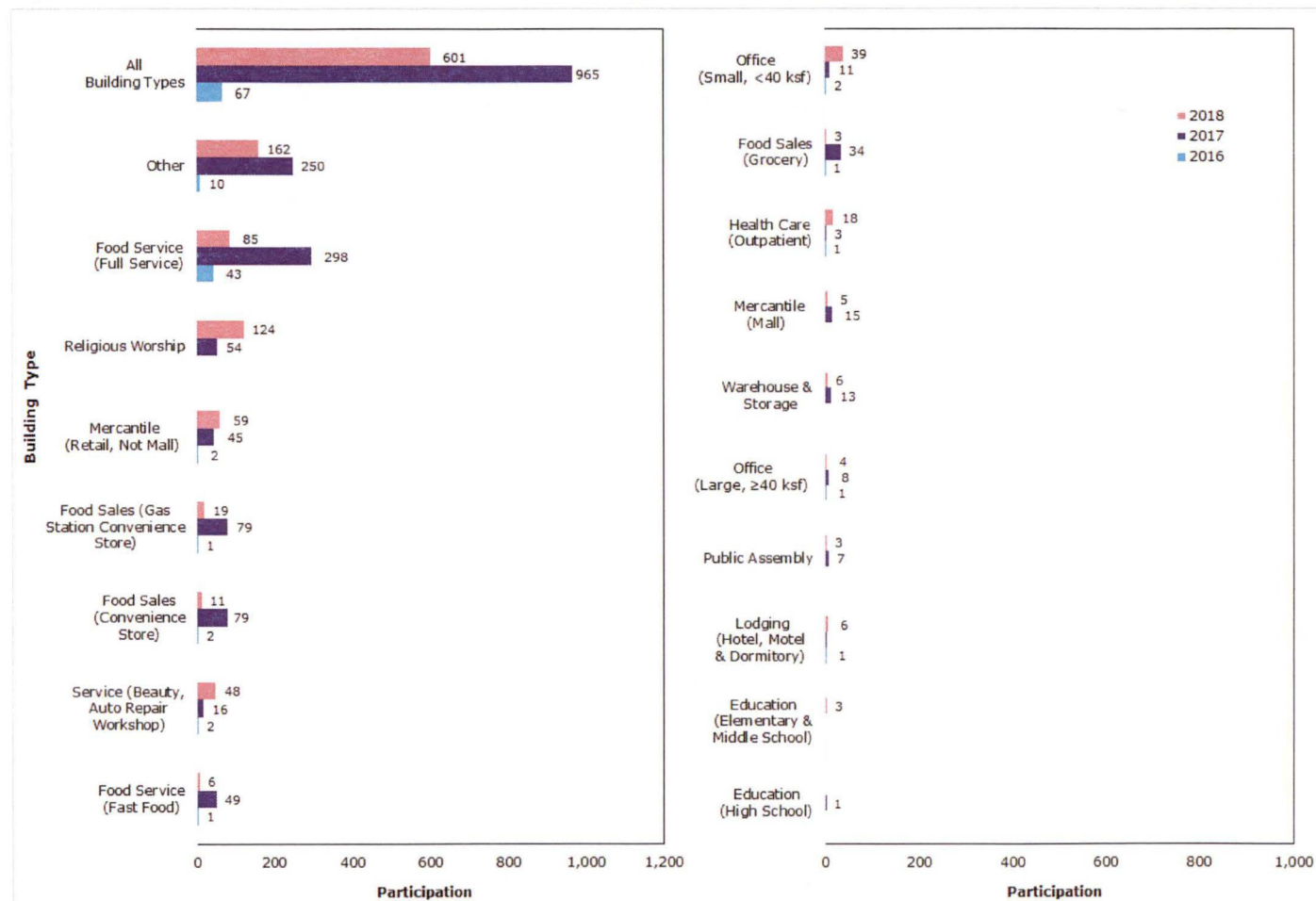
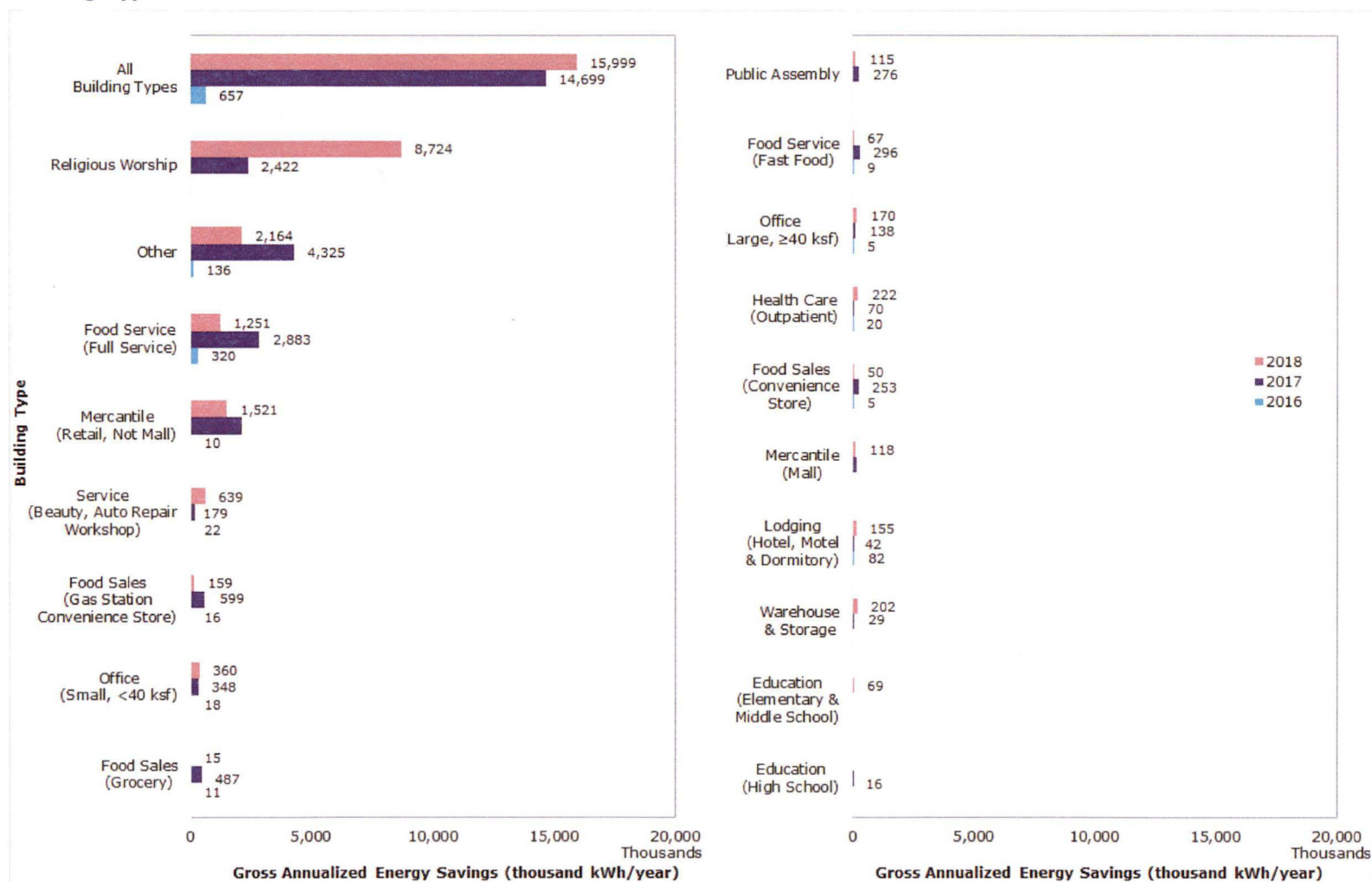


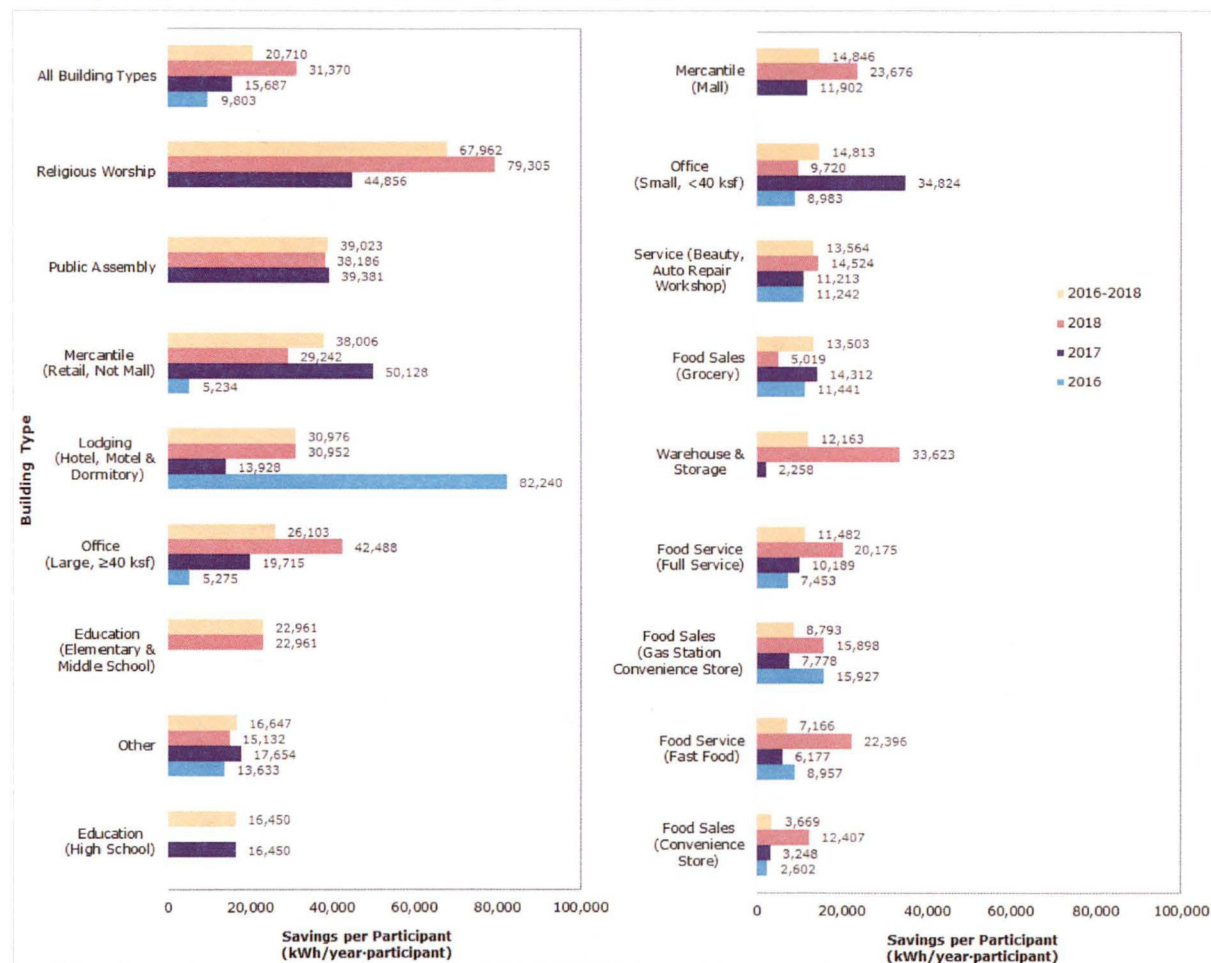
Figure 5-39 shows that, for 2018, the gross annual savings were yielded by measures installed at places of worship. This was followed by buildings described as "other," full-service restaurants and retail spaces.

Figure 5-39. VA Non-residential Small Business Improvement Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year



The building types that had the highest average per-participant savings (gross annualized) in 2018 (and overall) were places of worship and public assembly, as shown in Figure 5-40. In 2016, lodging had very high average per-participant savings, but that figure dropped off in 2017 and 2018.

Figure 5-40. VA Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year



5.4.2.4 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 in 2017 and 2018 by measure type and by building type.

The number of participants by measure and the distribution of savings by measure is shown in Figure 5-41 and Figure 5-43, respectively. The extent to which LED lamp savings dominate the programs savings relative to duct testing/sealing and AC tune-ups stands out.

Figure 5-41. NC Non-residential Small Business Improvement Program Participation by Measure and Year

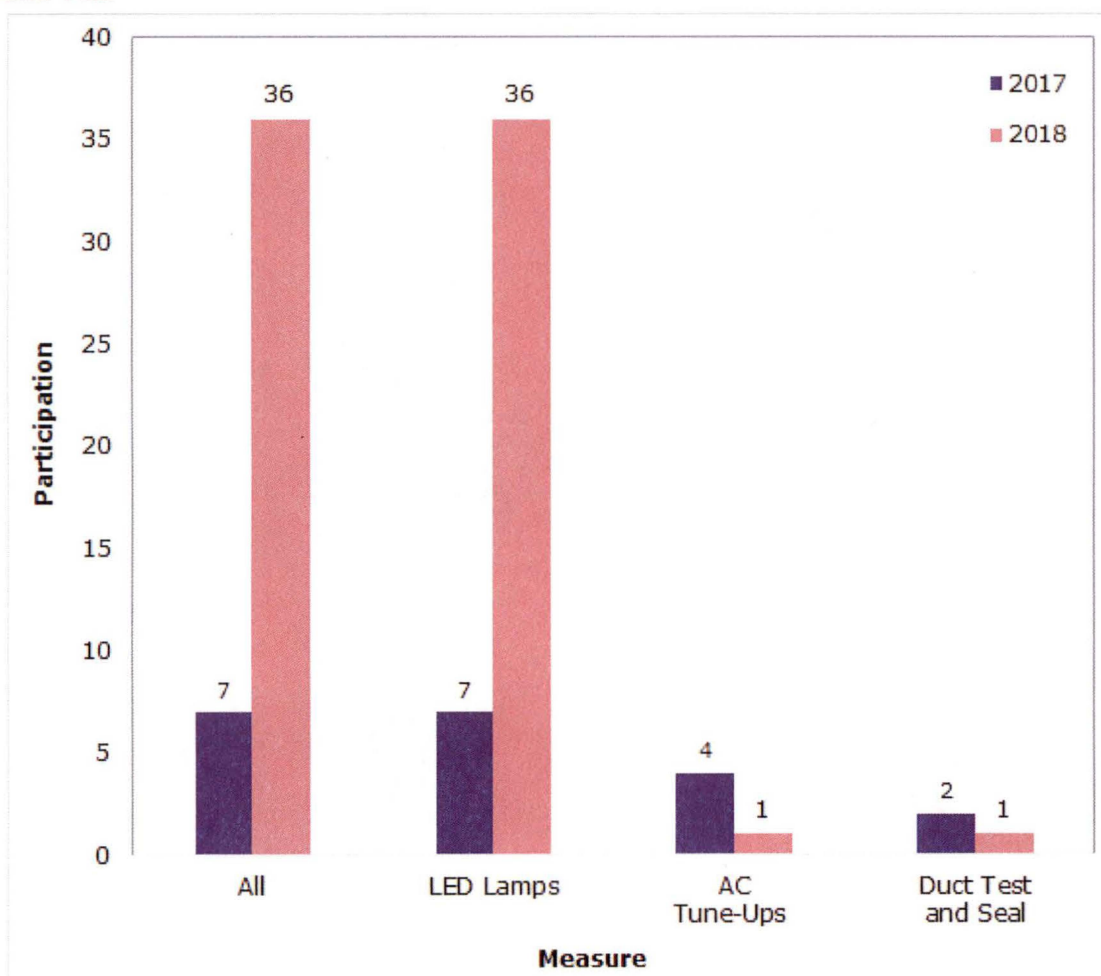
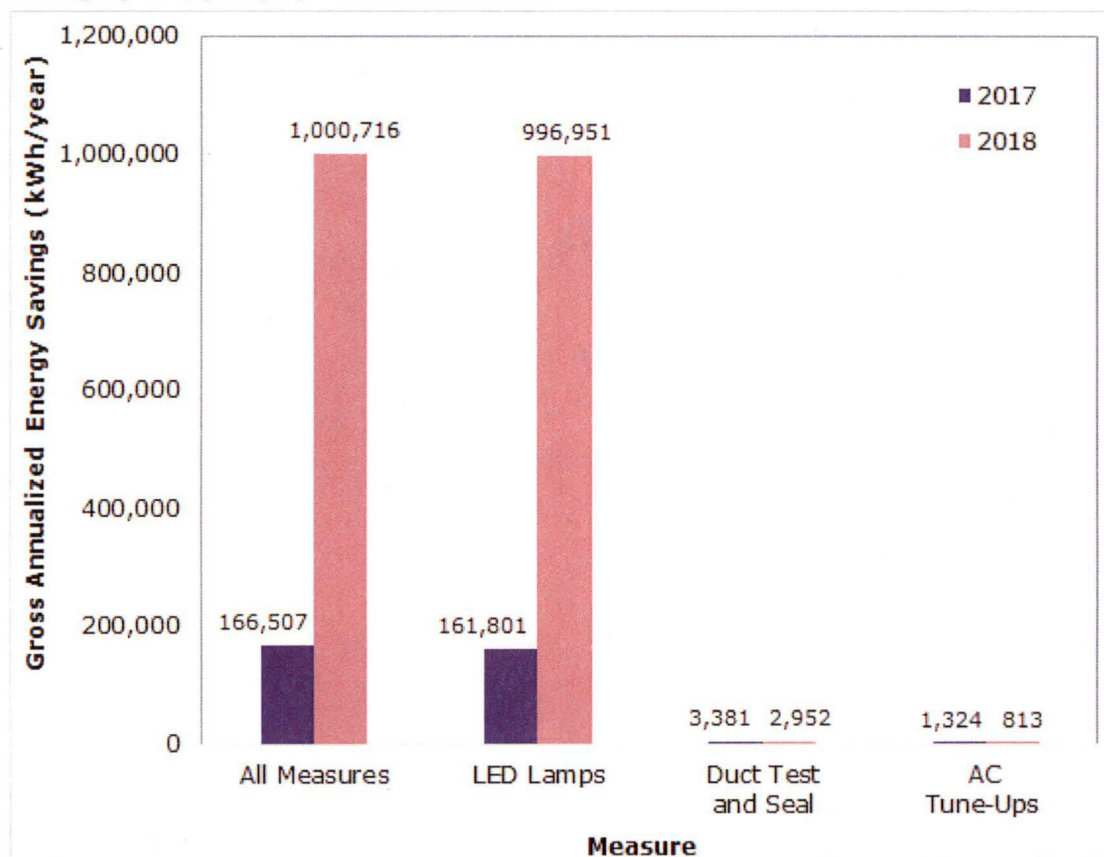


Figure 5-42. NC Non-residential Small Business Improvement Program Gross Annualized Energy Savings (kWh/year) by Measure and Year



In Figure 5-43, the average energy savings per participant (gross annualized) is shown for each measure installed, including LED lamps, duct testing and sealing, and AC tune-ups. The savings per participant due to the LED lamp replacements dwarfed those of the other two measures offered in North Carolina, thus far.

Figure 5-43. NC Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure and Year

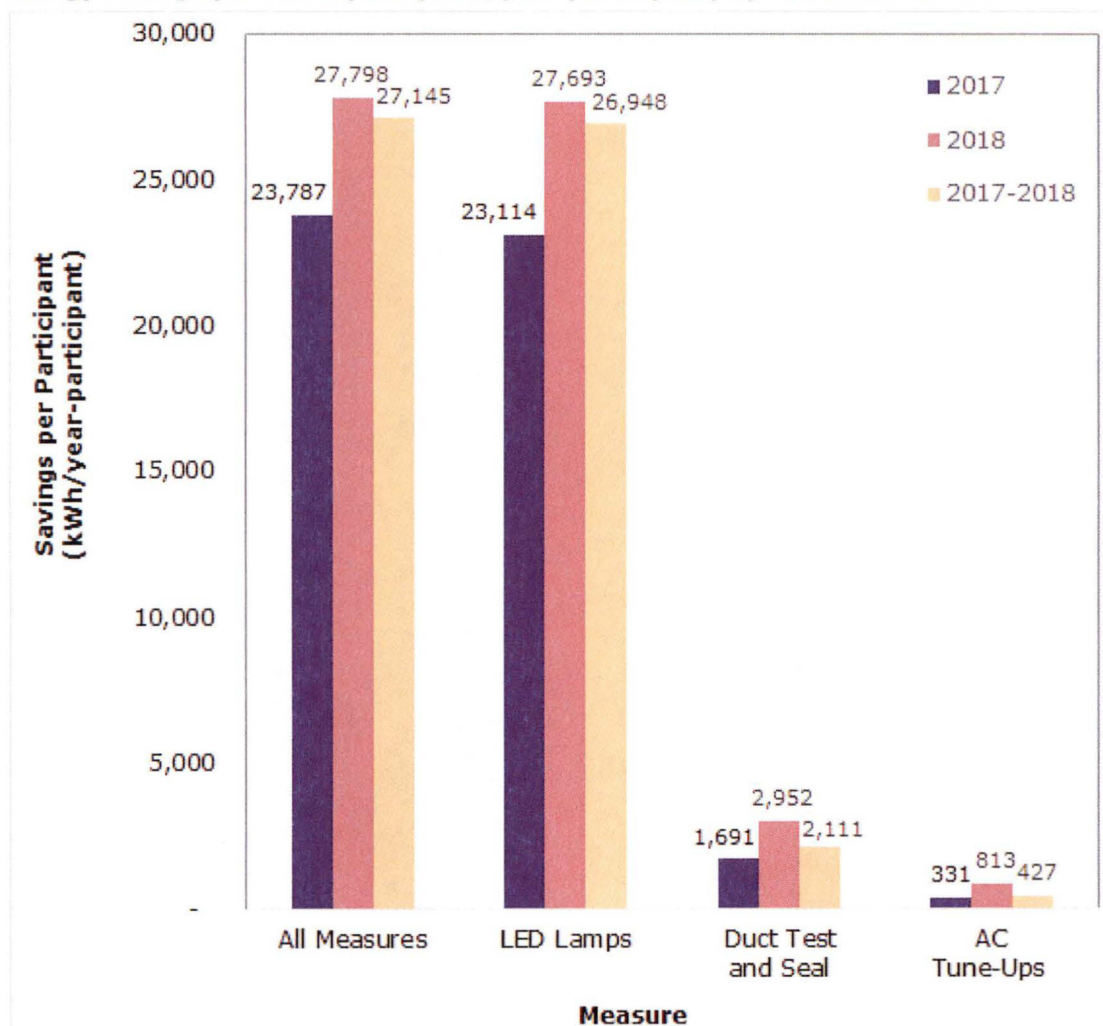
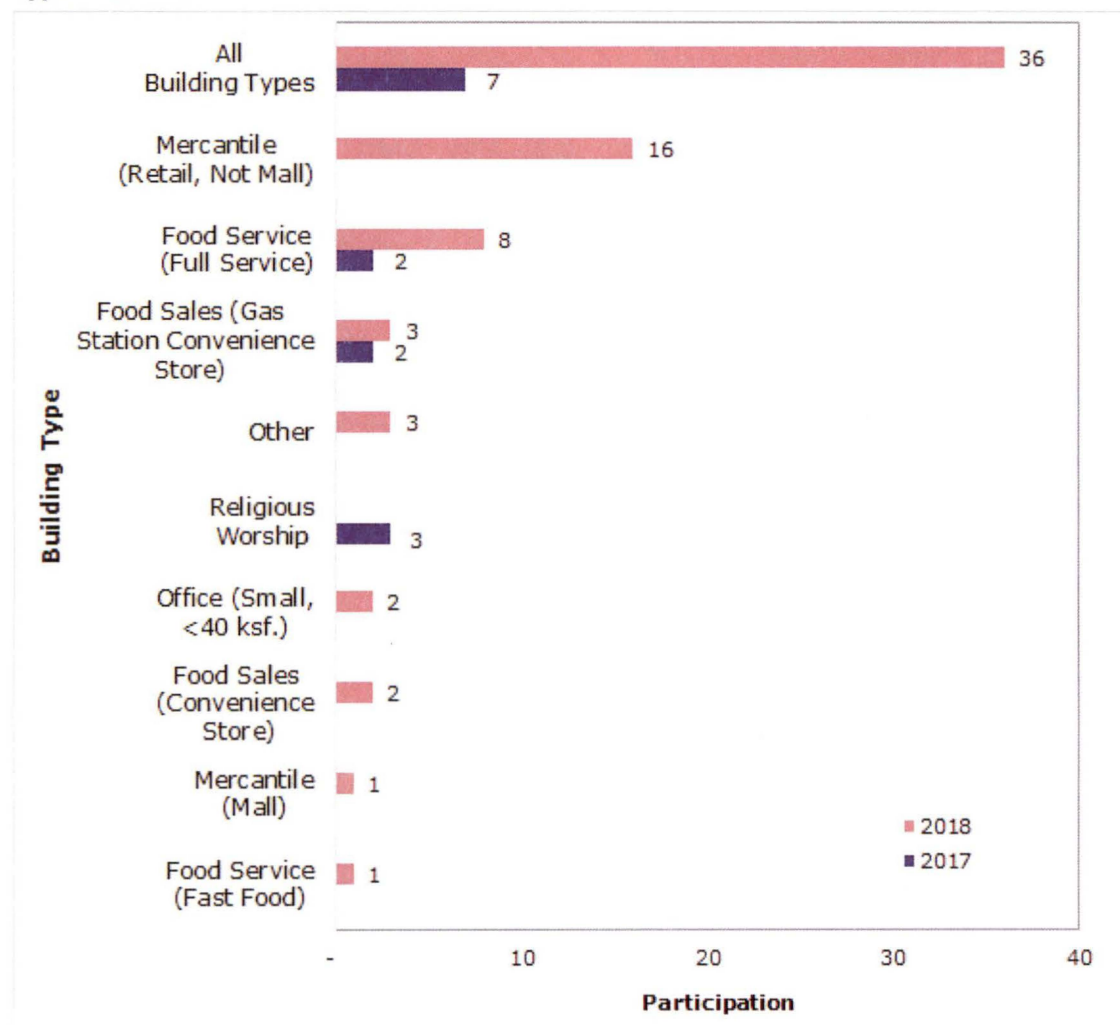


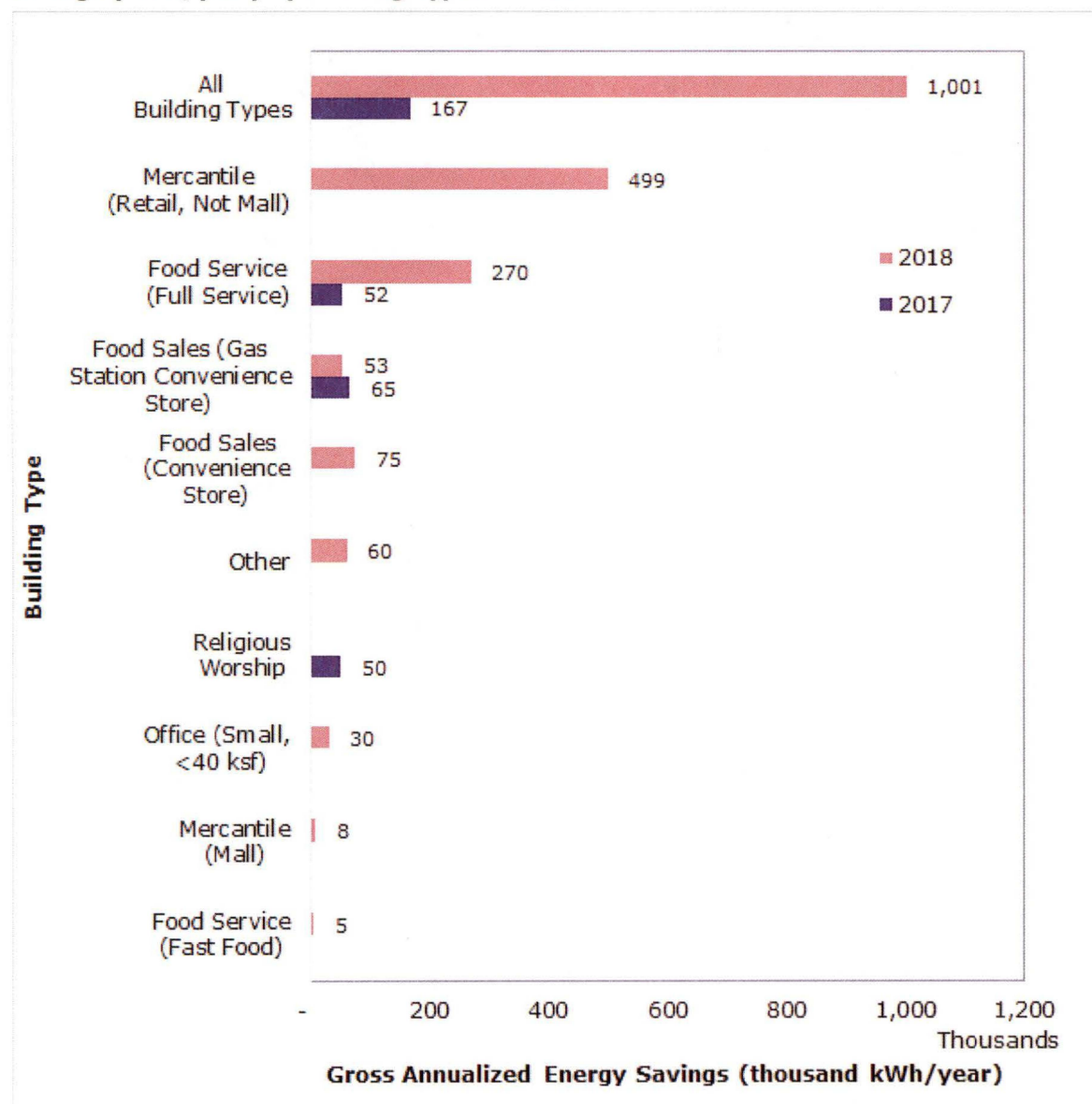
Figure 5-44. NC Non-residential Small Business Improvement Program Participation by Building Type and Year



Across the building types that participated in the program in North Carolina in 2018, the two building types that yielded the most gross annual savings were retail spaces (not mall) and full-service restaurants, as

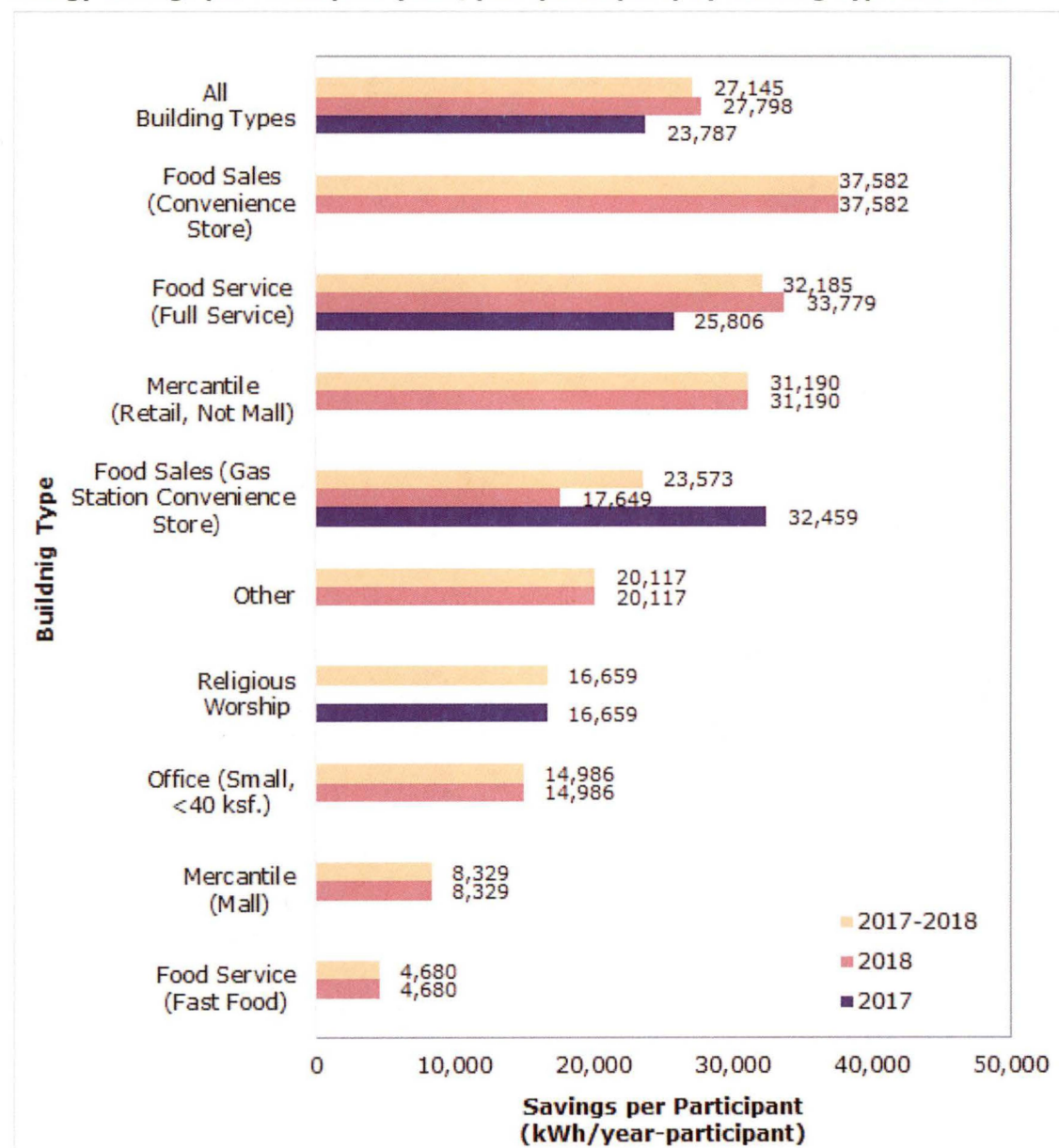
shown in Figure 5-45. These were also the building types with the most and second-most participating facilities, as shown in Figure 5-44.

Figure 5-45. NC Non-residential Small Business Improvement Program Gross Annualized Energy Savings (MWh/year) by Building Type and Year

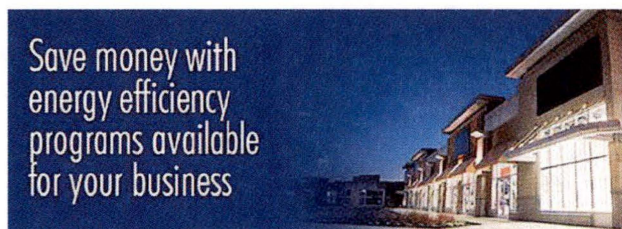


In Figure 5-46, the average per-participant savings are shown by building type.

Figure 5-46. NC Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year



5.5 Non-residential Prescriptive – Virginia and North Carolina



In the Non-residential Prescriptive program, qualifying customers are eligible to pursue one or more of the qualified measures through a local, 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 M.

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 in Virginia include those shown in Table 5-16.

Table 5-16. 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 |

| End-Use | Measure |
|---------|--|
| | Evaporator Fan Control |
| | Floating Head Pressure Control |
| | 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 |

5.5.1 Methods for the Current Reporting Period

Table 5-17 outlines Dominion Energy's initial program planning assumptions that were used to design the program. As previously described, 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 5-17. VA Non-residential Prescriptive Program Planning Assumptions

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

5.5.2 Assessment of Program Progress Towards Plan

The next subsection provides the tables summarizing the key indicators of the Non-residential Prescriptive Program progress in Virginia. The subsection thereafter provides charts to show the types of participant buildings involved and the types of measures implemented in 2018.

5.5.2.1 Key Virginia Program Data

Key data highlights for enrollment, energy savings, demand reduction and program costs for Virginia in 2018 are provided below. Following this summary, Table 5-18 provides performance indicator data from 2017 through December 31, 2018. Detailed program indicators by year and month are provided in Appendix A.7.



- The number of participants in Virginia increased from 4 in 2017 to 865 in 2018 (203% of planned).
- Cumulatively, the program has reached a total of 869 participants (125% of planned).

- Net annual energy savings were 5,737,642 kWh (21% of planned), and the net demand reduction was 2,621.1 kW (61% of planned).
- On a per-participant basis, the average gross annual energy savings was 7,804 kWh (5-year planned average: 128,984 kWh) and the average gross demand reduction per participant was 3.6 kW (5-year planned average planned: 19.29 kW).
- Cumulatively, the program has achieved a total of 5,738,236 kWh of net annual energy savings (17% of planned) and a total of 2,621.1 kW of net demand reduction (61% of planned). Based on DNV GL observations from other Dominion Energy non-residential programs (i.e., DSM Phase II programs), it is common for programs to still be in the ramp up stage in its first full year of program implementation— as is the case with this program.



Total annual program costs in 2018 were 108% of planned.

Table 5-18. VA Non-residential Prescriptive Program Performance Indicators (2017-2018)

| Category | Item | Virginia | | |
|--------------------------------------|---|-----------|------------|---------------------------|
| | | 2017 | 2018 | Program Total (2017-2018) |
| Operations and Management Costs (\$) | Direct Rebate | | | |
| | Direct Implementation | | | |
| | Direct EM&V | | | |
| | Indirect Other (Administrative) | \$28,898 | \$381,096 | \$409,994 |
| Total Costs (\$) | Total | | | |
| | Planned | | | |
| | Variance | | | |
| | Annual % of Planned | 20% | 108% | 75% |
| Participants | Total (Gross) | 4 | 865 | 869 |
| | Planned (Gross) | 266 | 427 | 693 |
| | Variance | -262 | 438 | 176 |
| | Annual % of Planned (Gross) | 2% | 203% | 125% |
| Installed Energy Savings (kWh/year) | Total Gross Deemed Savings | 699 | 6,750,167 | 6,750,866 |
| | Realization Rate Adjustment (100%) | 0 | 0 | 0 |
| | Adjusted Gross Savings | 699 | 6,750,167 | 6,750,866 |
| | Net-to-Gross Adjustment (85%) ⁴⁵ | -105 | -1,012,525 | -1,012,630 |
| | Net Adjusted Savings | 594 | 5,737,642 | 5,738,236 |
| | Planned Savings (Net) | 5,959,948 | 26,839,364 | 32,799,312 |
| | Annual % Toward Planned Savings (Net) | 0.01% | 21% | 17% |
| | Avg. Savings per Participant (Gross) | 175 | 7,804 | 7,769 |
| | Avg. Savings per Participant (Net) | 149 | 6,633 | 6,603 |

⁴⁵ The program implementation vendor has listed 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.