

Extraordinarily Sensitive Information Redacted

Category	Item	North Carolina			
		2015	2016	2017	Program Total (2015-2017)
	Avg. Savings per Participant (Gross)	N/A	N/A	N/A	N/A
	Avg. Savings per Square Foot (Gross)	N/A	N/A	N/A	N/A
	Avg. Savings per Participant (Net)	N/A	N/A	N/A	N/A
	Avg. Savings per Square Foot (Net)	N/A	N/A	N/A	N/A
Installed Demand Reduction	Total Gross Deemed Demand	0	0	0	0
	Realization Rate Adjustment (100%)	0	0	0	0
	Adjusted Gross Demand	0	0	0	0
	Net-to-Gross Adjustment (80%)	0	0	0	0
	Net Adjusted Demand	0	0	0	0
	Planned Demand (Net)	0	974	915	1,889
	Cum. % Toward Planned Demand (Net)	0%	0%	0%	0%
	Avg. Demand per Participant (Gross)	N/A	N/A	N/A	N/A
	Avg. Demand per Square Foot (Gross)	N/A	N/A	N/A	N/A
	Avg. Demand per Participant (Net)	N/A	N/A	N/A	N/A
	Avg. Demand per Square Foot (Net)	N/A	N/A	N/A	N/A
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	N/A	N/A	N/A	N/A
	Cum. \$Admin. per Cum. kWh/year (Gross)	N/A	N/A	N/A	N/A
	Cum. \$Admin. per Cum. kW (Gross)	N/A	N/A	N/A	N/A
	Cum. \$EM&V per Cum. Total Costs (\$)	18%	29%	25%	24%
	Cum. \$Rebate per Cum. Participant (Gross)				

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### 5.5.2.3 Additional Virginia Program Data

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

Figure 5-55 shows the average gross energy savings per participant by the window orientation. In 2017, east facing windows averaged 22 kWh/year, the highest average savings for all window orientations.

**Figure 5-55. 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**

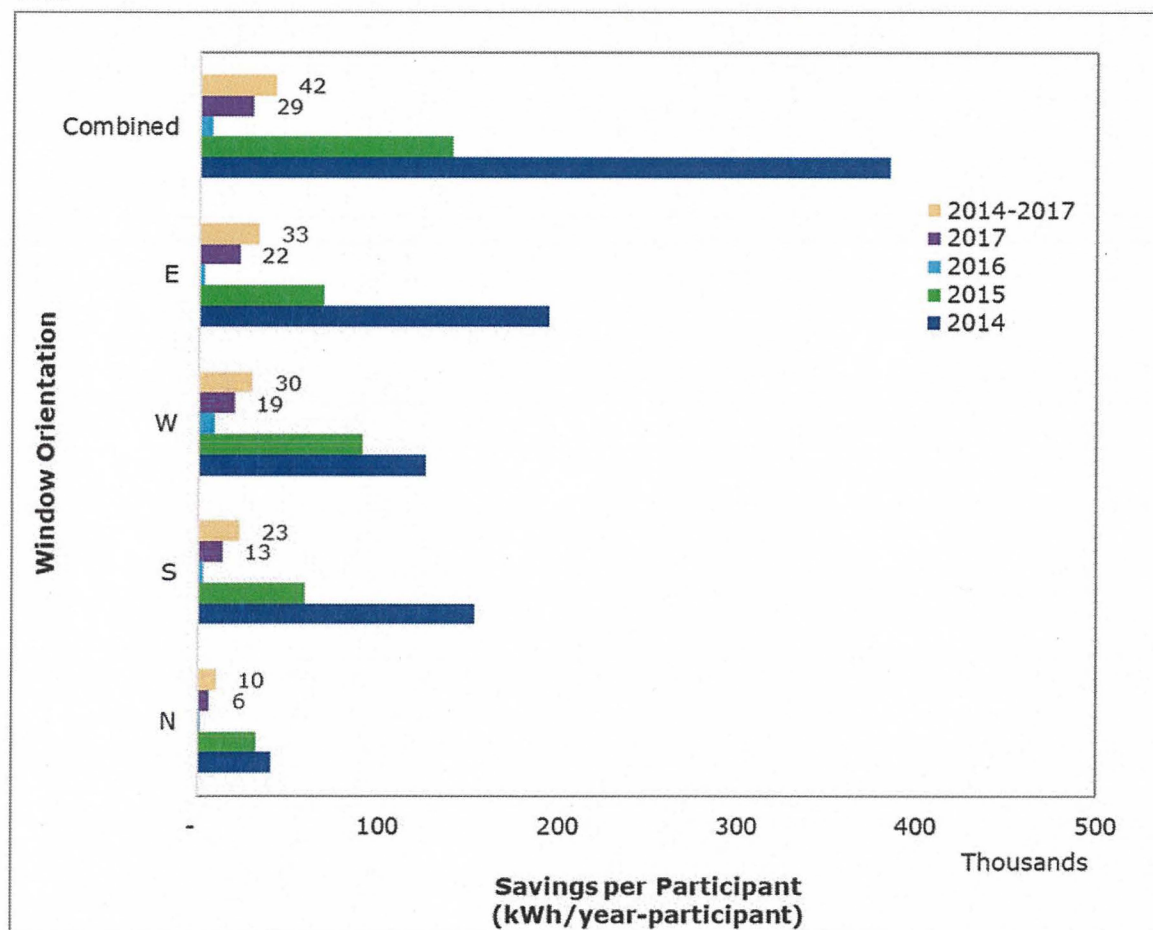




Figure 5-56 shows the participation for each window orientation. In 2017, window film was installed most frequently on south facing windows, installed by 37 out of 59 total participants.

**Figure 5-56. VA Non-residential Window Film Program Participation by Window Orientation and Year**

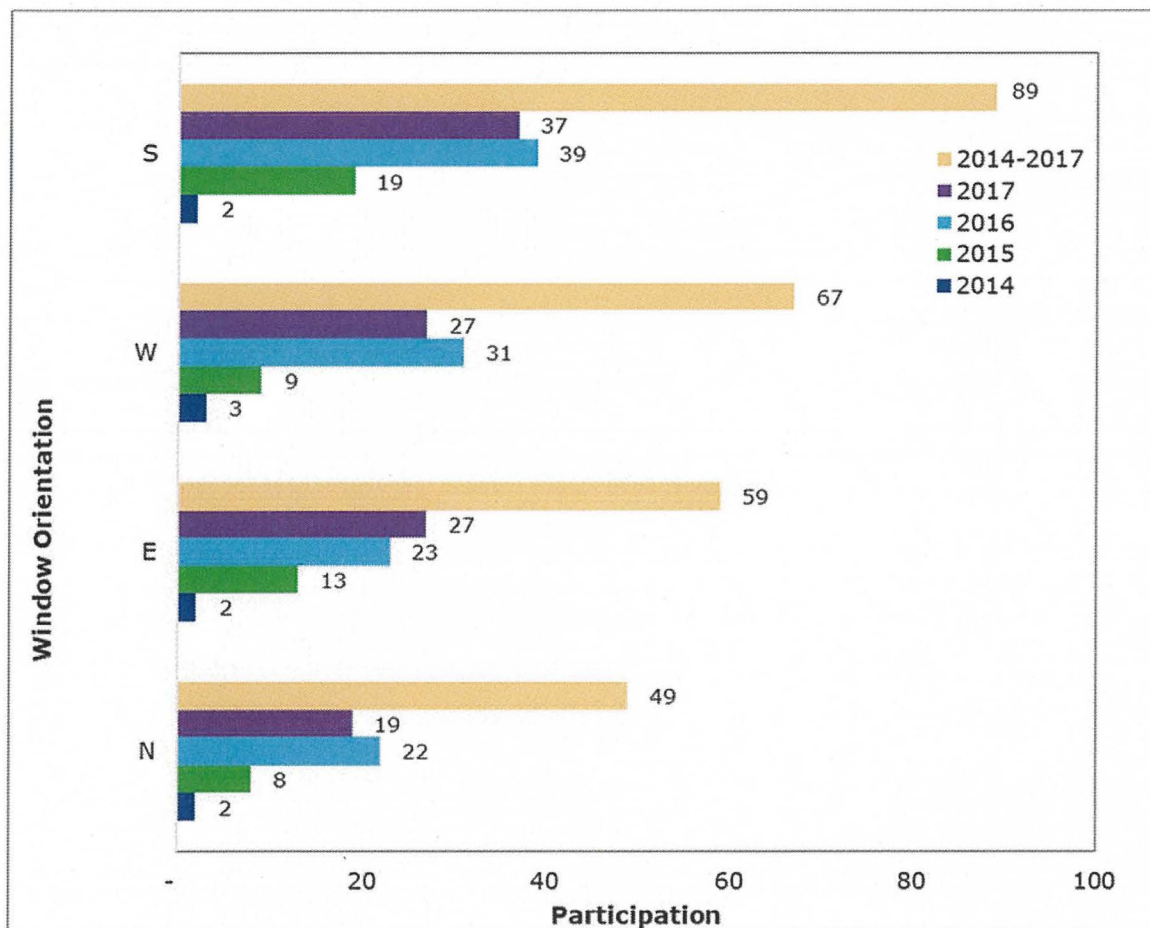


Figure 5-57 shows the gross annual energy savings by window orientation for each program year and cumulatively for the program. In 2017, window film installed on east facing windows combined to save the most energy as compared to north, west, or south facing windows.

**Figure 5-57. VA Non-residential Window Film Program Gross Annualized Energy Savings (kWh/year) by Window Orientation and Year**

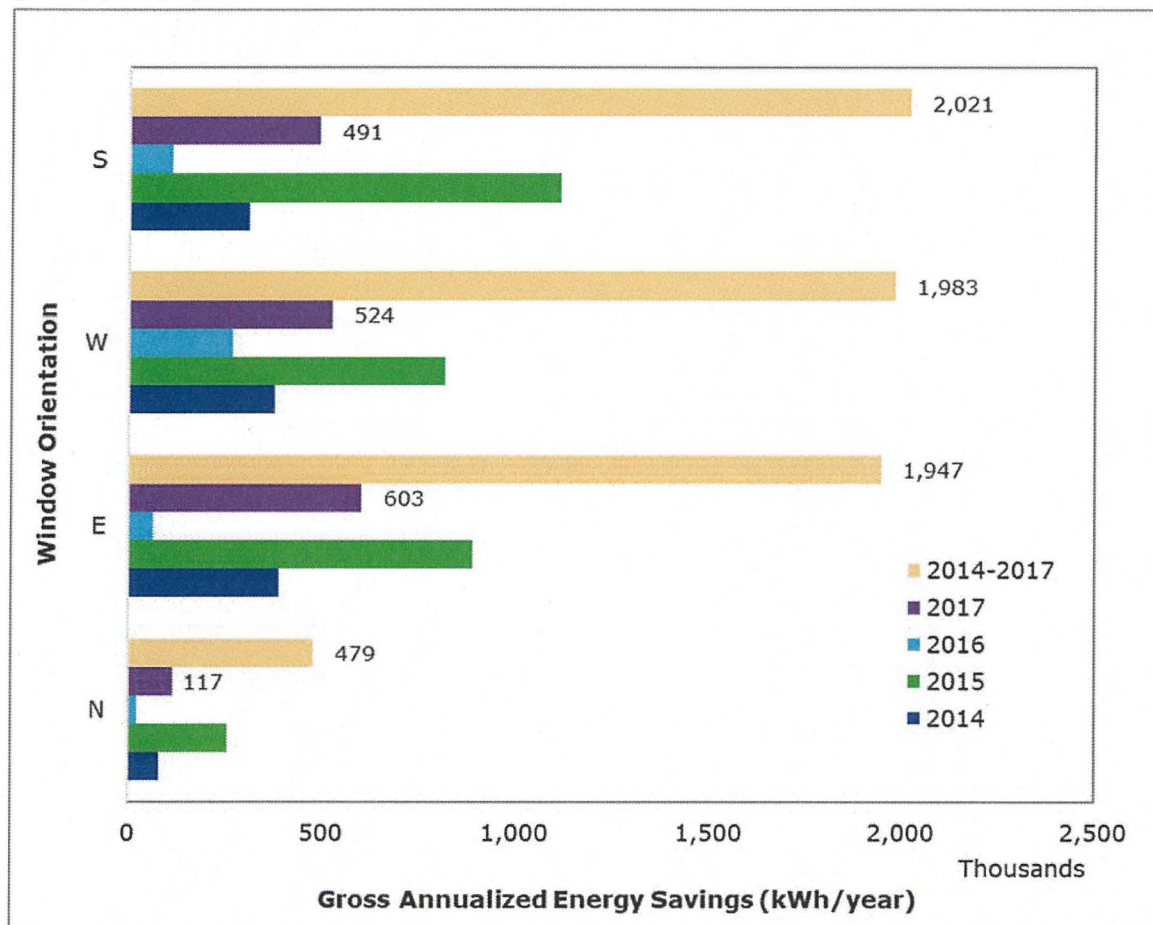


Figure 5-58 shows the average savings per participant by building type. In 2017, lodging building types averaged the highest gross savings per participant.

**Figure 5-58. VA Non-residential Window Film Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year**

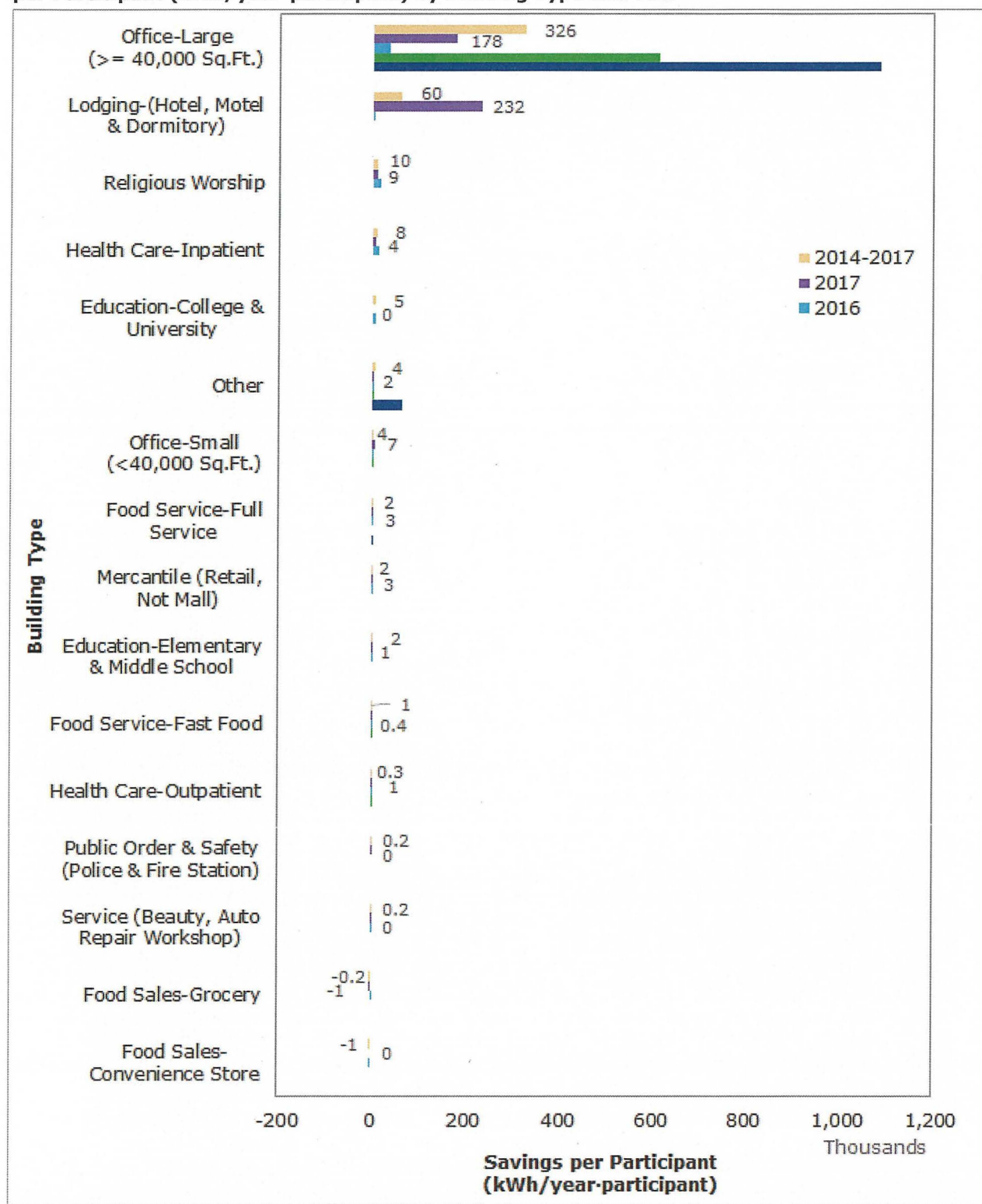
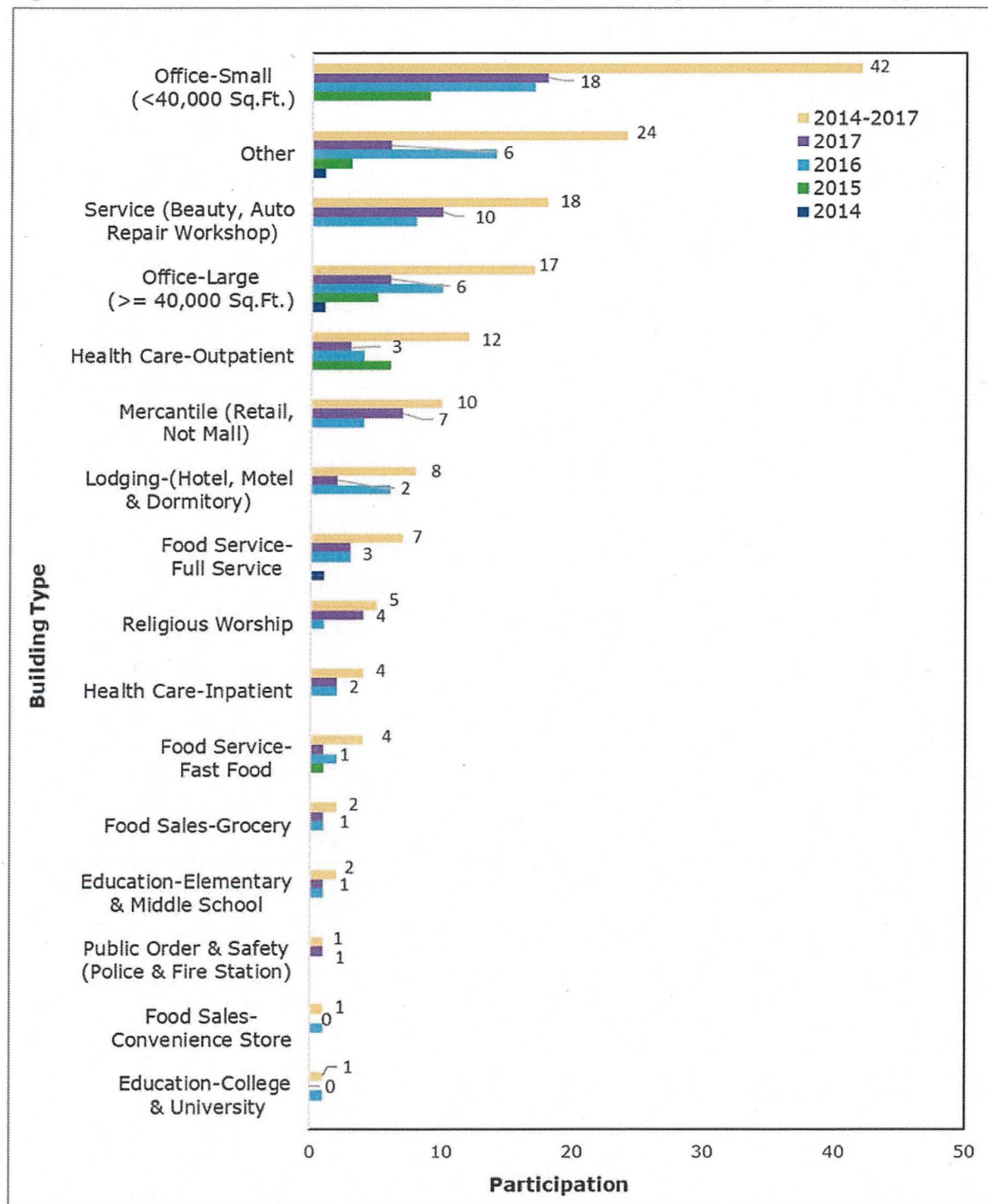




Figure 5-59 shows the number of participants by building type. In 2017, small offices participated most frequently in the program, totaling 18 participants and accounting for 31% of total participants.

**Figure 5-59. VA Non-residential Window Film Program Participation by Building Type and Year**






Figure 5-60 shows the total gross savings, by building type, for each program year and cumulatively for the program. In 2017, like each past year, large offices accounted for the most (61%) gross energy savings compared to all other building types. 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 5-60. VA Non-residential Window Film Program Gross Annualized Energy Savings (kWh/year) by Building Type and Year**







#### **5.5.2.4 Additional North Carolina Program Data**

No North Carolina customers have participated in the program through 2017.

## 5.6 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 M.

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 5-20. Most of the measures in this program already existed in other legacy programs, as indicated in the table. Three new recommissioning measures were introduced for the program: unitary/split AC & HP tune-ups, refrigerant charge corrections, and compressed air leak repairs.

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 have been approved in the Company's new Non-residential Prescriptive program.

**Table 5-20. Measures Offered Through Small Business Improvement Program**

End-Use	Measure	Legacy Program
Lighting	T5/T8 Fluorescent Lamp/Ballast	Non-residential Lighting Systems & Controls
	LED Lamp/Fixture	
	CFL Lamp/Fixture	
	De-lamping	
Refrigeration <sup>74</sup>	Door Gasket (cooler and freezer)	Non-residential Energy Audit Program
	Door Closer (cooler and freezer)	
	Strip Curtain (cooler and freezer)	
	Night Cover	
HVAC	Unitary/Split AC & HP Upgrade	Non-residential Heating and Cooling Efficiency
	Mini-split Heat Pump	
	Dual Enthalpy Air-side Economizer	
	Variable Frequency Drive	
	Programmable Thermostat	
HVAC, recommissioning	Duct Testing & Sealing	Non-residential Duct Testing & Sealing
	Unitary/Split AC & HP Tune-up	N/A
	Refrigerant Charge Correction	
Other, recommissioning	Compressed Air Leak Repair	N/A

### 5.6.1 Methods for the Current Reporting Period

Table 5-21 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 deemed savings calculations for the program measures that have not yet been verified through EM&V.

**Table 5-21. 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

<sup>74</sup> As of June 1, 2017, refrigeration measures are no longer 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.



## 5.6.2 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.

### 5.6.2.1 Key Virginia Program Data

Table 5-22 summarizes key indicators of progress from July 1, 2016 through December 31, 2017 for the Virginia program. Detailed program indicators by year and month are provided for Virginia in Appendix A.12.

In Virginia, the gross number of participants increased dramatically from 67 in 2016 to 938 in 2017. The net annual energy savings also increased year-over-year from 610,825 kWh to 13,759,969 kWh (318% of planned). The net peak demand reduction also increased year-over-year from 122.3 kW to 2887.4 kW (437% of planned). Total annual program costs in 2017 increased year-over-year to 72% of planned.

On a per-participant basis, the average gross annual energy savings increased from 9,803 kWh in 2016 to 15,774 kWh in 2017 (17,717 kWh planned). The average net peak demand reduction per participant increased from 2.0 kW to 3.3 kW (5.08 kW planned). The average rebate per participant nearly doubled to \$2,683.

Cumulatively, the program has achieved a total of 5,579,025 kWh of net annual energy savings (258% of planned) and a total of 3,009.7 kW of net demand reduction (311% of planned) through a total of 1,005 participants (118% of planned). Total program costs over the life of the program have been 59% of planned.

**Table 5-22. VA Non-residential Small Business Improvement Program Performance Indicators (2016-2017)**

Category	Item	Virginia		
		2016 <sup>75</sup>	2017	Program Total (2016-2017)
Operations and Management Costs (\$)	Direct Rebate			
	Direct Implementation			
	Direct EM&V			
	Indirect Other (Administrative)	\$21,431	\$150,600	\$172,031
Total Costs (\$)	Total			
	Planned			
	Variance			
	Cumulative % of Planned	31%	72%	59%
Participants	Total (Gross)	67	938	1,005

<sup>75</sup> 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.

Category	Item	Virginia		
		2016 <sup>75</sup>	2017	Program Total (2016-2017)
	Planned (Gross)	216	635	851
	Variance	-149	303	154
	Cumulative % of planned (Gross)	31%	148%	118%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	656,801	14,795,665	15,452,467
	Realization Rate Adjustment (100%)	0	0	0
	Adjusted Gross Savings	656,801	14,795,665	15,452,467
	Net-to-Gross Adjustment (93%) <sup>76</sup>	-45,976	-1,035,697	-1,081,673
	Net Adjusted Savings	610,825	13,759,969	14,370,794
	Planned Savings (Net)	1,255,549	4,323,476	5,579,025
	Cum. % Toward Planned Savings (Net)	49%	318%	258%
	Avg. Savings per Participant (Gross)	9,803	15,774	15,376
	Avg. Savings per Participant (Net)	9,117	14,669	14,299
Installed Demand Reduction	Total Gross Deemed Demand	131.5	3,104.7	3,236.2
	Realization Rate Adjustment (100%)	0.0	0.0	0.0
	Adjusted Gross Demand	131.5	3,104.7	3,236.2
	Net-to-Gross Adjustment (93%) <sup>77</sup>	-9.2	-217.3	-226.5
	Net Adjusted Demand	122.3	2,887.4	3,009.7
	Planned Demand (Net)	308.0	660.7	968.8
	Cum. % Toward Planned Demand (Net)	40%	437%	311%
	Avg. Demand per Participant (Gross)	2.0	3.3	3.2
	Avg. Demand per Participant (Net)	1.8	3.1	3.0
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$320	\$161	\$171
	Cum. \$Admin. per Cum. kWh/year (Gross)	\$0.03	\$0	\$0
	Cum. \$Admin. per Cum. kW (Gross)	\$163	\$49	\$53
	Cum. \$EM&V per Cum. Total Costs (\$)	7%	3%	3%
	Cum. \$Rebate per Cum. Participant (Gross)			

<sup>76</sup>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?" See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation.

<sup>77</sup> Ibid.



### 5.6.2.2 Key North Carolina Program Data

Table 5-23 summarizes key indicators of progress from January 1 through December 31, 2017 for the North Carolina program. Detailed program indicators by year and month are provided for North Carolina in Appendix B.12.

In North Carolina, the gross number of participants in its first year of operation was seven. The net annual energy savings were 154,851 kWh (54% of planned). The net peak demand reduction was 30.3 kW (69% of planned). Total annual program costs in 2017 were 28 percent of planned.

On a per-participant basis, the average gross annual energy savings were 23,787 kWh in 2017 (17,717 kWh planned). The average gross peak demand reduction per participant was 4.7 kW (5.08 kW planned). The average rebate per participant was \$3,778.

**Table 5-23. NC Non-residential Small Business Improvement Program Performance Indicators (2017)**

Category	Item	North Carolina 2017
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	
	Direct EM&V	
	Indirect Other (Administrative)	\$3,870
Total Costs (\$)	Total	
	Planned	
	Variance	
	Cumulative % of Planned	28%
Participants	Total (Gross)	7
	Planned (Gross)	42
	Variance	-35
	Cumulative % of planned (Gross)	17%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	166,507
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	166,507
	Net-to-Gross Adjustment (93%)	-11,655
	Net Adjusted Savings	154,851
	Planned Savings (Net)	288,232
	Cum. % Toward Planned Savings (Net)	54%
	Avg. Savings per Participant (Gross)	23,787
	Avg. Savings per Participant (Net)	22,122
Installed Demand Reduction	Total Gross Deemed Demand	32.6
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand	32.6



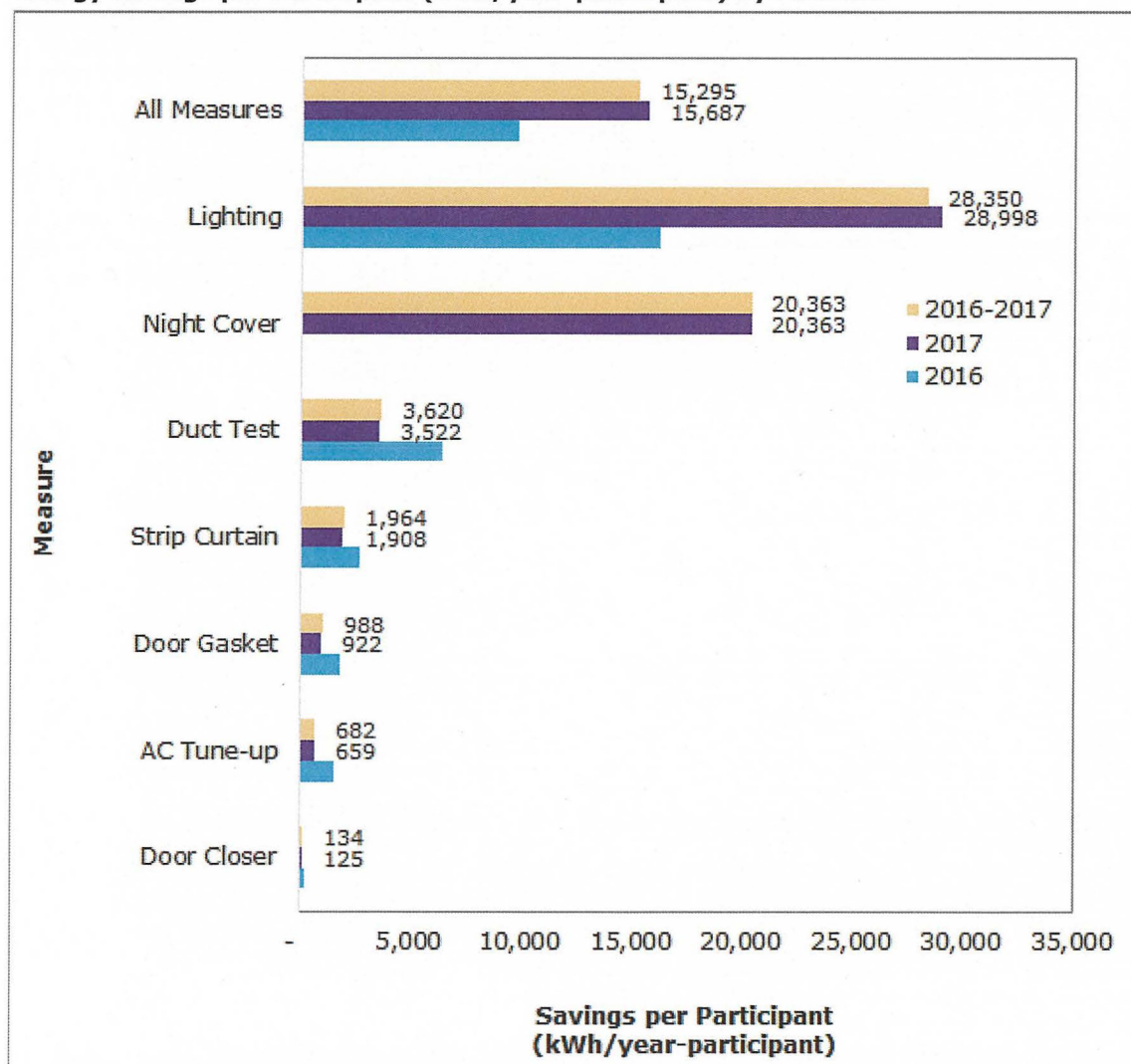
Category	Item	North Carolina
		2017
	Net-to-Gross Adjustment (93%)	-2.3
	Net Adjusted Demand	30.3
	Planned Demand (Net)	43.7
	Cum. % Toward Planned Demand (Net)	69%
	Avg. Demand per Participant (Gross)	4.7
	Avg. Demand per Participant (Net)	4.3
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$553
	Cum. \$Admin. per Cum. kWh/year (Gross)	\$0
	Cum. \$Admin. per Cum. kW (Gross)	\$119
	Cum. \$EM&V per Cum. Total Costs (\$)	7%
	Cum. \$Rebate per Cum. Participant (Gross)	

### 5.6.2.3 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.

In Figure 5-61, the average energy savings per participant (gross annualized) are shown for each measure category, by year and overall. In 2017 and over the life of the program, lighting measures have yielded the highest average savings per participant. The lighting measure group was comprised of LED lamp replacements at 419 participant facilities, whereas occupancy sensors were installed at only one.

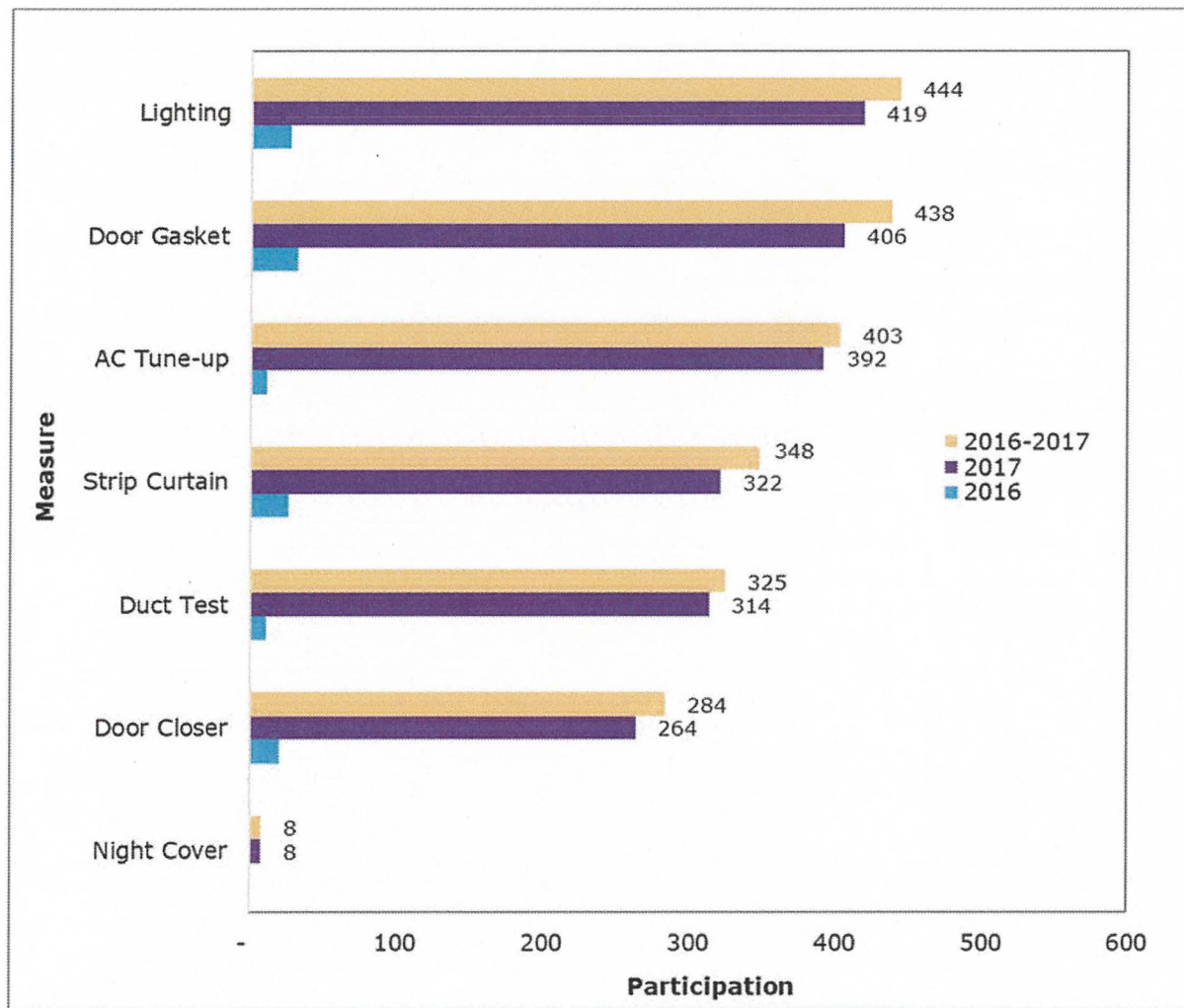
**Figure 5-61. VA Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure**



In Figure 5-62, it can be seen that lighting measures were installed at the most participant sites in 2017 and overall. As previously indicated, refrigeration measures were discontinued midway through 2017 and, hence,

no longer surpassed lighting with the most participants as had been the case in 2016. Note, the program did not begin implementation until August 2016.

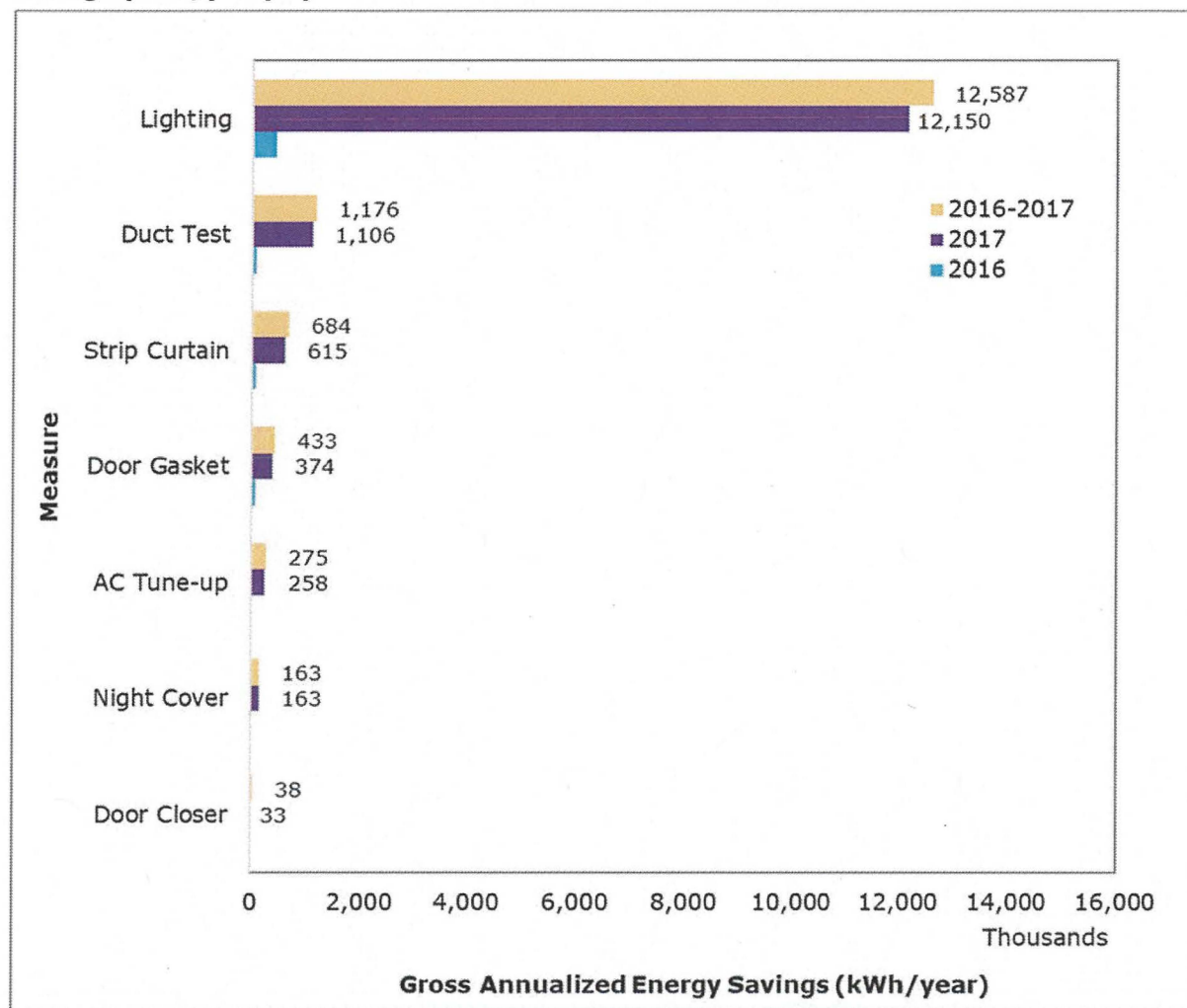
**Figure 5-62. VA Non-residential Small Business Improvement Program Participation by Measure and Year**





In Figure 5-63, it is clear that the savings due to lighting measures dominated the program with duct testing and sealing energy savings coming in at a distant second.

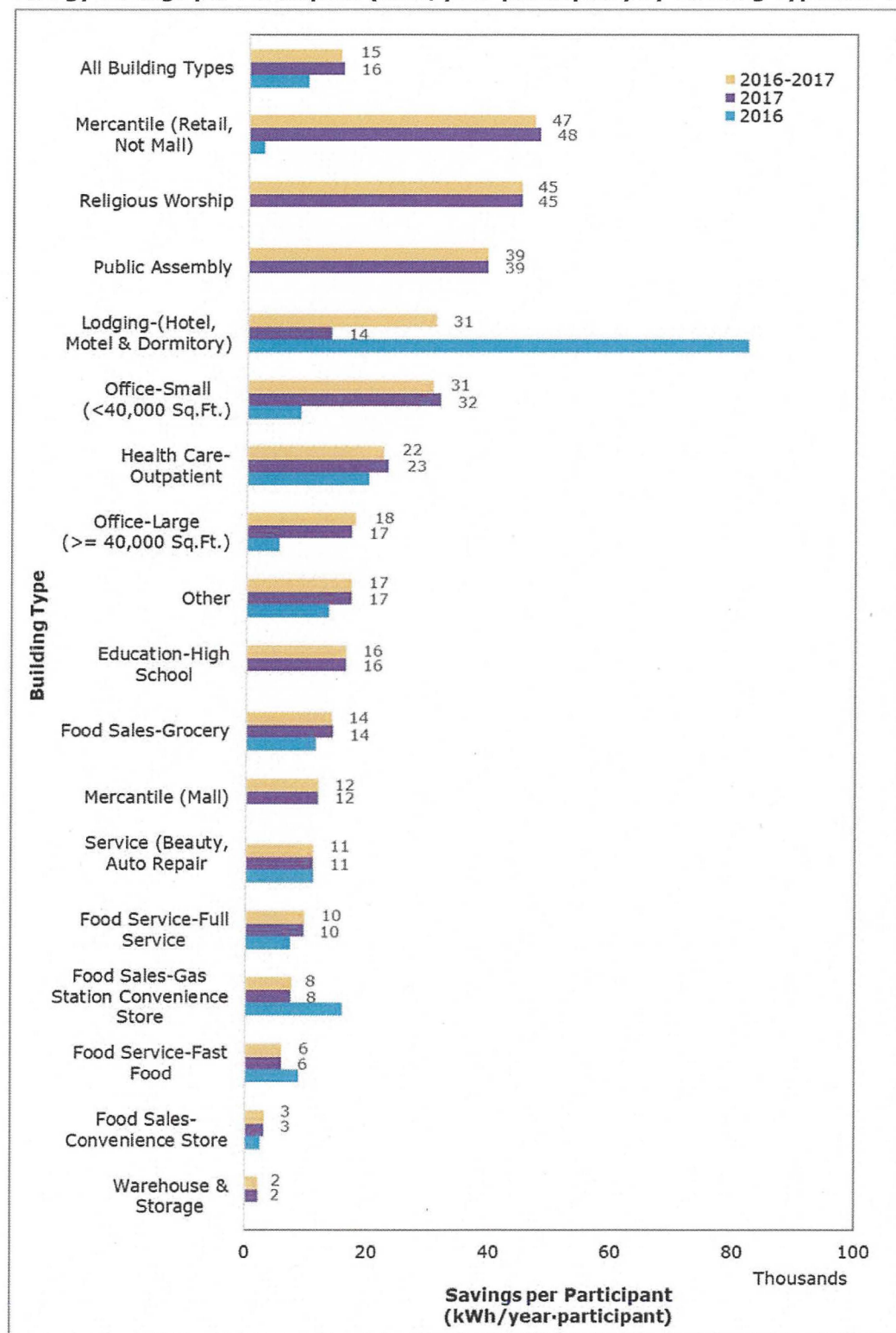
**Figure 5-63. VA Non-residential Small Business Improvement Program Gross Annualized Energy Savings (kWh/year) by Measure and Year**



The building types that had the highest average per-participant savings (gross annualized) in 2017 (and overall) were mercantile (retail, not mall), places of worship, and public assembly, shown in Figure 5-64.

In 2016, lodging had very high average per-participant savings, but that figure dropped off in 2017.

**Figure 5-64. VA Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year**




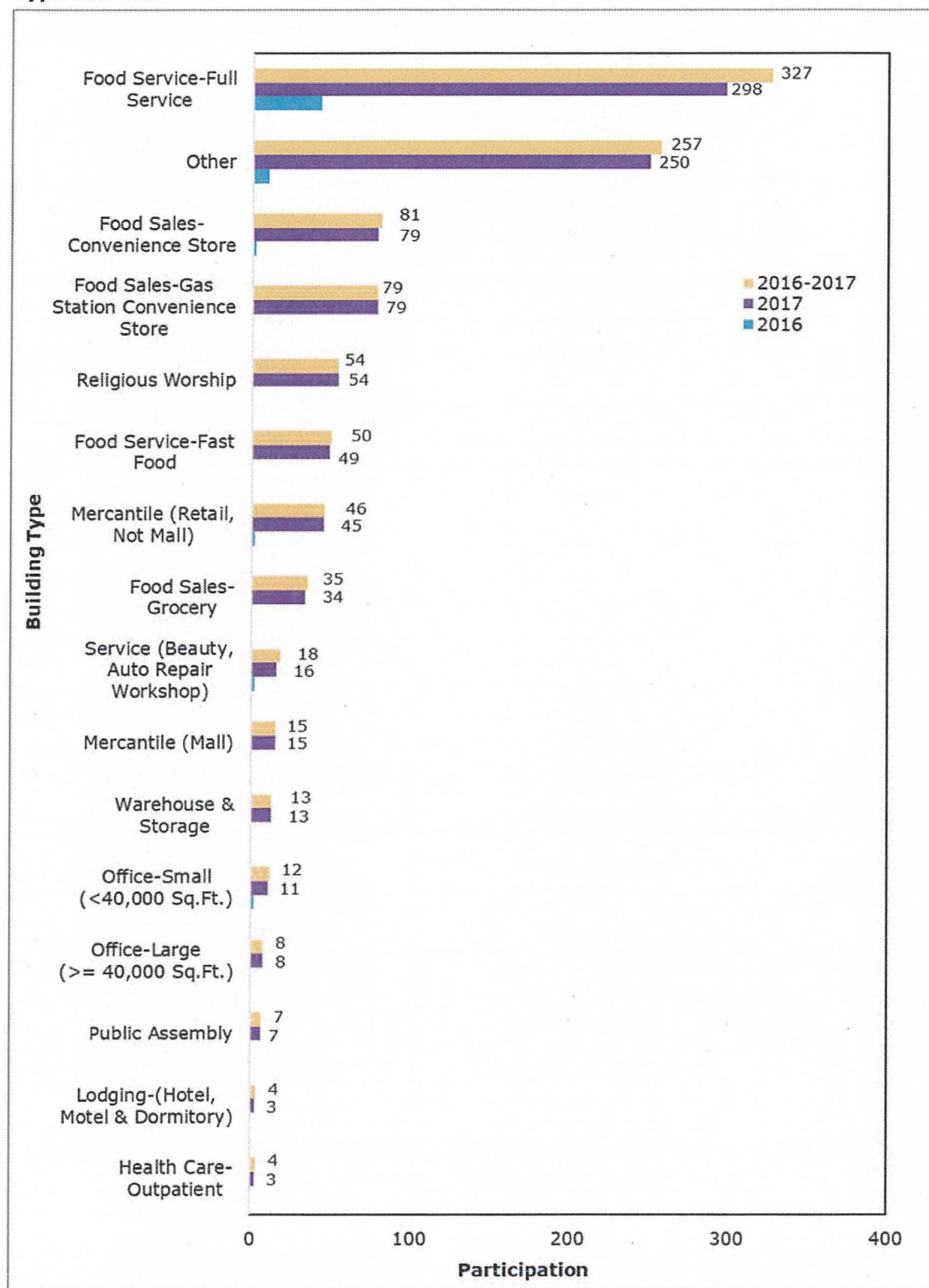


Figure 5-65 shows the building types at which program measures were implemented over the life of the program. In 2017, the “Other” building type was used to describe the second-largest number of participant facilities. Since this is a rather high ranking, it might be useful to verify whether any of these 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.

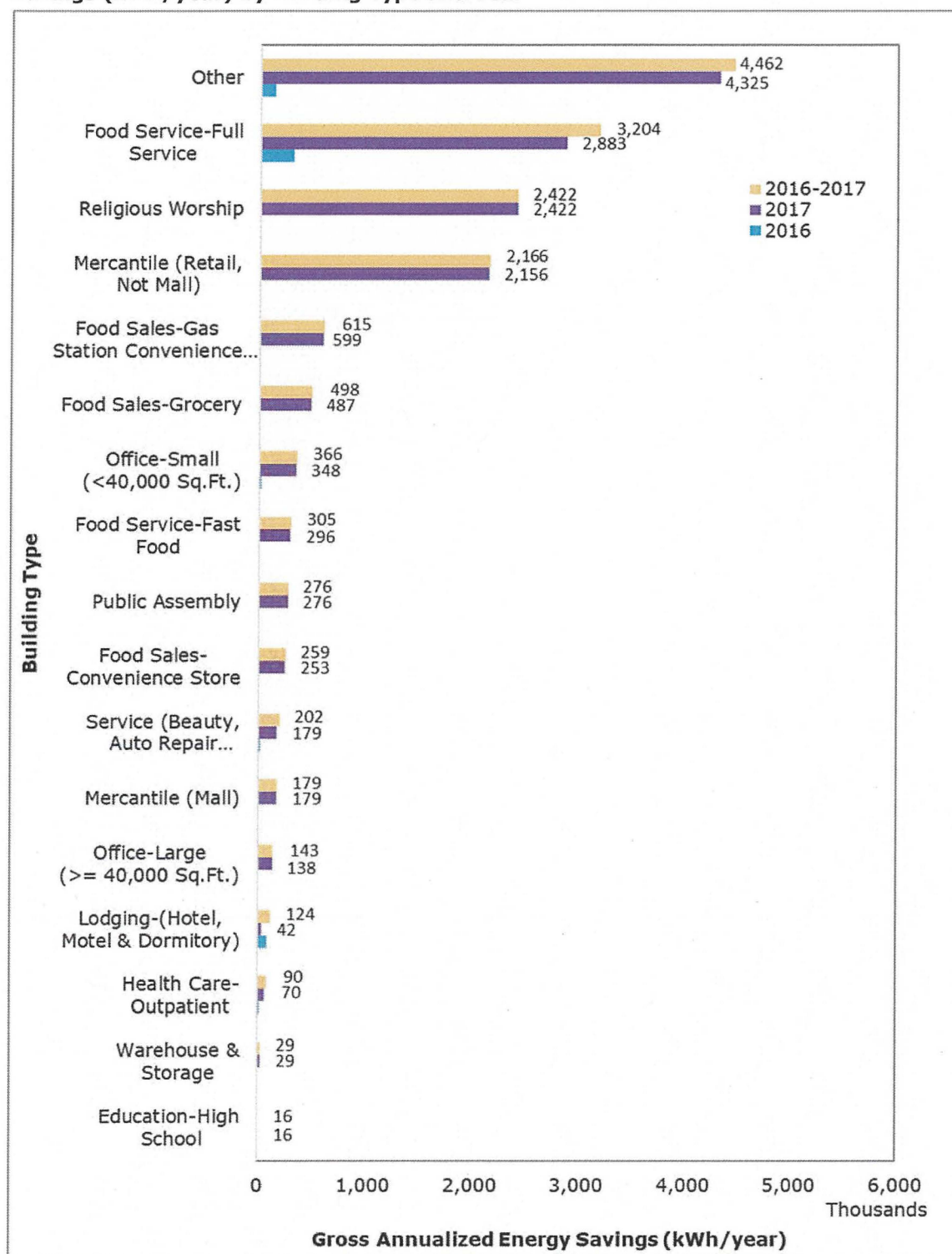
Figure 5-66 shows that, for 2017 and overall, the most savings were yielded by measures installed at building types described as “Other.” This was followed by full-service restaurants and places of worship.



**Figure 5-65. VA Non-residential Small Business Improvement Program Participation by Building Type and Year**



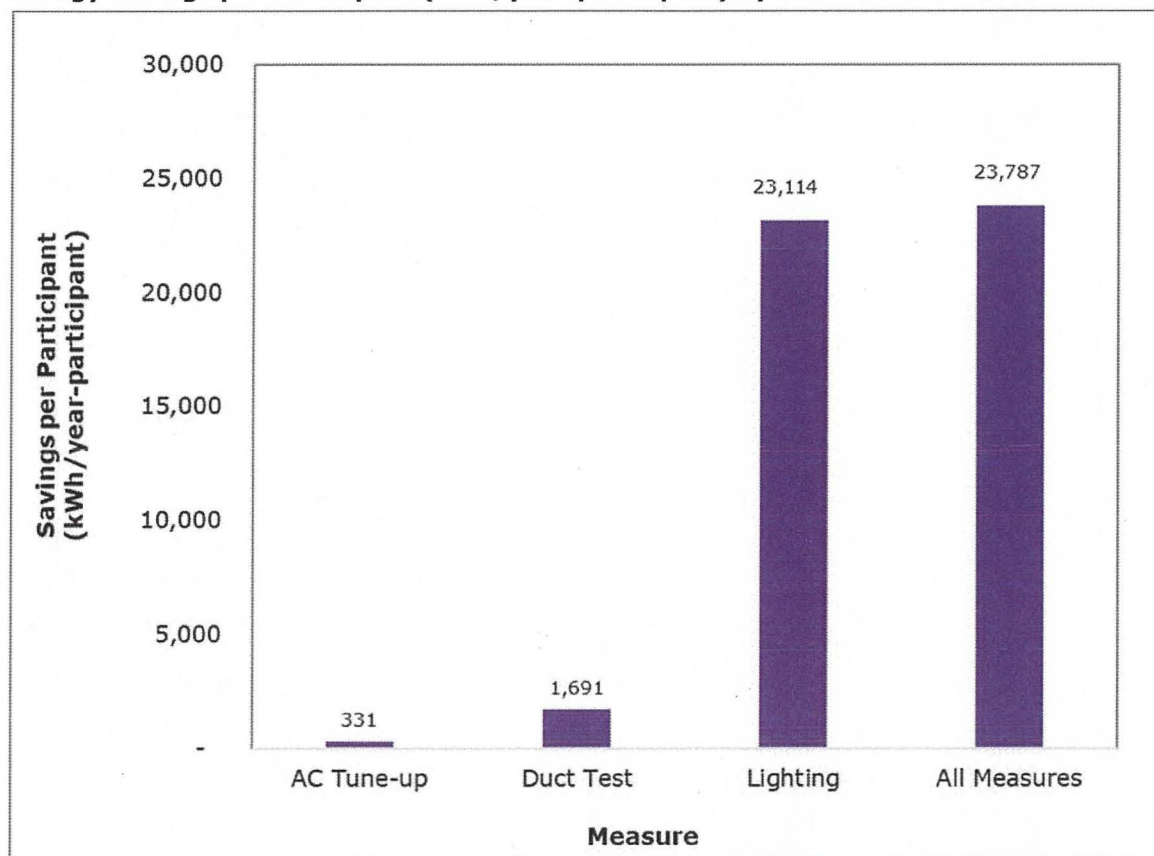
**Figure 5-66. VA Non-residential Small Business Improvement Program Gross Annualized Energy Savings (kWh/year) by Building Type and Year**



#### 5.6.2.4 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, during its first year of operation, by measure type and by building type. In Figure 5-67, the average energy savings per participant (gross annualized) is shown for each measure installed, including lighting, duct testing and sealing, and AC tune-ups. The lighting measures were entirely comprised of LED lamp replacements.

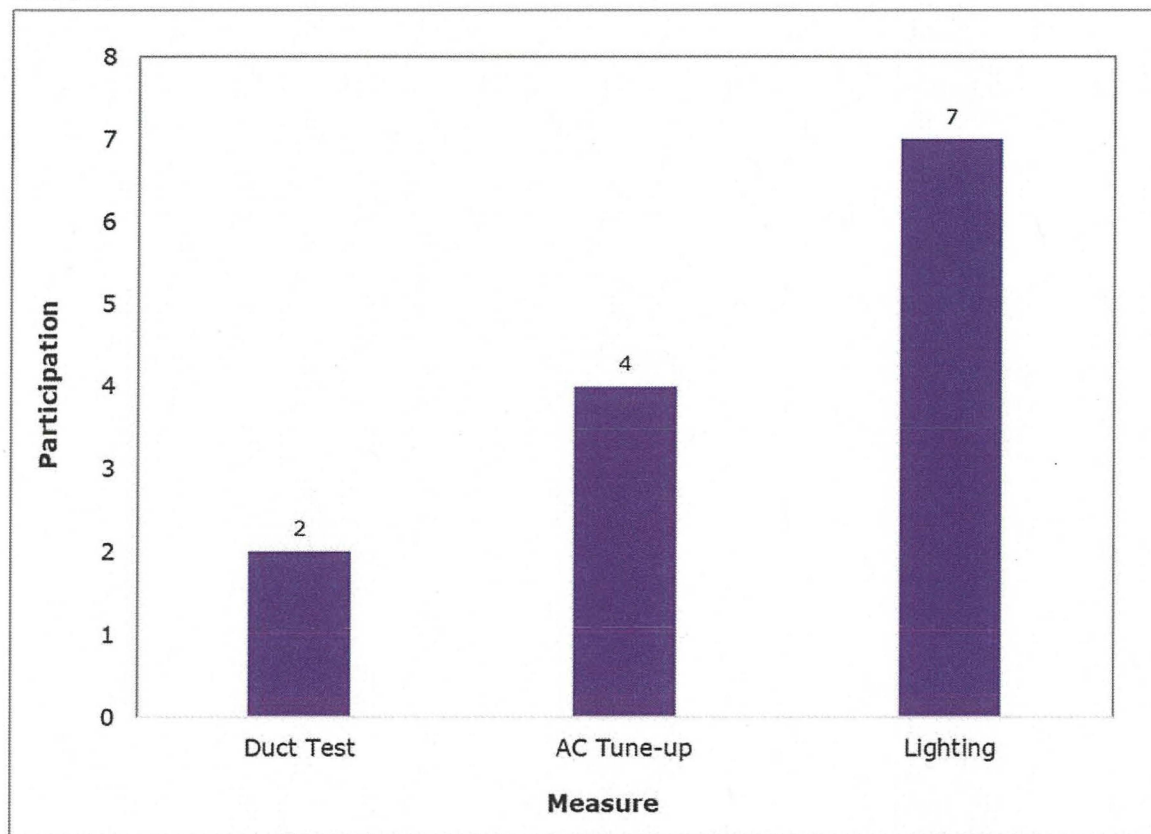
**Figure 5-67. NC Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure and Year**



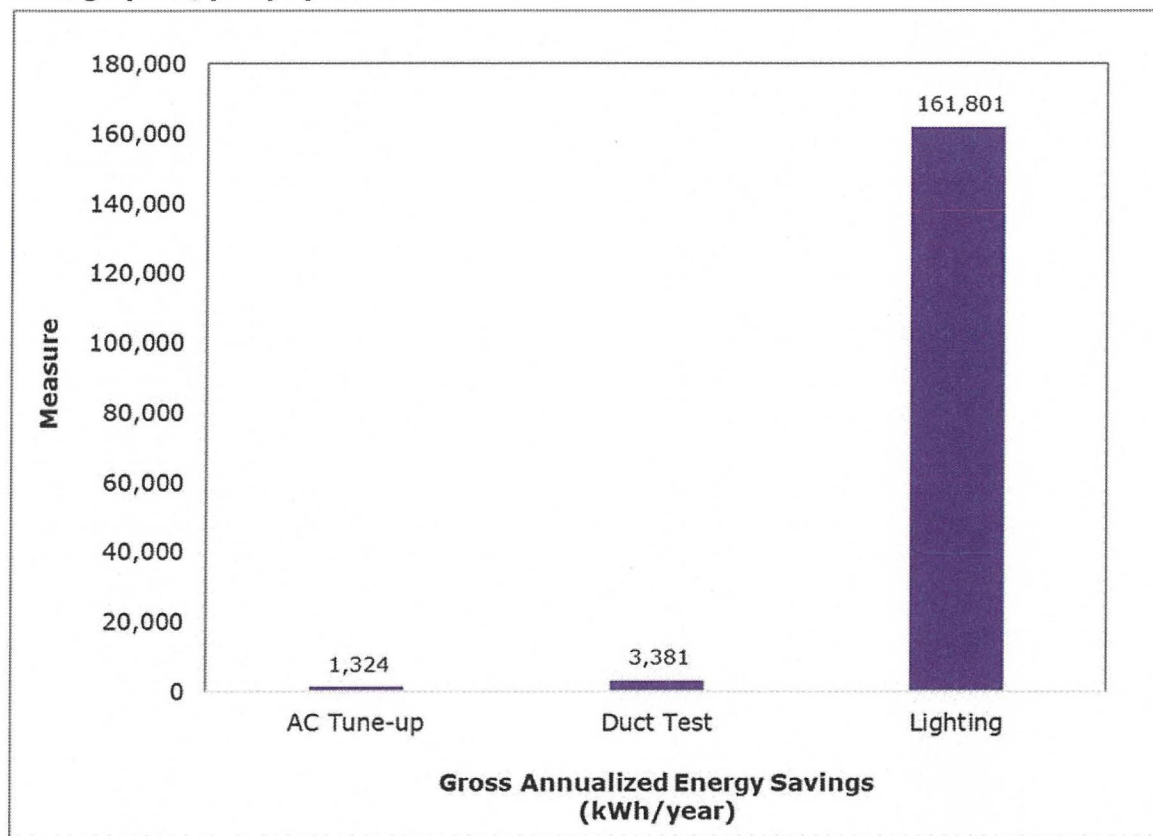


The number of participants by measure and the distribution of savings by measure is shown in Figure 5-68 and Figure 5-69, respectively. The extent to which LED lamp savings dominate the programs savings relative to duct testing/sealing and AC tune-ups stands out.

**Figure 5-68. NC Non-residential Small Business Improvement Program Participation by Measure and Year**

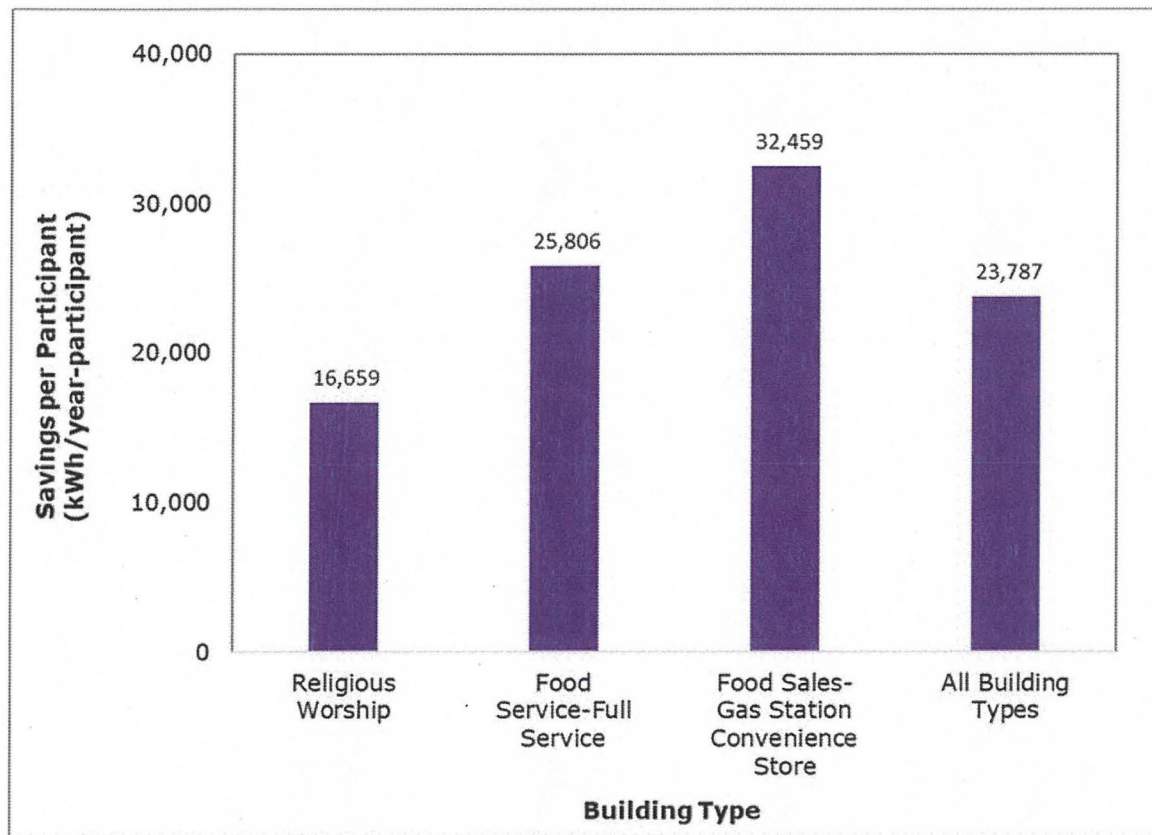


**Figure 5-69. NC Non-residential Small Business Improvement Program Gross Annualized Energy Savings (kWh/year) by Measure and Year**



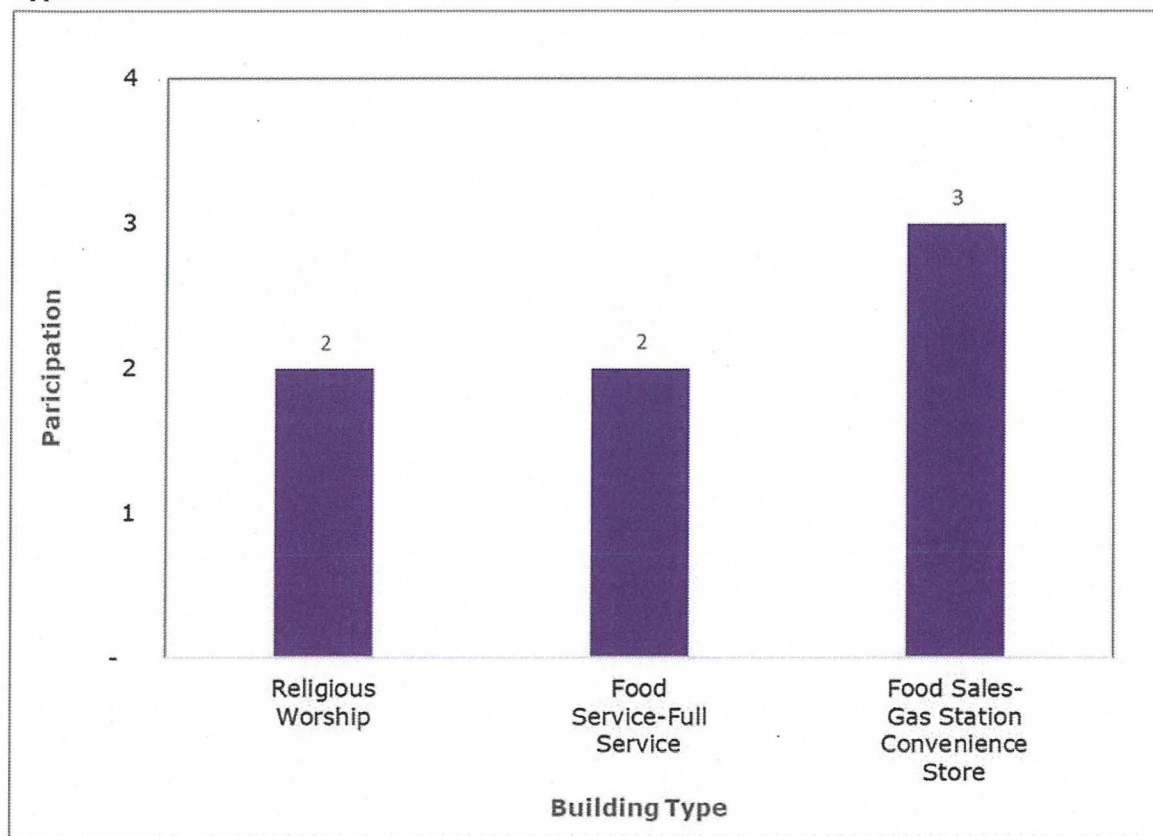
In Figure 5-70 and Figure 5-71, respectively, the average per-participant savings and the number of participants are shown by building type.

**Figure 5-70. NC Non-residential Small Business Improvement Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Building Type and Year**



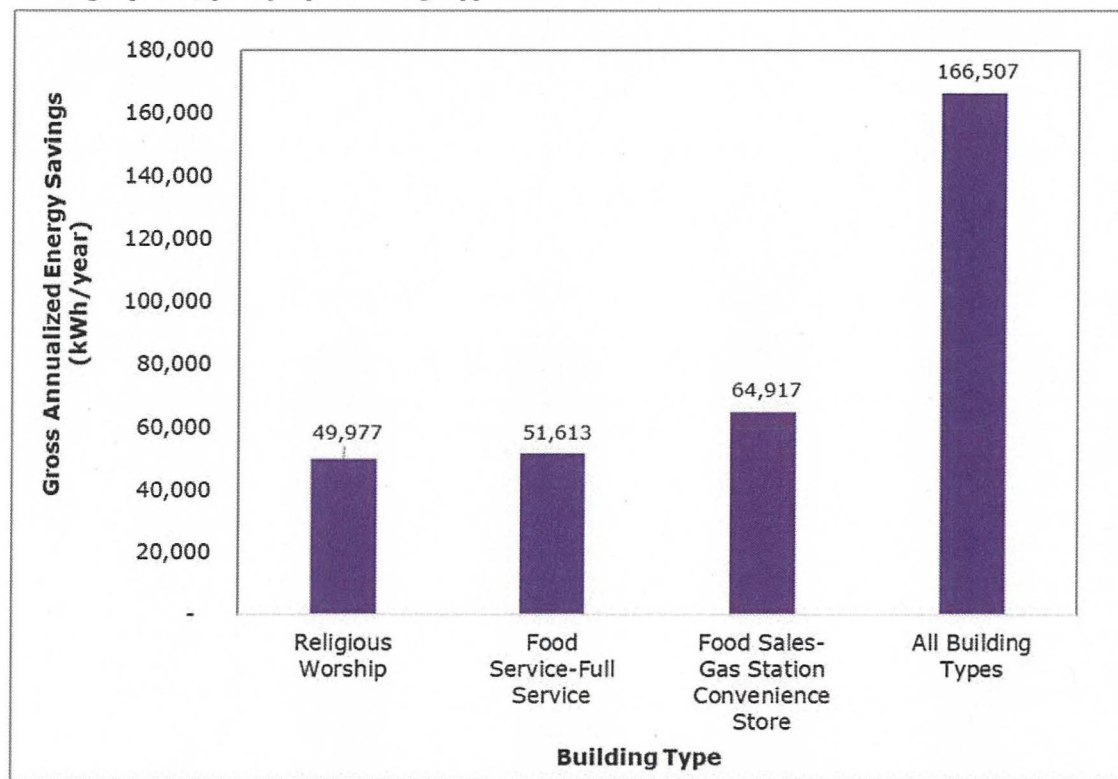


**Figure 5-71. NC Non-residential Small Business Improvement Program Participation by Building Type and Year**

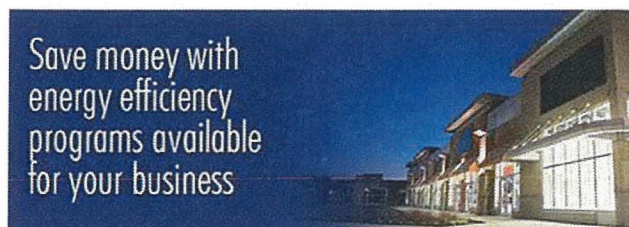


Across the building types that participated in the program in North Carolina, the gross annual savings are fairly evenly divided across three categories: gas station convenience stores, full-service restaurants, and places of worship (Figure 5-72).

**Figure 5-72. NC Non-residential Small Business Improvement Program Gross Annualized Energy Savings (kWh/year) by Building Type and Year**



## 5.7 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 N.

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 considered 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 2017 in Virginia include those shown in Table 5-24. Most of the measures in this program already existed in other legacy programs, as indicated in the table. Ten measures that are new to the Dominion Energy DSM portfolio have been introduced across three end uses: cooking, HVAC, and refrigeration.

**Table 5-24. Measures offered through Non-residential Prescriptive Program**

End-Use	Measure	Legacy Program
Cooking	Commercial Convection Oven	N/A
	Commercial Electric Combination Oven	
	Commercial Electric Fryer	
	Commercial Griddle	
	Commercial Hot Food Holding Cabinet	
	Commercial Steam Cooker	
HVAC	Duct Testing & Sealing	Small Business Improvement Program
	Unitary/Split AC & HP Tune-up	
	Variable Speed Drives on Kitchen Fan	N/A



End-Use	Measure	Legacy Program
Plug Load	Smart Strip	Non-residential Energy Audit Program
Refrigeration	Door Closer	Non-residential Energy Audit Program
	Door Gasket	
	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	N/A
	Ice Maker	
	Low/No-Sweat Door Film	

### 5.7.1 Methods for the Current Reporting Period

Table 5-25 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 deemed savings calculations for the program measures that have not yet been verified through EM&V.

**Table 5-25. 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	216,931 kWh per participant per year
Average Peak Demand Reduction (kW) per Participant	31.4 kW per participant per year
Average Rebate (US \$) per Participant	\$17,056 per participant

### 5.7.2 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 next subsection thereafter provides charts to show the types of participant buildings involved and the types of measures implemented in late 2017.

#### 5.7.2.1 Key Virginia Program Data

Table 5-26 summarizes key indicators of progress from October through December 31, 2017 for the Virginia program. Detailed program indicators by year and month are provided for Virginia in Appendix A.13.

Program enrollment began during the final quarter of 2017. The gross number of participants was four (2% of planned), the net annual energy savings were 594 kWh (0% of planned), and the net peak demand reduction was 0.1 kW (0% of planned). Total annual program costs in 2017 were 20 percent of planned.

On a per-participant basis, the average gross annual energy savings was 163 kWh (216,931 kWh planned), and the average gross peak demand reduction per participant was 0.02 kW (34.1 kW planned).

**Table 5-26. VA Non-residential Prescriptive Program Performance Indicators (2017)**

Category	Item	Virginia
		2017
Operations and Management Costs (\$)	Direct Rebate	
	Direct Implementation	
	Direct EM&V	
	Indirect Other (Administrative)	\$28,898
Total Costs (\$)	Total	
	Planned	
	Variance	
	Cumulative % of Planned	20%
Participants	Total (Gross)	4
	Planned (Gross)	266
	Variance	-262
	Cumulative % of planned (Gross)	2%
Installed Energy Savings (kWh/year)	Total Gross Deemed Savings	699
	Realization Rate Adjustment (100%)	0
	Adjusted Gross Savings	699
	Net-to-Gross Adjustment (85%) <sup>78</sup>	-105
	Net Adjusted Savings	594
	Planned Savings (Net)	5,959,948
	Cum. % Toward Planned Savings (Net)	0%
	Avg. Savings per Participant (Gross)	163
	Avg. Savings per Participant (Net)	149
Installed Demand Reduction	Total Gross Deemed Demand	0.1
	Realization Rate Adjustment (100%)	0.0
	Adjusted Gross Demand	0.1
	Net-to-Gross Adjustment (93%) <sup>79</sup>	0.0
	Net Adjusted Demand	0.1

<sup>78</sup> 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?" See section 3.1.3 Net Savings Estimation for a description of net-to-gross estimation.

<sup>79</sup> Ibid.

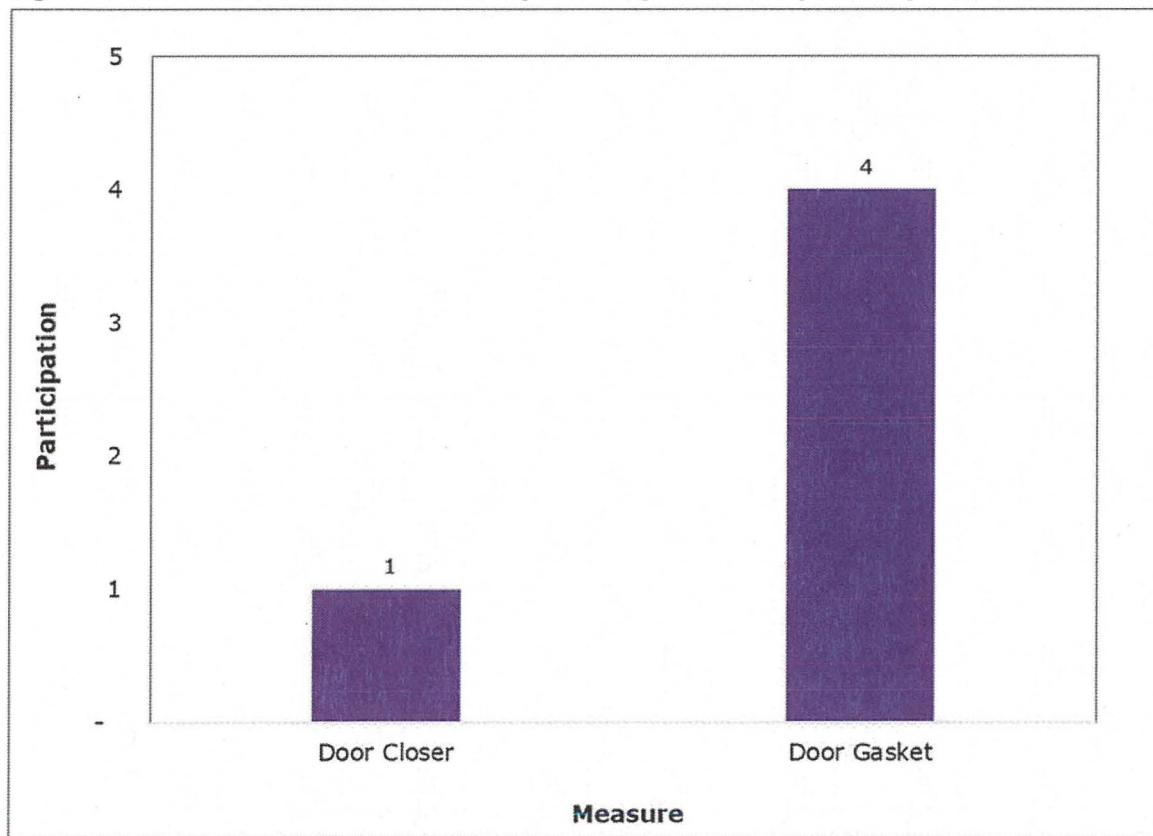


Category	Item	Virginia
		2017
	Planned Demand (Net)	n/a
	Cum. % Toward Planned Demand (Net)	0%
	Avg. Demand per Participant (Gross)	0.02
	Avg. Demand per Participant (Net)	0.02
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$7,225
	Cum. \$Admin. per Cum. kWh/year (Gross)	\$41.32
	Cum. \$Admin. per Cum. kW (Gross)	\$351,557
	Cum. \$EM&V per Cum. Total Costs (\$)	11%
	Cum. \$Rebate per Cum. Participant (Gross)	

### 5.7.2.2 Additional Virginia Program Data

All four participants were full-service restaurants. The measures for those participants were divided between two refrigeration measures: automatic door closers and door gaskets for refrigerated cases and spaces (see Figure 5-73).

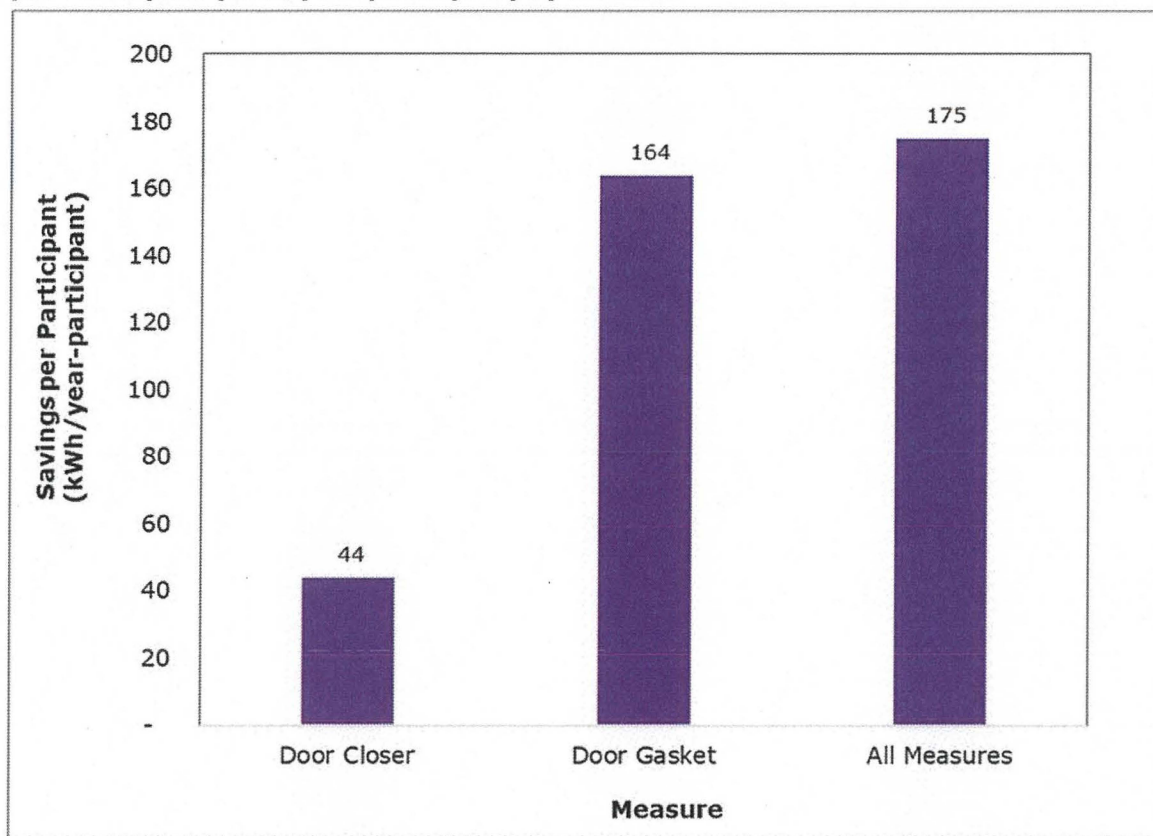
**Figure 5-73. VA Non-residential Prescriptive Program Participation by Measure and Year**





The average gross annualized savings per participant who installed the measures was 175 kWh/year as shown in Figure 5-74.

**Figure 5-74. VA Non-residential Prescriptive Program Average Gross Annualized Energy Savings per Participant (kWh/year-participant) by Measure**



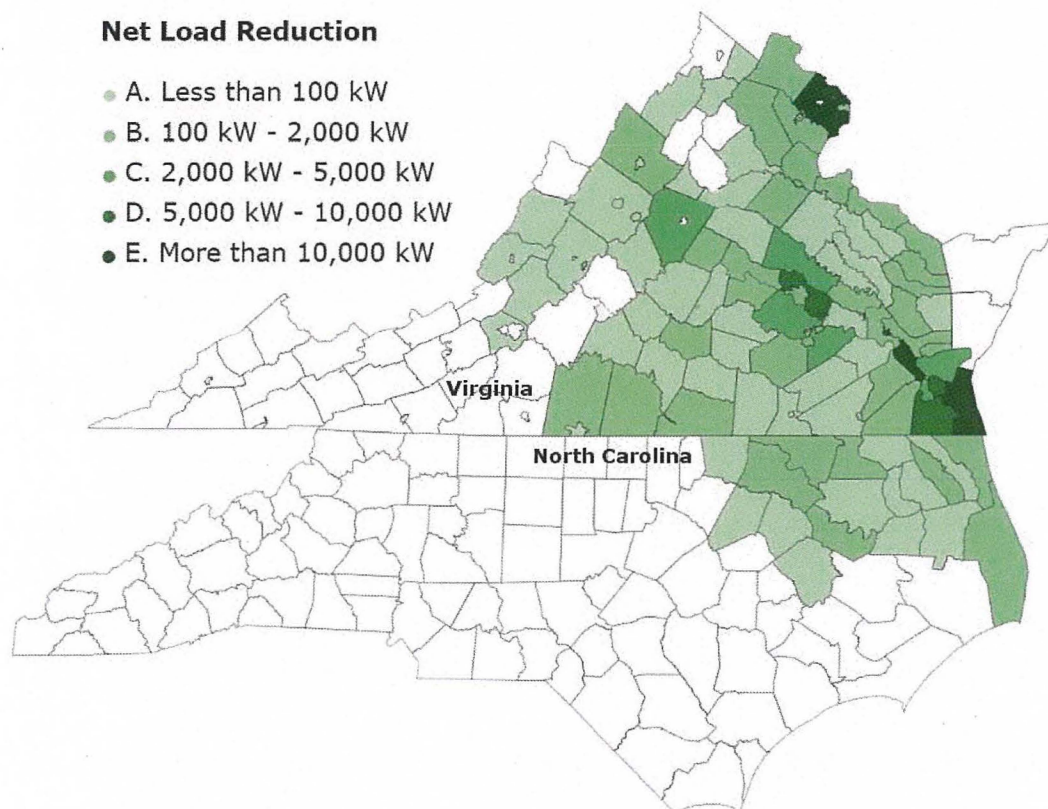
## 6 PEAK SHAVING PROGRAMS

Dominion Energy operates two peak shaving programs, the AC Cycling Program and the Non-residential DG Program. Both programs operate by dispatching load during controlled events for specified periods.

Both programs operate by dispatching load during controlled events, requesting customers to curtail load for a specified period. Figure 6-1 illustrates the combined peak shaving potential from both programs at the county level. The increase in color intensity represents higher peak shaving potential.

As with the DSM energy efficiency programs, the VA counties with the highest potential center around Richmond, Norfolk, and northern Virginia. In decreasing order, the jurisdictions with the highest peak shaving potentials are Newport News City, Fairfax, Arlington, and Virginia Beach City. In NC, the two jurisdictions with the highest peak shaving potentials are Dare and Halifax, in decreasing order.

**Figure 6-1. Distribution of Load Reduction Potential for all AC Cycling and Non-residential Distributed Generation Program Participants in VA and NC, by County, as of December 31, 2017**





## 6.1 Residential AC Cycling – Virginia and North Carolina

The AC Cycling Program, marketed as the Smart Cooling Rewards Program, was implemented in 2010 in Virginia and 2011 in North Carolina, to provide the Company a supply resource by shaving summer peak demand.

Residential customers living in an owner occupied single-family home, townhouse, or condominium with one of the following cooling systems are eligible to participate in this program:

- Electric residential/central AC
- HVAC - gas furnace/central AC
- HVAC - heat pump/electrical backup
- Dual-fuel heat pump with alternate fuel back-up

Participants are compensated with a \$40 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 weekdays between June 1–September 30 (excluding holidays and weekends). When cycling events are initiated, a radio signal is broadcast by the Company and received by load curtailment switches installed on the central air conditioners and heat pumps of participating customers. The signal initiates the curtailment switch which reduces the duty cycle of the registered AC units between 30%–50% while the event is in progress. A typical cycling event lasts between 2–4 hours.

In 2017, Virginia participation was 92% of the planned goal, a change from 95% in 2016. North Carolina's participation for 2017 was 60% of plan goal, a decrease from 95% over 2016. Consequently, total program costs were also below plan.

The program cost, number of participants, and peak load reduction impact estimates are reported and compared to Dominion Energy's corresponding planning numbers in Section 6.1.2 of this report.

2017 kW peak shaving potential was 0.68 kW for Virginia and North Carolina. This represents 64% of the planned estimates for Virginia and 45% for North Carolina. The Impact Evaluation of 2017 Dispatch Events and the EM&V Plan are included in Appendix O.

### 6.1.1 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
- in 2016, the analysis was 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 O-1, Impact Evaluation of 2017 Dispatch Events.

#### 6.1.1.1 STEP Manual Computation of Demand Reduction

For 2017 events, monthly kW impacts per participant were assigned the *ex ante* kW impact of 0.68 according to the STEP manual.



### 6.1.1.2 2017 Event Season Analysis of the AC Cycling Plan

The following steps are used to calculate the program impact estimates (kW) on the full census of AMI participants:

1. The AMI accounts are assigned weights based on the state, connected load, and division to ensure that the impact analysis is representative of all program participants.
2. Using the AMI data, the control history logs and weather stations assigned to each account, participant-level regressions are estimated to account for customers who opt-out of an event, weather, and time.
3. Baseline and actual load are aggregated to a program total using weights to extrapolate the AMI population to the program population.
4. Impacts in kW are calculated from the aggregate baselines and load.
5. Ex ante load is derived from a regression of estimated load reductions for each event on THI and event hour. For this program, program performance is extrapolated to hour ending 17:00 at a THI of 83.4.

### 6.1.1.3 Ex post Impact Regression Modeling

In October 2017, *ex post* impacts were evaluated by creating customer-specific event day baselines. A regression model based on non-event day load, temperature, and humidity was calculated to develop the event day baselines. The load reduction calculated for each event was aggregated and weighted to all participants to produce program level impact estimates in kW per participant. Further details on the AC Cycling Program *ex post* impacts are provided in Appendix O-1, Impact Evaluation of 2017 Dispatch Events.

### 6.1.1.4 Ex ante Impact Regression Modeling

Following the *ex post* analysis, an *ex ante* analysis was conducted to predict kW impacts specific to time and weather. The *ex ante* regression using *ex-post* impacts was fit for each event hour (13:00–21:00), with THI as a predictor variable, as shown in Table 6-1. The model for each hour was then used to obtain the impacts across a range of THI values. Further details on the *ex ante* modeling methodology can be found in Appendix O-1, with temperature-humidity index (THI) as a predictor variable.

The Dominion Energy peak condition for planning purposes is 95°F with 43% relative humidity for the hour ending at 17:00. This corresponds with a THI of 83.4. Based on the *ex ante* regression model for the hour ending at 17:00 at a THI of 83.4, the summer peak demand impact was calculated with the following equation:

$$\text{Predicted Ex Ante kW Impact}_{17:00, \text{day}} = -3.58 + .051 * (83.4)$$

This method increases the reliability of the estimates of program resources (kW) and peak shaving performance while taking into account that the kW resource is dependent on temperature, time, and load.

There were not a sufficient number of event observations to model impacts for hours ending 13, 14, 20, or 21. In these cases, *ex ante* estimates were assumed to be equivalent to closest hour (15 or 19).

**Table 6-1. 2017 Ex ante Impacts by THI and Hour Ending per Participant**

Per participant Ex Ante Impacts in kW by THI and Event-hour Ending									
THI	13	14	15	16	17	18	19	20	21
79	0.42	0.42	0.42	0.37	0.43	0.46	0.38	0.38	0.38
80	0.47	0.47	0.47	0.42	0.49	0.51	0.47	0.47	0.47
81	0.53	0.53	0.53	0.48	0.54	0.57	0.56	0.56	0.56
82	0.58	0.58	0.58	0.53	0.60	0.63	0.65	0.65	0.65
83	0.64	0.64	0.64	0.59	0.66	0.69	0.74	0.74	0.74
84	0.69	0.69	0.69	0.64	0.71	0.75	0.83	0.83	0.83
85	0.75	0.75	0.75	0.70	0.77	0.81	0.92	0.92	0.92
86	0.80	0.80	0.80	0.75	0.82	0.86	1.01	1.01	1.01
87	0.86	0.86	0.86	0.81	0.88	0.92	1.10	1.10	1.10
88	0.91	0.91	0.91	0.86	0.93	0.98	1.19	1.19	1.19

By interpolating between 83°F and 84°F at 17:00, the expected peak load reduction is 0.68 kW per participant for 29 AC Cycling events called in 2017. The *ex ante* model is updated following each season to reflect the current year's *ex post* impacts and weather data.

Dominion Energy replaced a server on the paging system that sends control messages to the AC control units. Although the pages were going out immediately after the server replacement and were being received by a test pager, they were not in the correct format to be decoded by the control units. Due to this, switches were not able to be controlled between June 26 and July 10. Therefore, the events called on July 3 and July 7 did not result in any load drop from the AC Cycling program.<sup>80</sup>

Table 6-2 outlines Dominion Energy's initial program planning assumptions, which were used during the program design. These assumptions are compared against actual program performance in Section 6.1.2.

**Table 6-2. AC Cycling Program Planning Assumptions**

Item	Description
Target Market	Residential single-family homes meeting eligibility requirements
Measure Life	15 years
Average. Number of AC Units/Premise	1.2

### 6.1.2 Assessment of Program Progress Towards Plan

Table 6-3 and Table 6-4 summarize the annual progress towards plan for key AC Cycling Program performance indicators in Virginia and North Carolina, respectively. Detailed indicators by year and month are provided for Virginia in Appendix A.14 and for North Carolina in Appendix B.13.

<sup>80</sup> All of the results in this appendix are based on analyses conducted on 29 events, to include the July 3<sup>rd</sup> and 7<sup>th</sup> events. When those two July events are excluded, the 2017 evaluated impacts are 0.70 kW per participant at Dominion Energy's summer peak.



**Table 6-3. VA Residential AC Cycling Program Performance Indicators (2010-2017)<sup>81</sup>**

Category	Item	Virginia	
		2017	Program Total (2010-2017)
Operations and Management Costs (\$)	Direct Rebate		
	Direct Implementation		
	Direct EM&V		
	Indirect Other (Administrative)	\$238,408	\$3,910,114
Capital (\$)	Direct Implementation		
Total Costs (\$)	Total		
	Planned		
	Variance		
	Cumulative % of Planned	65%	77%
Participants	Total (Cumulative @ End of Month)	149,219	149,219
	Removals (Uninstalled)/ Deactivations	-59,937	-59,937
	Net Participation (Cum.)	89,282	88,845
	Planned (Cum.)	97,037	97,037
	Variance (Cum.)	-7,755	-8,192
	Cum% toward planned total (Net basis)	92%	92%
	Removal (Uninstalled) /Deactivation Rate <sup>82</sup>	-0.92%	-0.84%
	Connected Load kW	267,857	228,419
	Ex Ante Estimated kW	0.68	0.68
	Connected Load Per Participant (kW)	3.00	2.99
kW Potential	Peak Shaving Potential kW - Gross Participants	101,469	101,469
	Removed (Uninstalled) / Deactivated Peak Shaving Potential kW	-40,757	-40,757
	Dispatchable Peak Shaving Potential – Net Total kW	60,691	60,414
	Planned Demand (Cum.)	95,027	95,027
	Cum. % Toward Planned Total	64%	64%
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$25	\$25
	Cum. \$Admin. per Cum. kW (Gross)	\$37	\$37

<sup>81</sup> Total kW Potential and removals/deactivations utilize ex ante impact estimates based on a linear regression methodology detailed in Appendix O-1, AC Cycling Program Impact Evaluation of 2017 Dispatch Events.

<sup>82</sup> The deactivation rate is the number of deactivations in a month divided by the number of active participant accounts. New deactivations are calculated as the cumulative deactivated accounts minus the prior month's cumulative deactivated accounts.



Category	Item	Virginia	
		2017	Program Total (2010-2017)
	Cum. \$EM&V per Cum Total Costs (\$)	2%	2%
	Cum. \$Rebate per Cum. Participant (Gross)		

**Table 6-4. NC Residential AC Cycling Program Performance Indicators (2011-2017)<sup>83</sup>**

Category	Item	North Carolina	
		2017	Program Total (2011-2017)
Operations and Management Costs (\$)	Direct Rebate		
	Direct Implementation		
	Direct EM&V		
	Indirect Other (Administrative)	\$9,349	\$103,325
Capital (\$)	Direct Implementation		
Total Costs (\$)	Total		
	Planned		
	Variance		
	Cumulative % of Planned	41%	63%
Participants	Total (Cumulative @ End of Month)	5,891	5,891
	Removals (Uninstalled)/ Deactivations	-2,285	-2,285
	Net Participation (Cum.)	3,605	3,598
	Planned (Cum.)	5,963	5,963
	Variance (Cum.)	-72	-2,365
	Cum% toward planned total (Net basis)	60%	74%
	Removal (Uninstalled) /Deactivation Rate <sup>84</sup>	-0.33%	-0.86%
	Connected Load kW	13,419	13,100
	Ex Ante Estimated kW	0.68	0.87
	Connected Load Per Participant (kW)	3.72	3.72
kW Potential	Peak Shaving Potential kW - Gross Participants	4,006	4,006
	Removed (Uninstalled) / Deactivated Peak Shaving Potential kW	-1,554	-1,554

<sup>83</sup> Total kW potential is calculated based on a linear regression methodology detailed in Appendix O-1, AC Cycling Program Impact Evaluation of 2017 Dispatch Events.

<sup>84</sup> The deactivation rate is the number of new deactivations in a month divided by the number of active accounts. The number of new deactivations is calculated as the cumulative number of deactivated accounts minus the previous month's cumulative number of deactivated accounts. The number of active accounts is the cumulative active accounts minus the cumulative deactivated accounts.

Category	Item	North Carolina	
		2017	Program Total (2011-2017)
	Dispatchable Peak Shaving Potential – Net Total kW	2,451	2,447
	Planned Demand (Cum.)	5,392	5,392
	Cum. % Toward Planned Total	45%	45%
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$18	\$18
	Cum. \$Admin. per Cum. kW (Gross)	\$26	\$26
	Cum. \$EM&V per Cum Total Costs (\$)	2%	2%
	Cum. \$Rebate per Cum. Participant (Gross)		

#### 6.1.2.1 Cumulative Indicators Over Time vs. Planned – Virginia and North Carolina

As of December 31, 2017, the aggregate dispatchable peak shaving program resources consisted of 60,691 dispatchable kW from active switches at 89,282 participant premises in Virginia and 2,451 dispatchable kW from 3,605 active switches in North Carolina. These peak shaving totals are 64% of the program planning estimates for Virginia and 45% for North Carolina. The average kW peak shaving potential was 0.68 kW per participant for Virginia and North Carolina at Dominion Energy's peak condition.<sup>85</sup> The number of participants for Virginia and North Carolina were 92% and 60% of the program planning estimates, respectively.

Cumulative net participants and kW peak shaving potential were derived by subtracting cumulative participants from cumulative removals, deactivations, and opt-outs (Table 6-5). The peak shaving impact estimates at hour ending 17:00 during the 29 AC Cycling events called in 2017 are summarized in Table 6-6.

**Table 6-5. Disposition from Cumulative and Net Participants, and Peak Shaving Potential (through December 31, 2017)**

Reduction Factor to Participants/ Savings	Participants		Peak Shaving Potential (kW)		Average Peak Shaving Potential per Participant (kW)	
	Virginia	North Carolina	Virginia	North Carolina	Virginia	North Carolina
Cumulative Total	149,219	5,891	101,469	4,006	N/A	N/A
Reduction for Disenrollment	-59,937	-2,285	-40,778	-1,555	N/A	N/A
<b>Net Total</b>	<b>89,282</b>	<b>3,605</b>	<b>60,691</b>	<b>2,451</b>	<b>0.068</b>	<b>0.068</b>

<sup>85</sup> The Dominion Energy peak condition is 95°F with 43% relative humidity for the hour ending at 17:00. This corresponds a THI of 83.4.



### Participants Included in the Analysis

Table 6-6 below shows the number of controlled participants included in the impact analysis by connected load. Here, connected load is categorized as greater than 4.0 kW, less than 4.0 kW, and data not available. Overall, dispatched participants averaged 1.13 air-conditioner units per household, which is lower than the planning assumption of 1.2.

**Table 6-6. Number of 2017 Controlled Participants Included in the Impact Analysis by Connected Load**

Connected Load (kW)	# of Participants
>4	28,212
<4	31,722
Data not Available	29,092
<b>Total</b>	<b>89,026</b>

Table 6-7 through Table 6-9 show the AC Cycling *ex post* impacts by event-day and hour. The daily high temperature, opt-out rate, and number of consecutive event days are shown. The color range indicates relative impacts over each interval (red indicating the highest relative impact). The highest impact occurred during the 18:00 interval on July 14, 2017, which had a daily high temperature of 97°F (98°F was the highest daily temperature of the season).



**Table 6-7. 2017 AC Cycling Impacts by Event-Day and Hour**

Event Date	12-Jun	13-Jun	22-Jun	03-Jul	07-Jul	11-Jul	12-Jul	13-Jul	14-Jul	18-Jul	19-Jul
Consecutive Event-days	1	2	1	1	1	1	2	3	4	1	2
Dispatch Type	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch
Opt Out Percent	0.100%	0.075%	0.024%	0.00%	0.01%	0.037%	0.087%	0.124%	0.123%	0.045%	0.070%
Daily High Temperature	91	90	87	93	89	95	98	98	97	91	94
15:00:00								0.74	0.71		
16:00:00	0.45	0.49	0.38	0.03	0.01	0.51	0.68	0.85	0.91	0.51	0.46
17:00:00	0.50	0.62	0.49	0.00	-0.04	0.59	0.71	0.82	1.10	0.62	0.56
18:00:00	0.50	0.62	0.48	0.02	-0.13	0.64	0.78	0.87	1.13	0.60	0.59
19:00:00	0.49						0.71			0.51	0.60
Average Kw Impact	0.48	0.57	0.45	0.02	-0.06	0.58	0.72	0.82	0.96	0.56	0.55

**Table 6-8. AC Cycling Impacts by Event-Day and Hour Continued**

Event Date	20-Jul	21-Jul	24-Jul	27-Jul	1-Aug	2-Aug	3-Aug	4-Aug	16-Aug	17-Aug	18-Aug
Consecutive Event Days	3	4	1	1	1	2	3	4	1	2	3
Dispatch Type	Full-dispatch	Full-dispatch	Full-dispatch	Partial-dispatch	Partial-dispatch	Partial-dispatch	Partial-dispatch	Partial-dispatch	Partial-dispatch	Partial-dispatch	Partial-dispatch
Opt Out Percent	0.043%	0.053%	0.029%	0.015%	0.001%	0.007%	0.009%	0.014%	0.010%	0.000%	0.019%
Daily High Temperature	97	97	94	88	89	89	92	90	90	85	91
15:00:00								0.41			
16:00:00	0.63	0.65	0.56	0.34	0.32	0.34	0.41	0.54	0.38	0.40	0.63
17:00:00	0.69	0.76	0.70	0.34	0.37	0.35	0.46	0.50	0.37	0.42	0.75
18:00:00	0.73	0.83	0.72	0.32	0.36	0.31	0.42		0.36	0.41	0.80
19:00:00											
Average Kw Impact	0.68	0.75	0.66	0.33	0.35	0.33	0.43	0.49	0.37	0.41	0.73

**Table 6-9. AC Cycling Impacts by Event-Day and Hour Continued**

Event Date	21-Aug	22-Aug	23-Aug	5-Sep	20-Sep	21-Sep	25-Sep
Consecutive Event-days	1	2	3	1	1	2	1
Dispatch Type	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch	Full-dispatch	Partial-dispatch	Full-dispatch
Opt Out Percent	0.016%	0.032%	0.014%	0.004%	0.003%	0.004%	0.008%
Daily High Temperature	88	90	85	86	88	88	87
15:00:00	0.72	0.55					0.29
16:00:00	0.89	0.61	0.47	0.38		0.05	0.36
17:00:00	0.82	0.65	0.47	0.46	0.35	0.42	0.39
18:00:00	0.71	0.71	0.35	0.45	0.41	0.38	0.40
19:00:00						0.01	
Average Kw Impact	0.78	0.63	0.43	0.43	0.38	0.21	0.36



### 6.1.2.2 Program Costs – Virginia and North Carolina

Key program cost data were provided previously in the performance indicator summary in Table 6-3 and Table 6-4. From 2010 through 2017, AC Cycling Program expenditures in Virginia were \$59,304,501, or 77% of the planned total. North Carolina's expenditures were \$2,681,385, or 63% of the planned total.

For the 2017 program year, Virginia's expenditures were \$6,159,956, or 65% of the planned total. North Carolina expenditures were \$238,761 for the program year, or 41% of planned totals.

## 6.2 Non-residential Distributed Generation – Virginia

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 of the customer's backup generation equipment, and for dispatching load during curtailment events under the direction of the Company.

Non-residential customers with a minimum demand of 200 kW are eligible for the program. Participant sites are required to have existing on-site generation capacity. Each enrolled site has its individual registered amount of dispatchable kW registered in the program. Up to 30 minutes prior to a curtailment event, the Company requests the implementation contractor to dispatch load. The actual load dispatched is measured at each generator and compared against the sites registered 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 registered load.

The Non-residential DG Pilot was approved in January 2008, and the Non-residential DG Program was approved in 2012. Upon program approval, 19 of the 27 pilot sites transitioned to the program. The remaining eight sites continued to participate in the pilot until it ended on December 31, 2014. Through the end of 2014, the pilot and program participants were evaluated together.

### 6.2.1 Methods for the Current Reporting Period

The analysis methodology is defined by the STEP manual, included as Appendix F, and has remained consistent over the programs history. A detailed description of the evaluation methodology can be found in Appendix P, Non-residential Distributed Generation Analysis for 2017 Event Season. Program tracking and consumption data are reviewed on a regular basis for quality and consistency, and the impact evaluation is conducted at the end of each calendar year.



Table 6-10 below outlines the DG program planning assumptions which are compared against actual program performance in Section 6.2.4.

**Table 6-10. Non-residential DG Program Planning Assumptions**

Item	Description
Target Market	Non-residential customers with at least 200 kW of demand and backup generation capable of serving the full electrical load for the customer site.
Participant Definition	1 participant = 1,000 kW of enrolled generation. A participant site may take on a decimal value, e.g., a participant site with 250 kW of generation would have a participant value of 0.25.
NTG Factor	100%
Measure Life	N/A
Average Energy Savings (kWh) per Participant per Year	120,000 kWh per participant per year
Average Demand Reduction (kW) per Participant	1,000 kW per participant per year

## 6.2.2 STEP Manual Computation of Demand Reduction

The STEP Manual defines the analysis methodology used to estimate demand reduction. The key performance indicator for the DG program is measured kW generated during dispatch events. 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.

## 6.2.3 Impact Analysis of 2017 Dispatch Events

The Non-residential DG Program is evaluated annually using metered consumption data to verify event based dispatched load. Summary results from the 2017 impact analysis are presented in Section 6.3.2.1. and Appendix P-1: Non-residential Distributed Generation Analysis for 2017 Event Season. The objectives for the impact analysis of 2017 program events were as follows:

- to compute aggregate kW of load curtailment for one-hour intervals on each event day
- to compute realization rates for the DG program comparing actual load curtailed (kW) to dispatched load (kW)
- to describe trends across event intervals related to program performance versus planned assumptions and to identify issues that should be addressed in program operation

## 6.2.4 Assessment of Program Progress Towards Plan

Table 6-11 below summarizes the annual progress towards plan for key program performance metrics in Virginia. The table contains an abridged version of a wider set of performance indicators. The detailed program indicators by year and month are available in Appendix A.15.

**Table 6-11. VA Non-residential Distributed Generation Program Performance Indicators (2012-2017)**

Category	Item	Virginia						Program Total (2012-2017)
		2012	2013	2014	2015	2016	2017	
Operations and Management Costs (\$)	Direct Rebate							
	Direct Implementation							
	Direct EM&V							
	Indirect Other (Administrative)	\$45,196	\$70,742	\$55,136	\$14,914	\$17,395	\$20,476	\$223,859
Total Costs (\$)	Total							
	Planned							
	Variance							
	Cumulative % of Planned	21%	29%	55%	57%	67%	77%	43%
Participants	Total (Cumulative @ End of Month)	19.0	19.4	18.6	5.9	6.5	6.1	6.10
	Planned (Cum.)	23	28	35	13	7	7.4	7.39
	Variance (Cum.)	-4	-9	-16	-7	-1	-1.3	-1.29
	Cum % Toward Planned Total (Net basis)	83%	69%	53%	45%	93%	82%	82%
kW Potential	Total (Cumulative @ End of Month)	19,040	19,410	18,580	5,875	5,740	5,548	5,548
	Realization Rate	69.8%	77.3%	78.0%	93.0%	106.0%	108.0%	108%
	Net kW (Cum.)	16,051	16,110	14,492	5,457	4,348	5,992	5,992
	Planned (Cum.)	23,000	28,000	35,000	13,000	7,000	7,394	7,394
	Cum % Toward Planned Total (Net basis)	70%	58%	41%	42%	62%	86%	81%
	Avg. per Net Participant (Net kW)	843	830	780	929	669	982	5,033



Category	Item	Virginia						Program Total (2012-2017)
		2012	2013	2014	2015	2016	2017	
Program Performance	Cum. \$Admin. per Cum. Participant (Gross)	\$2,374	\$5,973	\$9,207	\$9,294	\$9,589	\$3,357	\$3,357
	Cum. \$Admin. per Cum. kW (Gross)	\$2	\$6	\$9	\$9	\$10	\$3	\$3
	Cum. \$EM&V per Cum Total Costs (\$)	3.3%	7.5%	8.8%	9.7%	11.4%	11.3%	11%
	Cum. \$Rebate per Cum. Participant (Gross)	\$21,366	\$47,494	\$99,549	\$106,856	\$106,950	\$103,582	\$103,582
	Cum. \$Admin. per Cum. Participant (Gross)							



### 6.2.4.1 Cumulative Indicators Over Time vs. Planned

The average kW dispatched per event interval per month varied from 5,386 kW to 6,130 kW across the 27 event days called in 2017. According to the program definition (1,000 enrolled kW equals one participant), the weighted average number of participants was 6.1 MW, which is less than the 2017 plan total of 7.4 MW for 2017 by 1.3 MW. The cumulative percentage towards planned participation is 83%.

The 2017 peak shaving realization rate for the DG program is calculated by dividing the measured generation by the enrolled (registered) dispatched generation. The total peak kW shaved over the 2017 season was 6,054 kW, yielding an average realization rate of 108%, the highest program realization rate to date. The average realization rate for 2017 summer events was 110% and 85% for winter events. Winter realization rates are expected to be lower than summer rates because the planned kW peak shaved goal<sup>86</sup> is based on summer peak load.

The aggregate hourly realization rates for the 27 events in 2017 for program sites are presented in Table 6-12 for winter events and Table 6-13 for summer events. Average realization rates for event intervals that met or exceeded the program target of 95% are highlighted green. The realization rates vary by event date and event-hour interval, with the lowest rates occurring the first event hour in 24 out of 27 events and the highest rates occurring during summer events.

**Table 6-12. Program Realization Rates of Measured vs. Dispatched Generation (2017 Winter Event Intervals)**

Overall Realization Rate by Event Day and Time						
Event Day	Hour Ending					Average RR
	8:00	9:00		19:00	20:00	
Jan 09	81%	88%				84%
Dec 28				86%	85%	85%
Dec 29				86%	88%	87%

<sup>86</sup> The winter season spans October–March, while the summer season spans April–September.

**Table 6-13. Program Realization Rates of Measured vs. Dispatched Generation (2017 Summer Event Intervals)**

Overall Realization Rate by Event Day and Time						
Event Day	Hour Ending					Average RR
	15:00	16:00	17:00	18:00	19:00	
May 17			81%	99%		90%
May 18		89%	93%	96%		93%
Jun 12		94%	108%	109%	107%	105%
Jun 13		102%	111%	108%		107%
Jun 22		102%	107%	108%		106%
Jul 3		105%	112%	111%		109%
Jul 7		89%	112%	108%		103%
Jul 10		107%	112%	113%	112%	111%
Jul 11		111%	115%	114%		113%
Jul 12		117%	122%	121%	121%	120%
Jul 13	123%	127%	125%	121%		124%
Jul 14	112%	119%	117%	116%		116%
Jul 18		94%	97%	96%	48%	84%
Jul 19		106%	111%	111%	111%	110%
Jul 20		112%	116%	113%		114%
Jul 21		114%	122%	121%		119%
Jul 22		112%	120%	121%		118%
Jul 24		105%	118%	116%		113%
Aug 17		107%	115%	115%		112%
Aug 18		121%	126%	125%		124%
Aug 21	113%	117%	120%	120%		117%
Aug 22	114%	125%	123%	123%		121%
Sep 21			102%	106%	100%	102%
Sep 25	95%	104%	103%	103%		101%

Table 6-14 below shows the event-day realization rates by site. Each site is assigned a unique identifier. Empty cells indicate that a site was not dispatched during an event. Realization rates greater than or equal to 95% are highlighted green, rates greater than 50% and less than 95% are light purple and rates less than or equal to 50% are highlighted light blue.