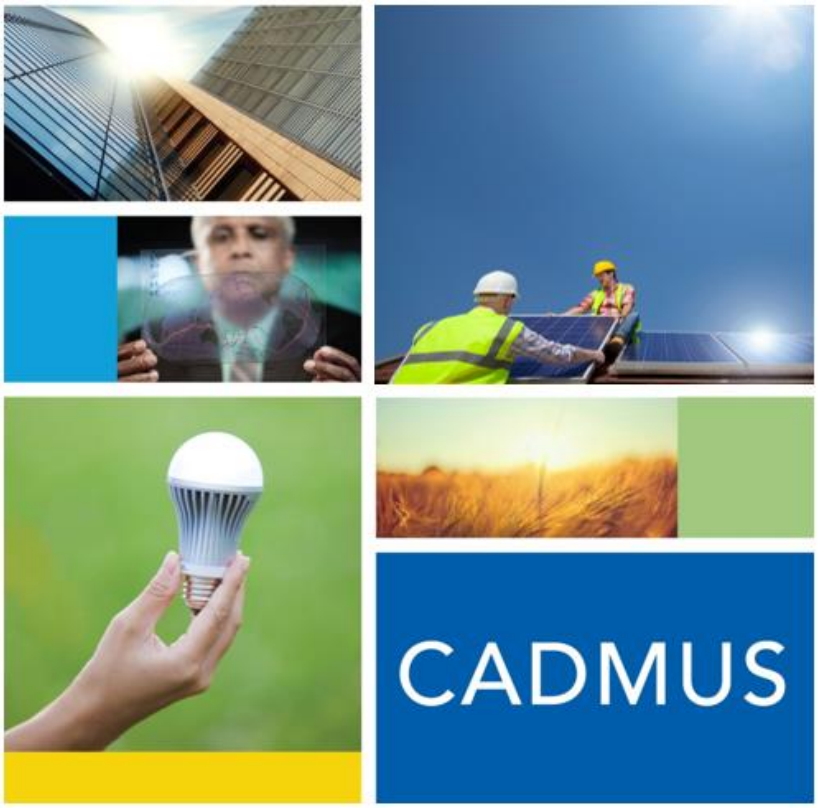

Focus on Energy

Calendar Year 2017 Evaluation Report

Volume I

May 22, 2018

Public Service Commission of Wisconsin
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Table of Contents

Figures

Tables

List of Acronyms

Acronym	Term
AVERT	AVoided Emissions and geneRation Tool (from U.S. Environmental Protection Agency)
CY	calendar year
kW	Kilowatt
kWh	Kilowatt hour
MMBtu	Million British thermal units
MThm	Tons/thousand therms
NPS	net promoter score
NTG	net-to-gross
PSC	Public Service Commission of Wisconsin
RIM	ratepayer impact measure test
SPECTRUM	Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management
TRC	total resource cost
TRM	Wisconsin Technical Reference Manual
UAT	utility administrator test

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Executive Summary

This report, presented in three volumes, describes the evaluation findings and impacts achieved by Focus on Energy for calendar year (CY) 2017. Volume I is a summary of findings across all programs and measure categories in the portfolio. Volume II provides detailed findings for each Focus on Energy program, including pilot programs. Volume III is the appendices, which contains additional details on the evaluation methodologies along with supporting data and evaluation materials. The Wisconsin Focus on Energy Online Reporting Tool allows users to review savings by year, program, customer sector, and measure category and offers other useful data by county, political district, and utility territory.[1]

All four resources (Volume I, Volume II, Volume III appendices, and the Online Reporting Tool) should be read together to gain a comprehensive perspective of the Focus on Energy portfolio.

Overall, the CY 2017 programs were cost-effective and achieved high participant satisfaction. Altogether, the programs made significant progress toward the four-year savings goals established for the Focus on Energy CY 2015–CY 2018 quadrennial.

SUMMARY OF METHODS

The Evaluation Team defined key evaluation terms, briefly presented here and described in more detail in the Glossary of Terms in Appendix B:

- ***Gross savings:*** Program-reported change in energy consumption, demand, or both resulting from an efficiency program
- ***Verified gross savings:*** Energy savings verified by an independent evaluation team
- ***Net savings:*** Savings directly attributable to program efforts (net of what would have occurred in absence of the program)

To determine verified gross savings, the Evaluation Team reviewed and assessed the technical assumptions that Focus on Energy used to calculate savings, participation levels, and measure installation and retention rates.[2]

To determine net savings, the Evaluation Team conducted primary research in CY 2017 and in a few instances applied previous years' evaluation results.

1 The Wisconsin Focus on Energy Online Reporting Tool can be found at: http://evaluations.focusonenergy.com
2 The Evaluation Team comprises Cadmus, Apex Analytics, and St. Norbert College Strategic Research Institute.

The Public Service Commission of Wisconsin (PSC) adopted four-year (CY 2015 through CY 2018) net annual savings goals of 15,407,384 MMBtu, 2,261,492,068 kWh, 319,838 kW, and 76,911,727 therms.[3]

Table 1 lists CY 2017 annual gross claimed savings, verified gross savings, and verified net savings for residential and nonresidential programs.

Table 1. CY 2017 First-Year Annual Savings by Segment*

SAVINGS TYPE	UNIT	RESIDENTIAL	NONRESIDENTIAL	PILOTS	TOTAL
Gross	MMBtu	1,275,668	3,090,874	172,044	4,538,586
	kWh	252,356,217	462,766,457	5,913,973	721,036,647
	kW	32,551	64,419	665	97,635
	therms	4,146,287	15,119,151	1,518,651	20,784,089
Verified Gross	MMBtu	1,204,958	3,055,220	168,794	4,428,972
	kWh	234,600,174	474,028,579	5,802,194	714,430,947
	kW	30,921	65,410	1,020	97,351
	therms	4,045,022	14,378,344	1,489,966	19,913,332
Verified Net	MMBtu	679,437	2,287,420	167,880	3,134,737
	kWh	127,922,119	342,364,018	5,534,332	475,820,469
	kW	16,756	47,230	991	64,977
	therms	2,429,672	11,192,738	1,489,966	15,112,376

**Totals may not match the sum of segment savings due to rounding.*

3 Public Service Commission of Wisconsin. "Amendment 2 to the Contract for Services Between The Statewide Energy Efficiency and Renewables Administration and CB&I Government Solutions, Inc." PSC REF#: 283917, Contract Number 9501-FE-120, Amendment 2. Available online: http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=283917

Table 2 lists the verified net savings achieved in the first three years of the CY 2015–CY 2018 quadrennial.

Table 2. CY 2015, CY 2016, and CY 2017 First-Year Annual Verified Net Savings by Segment*

CALENDAR YEAR	UNIT	RESIDENTIAL	NONRESIDENTIAL	PILOTS	TOTAL
2015	MMBtu	927,346	3,869,846	N/A	4,797,192
	kWh	206,530,139	351,708,289	N/A	558,238,428
	kW	24,312	48,869	N/A	73,180
	therms	2,226,649	26,698,171	N/A	28,924,820
2016	MMBtu	808,349	2,658,146	N/A	3,466,495
	kWh	148,369,600	293,179,447	N/A	441,549,046
	kW	21,746	41,663	N/A	63,409
	therms	3,021,116	16,578,176	N/A	19,599,292
2017	MMBtu	679,437	2,287,420	167,880	3,134,737
	kWh	127,922,119	342,364,018	5,534,332	475,820,469
	kW	16,756	47,230	991	64,977
	therms	2,429,672	11,192,738	1,489,966	15,112,376
Total	MMBtu	2,415,132	8,815,412	167,880	11,398,423
	kWh	482,821,858	987,251,753	5,534,332	1,475,607,943
	kW	62,814	137,762	991	201,567
	therms	7,677,437	54,469,086	1,489,966	63,636,488

**Totals may not match the sum of residential and nonresidential savings due to rounding.*

As shown in Figure 1, Focus on Energy achieved 74% of the MMBtu savings goal, 65% of the electric energy savings goal, 63% of the electric demand reduction goal, and 83% of the natural gas net annual quadrennial savings goal.

Figure 1. Focus on Energy's Achievements-to-Date of Four-Year (CY 2015–CY 2018) Net Annual Savings Goal*

**These are the percentages achieved of PSC's established net annual goals of 15,407,384 MMBtu, 2,261,492,068 kWh, 319,838 kW, and 76,911,727 therms.*

Additionally, the PSC ordered that the Focus on Energy Program Administrator track quadrennial savings goals compared to verified gross lifecycle savings targets. Lifecycle savings represent the savings that programs can realize through measures over their expected useful lives. These targets are 270,978,131 MMBtu, 33,166,224,930 kWh, 422,264 kW, 1,578,025,700 therms.[4] Table 3 shows the lifecycle savings achieved by Focus on Energy in CY 2017.

Table 3. CY 2017 Lifecycle Savings by Segment*

SAVINGS TYPE	UNIT	RESIDENTIAL	NONRESIDENTIAL	PILOTS	TOTAL
Gross	MMBtu	24,712,620	47,042,100	571,212	72,325,932
	kWh	4,812,046,701	7,345,668,045	55,184,499	12,212,899,245
	kW	32,551	64,419	665	97,635
	therms	82,939,166	219,786,810	3,829,226	306,555,202
Verified Gross	MMBtu	23,537,736	45,551,206	185,023	69,273,965
	kWh	4,503,849,482	7,204,857,056	10,558,641	11,719,265,179
	kW	30,921	65,410	1,020	97,351
	therms	81,706,019	209,682,335	1,489,966	292,878,320
Verified Net	MMBtu	12,351,095	33,746,144	167,712	46,264,951
	kWh	2,383,184,678	5,144,023,044	5,485,116	7,532,692,838
	kW	16,756	47,230	991	64,977
	therms	42,196,686	161,947,374	1,489,966	205,634,026

**Totals may not match the sum of residential and nonresidential savings due to rounding.*

4 Public Service Commission of Wisconsin. "Amendment 4 to the Contract for Services Between The Statewide Energy Efficiency and Renewables Administration and CB&I Government Solutions, Inc." PSC REF#: 338759, Contract Number 9501-FE-120, Amendment 4.

Table 4 lists verified gross lifecycle savings achieved in the first three years of the CY 2015–CY 2018 quadrennial.

Table 4. CY 2015, CY 2016, and CY 2017 Verified Gross Lifecycle Savings by Segment*

CALENDAR YEAR	UNIT	RESIDENTIAL	NONRESIDENTIAL	PILOTS	TOTAL
2015	MMBtu	15,832,924	61,140,436	N/A	76,973,360
	kWh	2,223,095,841	6,583,672,339	N/A	8,806,768,180
	kW	28,896	62,608	N/A	91,504
	therms	82,477,213	386,769,461	N/A	469,246,674
2016	MMBtu	19,728,652	52,365,600	N/A	72,094,252
	kWh	3,199,626,956	6,291,666,334	N/A	9,491,293,290
	kW	29,612	59,101	N/A	88,712
	therms	88,115,245	308,984,348	N/A	397,099,593
2017	MMBtu	23,537,736	45,551,206	185,023	69,273,965
	kWh	4,503,849,482	7,204,857,056	10,558,641	11,719,265,179
	kW	30,921	65,410	1,020	97,351
	therms	81,706,019	209,682,335	1,489,966	292,878,320
Total	MMBtu	59,099,312	159,057,242	185,023	218,341,577
	kWh	9,926,572,279	20,080,195,729	10,558,641	30,017,326,649
	kW	89,428	187,119	1,020	277,567
	therms	252,298,477	905,436,144	1,489,966	1,159,224,587

**Totals may not match the sum of residential and nonresidential savings due to rounding.*

As shown in Figure 2, Focus on Energy achieved 81% of its MMBtu savings goal, 91% of the electric energy savings goal, 66% of the electric demand reduction goal, and 73% of the natural gas verified gross lifecycle quadrennial savings goal.

Figure 2. Program Administrator's Achievements-to-Date of Four-Year (CY 2015–CY 2018) Verified Gross Lifecycle Savings Goal*

**These are the percentages achieved of the Program Administrator established verified gross lifecycle goals of 270,978,131 MMBtu, 33,166,224,930 kWh, 422,264 kW, and 1,578,025,700 therms.*

The Program Administrator also has a contractual goal to maximize participant satisfaction. In CY 2017 surveys, participants identified an average customer satisfaction rating of 9.0 on an 11-point scale, where 10 meant *extremely satisfied* and 0 meant *extremely dissatisfied*. The CY 2017 average customer satisfaction rating is statistically higher than the CY 2015 average rating of 8.8, which was established as the portfolio baseline against which improvement will be measured for the CY 2015–CY 2018 quadrennial.

Table 5 lists findings from the Evaluation Team's benefit/cost analysis of the CY 2017 portfolio. The residential and nonresidential segments and overall portfolio were cost-effective. In CY 2017, cost-effectiveness is presented in more detail due to the presence of new pilot and rural programs. The overall effects of the presence of these new programs is minor in 2017 because evaluated programs had limited effects and because no rural programs were evaluated in 2017, but these programs will have more influence on the portfolio in 2018.

Table 5. CY 2017 Cost-Effectiveness Results

FOCUS ON ENERGY BENEFITS AND COSTS			CORE EFFICIENCY	PILOTS	RURAL	RENEWABLES
Modified TRC Benefits	$761,053,424		$731,169,846	$4,802,481	$0.00	$24,845,375
Modified TRC Costs	$187,027,759		$166,534,957	$2,118,662	$0.00	$18,198,531
Portfolio TRC Ratio	4.07	Alone	4.39	2.27	N/A	1.37
		With Core		4.36	N/A	4.09
		With Core & Pilots (All Efficiency)			N/A	4.07
		With Core & Pilots & Rural				4.07

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Introduction

Focus on Energy is Wisconsin's statewide energy efficiency and renewable resource program funded by the state's investor-owned energy utilities—as required under Wisconsin Statute §196.374(2)(a)—and by participating municipal and electric cooperative utilities. The Public Service Commission of Wisconsin (PSC) provides oversight of Focus on Energy.

Focus on Energy works with eligible Wisconsin residents and businesses to install cost-effective energy efficiency and renewable energy projects. Information, resources, and financial incentives enable consumers to implement and complete energy projects they otherwise would not have been able to complete or to complete projects ahead of schedule. Focus on Energy helps Wisconsin residents and businesses manage rising energy costs, promotes in-state economic development, protects the environment, and controls Wisconsin's demand for electricity and natural gas.

In December 2014, the PSC contracted with a team of energy consulting and market research firms to verify Focus on Energy savings and evaluate its programs during the CY 2015–CY 2018 quadrennial. These firms, collectively referred to as the Evaluation Team, are Cadmus, Apex Analytics, and St. Norbert College Strategic Research Institute.

The state's investor-owned utilities, with PSC approval, contracted with APTIM (formerly Chicago Bridge & Iron Company) to serve as the Program Administrator for the CY 2015–CY 2018 quadrennial. The Program Administrator is responsible for designing all Focus on Energy programs and for the overall performance of these programs to meet Wisconsin's energy-savings goals. The Program Administrator is also responsible for managing and coordinating individual program offerings, supporting customers and Trade Allies through a customer service center, coordinating with participating utilities, guiding marketing and communication activities, and reporting to the Statewide Energy Efficiency and Renewable Administration and to the PSC.

The Statewide Energy Efficiency and Renewable Administration, formed by the state's investor-owned utilities, is responsible for collecting utility funding for Focus on Energy and for contracting with the Program Administrator.

In CY 2017, Focus on Energy maintained three separate portfolios of programs:

- The residential portfolio, servicing single-family and multifamily homes
- The nonresidential portfolio, servicing commercial, industrial, school, government, and agricultural customers
- The rural portfolio, servicing rural communities throughout Wisconsin; these programs were in various stages of ramp-up in 2017, official evaluation will be conducted in 2018 and will include *ex ante* savings accrued in both 2017 and 2018.

The residential and nonresidential portfolios also included multiple pilot programs, which are categorized separately from the established programs.

CY 2017 Evaluation

The Evaluation Team investigated the performance of 15 programs that delivered energy savings during CY 2017. Table 6 lists the programs evaluated in the residential and nonresidential portfolios.

Table 6. Residential and Nonresidential Programs

Residential Portfolio	Nonresidential Portfolio
Multifamily Direct Install	Small Business
Multifamily Energy Savings	Renewable Energy Competitive Incentive
Multifamily New Construction	Design Assistance
Appliance Recycling	Business Incentive
Home Performance with ENERGY STAR	Agriculture, Schools, and Government
New Homes	Large Energy Users
Retail Lighting and Appliance	
Simple Energy Efficiency	
Design Assistance	

In addition to the standard programs, Focus on Energy delivered six pilot programs and two rural programs (Table 7 and Table 8). Additional rural programs were operated as components of the core programs listed above, including Home Performance with ENERGY STAR, Simple Energy Efficiency, and Small Business. Appendix C provides detailed descriptions of all programs.

Table 7. Residential and Nonresidential Pilot Programs

Residential Pilot Programs	Nonresidential Pilot Programs
Low-E Storm Windows	Strategic Energy Management
Seasonal Savings	Networked Lighting Controls
ENERGY STAR Retail Products Platform (ESRPP)	Midstream Commercial Kitchen Equipment

Table 8. Nonresidential Rural Programs

Nonresidential Rural Programs
Communications Provider Initiative
Digital Customer Engagement for Business

Summary of Measures by Segment

The Evaluation Team assessed the electric and natural gas savings achieved by each measure installed in CY 2017 during its first year of operation, as well as any impacts that each measure can incur during its effective useful life. Reporting on both first-year annual and lifecycle savings provides a full picture of each program's performance.

Table 9 lists all measure categories in the residential and nonresidential programs.

Table 9. CY 2017 Residential and Nonresidential Program Measure Categories

Residential Only	
Domestic Hot Water - Aeration	Motors & Drives - Motor

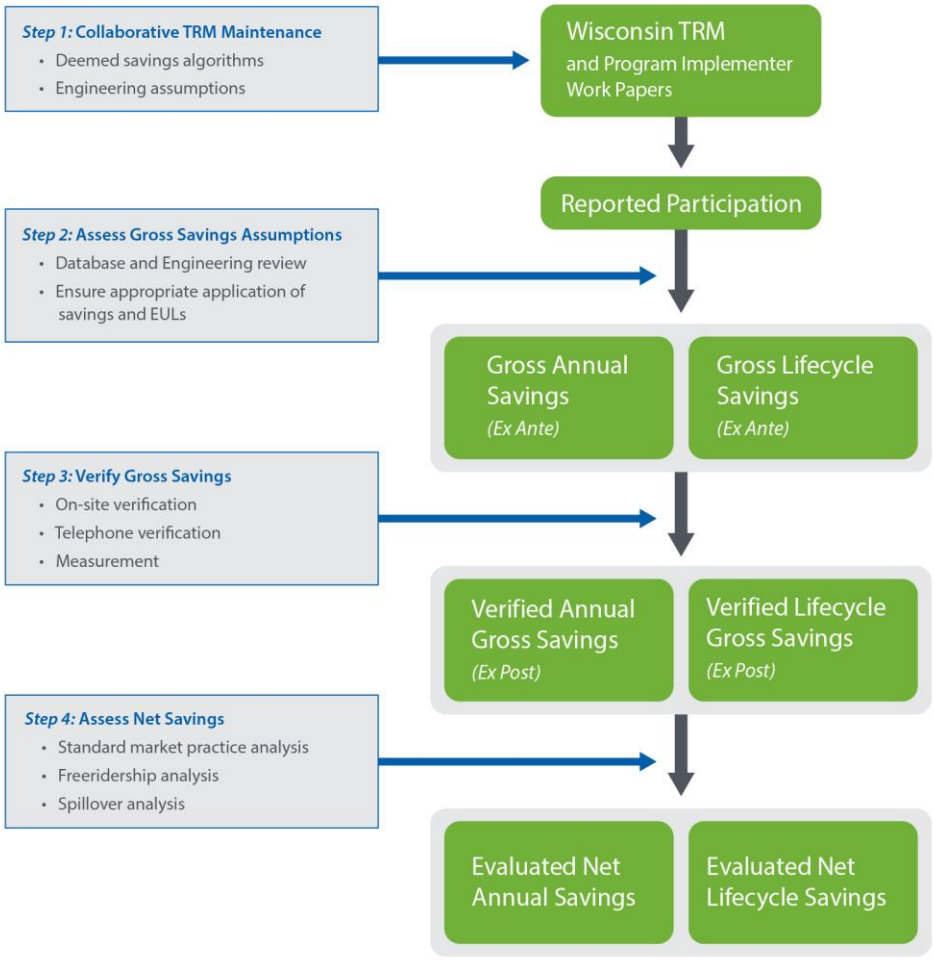
Domestic Hot Water - Controls	New Construction - Whole Building
Domestic Hot Water - Showerhead	Renewable Energy - Geothermal
Lighting - Fluorescent, Compact (CFL)	
Residential and Nonresidential Segments	
Boilers & Burners – Boiler	HVAC - Steam Trap
Boilers & Burners – Controls	HVAC - Variable Speed Drive
Boilers & Burners – Insulation	Laundry - Clothes Washer
Building Shell - Air Sealing	Lighting - Controls
Building Shell - Insulation	Lighting - Delamping
Building Shell - Window	Lighting - Fluorescent, Linear
Domestic Hot Water - Insulation	Lighting - Light Emitting Diode (LED)
Domestic Hot Water - Other	Lighting - Other
Domestic Hot Water - Variable Speed Drive	New Construction - Design
Domestic Hot Water - Water Heater	Other - Bonus
HVAC - Chiller	Other - Other
HVAC - Controls	Pools - Variable Speed Drive
HVAC - Furnace	Refrigeration - Other
HVAC - Motor	Renewable Energy - Photovoltaics
HVAC - Other	Training & Special - Other
HVAC - Packaged Terminal Unit (PTAC, PTHP)	Vending & Plug Loads - Controls
HVAC - Rooftop Unit / Split System AC	
Nonresidential Only	
Agriculture - Compressor	HVAC - Filtration
Agriculture - Dryer	HVAC - Infrared Heater
Agriculture - Energy Recovery	HVAC - Scheduling
Agriculture - Fan	HVAC - Tune-up / Repair / Commissioning
Agriculture - Grain Dryer	HVAC - Unit Heater
Agriculture - Greenhouse	HVAC - Variable Air Volume (VAV)
Agriculture - Heat Exchanger	Industrial Ovens and Furnaces - Other
Agriculture - Irrigation	Information Technology - Other
Agriculture - Livestock Waterer	Information Technology - Supporting Equipment
Agriculture - Variable Speed Drive	Laundry - Dryer
Boilers & Burners - Energy Recovery	Lighting - High Intensity Discharge (HID)
Boilers & Burners - Tune-up / Repair / Commissioning	Motors & Drives - Other
Boilers & Burners - Variable Speed Drive	Motors & Drives - Variable Speed Drive
Building Shell - Door	Pools - Other
Building Shell - Other	Process - Energy Recovery
Compressed Air, Vacuum Pumps - Compressor	Process - Filtration
Compressed Air, Vacuum Pumps - Controls	Process - Furnace
Compressed Air, Vacuum Pumps - Dryer	Process - Other
Compressed Air, Vacuum Pumps - Energy Recovery	Process - Process Heat

Compressed Air, Vacuum Pumps - Filtration	Process - Pump
Compressed Air, Vacuum Pumps - Nozzle	Process - Variable Speed Drive
Compressed Air, Vacuum Pumps - Other	Process - Welder
Compressed Air, Vacuum Pumps - Reconfigure Equipment	Refrigeration - Compressor
Compressed Air, Vacuum Pumps - Tune-up / Repair / Commissioning	Refrigeration - Controls
Domestic Hot Water - Energy Recovery	Refrigeration - Economizer
Domestic Hot Water - Pre-Rinse Sprayer	Refrigeration - Energy Recovery
Food Service - Controls	Refrigeration - Heat Exchanger
Food Service - Dishwasher, Commercial	Refrigeration - Ice Machine
Food Service - Fryer	Refrigeration - Motor
Food Service - Griddle	Refrigeration - Reconfigure Equipment
Food Service - Hot Holding Cabinet	Refrigeration - Refrigerated Case Door
Food Service - Ice Machine	Refrigeration - Refrigerator / Freezer
Food Service - Other	Refrigeration - Strip Curtain
Food Service - Oven	Refrigeration - Tune-up / Repair / Commissioning
Food Service - Refrigerator / Freezer - Commercial	Training & Special - Bonus
Food Service - Steamer	Training & Special - Study
HVAC - Air Conditioner	Training & Special - Training
HVAC - Economizer	Vending & Plug Loads - Filtration
HVAC - Energy Recovery	Vending & Plug Loads - Other
HVAC - Fan	Waste Water Treatment - Aeration

Overview of Evaluation Activities

Figure 3 depicts the four-step process the Evaluation Team is conducting throughout the CY 2015–CY 2018 quadrennial (further explained after the figure).

Figure 3. Evaluation Steps to Determine Net Savings



The Evaluation Team conducted the following steps:

- ***Step 1. Conduct Collaborative Technical Reference Manual (TRM) Maintenance.*** The Evaluation Team collaborated with the PSC and key Focus on Energy program stakeholders to ensure that the programs' deemed savings, algorithms, and input assumptions are appropriate. Specific activities in this step included developing measure-specific workpapers, preparing deemed savings reports, and updating the Wisconsin TRM.
- ***Step 2. Assess Gross Savings Assumptions.*** The Evaluation Team reviewed the implementation database to check for entry errors, inconsistencies, ineligible equipment, and any other possible errors. This process produced the *ex ante* gross annual and lifecycle savings.
- ***Step 3. Verify Gross Savings.*** The Evaluation Team verified—either through site visits or phone surveys—the installation of measures and assessed gross savings, which included revisiting baseline assumptions and engineering inputs. The Team also recalculated or measured the actual performance of installed measures, particularly for hybrid and custom projects. The

Evaluation Team applied the data collection and analysis methods appropriate for the specific program and installed measures.

- ***Step 4. Assess Net Savings.*** The Evaluation Team estimated net-to-gross (NTG) ratios that represent the proportion of gross savings directly attributable to the influence of the programs. In deriving these ratios, the Evaluation Team accounted for, and deducted, reported savings that were associated with *freeriders* (participants who would have undertaken the same action and achieved the same savings in the absence of a program) and also accounted for, and added, *spillover* (savings that were the result of a program's influence but for which no incentive was paid and for which no program had recorded savings). The Evaluation Team applied NTG ratios to the *ex post* gross savings from step three. The Team determined net savings through billing analysis (using a control group), self-reported information (conducted via surveys), or using a standard market practice approach. For the standard market practice method, the Team used program data collected through the evaluation process to define the average market baseline and average program-installed energy consumption of specific measure categories.

Table 10 lists the specific data collection activities and sample sizes used in the residential and nonresidential segments for the CY 2017 evaluation.

Table 10. CY 2017 Evaluation Activities

Evaluation Activity	Residential	Nonresidential	Pilots	Total
On-Site Evaluation, Measurement, and Verification[1]	0	175	0	**175**
Engineering Desk Reviews	0	351	12	**363**
Project Audit and Verification Surveys[2]	0	27	0	**27**
Participant Surveys	4,155	33	5	**4,193**
Ongoing Participant Satisfaction Surveys[3]	6,352	1,341	0	**7,693**
Program Actor Interviews	12	17	2	**31**
Trade Ally and Market Actor Surveys/Interviews	93	6	0	**99**
Regression Modeling	0	0	6	**6**
System Energy Monitoring Data Collection	0	0	2	**2**
On-Site Logger Installation	0	20	3	**23**

[1] All projects included in on-site evaluation, measurement, and verification also received an engineering desk review.

[2] Exclusive of project audits conducted for on-site evaluation, measurement, and verification.

[3] This number includes only the 15% sample from all Simple Energy Efficiency Program ongoing participant satisfaction survey responses.

Evaluation Findings

Table 11 lists the overall net annual MMBtu, electricity, demand, and natural gas savings for Focus on Energy's portfolio in CY 2015, CY 2016, and CY 2017.

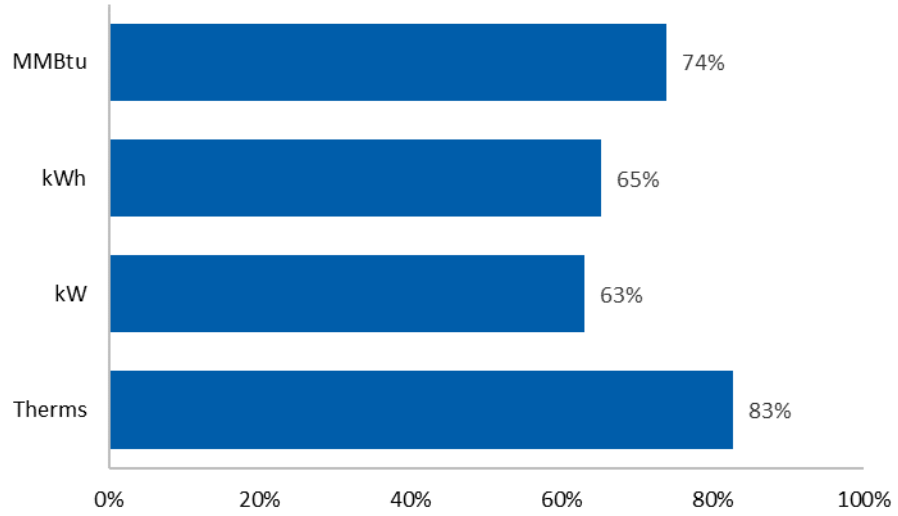
Table 11. Overall Portfolio Net Annual Savings by Calendar Year

Calendar Year	Annual Savings (MMBtu)	Electric Savings (kWh)	Demand Reduction (kW)	Natural Gas Savings (therms)
2015	4,797,192	558,238,428	73,180	28,924,820
2016	3,466,495	441,549,046	63,409	19,599,292
2017	3,134,737	475,820,469	64,977	15,112,376
Total	**11,398,423**	**1,475,607,943**	**201,567**	**63,636,488**

The PSC Order, (PSC REF#:283917), set four-year net annual savings goals of 15,407,384 MMBtu, 2,261,492,068 kWh, 319,838 kW, and 76,911,727 therms. According to the Order, the PSC must meet the MMBtu savings goal, which is calculated from the electric energy savings and natural gas savings goals. To provide flexibility in the changing markets, the Program Administrator is required to meet only 90% of the electric energy savings and natural gas savings goals. Remaining MMBtu savings above the 90% threshold can be met with either fuel.

The Focus on Energy programs reached 74% of the MMBtu savings goal, 65% of the electric energy savings goal, 63% of the electric demand reduction goal, and 83% of the natural gas quadrennial savings goal to-date. Figure 4 shows a comparison of Focus on Energy's actual quadrennial savings to the PSC's quadrennial goals. Note that the PSC's established goals and verified gross targets are for the full four-year cycle.

Figure 4. Focus on Energy's Achievements-to-Date of Four-Year (CY 2015–CY 2018) Net Annual Savings Goal[1]



[1] These are the percentages achieved of PSC's established net annual goals of 15,407,384 MMBtu, 2,261,492,068 kWh, 319,838 kW, and 76,911,727 therms.

Table 12 lists the overall verified gross lifecycle electricity savings, demand reduction, and natural gas savings for the portfolio in CY 2015, CY 2016, and CY 2017.

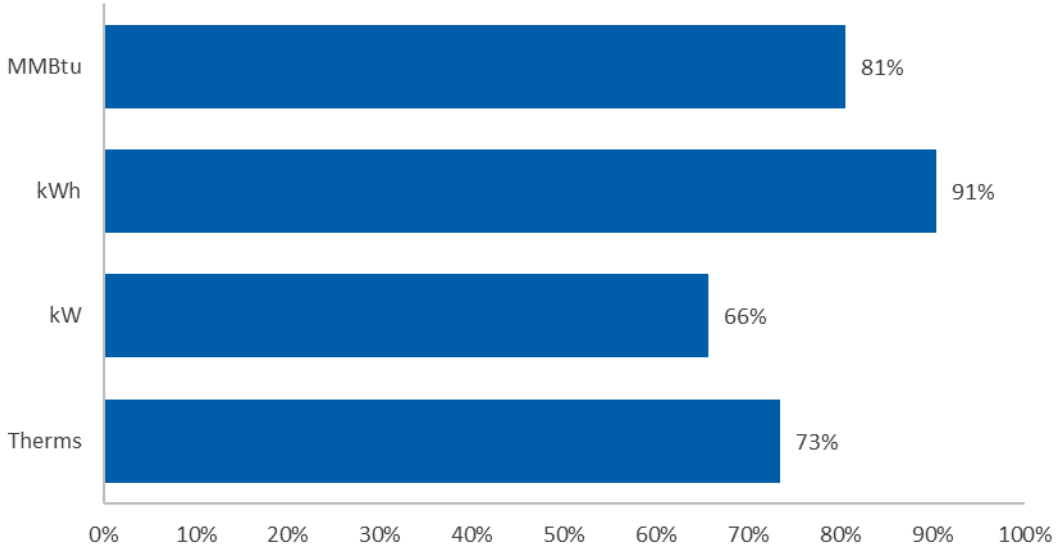
Table 12. Overall Portfolio Verified Gross Lifecycle Savings by Calendar Year

Calendar Year	Annual Savings (MMBtu)	Electric Savings (kWh)	Demand Reduction (kW)	Natural Gas Savings (therms)
2015	76,973,360	8,806,768,180	91,504	469,246,674
2016	72,094,252	9,491,293,290	88,712	397,099,593
2017	69,273,965	11,719,265,179	97,351	292,878,320
Total	**218,341,577**	**30,017,326,649**	**277,567**	**1,159,224,587**

The PSC has ordered that the Focus on Energy Program Administrator track quadrennial savings goals compared to verified gross lifecycle savings targets: 270,978,131 MMBtu, 33,166,224,930 kWh, 422,264 kW, 1,578,025,700 therms (PSC REF#:338759). Of the quadrennial goals, the Program Administrator reached 81% of the MMBtu savings goal, 91% of the electric energy savings goal, 66% of the demand reduction goal, and 73% of the natural gas savings goal.

Figure 5 shows a comparison of the actual quadrennial savings totals to the Programs Administrator's quadrennial savings goals.

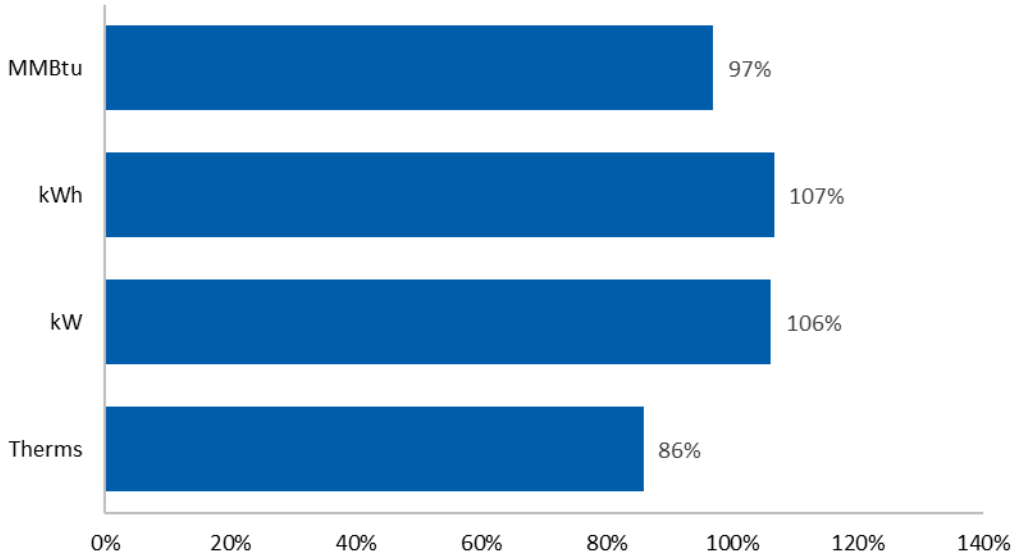
Figure 5. Program Administrator's Achievements-to-Date of Four-Year (CY 2015–CY 2018) Verified Gross Lifecycle Savings Goal[1]



[1] These are the percentages achieved of the Program Administrator established verified gross lifecycle goals of 270,978,131 MMBtu, 33,166,224,930 kWh, 422,264 kW, 1,578,025,700 therms.

The Program Administrator also tracks interim annual verified gross lifecycle targets, defined as approximately one-fourth of the overall CY 2015–CY 2018 quadrennial savings goals. In CY 2017, these targets represented 71,223,246 MMBtu, 10,964,194,371 kWh, 91,596 kW, 339,549,982 therms. The Program Administrator reached 97% of the MMBtu savings goal, 107% of the electric energy savings goal, 106% of the electric demand reduction goal, and 86% of the natural gas verified gross lifecycle savings goal. Figure 6 shows the CY 2017 actual savings totals compared to the Programs Administrator's CY 2017 savings goals.

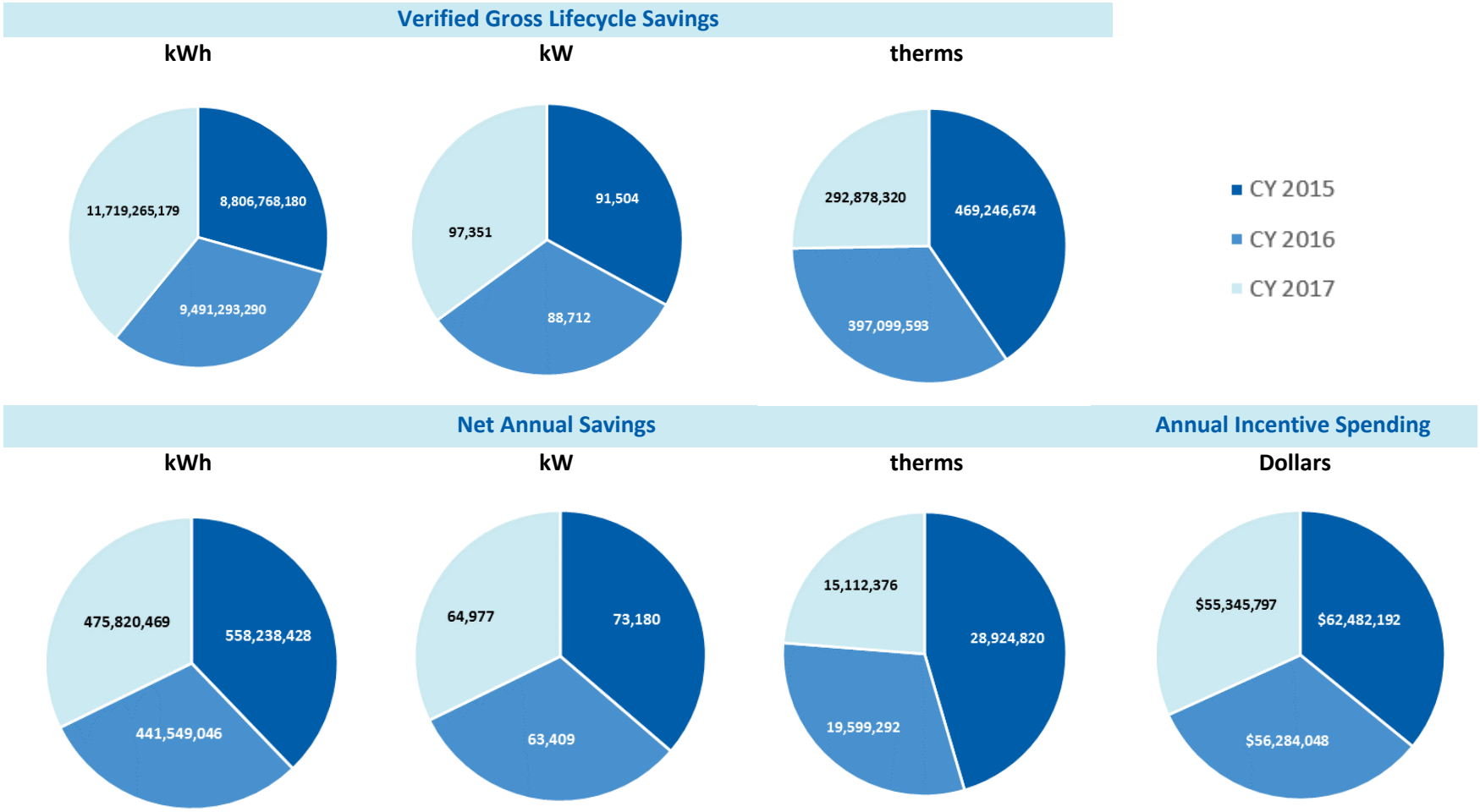
Figure 6. Program Administrator's Achievement of CY 2017 Verified Gross Lifecycle Savings Goal[1]



[1] These are the percentages achieved of the Program Administrator's CY 2017 verified gross lifecycle goals of 71,223,246 MMBtu, 10,964,194,371 kWh, 91,596 kW, 339,549,982 therms.

Figure 7 presents a summary of verified gross lifecycle savings, net annual savings, and annual incentive spending for CY 2015-CY 2017.

Figure 7. Focus on Energy CY 2015–CY 2017 Savings and Spending Progress



Summary of Findings by Program

This section summarizes the CY 2017 savings and participation for each program in the Focus on Energy portfolio. Volume II discusses savings for each program and the approaches used for calculating the savings values. The Evaluation Team varied the calculation approach and activities by program, depending on the level of participation, savings achieved, and information available.

Across all programs, the Evaluation Team applied the following equations for verified gross lifecycle, net annual, and net lifecycle savings:

$$Verified\ Gross\ Lifecycle\ Savings\ = \sum(Verified\ Gross\ Annual\ Savings \times EUL\ for\ each\ measure)$$

$$Verified\ Net\ Annual\ Savings = \sum(Verified\ Gross\ Annual\ Savings\ \times NTG\ for\ each\ measure)$$

$$Verified\ Net\ Lifecycle\ Savings = \sum(Verified\ Gross\ Lifecycle\ Savings \times NTG\ for\ each\ measure)$$

Table 13 lists the total CY 2017 participation (measured as number of participating customers) in each program and segment.

Table 13. Total Participation by Program in CY 2017

Segment	Program	Participation
Residential	Multifamily Direct Install	177
Residential	Multifamily Energy Savings	270
Residential	Multifamily New Construction	38
Residential	Appliance Recycling Program	11,423
Residential	Home Performance with ENERGY STAR	21,678
Residential	New Homes	2,228
Residential	Retail Lighting and Appliance[1]	881,427
Residential	Simple Energy Efficiency	69,886
Residential	Design Assistance - Residential	11
Residential Subtotal		**113,478**
Nonresidential	Small Business	1,333
Nonresidential	Renewable Energy Competitive Incentive	32
Nonresidential	Design Assistance	52
Nonresidential	Business Incentive	2,097
Nonresidential	Agriculture, Schools, and Government	1,233
Nonresidential	Large Energy Users	386
Nonresidential Subtotal		**5,133**
Pilot - Residential	Low-e Storm Windows[2]	2
	Seasonal Savings	123
	ENERGY STAR Retail Products Platform (ESRPP)[2]	4
Pilot - Nonresidential	Strategic Energy Management	27
	Networked Lighting Controls	5
	Midstream Commercial Kitchen Equipment Pilot[2]	5
Pilot Subtotal		**155**

Segment	Program	Participation
Rural – Nonresidential	Communications Providers Initiative	3
Rural – Residential	Direct-Mail Home Energy Assessment Pilot[3]	9,580
Rural Subtotal		**3**

[1] For CY 2017, the Evaluation Team determined participation for light bulbs using data from the CY 2015 residential general population survey. The survey collected data on the number of bulbs purchased annually by 609 Wisconsin residents. Using the average number of bulbs purchased annually per household (5.8 LEDs) and the total number of bulbs purchased from the Program Implementer's tracking system, the Evaluation Team estimated the number of households that participated in the program in CY 2017 (873,660). See Volume II for methods used to determine annual participation. Because this participation number is an estimate, it is not included in the residential participation subtotal.

[2] Numbers listed for the Low-e Storm Windows Pilot, Retail Products Platform Pilot, and Midstream Commercial Kitchen Equipment Pilot represent the participating retailers or manufacturers that receive program incentives, rather than end-use utility customers. For this reason participation in these programs is not included in the pilot participation subtotal.

[3] Participation for the Direct-Mail Home Energy Assessment Pilot represents the number of customers who conducted home assessment surveys under the program. Subsequent energy-saving actions taken as a result of the assessments would be reflected in participation totals for other programs. For this reason, this participation number is not included in the rural subtotal.

Figure 8 shows verified gross lifecycle savings by sector.

Figure 8. CY 2017 Verified Gross Lifecycle Savings Impacts by Sector

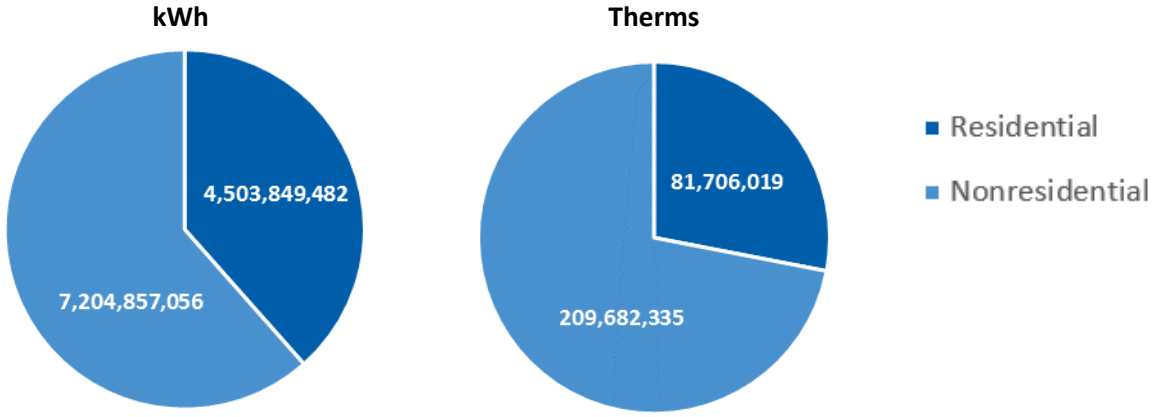


Figure 9 and Figure 10 show the verified gross lifecycle electric and natural gas energy savings by program for residential and nonresidential programs. There are five key findings from both segments:

- Overall gas savings in nonresidential programs which offer boiler, furnace, and steam trap measures decreased. These results were likely affected by recent TRM changes which lowered the standard claimed savings values for these measures types.
- The Retail Lighting and Appliance Program contributed the greatest amount of electric savings for the residential segment.
- The New Homes and Home Performance with ENERGY STAR Programs contributed the greatest amount of natural gas savings for the residential segment.
- The Business Incentive Program contributed the greatest amount of electric savings for the nonresidential segment.

- The Large Energy Users Program contributed the greatest amount of natural gas savings for the nonresidential segment.

Figure 9. CY 2017 Verified Gross Lifecycle Electric Energy Impacts by Program

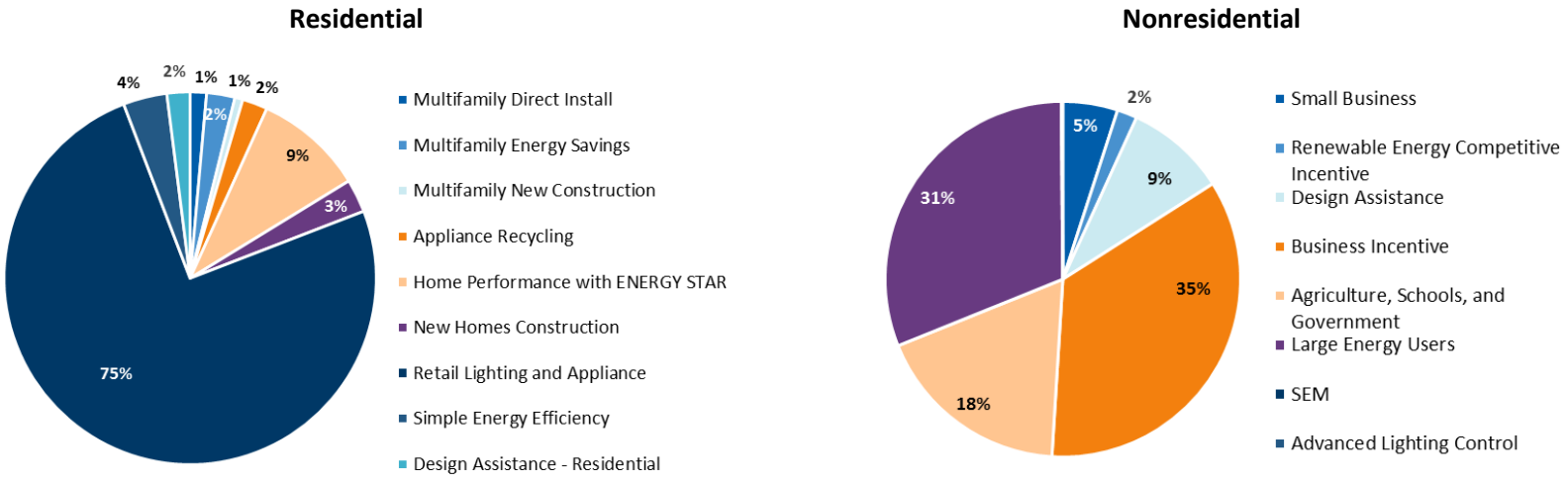


Figure 10. CY 2017 Verified Gross Lifecycle Natural Gas Energy Impacts by Program

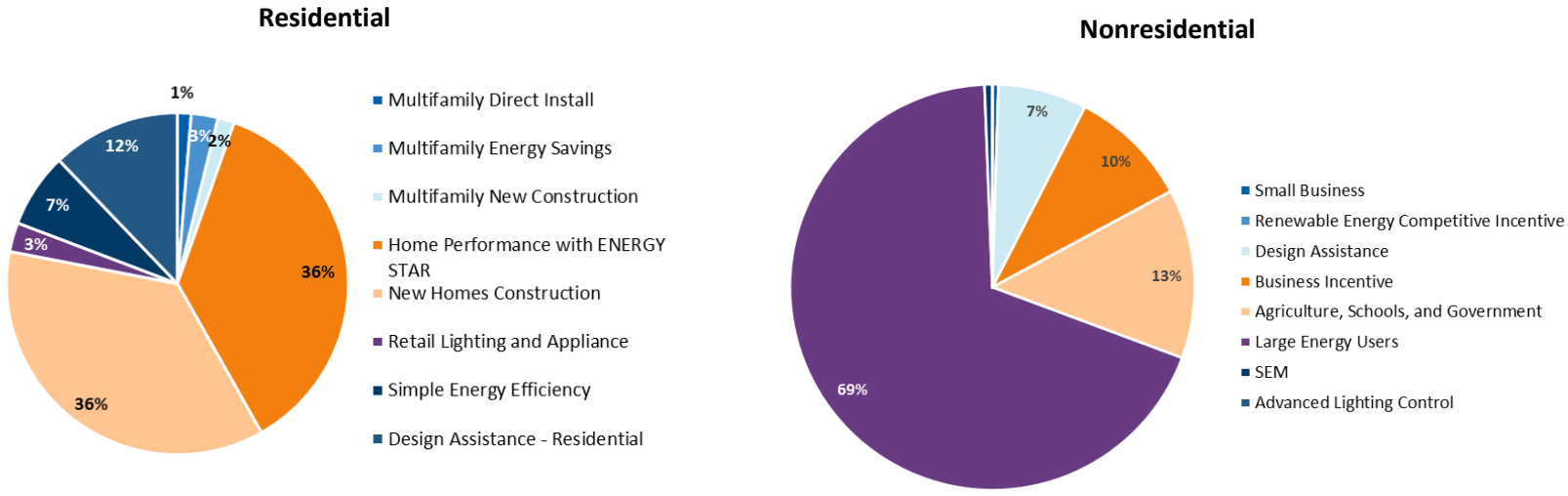


Table 14 lists the first-year annual gross savings, verified gross savings, and verified net demand reduction for electricity and natural gas by program, segment, and overall portfolio.

Table 14. Summary of CY 2017 Annual Savings by Program

Program Name	Gross			Verified Gross			Verified Net		
	kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
Residential Programs									
Multifamily Direct Install	4,490,222	268	126,190	4,212,647	235	105,175	4,212,647	235	105,175
Multifamily Energy Savings	8,952,599	835	153,060	8,096,642	791	132,601	6,522,913	637	106,828
Multifamily New Construction	2,481,485	360	84,700	1,600,039	364	79,415	1,289,043	293	63,979
Appliance Recycling Program	11,989,897	1,404	0	10,144,693	1,233	0	5,448,059	660	0
Home Performance with ENERGY STAR	17,440,976	5,359	1,528,776	18,556,076	5,581	1,509,969	15,021,183	4,315	1,146,029
New Homes Construction	4,339,960	1,403	986,067	4,339,960	1,403	986,067	0	0	72,740
Retail Lighting and Appliance	185,820,254	21,155	226,235	170,657,789	19,527	226,235	80,560,957	9,126	162,889
Simple Energy Efficiency	12,310,646	1,122	546,130	12,471,032	1,154	508,691	12,471,032	1,154	508,691
Design Assistance - Residential	4,530,178	646	495,128	4,521,295	632	496,869	2,396,286	335	263,341
Residential Total	**252,356,217**	**32,551**	**4,146,287**	**234,600,174**	**30,921**	**4,045,022**	**127,922,119**	**16,756**	**2,429,672**
Nonresidential Programs									
Small Business	21,557,262	2,723	72,944	21,933,322	2,673	55,407	19,882,116	2,423	50,225
Renewable Energy Competitive Incentive	4,919,834	1,541	0	4,919,834	1,803	0	4,624,644	1,695	0
Design Assistance	33,124,797	5,313	744,645	33,059,843	5,200	747,264	17,521,717	2,756	396,050
Business Incentive	170,173,893	22,757	1,737,666	159,236,928	21,397	1,358,252	95,051,087	12,772	810,763
Agriculture, Schools, and Government	87,275,215	12,685	2,182,165	86,058,588	13,253	1,912,567	66,852,000	10,295	1,485,720
Large Energy Users	145,715,455	19,400	10,381,731	168,820,065	21,084	10,304,854	138,432,453	17,289	8,449,980
Nonresidential Total	**462,766,457**	**64,419**	**15,119,151**	**474,028,579**	**65,410**	**14,378,344**	**342,364,018**	**47,230**	**11,192,738**

Program Name	Gross			Verified Gross			Verified Net		
	kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
Pilot Programs									
Strategic Energy Management	4,648,326	499	1,343,787	5,133,522	972	1,315,102	5,133,522	972	1,315,102
Advanced Lighting Controls	914,071	166	0	317,096	47	0	49,235	18	0
Seasonal Savings	351,576	0	174,864	351,576	0	174,864	351,576	0	174,864
Pilot Total	**5,913,973**	**665**	**1,518,651**	**5,802,194**	**1,020**	**1,489,966**	**5,534,332**	**991**	**1,489,966**
Total All Programs	**721,036,646**	**97,635**	**20,784,088**	**714,430,947**	**97,350**	**19,913,333**	**475,820,469**	**64,977**	**15,112,376**

[1] Totals may not sum due to rounding.

Focus on Energy did not claim savings in CY 2017 for the Midstream Commercial Equipment Pilot, Retail Products Platform, or the Low-E Storm Windows pilot. All rural programs, including the Communications Providers Initiative and the Digital Customer Engagement for Business Pilot, are two-year programs that will claim final savings at the end of CY 2018. The Evaluation Team plans to verify *ex ante* savings and provide impact evaluation findings for these three programs in the CY 2018 report. The gross savings for these pilots and rural programs are therefore excluded from all portfolio summaries of savings and cost-effectiveness.

Summary of Findings by Measure Category

Table 15 lists CY 2017 residential energy savings, demand reduction, and incentive monies spent by measure category.

Table 15. Summary of CY 2017 Annual Savings by Measure Category in the Residential Segment

Measure Category	Verified Gross						Incentives Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW%	Therms	Therms %		
Agriculture - Variable Speed Drive	175,296	0.07%	15	0.05%	0	0.00%	$8,456.00	0.04%
Boilers & Burners - Boiler	0	0.00%	0	0.00%	149,209	3.69%	$270,321.00	1.27%
Boilers & Burners - Controls	366,228	0.16%	18	0.06%	27,499	0.68%	$23,528.81	0.11%
Boilers & Burners - Insulation	147,613	0.06%	1	0.00%	27,936	0.69%	$25,320.81	0.12%
Building Shell - Air Sealing	0	0.00%	0	0.00%	0	0.00%	$0.00	0.00%
Building Shell - Insulation	0	0.00%	0	0.00%	0	0.00%	$0.00	0.00%

Measure Category	Verified Gross						Incentives Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW%	Therms	Therms %		
Domestic Hot Water - Aeration	2,443,999	1.04%	148	0.48%	361,400	8.93%	$120,775.03	0.57%
Domestic Hot Water - Insulation	1,095,885	0.47%	163	0.53%	121,410	3.00%	$77,638.50	0.36%
Domestic Hot Water - Other	260,424	0.11%	6	0.02%	51,347	1.27%	$38,224.63	0.18%
Domestic Hot Water - Showerhead	1,291,563	0.55%	57	0.18%	129,155	3.19%	$104,389.89	0.49%
Domestic Hot Water - Water Heater	77,929	0.03%	6	0.02%	9,249	0.23%	$29,500.00	0.14%
HVAC - Chiller	157,585	0.07%	18	0.06%	0	0.00%	$11,443.68	0.05%
HVAC - Controls	2,051,224	0.88%	913	2.96%	766,686	18.95%	$946,863.17	4.45%
HVAC - Furnace	6,584,955	2.81%	1,299	4.21%	577,980	14.29%	$2,379,820.00	11.17%
HVAC - Motor	30,830	0.01%	6	0.02%	0	0.00%	$225.00	0.00%
HVAC - Other	2,291,727	0.98%	791	2.56%	67,641	1.67%	$869,450.00	4.08%
HVAC - Packaged Terminal Unit (PTAC, PTHP)	142,556	0.06%	-1	0.00%	0	0.00%	$11,400.00	0.05%
HVAC - Rooftop Unit / Split System AC	26,038	0.01%	116	0.37%	0	0.00%	$58,112.01	0.27%
HVAC - Smart Thermostat, Existing Air Source Heat Pump2	9,240	0.00%	0	0.00%	0	0.00%	$1,575.00	0.01%
HVAC - Steam Trap	0	0.00%	0	0.00%	44,470	1.10%	$3,560.00	0.02%
Laundry - Clothes Washer	6,354	0.00%	0	0.00%	0	0.00%	$250.00	0.00%
Lighting - Delamping	31,964	0.01%	4	0.01%	0	0.00%	$388.00	0.00%
Lighting - Fluorescent, Compact (CFL)	53,896	0.02%	5	0.02%	0	0.00%	$6,265.00	0.03%
Lighting - Fluorescent, Linear	93,243	0.04%	12	0.04%	0	0.00%	$15,003.50	0.07%
Lighting - Light Emitting Diode (LED)	184,469,391	78.82%	21,174	68.60%	0	0.00%	$10,525,702.89	49.42%
Motors & Drives - Motor	55,610	0.02%	11	0.03%	0	0.00%	$13,400.00	0.06%
New Construction - Design	4,521,295	1.93%	632	2.05%	496,869	12.28%	$756,466.40	3.55%
New Construction - Whole Building	4,339,960	1.85%	1,403	4.55%	986,067	24.38%	$696,950.00	3.27%
Other - Bonus	0	0.00%	0	0.00%	0	0.00%	$30,556.00	0.14%
Other - Other	3,250,526	1.39%	-170	-0.55%	228,105	5.64%	$2,359,393.09	11.08%
Refrigeration - Other	10,144,693	4.33%	1,233	3.99%	0	0.00%	$446,845.00	2.10%
Renewable Energy - Geothermal	148,045	0.06%	29	0.09%	0	0.00%	$18,850.00	0.09%

Measure Category	Verified Gross						Incentives Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW%	Therms	Therms %		
Renewable Energy - Photovoltaics	7,407,850	3.17%	2,745	8.89%	0	0.00%	$1,080,851.82	5.08%
Training & Special - Other	545,686	0.23%	0	0.00%	0	0.00%	$0.00	0.00%
Vending & Plug Loads - Controls	1,803,262	0.77%	237	0.77%	0	0.00%	$365,098.29	1.71%

Table 16 lists CY 2017 nonresidential savings and incentive monies spent by measure category.

Table 16. Summary of CY 2017 Annual Savings by Measure Category in the Nonresidential Segment

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	therms	therms %		
Aeration	754,364	0.16%	128	0.20%	0	0.00%	$39,501.79	0.12%
Air Sealing	10,604	0.00%	0	0.00%	154,567	1.07%	$66,035.62	0.20%
Boiler	27,162	0.01%	6	0.01%	1,072,176	7.46%	$1,308,527.85	4.05%
Bonus	0	0.00%	0	0.00%	0	0.00%	$118,512.02	0.37%
Chiller	13,439,357	2.84%	2,757	4.22%	0	0.00%	$1,004,878.10	3.11%
Clothes Washer	0	0.00%	0	0.00%	721	0.01%	$493.80	0.00%
Compressor	6,143,292	1.30%	1,060	1.62%	0	0.00%	$400,140.00	1.24%
Controls	29,441,164	6.21%	2,461	3.76%	805,078	5.60%	$1,718,797.91	5.32%
Delamping	5,643,579	1.19%	1,162	1.78%	0	0.00%	$131,996.44	0.41%
Design	33,059,843	6.97%	5,200	7.95%	747,264	5.20%	$3,183,935.48	9.85%
Dishwasher, Commercial	352,115	0.07%	1	0.00%	4,485	0.03%	$19,330.00	0.06%
Door	-1,114	0.00%	-11	-0.02%	45,038	0.31%	$15,566.10	0.05%
Dryer	578,345	0.12%	105	0.16%	35,291	0.25%	$40,650.50	0.13%
Economizer	188,736	0.04%	0	0.00%	0	0.00%	$5,092.33	0.02%
Energy Recovery	-460,663	-0.10%	32	0.05%	1,852,611	12.88%	$859,433.23	2.66%
Fan	2,750,178	0.58%	614	0.94%	4,808	0.03%	$268,455.64	0.83%
Filtration	1,188,572	0.25%	233	0.36%	266,016	1.85%	$181,103.20	0.56%

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	therms	therms %		
Fluorescent, Linear	4,449,224	0.94%	824	1.26%	0	0.00%	$200,363.68	0.62%
Fryer	17,696	0.00%	4	0.01%	3,095	0.02%	$4,780.00	0.01%
Furnace	126,589	0.03%	-7	-0.01%	265,000	1.84%	$136,759.70	0.42%
Grain Dryer	0	0.00%	0	0.00%	65,095	0.45%	$49,966.80	0.15%
Greenhouse	0	0.00%	0	0.00%	40,125	0.28%	$11,848.38	0.04%
Griddle	5,482	0.00%	1	0.00%	0	0.00%	$450.00	0.00%
Heat Exchanger	1,065,000	0.22%	0	0.00%	0	0.00%	$52,391.00	0.16%
High Intensity Discharge (HID)	7,565	0.00%	1	0.00%	0	0.00%	$224.00	0.00%
Hot Holding Cabinet	9,221	0.00%	2	0.00%	0	0.00%	$160.00	0.00%
Ice Machine	33,714	0.01%	4	0.01%	0	0.00%	$1,690.00	0.01%
Infrared Heater	0	0.00%	0	0.00%	65,972	0.46%	$23,065.00	0.07%
Insulation	6,954	0.00%	1	0.00%	175,613	1.22%	$87,474.52	0.27%
Irrigation	100,899	0.02%	25	0.04%	0	0.00%	$3,250.00	0.01%
Light Emitting Diode (LED)	217,398,250	45.86%	32,013	48.94%	0	0.00%	$13,183,967.53	40.78%
Livestock Waterer	568,499	0.12%	0	0.00%	0	0.00%	$16,320.00	0.05%
Motor	7,781,944	1.64%	922	1.41%	0	0.00%	$300,981.36	0.93%
Nozzle	498,785	0.11%	177	0.27%	0	0.00%	$736.00	0.00%
Other	47,055,131	9.93%	5,400	8.25%	7,378,248	51.32%	$4,644,582.46	14.37%
Oven	14,378	0.00%	4	0.01%	8,685	0.06%	$10,660.00	0.03%
Packaged Terminal Unit (PTAC, PTHP)	600,969	0.13%	0	0.00%	0	0.00%	$33,150.00	0.10%
Photovoltaics	4,919,834	1.04%	1,803	2.76%	0	0.00%	$1,398,442.41	4.33%
Pre-Rinse Sprayer	0	0.00%	0	0.00%	115	0.00%	$125.00	0.00%
Process Heat	25,025	0.01%	4	0.01%	0	0.00%	$1,008.00	0.00%
Pump	5,930,105	1.25%	651	1.00%	0	0.00%	$213,705.50	0.66%
Reconfigure Equipment	2,696,482	0.57%	424	0.65%	0	0.00%	$114,350.82	0.35%
Refrigerated Case Door	4,318,558	0.91%	345	0.53%	101,410	0.71%	$209,612.00	0.65%
Refrigerator / Freezer - Commercial	609,571	0.13%	70	0.11%	0	0.00%	$35,675.00	0.11%

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	therms	therms %		
Rooftop Unit / Split System AC	560,879	0.12%	762	1.16%	56,828	0.40%	$204,661.72	0.63%
Scheduling	59,766	0.01%	18	0.03%	4,425	0.03%	$7,524.60	0.02%
Steam Trap	0	0.00%	0	0.00%	778,863	5.42%	$80,114.43	0.25%
Steamer	91,563	0.02%	17	0.03%	0	0.00%	$4,000.00	0.01%
Strip Curtain	23,889	0.01%	3	0.00%	0	0.00%	$656.00	0.00%
Supporting Equipment	114,617	0.02%	10	0.02%	0	0.00%	$4,054.07	0.01%
Tune-up / Repair / Commissioning	14,158,529	2.99%	1,195	1.83%	166,129	1.16%	$212,734.32	0.66%
Unit Heater	0	0.00%	0	0.00%	17,187	0.12%	$6,325.00	0.02%
Variable Air Volume (VAV)	80,942	0.02%	0	0.00%	91,307	0.64%	$38,385.90	0.12%
Variable Speed Drive	67,454,020	14.23%	6,971	10.66%	0	0.00%	$1,512,137.06	4.68%
Water Heater	64,661	0.01%	1	0.00%	167,622	1.17%	$151,837.80	0.47%
Welder	40,058	0.01%	21	0.03%	0	0.00%	$2,886.00	0.01%
Window	24,248	0.01%	0	0.00%	4,570	0.03%	$4,100.79	0.01%

Residential Segment Process Evaluation Findings

For the CY 2017 process evaluation of the residential programs, the Evaluation Team collected information and perspectives from Focus on Energy participants, Trade Allies, Program Implementers, and the Program Administrator. The Evaluation Team reached participants through a telephone program-level participant survey, an online or mailed participant satisfaction survey, or both. Table 17 shows the evaluation activity by residential program.

Table 17. Residential Process Evaluation Activities by Program

	Participant Surveys	Ongoing Participant Satisfaction Surveys	Partial Participant Interviews	Stakeholder Interviews	Trade Ally and Market Actor Surveys/ Interviews
Multifamily Direct Install	--	✓	--	✓	--
Multifamily Energy Savings	✓	✓	--	✓	--
Multifamily New Construction	--	✓	--	✓	--
Appliance Recycling	✓	✓	--	✓	--
Home Performance with ENERGY STAR	--	✓	--	✓	✓
New Homes Construction	--	--	--	✓	✓
Retail Lighting and Appliance	--	✓	--	✓	--
Simple Energy Efficiency	✓	✓	--	✓	--
Direct-Mail Home Energy Assessment	✓	--	--	✓	--

Over 113,000 residential customers in Wisconsin participated in Focus on Energy's programs in CY 2017, not including an estimated 873,660 Wisconsin customers who purchased upstream lighting measures through the Retail Lighting and Appliance Program and 9,580 who participated in the Direct-Mail Home Energy Assessment Pilot. As listed above in Table 15, residential customers installed energy-efficient measures across a wide range of technologies—which did include products purchased through the Retail Lighting and Appliance Program—and achieved electricity savings of 234,024,868 kWh and natural gas savings of 4,045,022 therms.

Participant Satisfaction

The Evaluation Team fielded satisfaction surveys online and by mail during CY 2017 and asked program participants to rate how satisfied they were with Focus on Energy's programs on a scale from 0 to 10, where 10 meant *extremely satisfied* and 0 meant *extremely dissatisfied*. Focus on Energy residential and nonresidential participants completed over 13,000 surveys in CY 2017.

Participants in programs with a comparable CY 2016 program gave higher or equivalent overall satisfaction ratings in CY 2017, except for the Multifamily Energy Savings and Multifamily Direct Install programs, for which the ratings declined in CY 2017, but were still higher than in CY 2015.[6]

The satisfaction ratings for most residential programs in CY 2017 were above the portfolio baseline of 8.8, with the exceptions of Multifamily Direct Install (8.6) and Retail Lighting and Appliance pop-up retail events (8.8), which had satisfaction ratings that were statistically equivalent to the baseline.[7]

The participation-weighted average overall program satisfaction across all surveyed residential programs was 9.0, which was statistically higher than the portfolio baseline.[8]

Figure 11 shows participants' average satisfaction ratings with all surveyed residential programs.[9]

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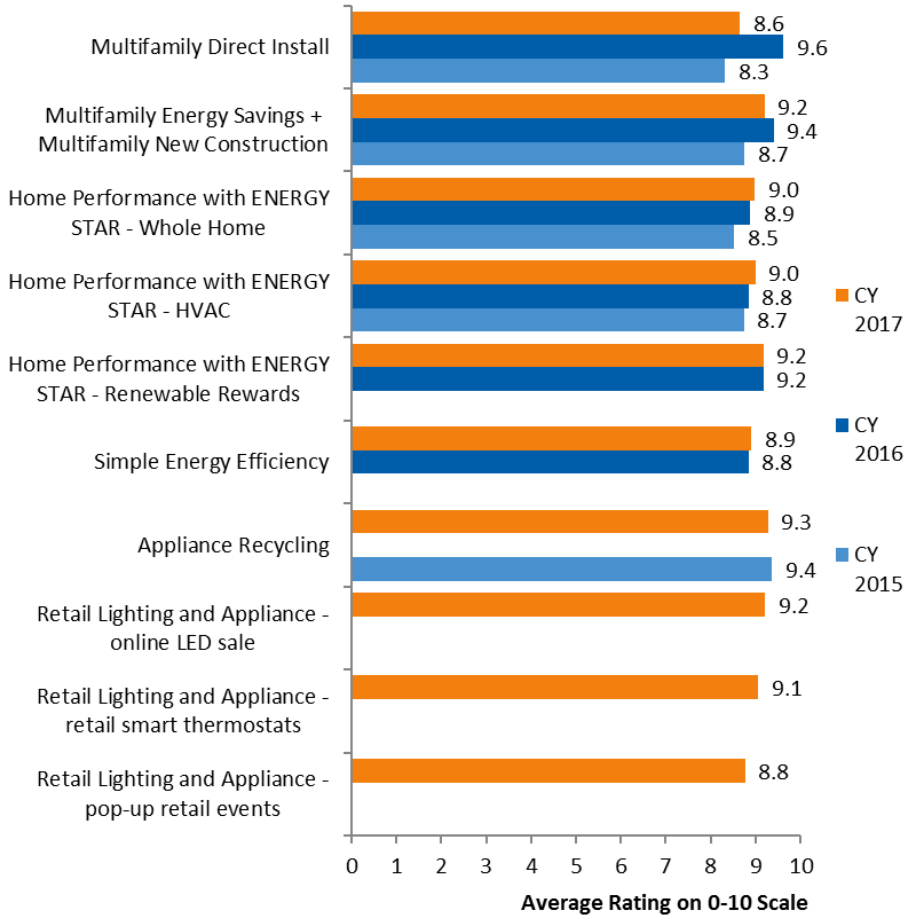
[6] Although Focus on Energy captures multifamily property savings and ongoing participant satisfaction survey results through its residential portfolio, participants of the Multifamily Energy Savings, Multifamily Direct Install, and Multifamily New Construction Programs are property managers and owners. These individuals participate through Trade Allies who typically serve nonresidential customers, and the Program Implementer has aligned these multifamily programs' design, delivery strategy, and application materials with the nonresidential programs.

[7] $p<0.10$ or better using binomial *t*-tests.

[8] $p<0.05$ using a binomial *t*-test.

[9] Ongoing participant satisfaction surveys for CY 2017 did not include the New Homes Program. Retail Lighting and Appliance surveys for CY 2017 did not cover the entire program but were specific to channels or products within the Program (retail smart thermostats rebates, a one-time online LED sale, and pop-up retail events that offered LEDs and power strips). The respondents for the Multifamily Programs' surveys were the building owners, not the residents of the buildings.

Figure 11. CY 2017 Average Overall Satisfaction Ratings for Residential Programs



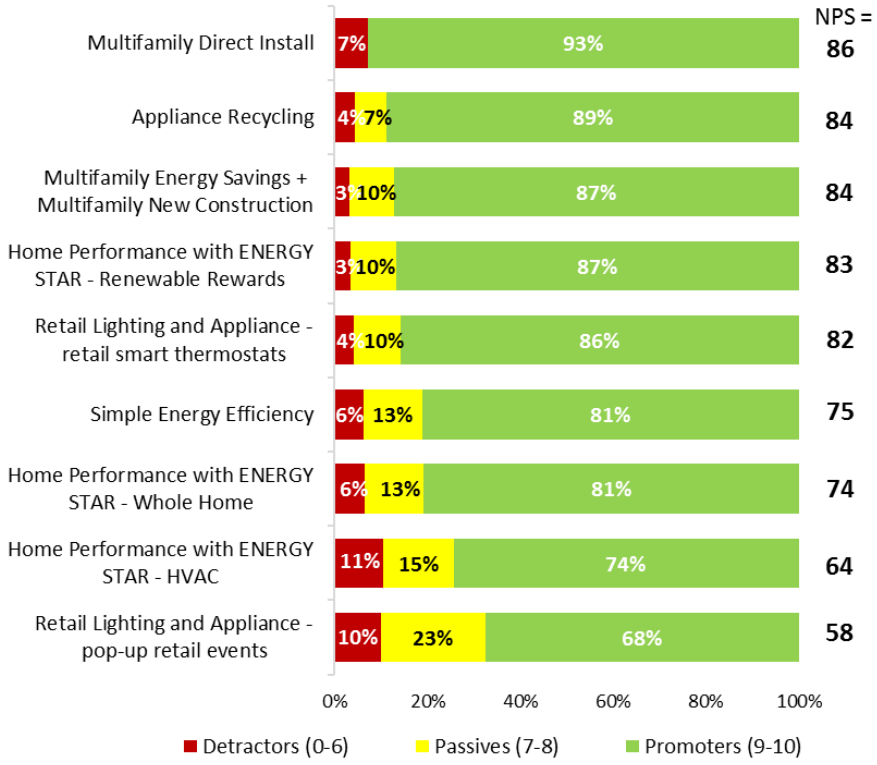
Source: Wisconsin Focus on Energy Program Participant Satisfaction Mail/Online Surveys. "Overall, how satisfied are you with the program?" Multifamily Direct Install CY 2017 (n=17); Multifamily Energy Savings CY 2017 (n=31 including two Multifamily New Construction surveys); Home Performance with ENERGY STAR (Whole Home) CY 2017 (n=970); Home Performance with ENERGY STAR (HVAC) CY 2017 (n=412); Home Performance with ENERGY STAR (Renewable Rewards) CY 2017 (n=148); Simple Energy Efficiency CY 2017 (n=921); Appliance Recycling CY 2017 (n=2,017); Retail Lighting and Appliance (online LED sale) CY 2017 (n=896); Retail Lighting and Appliance (retail smart thermostats) CY 2017 (n=671); Retail Lighting and Appliance (pop-up retail events) CY 2017 (n=148)

The Evaluation Team calculated a net promoter score (NPS) for each program based on the likelihood of the participant to recommend the program. The NPS is the percentage of promoters (respondents giving a rating of 9 or 10) minus the percentage of detractors (respondents giving a rating of 0 to 6) and is expressed as an absolute number between -100 and +100. Generally, positive NPS scores are interpreted as good, and the closer the NPS is to +100, the more favorable the respondent is toward the program.

The residential programs received universally high ratings from participants, with the multifamily programs, Home Performance with ENERGY STAR (Renewable Rewards), Appliance Recycling, and retail smart thermostats component of Retail Lighting and Appliance all having NPS over +80 for CY 2017. The

only two residential program components with NPS less than +70 were Home Performance with ENERGY STAR (HVAC) (+64) and the Retail Lighting and Appliance pop-up retail events (+58). Figure 12 shows the NPS and distribution of promoters, passives, and detractors for each program surveyed.

Figure 12. CY 2017 Net Promoter Scores for Residential Programs



Source: Wisconsin Focus on Energy Program Participant Satisfaction Mail/Online Surveys. "How likely is it that you would recommend this program to others?" Multifamily Direct Install (n=14); Multifamily Energy Savings (n=31 including two Multifamily New Construction surveys); Home Performance with ENERGY STAR (Whole Home) (n=962); Home Performance with ENERGY STAR (HVAC) (n=418); Home Performance with ENERGY STAR (Renewable Rewards) (n=150); Simple Energy Efficiency (n=966); Appliance Recycling (n=2,009); Retail Lighting and Appliance (retail smart thermostats) (n=672); "How likely is it that you would recommend Focus on Energy to others?" Retail Lighting and Appliance (pop-up retail events) (n=151)

Nonresidential Segment Process Evaluation Findings

For the CY 2017 nonresidential program evaluation, the Evaluation Team collected information and perspectives from customers, the Program Administrator, Program Implementers, and building design teams. This section describes high-level findings from the evaluation activities across four programs: Agriculture, Schools and Government, Business Incentive, Large Energy Users, and Small Business.[10]

[10] Due to small sample sizes and alternate delivery approaches, the Design Assistance Program pre-interview online survey (n=8) and the Renewable Energy Competitive Incentive Program interviews (n=4) were omitted from this analysis.

The Evaluation Team asked specific core marketing and program experience questions to compare these programs' participants. The Team surveyed Trade Allies about their participation to gain insights into year-over-year perceptions and insight into program design changes.

Focus on Energy offers three programs to the general business population with incentives based on energy usage—Business Incentive, Small Business, and Large Energy Users—and offers three programs that provide more tailored support for specific customer types and technologies—Agriculture, Schools and Government, Design Assistance, and Renewable Energy Competitive Incentive. These programs are targeted to specific customer segments and are tailored to optimize participation within that customer segment.

During CY 2017, the Program Administrator and Evaluation Team fielded satisfaction surveys online and by mail that asked program participants to rate how satisfied they were with Focus on Energy's programs.[11] Figure 13 shows participants' average satisfaction ratings with nonresidential programs.

Participants gave the Small Business Program an average satisfaction rating of 9.2, making this the highest-rated CY 2017 nonresidential program, and the only nonresidential program with a statistically significant improvement from CY 2016.[12] As had been the case in CY 2016, the Large Energy Users Program received the lowest average satisfaction rating among nonresidential programs at 8.9, which was statistically equivalent to the portfolio baseline of 8.8. The other two nonresidential programs had CY 2017 satisfaction scores that were significantly above the portfolio baseline.[13] Across all nonresidential programs surveyed, the participation-weighted average overall program satisfaction rating was 9.1, which was significantly above the portfolio baseline.[14]

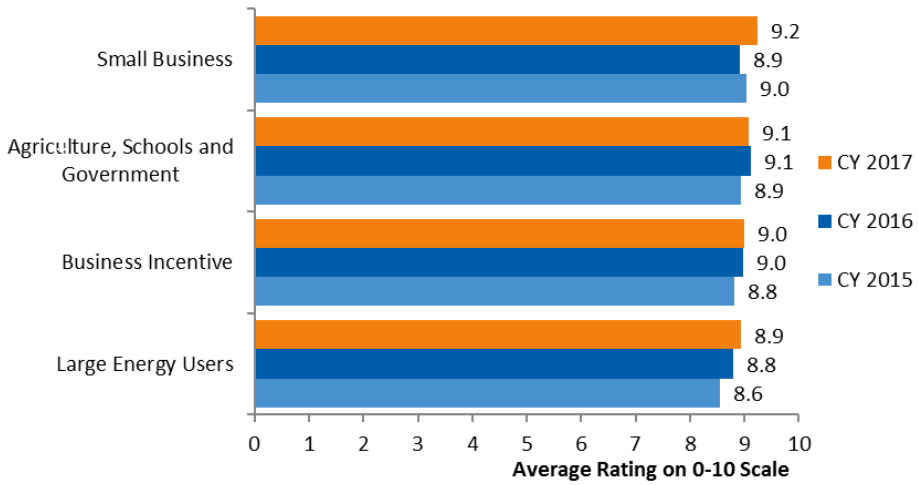
[11] The Multifamily Programs' participant satisfaction findings were presented in the *Residential Segment Process Evaluation Findings* section above. The surveys used a scale from 0 to 10, where 10 means *extremely satisfied* and 0 means *not at all satisfied*.

[12] $p<0.05$ using a binomial *t*-test.

[13] $p<0.05$ using binomial *t*-tests.

[14] $p<0.05$ using a binomial *t*-test.

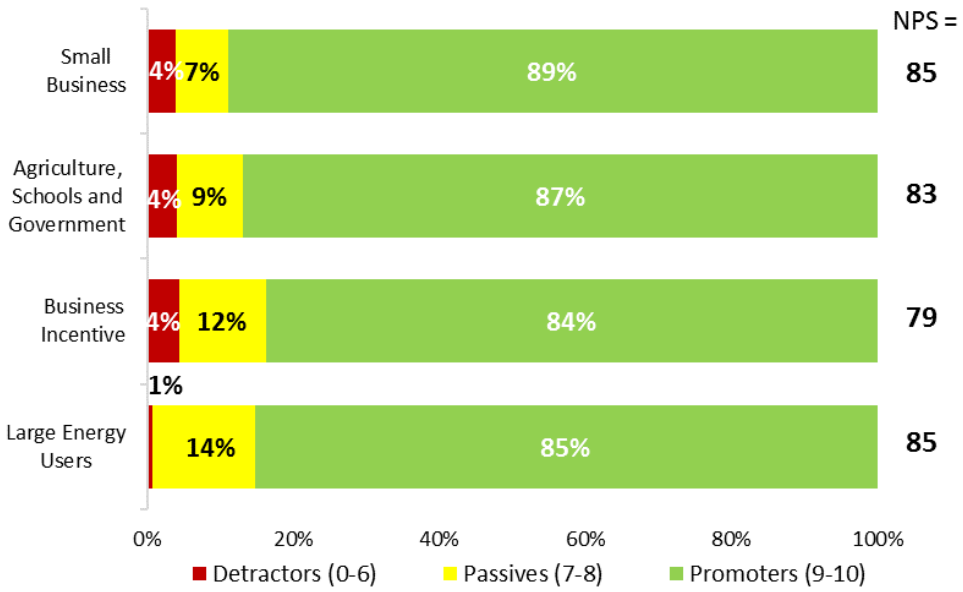
Figure 13. CY 2017 Average Overall Satisfaction Ratings for Nonresidential Programs



Source: Wisconsin Focus on Energy Program Participant Satisfaction Mail/Online Surveys. "Overall, how satisfied are you with the program?" Agriculture, Schools and Government CY 2017 (n=482), CY 2016 (n=471), CY 2015 (n=324); Business Incentive CY 2017 (n=442), CY 2016 (n=493), CY 2015 (n=372); Small Business CY 2017 (n=255), CY 2016 (n=198), CY 2015 (n=256); Large Energy Users CY 2017 (n=149), CY 2016 (n=170), CY 2015 (n=131)

The Evaluation Team calculated a NPS for each program based on the likelihood of the participant to recommend the program. Generally, positive NPS scores are interpreted as good, and the closer the NPS is to +100, the more favorable the respondent is toward the program. Figure 14 shows that all four nonresidential programs received high NPS from participants: the Small Business and Large Energy Users programs had the highest NPS at +85, and the lowest nonresidential program NPS was for the Business Incentive Program (+79).

Figure 14. CY 2017 Net Promoter Scores for Nonresidential Programs



Source: Wisconsin Focus on Energy Program Participant Satisfaction Mail/Online Surveys. "How likely is it that you would recommend this program to others?" Small Business (n=253); Agriculture, Schools and Government (n=471); Business Incentive (n=436); Large Energy Users (n=149)

Cost-Effectiveness Findings

With the oversight of and in collaboration with the PSC and the Evaluation Team, the Focus on Energy Program Administrator developed a specific cost-effectiveness calculator for the CY 2015–CY 2018 quadrennial. The Program Administrator and Program Implementers used the calculator to assess the cost-effectiveness of program designs prior to their implementation each year.

To maintain consistency between planning and evaluation approaches—critical for understanding program performance compared to expectations—the Evaluation Team used the same calculator as the Program Administrator and Program Implementers to evaluate the cost-effectiveness of the Focus on Energy programs in CY 2017. The Evaluation Team's findings are presented in this section.

As directed by the PSC,[15] the modified total resource cost (TRC) test is considered the primary test in assessing the cost-effectiveness of individual programs and of the entire Focus on Energy portfolio of programs. The PSC also directed that three additional tests be conducted for advisory purposes: an expanded TRC that also includes net economic benefits, the utility administrator test (UAT), and the ratepayer impact measure test (RIM).

[15] The PSC directed the use of the modified total resource cost test as the primary cost-effectiveness test. Public Service Commission of Wisconsin. *Quadrennial Planning Process II – Final Decision. Order PSC Docket 5-FE-100, REF#:215245.* September 5, 2014. Available online: http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=215245

NTG ratios can be a significant driver of TRC, UAT, and RIM results. NTG ratios are applied to adjust the programs' impacts to reflect only the gains resulting from the programs. Therefore, NTG ratios account for the energy savings that would have been achieved without the efficiency programs (that is, when the NTG ratio is less than 1, savings are removed and when the NTG ratio is greater than 1, savings are added). In all cases, the energy savings are multiplied by the NTG ratio.

On the cost side, expenditures that would have occurred without the efficiency effort are also removed. These expenditures include the incremental measure costs and lost revenues, both of which are multiplied by the NTG ratio. Costs that would not have occurred in the absence of the programs (such as delivery and administrative costs) are not impacted by the NTG ratio.

Test Description

The Evaluation Team—as well as the Program Administrator in developing its calculator—used methods adapted from the California Standard Practice Manual, the conventional standard of cost-effectiveness analysis for energy efficiency programs in the United States.[16] The modified TRC is described below, and the detailed descriptions and results for the other benefit/cost tests—the expanded TRC, the UAT, and the RIM—are in Appendix F.

The TRC is the most commonly applied test for evaluating the cost-effectiveness of energy efficiency and renewable resource programs around the country. Applications range across states and utility jurisdictions, from the standard TRC to the societal cost test, which expands the test inputs to account for a more holistic societal perspective. Modifications to the standard TRC often include reducing the discount rate or including various environmental and non-energy benefits. The test includes total participant and Program Administrator costs. The test also includes some non-energy benefits, such as emission reduction benefits. The TRC does not include incentive costs.

The modified TRC used for the CY 2017 evaluation defines program cost-effectiveness from a regulatory perspective (as directed by the PSC) and is intended to measure the overall impacts of program benefits and costs on the state of Wisconsin. The test compares all benefits and costs to the state that can be measured with a high degree of confidence, including any net avoided emissions that are regulated and that have either well-defined market or commission-established values. The purpose of the modified TRC is to determine if the total costs incurred by residents, businesses, and Focus on Energy for operating the programs are outweighed by the total benefits they receive.

In simple terms, the modified TRC benefit/cost value is the ratio of avoided utility and emission costs from avoided energy consumption to the combination of program administrative costs, program delivery costs, and net participant incremental measure costs.

[16] California Public Utilities Commission. *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*. July 2002. Available online: http://www.calmac.org/events/SPM_9_20_02.pdf

The benefit/cost equation used for the modified TRC is:

$$TRC\frac{B}{C} = \frac{[Value\ of\ Gross\ Saved\ Energy + Value\ of\ Gross\ Avoided\ Emissions] * NTG}{[Adminstrative\ Costs\ +\ Delivery\ Costs + (Incremental\ Measure\ Cost\ * NTG)]}$$

Where:

$$Value\ of\ Gross\ Saved\ Energy = Net\ Gross\ Savings * Utility\ Avoided\ Costs$$

Interpreting Test Results

Because of changes in avoided electric energy and natural gas costs, changes to measure-level incremental costs, and emissions allowance prices for the CY 2015–CY 2018 quadrennial, cost-effectiveness results reported here are not directly comparable to results from the previous quadrennial (CY 2011–CY 2014). The CY 2015, CY 2016, and CY 2017 results are directly comparable.

Value of Net Saved Energy

The value of energy saved, or displaced, equals the net energy saved multiplied by the utility-avoided cost of the saved energy. In the case of energy efficiency and renewable resource programs, avoided cost is the incremental (or marginal) cost for the additional energy and capacity the utility must generate or purchase from another source rather than pay for the efficient measure that offsets this demand.

The PSC established the methodology to estimate electric energy avoided costs on June 18, 2012, in Order PSC Docket 5-GF-191 (PSC REF#:166932).[17] The PSC established new natural gas avoided costs for the CY 2015–CY 2018 quadrennial on February 25, 2015, in Order PSC Docket 5-FE-100 (PSC REF#:232431).[18] These costs are based on Henry Hub price forecasts from the 2014 U.S. Energy Information Administration *Annual Energy Outlook*.[19]

[17] Public Service Commission of Wisconsin. *Quadrennial Planning Process II – Scope. Order PSC Docket 5-GF-191, REF#:166932.* June 18, 2012. Available online: http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=166932

[18] Public Service Commission of Wisconsin. *Quadrennial Planning Process II – Scope. Order PSC Docket 5-FE-100, REF#:232431.* February 25, 2015. Available online: http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=232431

[19] U.S. Energy Information Administration. *Annual Energy Outlook*. 2014. Available online: https://www.eia.gov/outlooks/aeo/pdf/0383(2014).pdf

In the CY 2017 evaluation, the Evaluation Team updated the electric energy avoided costs using an avoided cost/annualized forecast model, which relied on the Midcontinent Independent Transmission System Operator's forecast of locational marginal pricing for CY 2018, CY 2023, and CY 2028.[20]

To derive net savings, the Evaluation Team decreased the verified gross energy savings by the conventional attribution factor of the NTG ratio. The Team then increased the net savings by the line loss factor of 8% to account for distribution losses. Table 18 shows the avoided cost assumptions used for the cost-effectiveness tests in CY 2015 through CY 2017.

Table 18. Avoided Cost Comparison between Years

Avoided Cost	CY 2015	CY 2016	CY 2017
Electric Energy ($/kWh)	$0.02914-$0.06871[1]	$0.03525-$0.06871	$0.04136-$0.06871
Electric Capacity ($/kW year)	130.26	130.26	130.26
Natural Gas ($/therms)	$0.625-$1.278[2]	$0.691-$1.278	$0.735-$1.278
Avoided Cost Inflation	0%	0%	0%
Real Discount Rate	2%	2%	2%
Line Loss	8%	8%	8%

[1] The CY 2015 - 2017 cost-effectiveness analyses used a time series that grows from $0.02914 to $0.06871 over 14 years in the forecast model.

[2] The natural gas avoided costs grows from $0.625 to $1.278 over a 25-year period based on growth rates from the U.S. Energy Information Administration *Annual Energy Outlook*, 2014.

Emissions Benefits

The emissions benefits require three key parameters—lifecycle net energy savings, emissions factors, and the dollar value of the displaced emissions. Emissions factors are simply the rate at which the pollutants are emitted per unit of energy and are most often expressed in tons of pollutant per energy unit—electric is expressed in tons/megawatt hour (MWh) and natural gas is expressed in tons/thousand therms (MThm). The product of the emissions factor and the net lifecycle energy savings is the total weight of air pollutant displaced by the program. The product of the total tonnage of pollutant displaced and the dollar value of the displaced emissions per ton is therefore the avoided emissions benefit.

The natural gas emissions factor has remained constant since the CY 2011 evaluation report. For CY 2017, the Evaluation Team revised the electric emissions factors using the AVoided Emissions and geneRation Tool (AVERT) developed by the U.S. Environmental Protection Agency to calculate avoided emissions from renewable energy and energy efficiency programs. Table 19 lists the emissions factors and allowance prices.

[20] Midcontinent Independent Transmission System Operator, Inc. Available online: http://www.pjm.com/markets-and-operations/energy/real-time/it-sced-forecasted-lmps.aspx

Table 19. Emissions Factors and Allowance Price

Service Fuel Type	CO_2	NO_X	SO_2
Electric Emissions Factor (Tons/MWh)	0.8855	0.0007	0.0015
Natural Gas Emissions Factor (Tons/MThm)	5.85	n/a	n/a
Allowance Price ($/Ton)	$15	$7.50	$2

The Evaluation Team obtained nitrogen oxide and sulfur dioxide emissions allowance prices from near the end of CY 2016 from the U.S. Environmental Protection Agency's Cross State Air Pollution Rule.[21] Markets for nitrogen oxide and sulfur dioxide allowances continue to be volatile, making it difficult to forecast nitrogen oxide and sulfur dioxide allowance prices. However, given the generally lower prices in CY 2016, the Evaluation Team lowered the avoided emissions values for sulfur dioxide and nitrogen oxide for CY 2016 to maintain a conservative estimate of the value of avoided emissions. The Evaluation Team used the carbon dioxide emissions price in the Order PSC Docket 5-FE-100 Ref#:279739, which states, "For purposes of evaluating the Focus program during the 2015–2018 quadrennium, the value of avoided carbon emissions shall be $15 per ton."[22]

Table 20 lists the emissions benefits for all programs by segment.

Table 20. Total Program Emissions Benefits by Segment

Program Year[1]	Residential	Nonresidential	Total
CY 2015 Emissions Benefits	$25,236,521	$85,344,610	$110,581,131
CY 2016 Emissions Benefits	$33,488,565	$70,614,708	$104,103,273
CY 2017 Emissions Benefits	$27,784,615	$72,107,782	$99,892,397

[1] Reported emissions impacts are based on portfolio-level modeling and are not measure- or project-level specific.

Program Costs

The program costs represent all costs associated with running the efficiency and renewable programs (including administration and delivery costs). The Evaluation Team did not include incentive costs because they are deemed as transfer payments to the customer.[23] Focus on Energy's fiscal agent, Wipfli, provided the CY 2017 program costs used in this evaluation.

[21] U.S. Environmental Protection Agency. "Cross-State Air Pollution Rule (CSAPR)." December 14, 2017. Accessed May 2018: https://www.epa.gov/csapr

[22] Public Service Commission of Wisconsin. *Quadrennial Planning Process II – Scope.* Order PSC Docket 5-FE-100, REF#:279739. December 23, 2015. Available online: http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=279739

[23] The Evaluation Team included the incentive costs as part of the incremental cost but not as a program cost.

Table 21 shows the CY 2015 through CY 2017 program and incentive incremental cost values used for the cost-effectiveness tests.

Table 21. Sector Costs Comparison[1]

Costs	CY 2015	CY 2016	CY 2017
Residential			
Incentive Costs	$21,377,732	$20,313,920	$21,194,958
Administrative Costs	$4,421,952	$3,772,429	$4,505,599
Delivery Costs	$10,084,023	$8,873,833	$10,274,774
Total Residential Program Costs	**$35,883,707**	**$32,960,182**	**$35,975,330**
Nonresidential			
Incentive Costs	$40,612,777	$35,523,227	$33,631,479
Administrative Costs	$4,070,977	$4,162,016	$4,336,290
Delivery Costs	$16,623,494	$16,995,245	$17,706,879
Total Nonresidential Program Costs	**$61,307,247**	**$56,680,488**	**$55,674,648**
Total for Residential and Nonresidential Sectors			
Incentive Costs	$61,990,509	$55,837,147	$54,826,436
Administrative Costs	$8,492,929	$7,934,445	$8,841,889
Delivery Costs	$26,707,516	$25,869,078	$27,981,653
Total Program Costs	**$97,190,955**	**$89,640,670**	**$91,649,978**

[1] Totals may not match the sum of residential and nonresidential costs due to rounding.

Incremental Costs

The gross incremental costs are the additional costs incurred as a result of purchasing efficient equipment over and above a baseline nonqualified product. The Evaluation Team derived the gross incremental cost values used in this CY 2017 evaluation from the incremental cost study conducted by the Program Administrator, Program Implementers, and Evaluation Team. This study established up-to-date incremental costs for all measures using the best available data, including historical Focus on Energy program data and independent research from other state programs. The gross incremental costs, similar to the energy savings values used in the cost-effectiveness tests, required the application of attribution factors to account for freeridership.

As in the previous quadrennial evaluation (CY 2011–CY 2014), the Evaluation Team assigned actual project cost values from the program tracking databases to the renewable energy projects.

Table 22 shows the CY 2015 through CY 2017 total measure net incremental costs used for the cost-effectiveness tests. Following rising incremental costs in 2016 caused by transitions from CFLs to LEDs, in 2017, incremental costs dropped as LED incremental costs were updated to reflect changing market conditions.

Table 22. Net Incremental Measure Cost Comparison

Costs	Residential	Nonresidential
CY 2015 Incremental Costs	$39,756,677	$162,338,959
CY 2016 Incremental Costs	$77,731,522	$150,762,883
CY 2017 Incremental Costs	$52,340,833	$97,863,384

Table 23 lists CY 2017 incentive costs by sector, with renewables incorporated.

Table 23. CY 2017 Incentive Costs by Sector (with Renewables Incorporated)

Costs	Residential	Nonresidential	Total
Incentive Costs	$21,194,958	$33,631,479	$54,826,436

Table 24 lists the findings of the benefit/cost analysis for Focus on Energy's CY 2017 programs by sector.

Table 24. Benefit and Costs Portfolio Breakout

Focus on Energy Benefits and Costs		Portfolio Breakout	Core Efficiency	Pilots	Rural	Renewables
Incentives	$54,826,436		$51,250,513.17	$1,047,818.60	$0.00	$2,493,460.23
Modified TRC Benefits	$761,053,424		$731,169,845.79	$4,802,481.14	$0.00	$24,845,374.55
Modified TRC Costs	$187,027,759		$166,534,956.80	$2,118,661.71	$0.00	$18,198,531.23
Portfolio TRC Ratio	**4.07**	Alone	**4.39**	2.27	N/A	1.37
		With Core		**4.36**	N/A	4.09
		With Core & Pilots (All Efficiency)			**N/A**	4.07
		With Core & Pilots & Rural				**4.07**

Table 25 lists the findings of the benefit/cost analysis for Focus on Energy's CY 2017 programs by sector, with renewable measures incorporated into each sector for each cost-effectiveness test.

Table 25. CY 2017 Costs, Benefits, and Modified Total Resource Cost Test Results by Sector

	Residential	Nonresidential	Total
Administrative Costs	$4,505,599	$4,336,290	$8,841,889
Delivery Costs	$10,274,774	$17,706,879	$27,981,653
Incremental Measure Costs	$52,340,833	$97,863,384	$150,204,217
Total TRC Costs	**$67,121,206**	**$119,906,553**	**$187,027,759**
Electric Benefits	$147,114,241	$360,001,717	$507,115,958
Natural Gas Benefits	$34,874,492	$119,170,577	$154,045,069
Emissions Benefits	$27,784,615	$72,107,782	$99,892,397
Total TRC Benefits	**$209,773,348**	**$551,280,076**	**$761,053,424**
TRC Benefits Minus Costs	**$142,652,142**	**$431,373,523**	**$574,025,665**
TRC Benefit/Cost Ratio[1]	**3.13**	**4.60**	**4.07**

[1] The TRC ratio equals total TRC benefits divided by non-incentive costs.

Table 26 lists the CY 2015 through CY 2017 portfolio cost-effectiveness results.

Table 26. Cost-Effectiveness Results for Focus on Energy Portfolio

Calendar Year	Residential	Nonresidential	Renewables	Total
CY 2015: Modified TRC Results with Renewables	3.12	3.63	n/a	3.51
CY 2015: Modified TRC Results, Renewables Separate	3.33	3.93	1.18	3.51
CY 2016: Modified TRC Results with Renewables	2.73	3.14	n/a	3.00
CY 2016: Modified TRC Results, Renewables Separate	2.93	3.36	1.09	3.00
CY 2017: Modified TRC Results with Renewables	3.13	4.60	n/a	4.07
CY 2017: Modified TRC Results, Renewables Separate	3.39	4.89	1.37	4.07

The PSC directed Focus on Energy to perform additional benefit/cost tests for informational purposes:

- The expanded TRC has the same inputs as the modified TRC but also includes the net economic benefits.
- The UAT measures the net benefits and costs of the programs as a resource option from the perspective of the Focus on Energy Program Administrator.
- The RIM is the ratio of avoided utility costs and the combination of participant incentives, administrative costs, and lost utility revenue.

Table 27 lists the CY 2017 portfolio-level cost-effectiveness results for the additional test perspectives.

Table 27. CY 2017 Portfolio-Level Cost-Effectiveness Results for Additional Benefit/Cost Tests

Test	Residential	Nonresidential	Total
UAT Benefit/Cost Results	5.06	8.61	7.21
RIM Benefit/Cost Results[1]	0.62	1.02	0.87

[1] For the CY 2017 cost-effectiveness analysis, the lost revenue portion of the RIM test assumes a fixed utility rate that does not escalate over time, while the avoided energy costs are escalated on a yearly basis, resulting in greater benefits than costs for the nonresidential portfolio.

For the UAT, the results show that benefits from the residential programs were 5.06 times greater than the costs, while the benefits from the nonresidential programs outweighed the costs by a factor of 8.61. Given the RIM tests perspective's expansive view of program costs, particularly the inclusion of lost revenues, it is not surprising that the benefit/cost values from the RIM test are below 1.0 for the total portfolio. When interpreted within the context of the UAT results, these findings indicate that, although annual Focus on Energy activities will probably induce theoretical upward pressure on future energy rates, total ratepayer energy costs will go down.

For additional details on the different benefit/cost test results and processes used for calculating the cost-effectiveness of the Focus on Energy portfolio, please refer to Appendix F as well as the *Benefit/Cost Analysis CY 2009 Evaluation Report*.[24]

Outcomes and Recommendations

Based on the Evaluation Team's segment- and portfolio-level findings, this section presents high-level outcomes and recommendations.

Participant Satisfaction

Outcome 1. Participant satisfaction is high across all programs, and has increased significantly since the portfolio baseline was established in CY 2015.

Survey respondents gave Focus on Energy programs a combined, participation-weighted average overall satisfaction score of 9.0 (on a scale of 0 to 10), with average ratings per program ranging from 8.6 to 9.3. In CY 2017, overall portfolio satisfaction ratings were significantly higher than the 8.8 baseline established in CY 2015.

Consistent with CY 2016, participants also gave high ratings (averaging 8.7 or better) for Trade Allies, Program Implementers, and the upgrades they received. The aspect of Focus on Energy programs that received the lowest satisfaction ratings concerned incentive amounts, with average ratings per program ranging from 7.8 to 8.8. (This finding is not uncommon among energy efficiency programs across the country.)

[24] Focus on Energy. *Benefit/Cost Analysis CY 2009 Evaluation Report.* Submitted to Public Service Commission of Wisconsin. Submitted by PA Consulting Group and KEMA, Inc. Final: November 24, 2009. Available online: https://focusonenergy.com/sites/default/files/bcanalysiscy09_evaluationreport.pdf

In CY 2016, to assess NPS, the Program Administrator requested that the Evaluation Team add a question about the willingness of participants to recommend the program. In CY 2017, scores across all programs were high, ranging from +58 to +86 for residential and +79 to +85 for commercial participants. In a broader context, the strong customer loyalty represented by high NPS is associated with lower churn rates[25], higher uptake, and a lower cost of acquiring new customers. For utilities, customer loyalty translates into outcomes such as lower churn rates, higher willingness to purchase services from the same suppliers, higher energy efficiency program participation rates, and lower costs to serve.[26] The Multifamily Direct Install, Appliance Recycling, and Renewable Rewards component of Home Performance with ENERGY STAR programs had the highest residential NPS (+83 to +86), with Home Performance with ENERGY STAR (HVAC) and Retail Lighting and Appliance pop-up retail events components having the most room for improvement (+64 and +58, respectively). Participants in the Small Business and Large Energy Users programs gave the highest NPS (both +85) among commercial programs, though all nonresidential programs had NPS of at least +79.

These surveys also solicited open-ended feedback and suggestions, which were useful for informing process improvements. The Program Administrator regularly monitors customer satisfaction feedback, including identifying responses that require follow up. The Program Administrator collaborates with Program Implementers to respond to and resolve any identified ongoing issues and trends.

Recommendation 1a. Continue monitoring participant satisfaction and NPS through ongoing surveys and make process improvements to address customer concerns and suggestions. Although participant satisfaction ratings have been consistently trending high over the past two years, the surveys have offered insight into gaps in service levels and communication. Continue to monitor ongoing trends in satisfaction ratings and NPS and respond to comments from program participants and address small service issues and inconsistencies before they can affect more customers.

Recommendation 1b. Consider a proactive nurture campaign to follow up with survey respondents indicating high likelihood for making improvements in the coming year. Because positive experiences with programs can lead to stronger engagement with energy efficiency upgrades and improvements, consider directing specific information and program outreach to participants who indicated a high likelihood to make another improvement. This type of nurture campaign is relatively cost-effective and can generate even higher satisfaction and repeat participation.

Outcome 2. Processes for tracking adjustment measures and water adjustments continue to improve but with room for improvement.

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[25] Churn rate (or attrition rate) is a measure of the number of individuals or items moving out of a collective group over a specific period.

[26] Critchlow, Julian, and Andreas Dullweber. *Why Customer Loyalty Matters to Utilities.* Bain & Company. 2011. Available online: http://www.bain.com/publications/articles/why-customer-loyalty-matters-to-utilities.aspx

Adjustment measures are created in SPECTRUM to resolve an oversight in savings or incentives, such as claiming incorrect *ex ante* kWh, therms, or kW values, or the payment of incorrect incentives. This adjustment reconciles known errors in SPECTRUM prior to end-of-year reporting. The process surrounding adjustment measures has steadily improved each year and has contributed to greater accuracy of the program metrics that impact realization rates and NTG ratios.

Electric savings generated at water treatment plants because of the installation of water-saving equipment are also tracked in SPECTRUM, with one water adjustment measure for each utility impacted by water savings. The evaluator must attribute these savings back to the originating applications and measures in order to properly capture their impacts. Large custom projects can claim water savings as an individual measure in the application.

Recommendation 2. Continue to work with the Evaluation Team to determine improvements in tracking adjustment measures and water adjustments to improve the accuracy of SPECTRUM.

Consistency, transparency, and understanding of the meaning and purpose of individual adjustment measures can be improved by implementing a frequent cycle of review between administrator and evaluator throughout the year, rather than attempting to true-up and review all adjustment measures predominantly during end-of-year processes.