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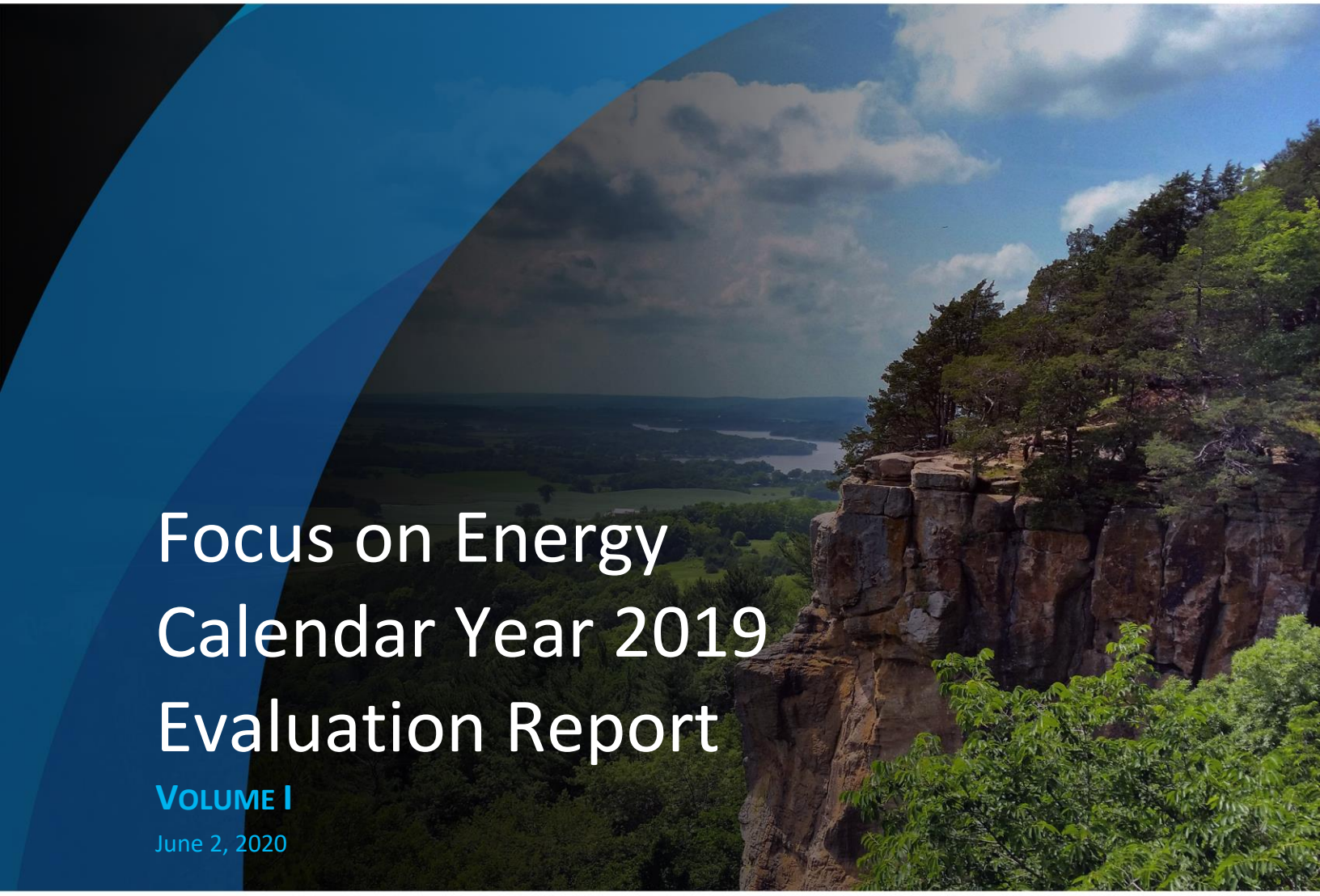

Focus on Energy Calendar Year 2019 Evaluation Report

VOLUME I

June 2, 2020

Prepared for:

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Table of Contents

Figures

Tables

Acronyms and Abbreviations

Acronym	Term
CY	Calendar year
DDC	Digital direct control
HVAC	Heating, ventilation, and air conditioning
Kw	Kilowatt
kWh	Kilowatt per hour
MMBtu	Million British thermal unit
MMID	Master measure identification
MThm	Thousand therms
MWh	Megawatt per hour
NPS	Net promoter score
NTG	Net-to-gross
PSC	Public Service Commission of Wisconsin
PTAC	Packaged terminal air conditioner
PTHP	Packaged terminal heat pump
RIM	Ratepayer impact measure test
RLAP	Retail Lighting and Appliance
SEM	Strategic energy management
SPECTRUM	Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management
SNF	Skilled nursing facility
TAS	Technical analysis summary
TRC	Total resource cost test
TRM	Technical reference manual
UAT	Utility administrator cost 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) 2019 and over the CY 2019-CY 2022 quadrennium.

- Volume I (this report) 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.
- Volume III provides the appendices with additional details on the evaluation methodologies along with supporting data and evaluation materials.

When appropriate, each volume presents rolled-up quadrennium findings with the annual results. The Wisconsin Focus on Energy Online Reporting tool allows users to review energy savings by year, program, customer sector, and measure category, and it offers other useful data by county, political district, and utility territory.[1]

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

Overall, the CY 2019 programs achieved high participant satisfaction.

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 the independent Evaluation Team[2]
- ***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 used by Focus on Energy to calculate savings, participation levels, and measure installation and retention rates. To determine net savings, the Evaluation Team conducted primary research in CY 2019 and, in a few instances, applied evaluation results from previous years.

[1]The Wisconsin Focus on Energy Online Reporting tool is available online: http://evaluations.focusonenergy.com

[2]The independent Evaluation Team comprises Cadmus, Apex Analytics, and Nexant.

Table 1 lists CY 2019 annual gross claimed savings, verified gross savings, and verified net savings for residential and nonresidential programs.

Table 1. CY 2019 First-Year Annual Savings by Segment

SAVINGS TYPE	UNIT	RESIDENTIAL	NONRESIDENTIAL	TOTAL
Gross	MMBtu	1,199,375	4,030,516	**5,229,891**
	kWh	258,518,345	521,656,531	**780,174,876**
	kW	32,908	68,219	**101,127**
	therms	3,173,106	22,506,239	**25,679,345**
Verified Gross	MMBtu	1,197,845	3,953,622	**5,151,466**
	kWh	257,798,406	523,239,416	**781,037,822**
	kW	32,950	67,532	**100,481**
	therms	3,182,364	21,683,288	**24,865,652**
Verified Net	MMBtu	582,347	2,857,821	**3,440,169**
	kWh	102,989,753	368,814,108	**471,803,861**
	kW	13,480	47,828	**61,307**
	therms	2,309,463	15,994,275	**18,303,738**

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

Table 2 lists the verified net savings achieved in CY 2018 and CY 2019.

Table 2. CY 2018 and CY 2019 First-Year Annual Verified Net Savings by Segment

SAVINGS TYPE	UNIT	RESIDENTIAL	NONRESIDENTIAL	TOTAL
CY 2018	MMBtu	998,126	2,556,149	**3,554,275**
	kWh	174,332,026	342,218,070	**516,550,096**
	kW	22,320	45,460	**67,780**
	therms	4,033,050	13,885,014	**17,918,064**
CY 2019	MMBtu	582,347	2,857,821	**3,440,169**
	kWh	102,989,753	368,814,108	**471,803,861**
	kW	13,480	47,828	**61,307**
	therms	2,309,463	15,994,275	**18,303,738**

The Public Service Commission of Wisconsin (PSC) ordered that the Focus on Energy Program Administrator track quadrennium savings achievements with respect to verified gross lifecycle savings targets.[3] Lifecycle savings represent the savings that programs can realize through measures over their expected useful lives. The PSC set an overall gross lifecycle savings goal for Focus in the 2019-2022 quadrennium in millions of

[3]*Public Service Commission of Wisconsin. June 6, 2018. Quadrennial Planning Process III. PSC REF#: 343909, Contract Number 5-FE-101 http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=343909*

British thermal units (MMBtu). In addition, the PSC established a quadrennium demand savings goal as well as minimum goal thresholds for kWh and therm savings. The minimum goal thresholds were set to achieve a balance in meeting the overall MMBtu goal using both types of savings.

The 2019-2022 quadrennium MMBtu savings goal set by the PSC is 299,555,154 MMBtu. The 2019-2022 quadrennium kW savings goal set by the PSC is 465,617 kW.

This report presents kWh and therms savings achievement relative to the overall goals. Savings in comparison to the minimum fuel-specific goal thresholds will be presented at the end of the quadrennium. The overall gross lifecycle savings targets for electric and natural gas presented in this report are 33,824,785,187 kWh and 1,841,449,874 therms, respectively.

Table 3 shows the lifecycle savings achieved by Focus on Energy in CY 2019.

Table 3. CY 2019 Lifecycle Savings by Segment

SAVINGS TYPE	UNIT	RESIDENTIAL	NONRESIDENTIAL	TOTAL
Gross	MMBtu	19,886,037	60,485,168	**80,371,205**
	kWh	4,132,290,830	7,630,386,270	**11,762,677,100**
	kW	32,908	68,219	**101,127**
	therms	57,866,604	344,502,902	**402,369,506**
Verified Gross	MMBtu	19,866,612	59,051,663	**78,918,274**
	kWh	4,120,568,612	7,571,848,059	**11,692,416,671**
	kW	32,950	67,532	**100,481**
	therms	58,072,316	332,165,170	**390,237,486**
Verified Net	MMBtu	9,308,457	42,841,675	**52,150,133**
	kWh	1,616,543,906	5,371,467,184	**6,988,011,090**
	kW	13,480	47,828	**61,307**
	therms	37,928,097	245,142,292	**283,070,389**

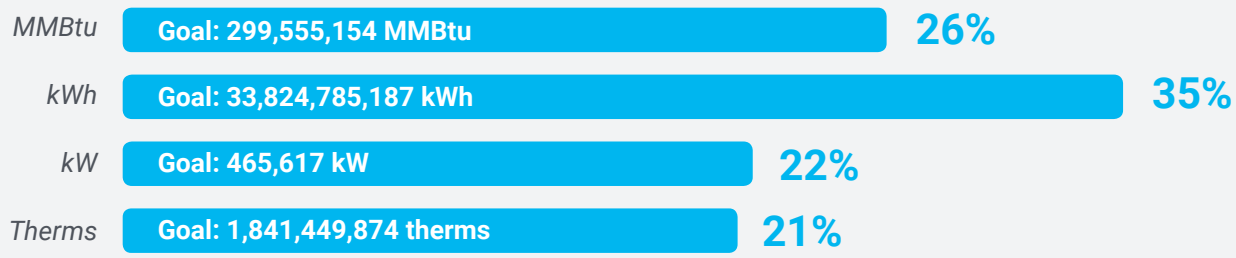
Table 4 lists verified gross lifecycle savings achieved in CY 2018 and CY 2019.

Table 4. CY 2018 and CY 2019 Verified Gross Lifecycle Savings by Segment

SAVINGS TYPE	UNIT	RESIDENTIAL	NONRESIDENTIAL	TOTAL
CY 2018	MMBtu	23,638,435	58,487,113	**82,125,547**
	kWh	4,802,375,984	7,485,804,898	**12,288,180,882**
	kW	36,780	71,629	**108,409**
	therms	72,527,277	329,455,464	**401,982,740**
CY 2019	MMBtu	19,866,612	59,051,663	**78,918,274**
	kWh	4,120,568,612	7,571,848,059	**11,692,416,671**
	kW	32,950	67,532	**100,481**
	therms	58,072,316	332,165,170	**390,237,486**

As shown in Figure 1, Focus on Energy achieved 26% of the MMBtu savings goal, 35% of the electric energy savings goal, 22% of the electric demand reduction goal, and 21% of the natural gas verified gross lifecycle quadrennium savings goal.

Figure 1. Program Administrator's Achievement of Four-Year (CY 2019-CY 2022) Verified Gross Lifecycle Savings Goal



Note: Percentages represent achievement to date (CY 2019) of the Program Administrator's established overall verified gross lifecycle goals.

The Program Administrator also has a contractual goal to maximize participant satisfaction. In CY 2019 surveys, participants gave an average customer satisfaction rating of 9.3 on a 0 to 10 point scale, where 10 meant extremely satisfied and 0 meant extremely dissatisfied. The CY 2019 average customer satisfaction rating was statistically higher, at 9.3,[4] than the portfolio target of 8.9.[5]

The Program Administrator has a goal to ensure that the portfolio passes a benefit/cost analysis, specifically the modified total resource cost test (TRC). Table 5 lists findings from the Evaluation Team's benefit/cost analysis of the CY 2019 portfolio. The residential and nonresidential segments and overall portfolio were cost-effective.

Table 5. CY 2019 Cost-Effectiveness Results

FOCUS ON ENERGY BENEFITS AND COSTS		PORTFOLIO BREAKOUT	CORE EFFICIENCY	PILOTS	RURAL	RENEWABLES
Incentives	$65,711,006		$59,293,753	N/A	$2,075,570	$4,341,683
Modified TRC Benefits	$606,696,377		$558,745,917	N/A	$9,960,916	$37,989,543
Modified TRC Costs	$235,541,325		$206,395,446	N/A	$4,043,144	$25,102,735
Portfolio TRC Ratio	**2.58**	Alone	**2.71**	N/A	2.46	1.51
		With Core		**N/A**	2.70	2.58
		With Core and Pilots (All Efficiency)			**2.70**	2.58
		With Core, Pilots, and Rural				**2.58**

[4] *p<0.05 using binomial t-test*

[5] *The Program Administrator's contract established a portfolio target of 8.9 to maintain or increase customer satisfaction.*

Introduction

Focus on Energy, Wisconsin's statewide energy efficiency and renewable resource program, is 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 helps manage Wisconsin's demand for electricity and natural gas.

The state's investor-owned utilities, with PSC approval, contracted with APTIM to serve as the Program Administrator for the CY 2019-CY 2022 quadrennium. The Program Administrator, in collaboration with the Program Implementers, is responsible for designing all of 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 2019, Focus on Energy maintained two separate portfolios of programs:

- The residential portfolio, servicing single-family and multifamily homes
- The nonresidential portfolio, servicing commercial, industrial, school, government, and agricultural customers

CY 2019 Evaluation

The Evaluation Team investigated the performance of 13 programs that delivered energy savings during CY 2019. Table 6 lists the programs evaluated in the residential and nonresidential portfolios.

Table 6. Residential and Nonresidential Programs

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

Summary of Measures by Segment

The Evaluation Team assessed the electric and natural gas savings achieved by each measure installed in CY 2019 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 7 lists all measure categories in the residential and nonresidential programs.

Table 7. CY 2019 Residential and Nonresidential Program Measure Categories

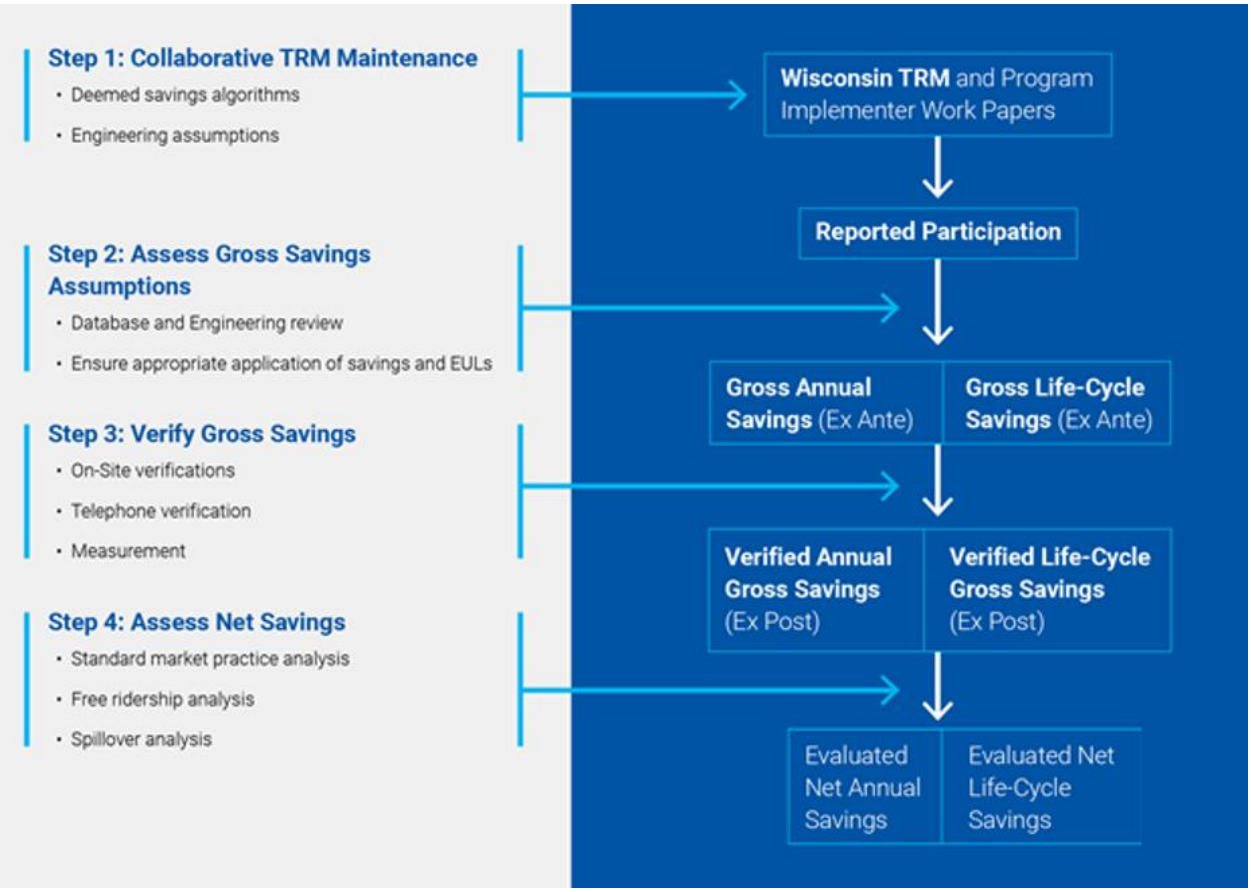
Program Measure Categories	
Residential Only	
Domestic Hot Water - Insulation	New Construction - Whole Building
Domestic Hot Water - Showerhead	Other - Controls
HVAC - Air Conditioner - Residential	Windows and Doors - Window
Motors & Drives - Motor	
Residential and Nonresidential	
Boilers & Burners - Boiler	HVAC - Packaged Terminal Unit (PTAC, PTHP)
Boilers & Burners - Controls	HVAC - Rooftop Unit / Split System AC
Boilers & Burners - Tune-up / Repair / Commissioning	HVAC - Steam Trap
Building Shell - Air Sealing	HVAC - Tune-up / Repair / Commissioning
Building Shell - Insulation	HVAC - Variable Speed Drive
Building Shell - Window	Lighting - Controls
Domestic Hot Water - Aeration	Lighting - Light Emitting Diode (LED)
Domestic Hot Water - Other	Other - Bonus
Domestic Hot Water - Variable Speed Drive	Other - Other
Domestic Hot Water - Water Heater	Refrigeration - Other
HVAC - Controls	Renewable Energy - Geothermal
HVAC - Energy Recovery	Renewable Energy - Photovoltaics
HVAC - Furnace	Training & Special - Other
HVAC - Motor	Vending & Plug Loads - Controls
HVAC - Other	

Program Measure Categories	
Nonresidential Only	
Agriculture - Bonus	HVAC - Economizer
Agriculture - Dryer	HVAC - Fan
Agriculture - Fan	HVAC - Filtration
Agriculture - Greenhouse	HVAC - Infrared Heater
Agriculture - Heat Exchanger	HVAC - Scheduling
Agriculture - Irrigation	HVAC - Unit Heater
Agriculture - Livestock Waterer	Industrial Ovens and Furnaces - Other
Agriculture - Tune-up / Repair / Commissioning	Information Technology - Other
Agriculture - Variable Speed Drive	Information Technology - Supporting Equipment
Boilers & Burners - Energy Recovery	Lighting - Delamping
Boilers & Burners - Insulation	Lighting - Other
Boilers & Burners - Variable Speed Drive	Motors & Drives - Other
Building Shell - Door	Motors & Drives - Variable Speed Drive
Building Shell - Other	New Construction - Design
Compressed Air, Vacuum Pumps - Compressor	Pools - Variable Speed Drive
Compressed Air, Vacuum Pumps - Controls	Process - Energy Recovery
Compressed Air, Vacuum Pumps - Dryer	Process - Filtration
Compressed Air, Vacuum Pumps - Energy Recovery	Process - Other
Compressed Air, Vacuum Pumps - Filtration	Process - Pump
Compressed Air, Vacuum Pumps - Nozzle	Process - Specialty Pulp & Paper
Compressed Air, Vacuum Pumps - Other	Process - Variable Speed Drive
Compressed Air, Vacuum Pumps - Reconfigure Equipment	Process - Welder
Compressed Air, Vacuum Pumps - System Isolation	Refrigeration - Controls
Compressed Air, Vacuum Pumps - Tune-up / Repair / Commissioning	Refrigeration - Energy Recovery
	Refrigeration - Heat Exchanger
Domestic Hot Water - Energy Recovery	Refrigeration - Ice Machine
Domestic Hot Water - Pre-Rinse Sprayer	Refrigeration - Motor
Food Service - Controls	Refrigeration - Reconfigure Equipment
Food Service - Dishwasher, Commercial	Refrigeration - Refrigerated Case Door
Food Service - Fryer	Refrigeration - Strip Curtain
Food Service - Griddle	Refrigeration - Tune-up / Repair / Commissioning
Food Service - Hot Holding Cabinet	Renewable Energy - Wind Electric
Food Service - Oven	Waste Water Treatment - Aeration
Food Service - Refrigerator / Freezer - Commercial	Waste Water Treatment - Other
Food Service - Steamer	Waste Water Treatment - Study
HVAC - Chiller	

Overview of Evaluation Activities

Figure 2 depicts the four-step process the Evaluation Team conducted in CY 2019 (further explained after the figure).

Figure 2. Evaluation Steps to Determine CY 2019 Net Savings



Step 1: Collaborative 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 Focus on Energy Technical Reference Manual (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. The Evaluation Team reconciled this information with data from the Program Administrator and Program Implementers. This process produced the *ex ante* gross annual and lifecycle savings.

Step 3: Verify Gross Savings. The Evaluation Team verified the installation of measures—either through site visits or phone surveys—and assessed gross savings, which included revisiting baseline assumptions and engineering inputs. The Evaluation 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. This process produced the *ex post* gross annual and lifecycle savings.

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 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 3, determining net savings based on self-reported information (conducted via surveys) or using a standard market practice approach. For the standard market practice method, the Evaluation 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 8 lists the specific data collection activities and sample sizes used in the residential and nonresidential segments for the CY 2019 evaluation.

Table 8. CY 2019 Evaluation Activities

Evaluation Activity	Residential	Nonresidential	Total CY 2019
On-Site Evaluation, Measurement, and Verification [a]	10	211	**221**
Engineering Desk Reviews	112	238	**350**
Project Audit and Verification Surveys [b]	0	0	**0**
Participant Surveys	279	1,182	**1,461**
Ongoing Participant Satisfaction Surveys [c]	5,849	1,557	**7,406**
Program Actor Interviews	9	4	**13**
Trade Ally and Market Actor Surveys/Interviews	44	73	**117**
Regression Modeling/Billing Analyses	1	3	**4**
System Energy Monitoring Data Collection	0	6	**6**
On-Site Logger Installation	0	4	**4**

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

[b] This row is exclusive of project audits conducted for on-site evaluation, measurement, and verification.

[c] This row includes only the 20% sample from all Simple Energy Efficiency Program ongoing participant satisfaction survey responses and the 42% sample from all Home Performance with ENERGY STAR Program HVAC path ongoing participant satisfaction survey responses that were analyzed for the CY 2019 evaluation.

Evaluation Findings

Table 9 lists the overall net lifecycle MMBtu, electricity, demand, and natural gas savings for Focus on Energy's portfolio in CY 2018 and CY 2019.

Table 9. Overall Portfolio Net Lifecycle Savings by Calendar Year

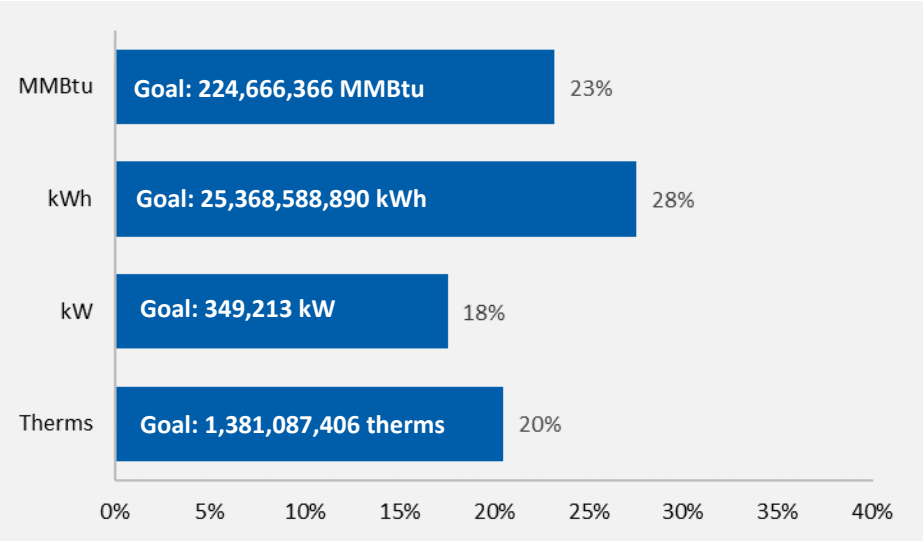
Calendar Year	Annual Savings (MMBtu)	Electric Savings (kWh)	Demand Reduction (kW)	Natural Gas Savings (therms)
CY 2018	53,310,563	7,630,824,848	67,780	272,741,888
CY 2019	52,150,133	6,988,011,090	61,307	283,070,389

The PSC Final Decision for Quadrennial Planning Process III (PSC Ref#: 343909) set four-year net lifecycle savings goals for the PSC of 224,666,366 MMBtu, 25,368,588,890 kWh, 349,213 kW, and 1,381,087,406 therms. The portfolio is required to meet only 90% of the electric energy savings and natural gas savings goals over the full quadrennium. Remaining MMBtu savings above the 90% threshold can be met with either fuel. These minimum thresholds were established to provide flexibility in program delivery in the changing markets.

This report presents kWh and therms savings achievement relative to the overall goals. Savings in comparison to the minimum goal thresholds will be presented at the end of the quadrennium.

The Focus on Energy programs reached 23% of the MMBtu savings goal, 28% of the electric energy savings goal, 18% of the electric demand reduction goal, and 20% of the natural gas quadrennium savings goal to-date. Figure 3 shows a comparison of Focus on Energy's actual quadrennium savings to the PSC's established goals and verified gross targets for the full four-year quadrennium.

Figure 3. Focus on Energy's Achievement of Four-Year (CY 2019-CY 2022) Net Lifecycle Savings Goal



Note: Percentages represent achievement to date (CY 2019) of PSC's established overall net lifecycle goals for the quadrennium.

Table 10 lists the overall verified gross lifecycle electricity savings, demand reduction, and natural gas savings for the portfolio in CY 2018 and CY 2019.

Table 10. Overall Portfolio Verified Gross Lifecycle Savings for CY 2018 and CY 2019

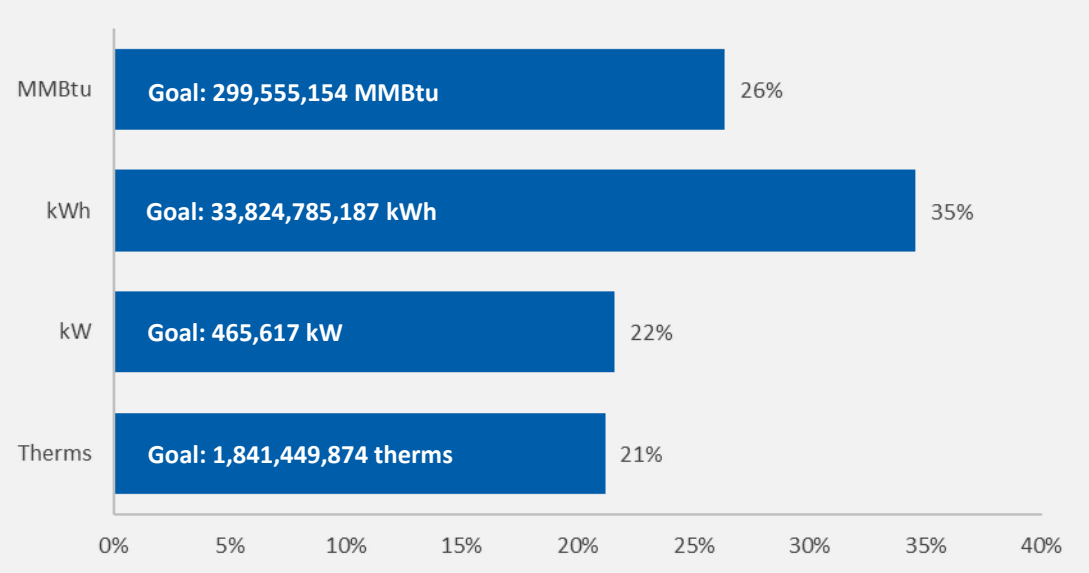
Calendar Year	Annual Savings (MMBtu)	Electric Savings (kWh)	Demand Reduction (kW)	Natural Gas Savings (therms)
CY 2018	82,125,547	12,288,180,882	108,409	401,982,740
CY 2019	78,918,274	11,692,416,671	100,481	390,237,486

The PSC has ordered that the Focus on Energy Program Administrator track quadrennium savings goals compared to verified gross lifecycle savings targets: 299,555,154 MMBtu, 33,824,785,187 kWh, 465,617 kW, and 1,841,449,874 therms (PSC Ref#: 343909). Similar to the discussion above regarding verified net lifecycle savings goals, this report presents kWh and therms savings achievement relative to the overall goals rather than the 90% threshold goals. Savings in comparison to the minimum goal thresholds will be presented at the end of the quadrennium.

Of the quadrennium goals, the Program Administrator reached 26% of the MMBtu savings goal, 35% of the electric energy savings goal, 22% of the demand reduction goal, and 21% of the natural gas savings goal.

Figure 4 shows a comparison of the actual quadrennium savings totals to the Programs Administrator's quadrennium savings goals.

Figure 4. Program Administrator's Achievement of Four-Year (CY 2019-CY 2022) Verified Gross Lifecycle Savings Goal



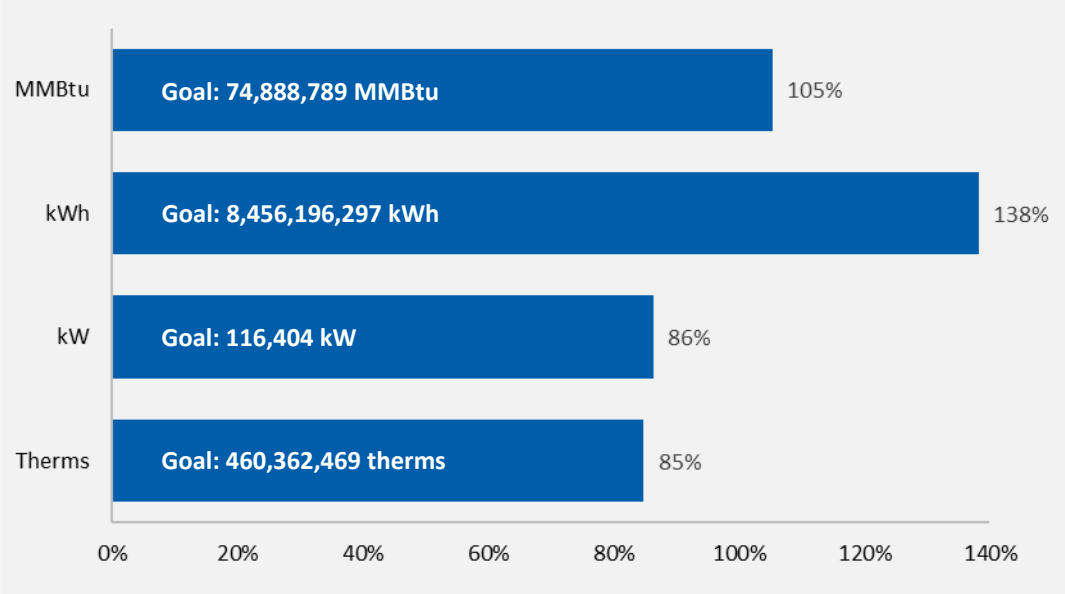
Note: Percentages represent achievements to date (CY 2019) of the Program Administrator's established overall verified gross lifecycle goals for the quadrennium.

The Program Administrator also tracks interim annual verified gross lifecycle targets, defined as approximately one-fourth of the overall CY 2019-CY 2022 quadrennium savings goals. In CY 2019, these targets represented 74,888,789 MMBtu, 8,456,196,297 kWh, 116,404 kW, and 460,362,469 therms.

The Program Administrator reached 105% of the MMBtu savings goal, 138% of the electric energy savings goal, 86% of the electric demand reduction goal, and 85% of the natural gas verified gross lifecycle savings goal.

Figure 5 shows the CY 2019 actual savings totals compared to the Programs Administrator's CY 2019 savings goals.

Figure 5. Program Administrator's Achievement of CY 2019 Verified Gross Lifecycle Savings Goal



Note: Percentages represent achievements to date of the Program Administrator's verified gross lifecycle goals for CY 2019.

Summary of Impacts by Program

This section summarizes the CY 2019 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 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 11 lists the total CY 2019 participation (measured as number of participating customers) in each program and segment.

Table 11. Total Participation by Program in CY 2019

Segment	Program	CY 2019 Participation
Residential	Appliance Recycling	9,627
	Home Performance with ENERGY STAR	26,645
	Multifamily Energy Savings	479
	New Homes	2,382
	Online Marketplace	1,375
	Retail Lighting and Appliance [a]	832,554
	Simple Energy Efficiency	61,849
Residential Subtotal		**934,911**
Nonresidential	Agriculture, Schools, and Government	1,565
	Business Incentive	1,730
	Design Assistance	124
	Large Energy Users	383
	Renewable Energy Competitive Incentive	65
	Small Business	3,125
Nonresidential Subtotal		**6,992**
Total		**941,903**

[a] Of the CY 2019 Retail Lighting and Appliance Program participants, 11,140 were not lighting participants.

Figure 6 shows verified gross lifecycle savings by sector.

Figure 6. CY 2019 Verified Gross Lifecycle Savings Impacts by Sector

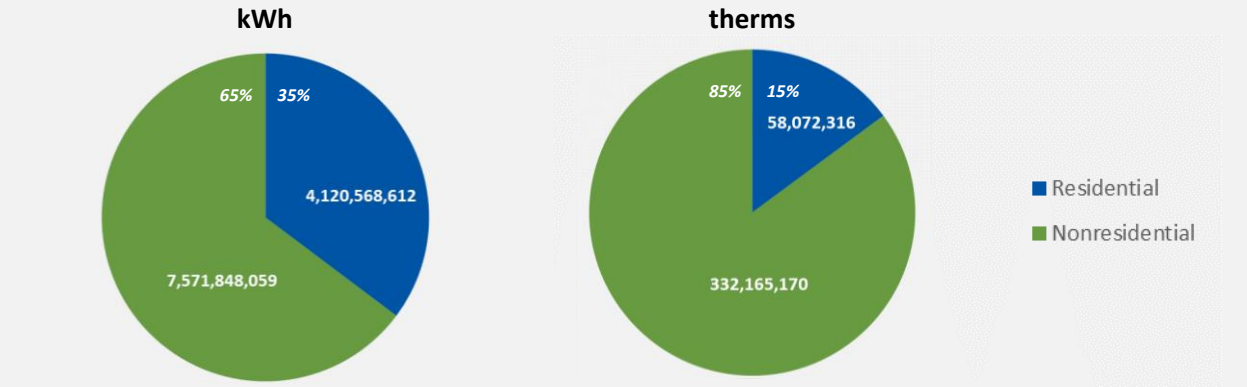


Figure 7 and Figure 8 show the verified gross lifecycle electric and natural gas energy savings by program for residential and nonresidential. There are three key findings:

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

Figure 7. CY 2019 Verified Gross Lifecycle Electric Energy Impacts by Program

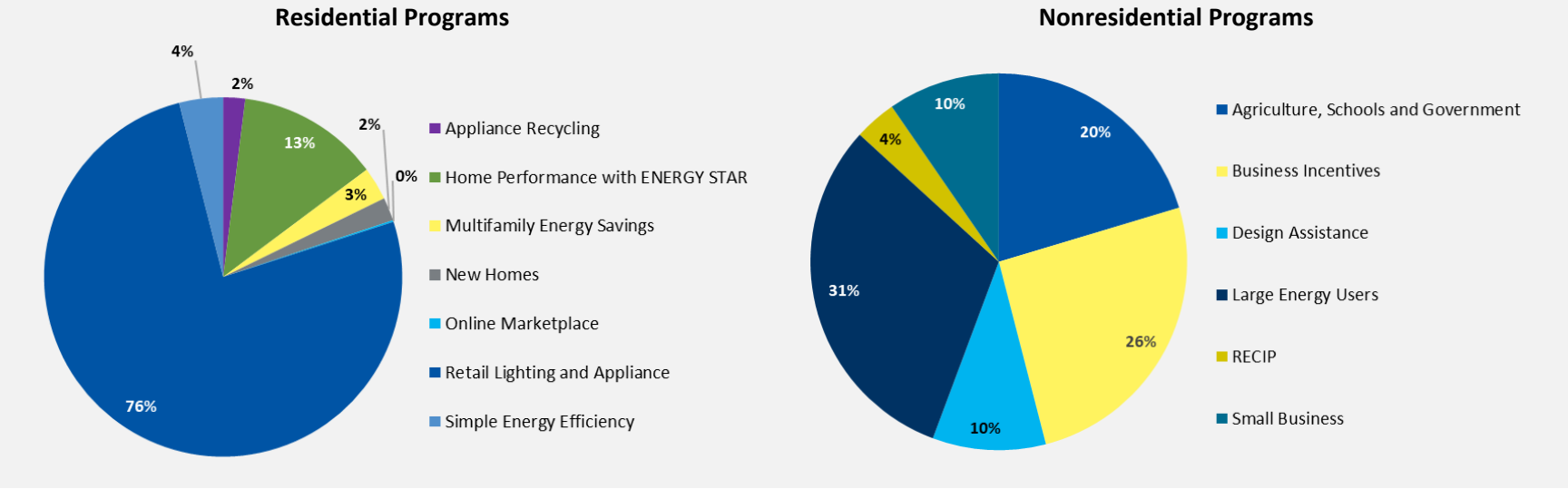


Figure 8. CY 2019 Verified Gross Lifecycle Natural Gas Energy Impacts by Program

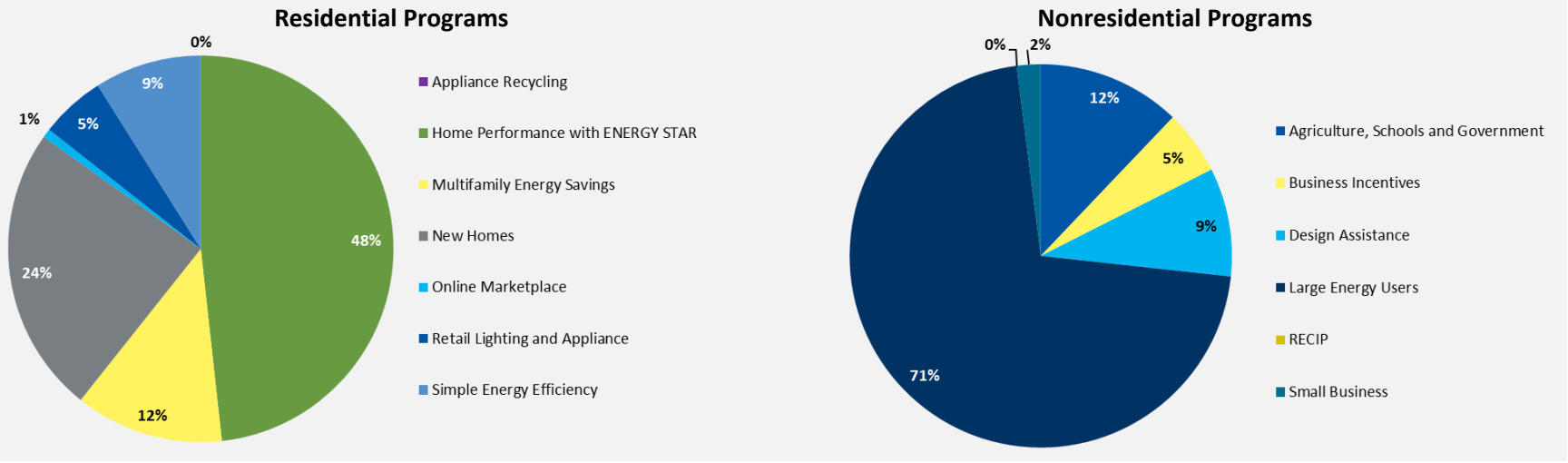


Table 12 lists the first-year annual gross savings, verified gross savings, and verified net demand reduction for electricity and natural gas by program, segment, and overall portfolio.

Table 12. Summary of CY 2019 Annual Savings by Program

Program Name	Gross			Verified Gross			Verified Net		
	kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
Residential Programs									
Appliance Recycling	8,440,556	988	0	8,191,038	960	0	3,560,424	418	0
Home Performance with ENERGY STAR	26,124,127	6,213	1,547,119	26,044,996	6,411	1,544,998	18,912,426	4,470	1,308,724
Multifamily Energy Savings	11,439,379	1,099	420,303	11,317,631	1,068	427,000	8,375,047	790	315,980
New Homes	2,859,673	765	466,695	2,859,673	765	466,695	0	0	23,335
Online Marketplace	642,937	0	44,234	630,107	0	43,349	548,197	0	37,714
Retail Lighting and Appliance	197,458,697	22,736	289,133	197,156,641	22,621	283,369	59,995,340	6,677	206,759
Simple Energy Efficiency	11,552,975	1,108	405,622	11,598,320	1,125	416,952	11,598,320	1,125	416,952
Residential Total	**258,518,345**	**32,908**	**3,173,106**	**257,798,406**	**32,950**	**3,182,364**	**102,989,753**	**13,480**	**2,309,463**
Nonresidential Programs									
Agriculture, Schools and Government	106,007,170	13,122	2,744,430	106,987,447	13,035	2,625,975	71,681,589	8,733	1,759,403
Business Incentives	142,918,881	19,272	1,790,486	145,782,240	19,273	1,275,295	82,918,886	10,933	723,413
Design Assistance	36,921,573	5,664	1,515,140	36,813,277	5,562	1,526,440	26,505,559	4,005	1,099,037
Large Energy Users	168,979,282	19,553	16,068,299	167,650,317	19,400	15,867,694	127,414,241	14,744	12,059,448
Renewable Energy Competitive Incentive	10,471,810	3,827	0	11,412,526	3,686	0	10,613,650	3,428	0
Small Business	56,357,815	6,781	387,884	54,593,609	6,575	387,884	49,680,184	5,984	352,974
Nonresidential Total	**521,656,531**	**68,219**	**22,506,239**	**523,239,416**	**67,532**	**21,683,288**	**368,814,108**	**47,828**	**15,994,275**
Total All Programs	**780,174,876**	**101,127**	**25,679,345**	**781,037,822**	**100,481**	**24,865,652**	**471,803,861**	**61,307**	**18,303,738**

Summary of Impacts by Measure Category

Table 13 lists CY 2019 residential energy savings, demand reduction, and incentive costs by measure category.

Table 13. Summary of CY 2019 Annual Savings by Measure Category in the Residential Segment

Measure Category	Verified Gross						Incentives Dollars	Incentive Dollars Percentage
	kWh	kWh Percentage	kW	kW Percentage	Therms	Therms Percentage		
Boilers & Burners-Boiler	0	0.00%	0	0.00%	298,148	9.37%	$396,030.00	1.72%
Boilers & Burners-Controls	0	0.00%	0	0.00%	5,446	0.17%	$7,375.00	0.03%
Boilers & Burners-Tune-up / Repair / Commissioning	0	0.00%	0	0.00%	222	0.01%	$858.37	0.00%
Building Shell-Air Sealing	6,086	0.00%	11	0.03%	25,184	0.79%	$612,290.65	2.65%
Building Shell-Insulation	780,303	0.30%	357	1.08%	201,086	6.32%	$652,562.35	2.83%
Building Shell-Window	3,686	0.00%	0	0.00%	3,531	0.11%	$2,967.10	0.01%
Domestic Hot Water-Aeration	254,789	0.10%	25	0.08%	60,385	1.90%	$39,454.68	0.17%
Domestic Hot Water-Insulation	1,571,210	0.61%	245	0.74%	198,551	6.24%	$157,614.73	0.68%
Domestic Hot Water-Other	40,228	0.02%	5	0.02%	65,392	2.05%	$69,817.18	0.30%
Domestic Hot Water-Showerhead	856,440	0.33%	41	0.13%	171,009	5.37%	$159,637.06	0.69%
Domestic Hot Water-Variable Speed Drive	56,686	0.02%	10	0.03%	0	0.00%	$2,700.00	0.01%
Domestic Hot Water-Water Heater	4,534	0.00%	0	0.00%	15,778	0.50%	$25,550.00	0.11%
HVAC-Air Conditioner - Residential	473	0.00%	1	0.00%	0	0.00%	$741.05	0.00%
HVAC-Controls	8,486,469	3.29%	0	0.00%	581,357	18.27%	$1,804,593.94	7.82%
HVAC-Energy Recovery	-244	0.00%	1	0.00%	1,401	0.04%	$562.50	0.00%
HVAC-Furnace	7,861,953	3.05%	1,541	4.68%	664,658	20.89%	$2,809,675.00	12.17%
HVAC-Motor	7,535	0.00%	1	0.00%	0	0.00%	$100.00	0.00%
HVAC-Other	2,998,867	1.16%	890	2.70%	129,294	4.06%	$1,088,848.60	4.72%
HVAC-Packaged Terminal Unit (PTAC, PTHP)	143,967	0.06%	8	0.02%	0	0.00%	$7,000.00	0.03%
HVAC-Rooftop Unit / Split System AC	89,282	0.03%	65	0.20%	0	0.00%	$101,913.40	0.44%
HVAC-Steam Trap	0	0.00%	0	0.00%	45,067	1.42%	$10,420.00	0.05%
HVAC-Tune-up / Repair / Commissioning	0	0.00%	0	0.00%	1,414	0.04%	$15,095.10	0.07%
HVAC-Variable Speed Drive	125,363	0.05%	18	0.05%	0	0.00%	$7,880.00	0.03%
Lighting-Controls	87,866	0.03%	4	0.01%	0	0.00%	$1,100.00	0.00%
Lighting-Light Emitting Diode (LED)	211,978,938	82.23%	24,123	73.21%	0	0.00%	$10,252,174.67	44.41%

Measure Category	Verified Gross						Incentives Dollars	Incentive Dollars Percentage
	kWh	kWh Percentage	kW	kW Percentage	Therms	Therms Percentage		
Motors & Drives-Motor	41,500	0.02%	8	0.02%	0	0.00%	$10,000.00	0.04%
New Construction-Whole Building	2,859,673	1.11%	765	2.32%	466,695	14.67%	$1,386,950.00	6.01%
Other-Bonus	0	0.00%	0	0.00%	0	0.00%	$18,444.00	0.08%
Other-Controls	0	0.00%	0	0.00%	0	0.00%	$2,475.00	0.01%
Other-Other	385,641	0.15%	157	0.48%	214,857	6.75%	$982,555.01	4.26%
Refrigeration-Other	8,191,038	3.18%	960	2.91%	0	0.00%	$218,825.00	0.95%
Renewable Energy-Geothermal	339,791	0.13%	71	0.22%	0	0.00%	$49,400.00	0.21%
Renewable Energy-Photovoltaics	9,840,300	3.82%	3,490	10.59%	0	0.00%	$1,803,276.69	7.81%
Training & Special-Other	27,811	0.01%	0	0.00%	0	0.00%	$0.00	0.00%
Vending & Plug Loads-Controls	701,470	0.27%	93	0.28%	0	0.00%	$155,911.33	0.68%
Window	57,264	0.02%	60	0.18%	32,890	1.03%	$230,193.79	1.00%

Note: This table does not include adjustment measure records. As a result, this sum will not match with other CY 2019 totals.

Table 14 lists CY 2019 nonresidential savings and incentive costs by measure category.

Table 14. Summary of CY 2019 Annual Savings by Measure Category in the Nonresidential Segment

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars Percentage
	kWh	kWh Percentage	kW	kW Percentage	therms	Therms Percentage		
Aeration	696,540	0.13%	70	0.10%	6,231	0.03%	$22,563.98	0.05%
Air Sealing	35,756	0.01%	6	0.01%	105,236	0.49%	$85,489.90	0.20%
Boiler	93,256	0.02%	8	0.01%	2,323,646	10.72%	$2,254,176.64	5.27%
Bonus	0	0.00%	0	0.00%	0	0.00%	$1,150,862.26	2.69%
Chiller	10,256,281	1.96%	1,076	1.59%	0	0.00%	$818,214.35	1.91%
Compressor	4,961,164	0.95%	906	1.34%	0	0.00%	$346,050.00	0.81%
Controls	27,589,086	5.27%	2,427	3.59%	537,749	2.48%	$2,396,731.87	5.61%
Delamping	1,791,938	0.34%	360	0.53%	0	0.00%	$55,502.31	0.13%
Design	36,813,277	7.04%	5,562	8.24%	1,526,440	7.04%	$4,155,925.49	9.72%
Dishwasher, Commercial	456,333	0.09%	1	0.00%	3,031	0.01%	$17,610.00	0.04%
Door	137,400	0.03%	0	0.00%	0	0.00%	$4,154.67	0.01%
Dryer	600,411	0.11%	98	0.14%	66,685	0.31%	$155,772.50	0.36%
Economizer	12,884	0.00%	0	0.00%	0	0.00%	$1,000.00	0.00%

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars Percentage
	kWh	kWh Percentage	kW	kW Percentage	therms	Therms Percentage		
Energy Recovery	9,973,784	1.91%	1,864	2.76%	8,134,377	37.51%	$3,290,523.52	7.70%
Fan	1,845,592	0.35%	363	0.54%	20,036	0.09%	$206,686.85	0.48%
Filtration	377,013	0.07%	49	0.07%	135,957	0.63%	$151,780.81	0.36%
Fryer	10,398	0.00%	2	0.00%	51,509	0.24%	$28,050.00	0.07%
Furnace	247,523	0.05%	47	0.07%	123,482	0.57%	$220,520.52	0.52%
Geothermal	26,814	0.01%	0	0.00%	0	0.00%	$6,151.00	0.01%
Greenhouse	0	0.00%	0	0.00%	7,403	0.03%	$760.32	0.00%
Griddle	24,847	0.00%	5	0.01%	200	0.00%	$1,170.00	0.00%
Heat Exchanger	1,024,403	0.20%	0	0.00%	0	0.00%	$65,392.74	0.15%
Hot Holding Cabinet	15,614	0.00%	3	0.00%	0	0.00%	$480.00	0.00%
Ice Machine	26,177	0.01%	3	0.00%	0	0.00%	$900.00	0.00%
Infrared Heater	0	0.00%	0	0.00%	27,516	0.13%	$38,160.00	0.09%
Insulation	21,676	0.00%	12	0.02%	253,361	1.17%	$155,425.56	0.36%
Irrigation	83,295	0.02%	44	0.07%	0	0.00%	$6,500.00	0.02%
Light Emitting Diode (LED)	262,801,867	50.23%	35,427	52.46%	0	0.00%	$15,501,227.32	36.26%
Livestock Waterer	478,319	0.09%	0	0.00%	0	0.00%	$14,000.00	0.03%
Motor	7,899,457	1.51%	928	1.37%	0	0.00%	$535,555.97	1.25%
Nozzle	146,880	0.03%	54	0.08%	0	0.00%	$240.00	0.00%
Other	49,616,628	9.48%	4,448	6.59%	7,398,628	34.12%	$4,965,827.66	11.62%
Oven	63,920	0.01%	15	0.02%	23,459	0.11%	$18,440.00	0.04%
Packaged Terminal Unit (PTAC, PTHP)	1,134,470	0.22%	49	0.07%	0	0.00%	$45,900.00	0.11%
Photovoltaics	11,371,174	2.17%	3,658	5.42%	0	0.00%	$2,681,024.47	6.27%
Pre-Rinse Sprayer	0	0.00%	0	0.00%	100	0.00%	$125.00	0.00%
Pump	1,392,504	0.27%	134	0.20%	0	0.00%	$48,268.10	0.11%
Reconfigure Equipment	1,693,183	0.32%	315	0.47%	0	0.00%	$57,332.84	0.13%
Refrigerated Case Door	4,229,788	0.81%	187	0.28%	46,119	0.21%	$104,240.00	0.24%
Refrigerator / Freezer - Commercial	162,772	0.03%	18	0.03%	0	0.00%	$41,130.00	0.10%
Rooftop Unit / Split System AC	1,331,014	0.25%	872	1.29%	136,097	0.63%	$455,057.22	1.06%
Scheduling	311,658	0.06%	25	0.04%	34,370	0.16%	$22,047.65	0.05%
Specialty Pulp & Paper	1,373,586	0.26%	164	0.24%	0	0.00%	$98,400.00	0.23%
Steam Trap	0	0.00%	0	0.00%	376,834	1.74%	$46,490.00	0.11%
Steamer	113,601	0.02%	195	0.29%	3,851	0.02%	$8,240.00	0.02%

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars Percentage
	kWh	kWh Percentage	kW	kW Percentage	therms	Therms Percentage		
Strip Curtain	107,290	0.02%	12	0.02%	0	0.00%	$3,014.00	0.01%
Study	0	0.00%	0	0.00%	0	0.00%	$24,548.95	0.06%
Supporting Equipment	307,590	0.06%	35	0.05%	0	0.00%	$32,487.47	0.08%
System Isolation	338,024	0.06%	0	0.00%	0	0.00%	$6,814.00	0.02%
Tune-up / Repair / Commissioning	10,789,842	2.06%	0	0.00%	290,053	1.34%	$146,174.51	0.34%
Unit Heater	0	0.00%	0	0.00%	4,527	0.02%	$12,600.00	0.03%
Variable Speed Drive	70,338,772	13.44%	8,044	11.91%	0	0.00%	$2,164,015.83	5.06%
Water Heater	26,583	0.01%	0	0.00%	38,515	0.18%	$63,487.00	0.15%
Welder	74,419	0.01%	15	0.02%	0	0.00%	$4,500.36	0.01%
Wind Electric	14,538	0.00%	29	0.04%	0	0.00%	$5,685.00	0.01%
Window	73	0.00%	0	0.00%	7,877	0.04%	$9,050.76	0.02%

Note: This table does not include adjustment measure records. As a result, this sum will not match with other CY 2019 totals.

Residential Segment Process Evaluation Findings

For the CY 2019 process evaluation of residential programs, the Evaluation Team collected information and perspectives from Focus on Energy participants, Trade Allies, Program Implementers, and the Program Administrator. The Team reached participants through program-level phone surveys, an online or mailed participant satisfaction survey, or both. The Team reached Trade Allies through phone interviews. Table 15 shows the evaluation activity by residential program.

Table 15. CY 2019 Residential Process Evaluation Activities by Program

Program	Participant Surveys	Ongoing Participant Satisfaction Surveys	Partial Participant Interviews	Program Actor Interviews	Trade Ally and Market Actor Surveys/ Interviews
Multifamily Energy Savings	✓	✓	70	✓	
Appliance Recycling	✓	✓		✓	
Home Performance with ENERGY STAR	✓	✓		✓	✓
New Homes				✓	✓
Retail Lighting and Appliance and Rural Pop-Up Events		✓		✓	
Simple Energy Efficiency and Farmhouse Kits		✓		✓	
Design Assistance—Residential				✓	

More than 50,000 residential customers in Wisconsin participated in Focus on Energy's programs in CY 2019, not including an estimated 834,000 Wisconsin customers who purchased lighting measures through the Retail Lighting and Appliance Program and Rural Pop-Up Events.

As listed above in Table 13, residential customers installed energy-efficient measures across a wide range of technologies, which included products purchased through the Retail Lighting and Appliance Program and Rural Pop-Up Events, and achieved verified gross electricity savings of 257,798,406 kWh and natural gas savings of 3,182,364 therms.

Participant Satisfaction

The Evaluation Team fielded satisfaction surveys online and by mail during CY 2019 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 nearly 15,000 surveys in CY 2019.

Participants in all ongoing programs gave higher or equivalent overall satisfaction ratings in CY 2019 compared to CY 2018. All average ratings in CY 2019 were 9.1 or higher. The largest increases in satisfaction ratings were for the Home Performance with ENERGY STAR Program Whole Home path (to 9.1 in CY 2019 from 8.7 in CY 2018) and Simple Energy Efficiency Program (to 9.4 CY 2019 from 9.1 in CY 2018). Participants in one new CY 2019 program (Retail Lighting and Appliances online coupon smart thermostats) also reported high overall satisfaction, with a rating of 9.3.

The satisfaction ratings for most residential programs in CY 2019 were statistically higher than the portfolio target of 8.9, with the exceptions of the Home Performance with ENERGY STAR Program Whole Home path (9.1) and Retail Lighting and Appliances Program online coupon smart thermostats (9.3 based on a small sample size of 24). Satisfaction ratings for both of these programs were not statistically different from the portfolio target.[6]

In CY 2019, across all surveyed residential programs, the participation-weighted average overall program satisfaction was 9.3, which was statistically higher than the portfolio target.[7] This represented an increase from the CY 2018 participation-weighted residential portfolio average of 9.1 as well as the residential portfolio average rating of 9.0 in the CY 2015-CY 2018 quadrennium.

Figure 9 shows surveyed participants' average satisfaction ratings with residential programs in CY 2019 along with the previous year (CY 2018) and the average ratings of the entire CY 2015-CY 2018 quadrennium.[8]

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, a positive NPS is interpreted as good, indicating a higher proportion of promoters to detractors. The closer the NPS is to +100, the more favorable the respondents are toward the program. NPS scores over +80 are considered excellent, while scores that dip below 50 warrant investigation into a potential improvement opportunity.

The residential programs received universally high ratings from participants, with an NPS over +80 for every CY 2019 program with one exception. The Home Performance with ENERGY STAR Program Whole Home path had an NPS of +78. The highest scores for any residential programs in CY 2019 were +94 NPS for the Multifamily Energy Savings Program and +90 NPS for the Appliance Recycling Program.

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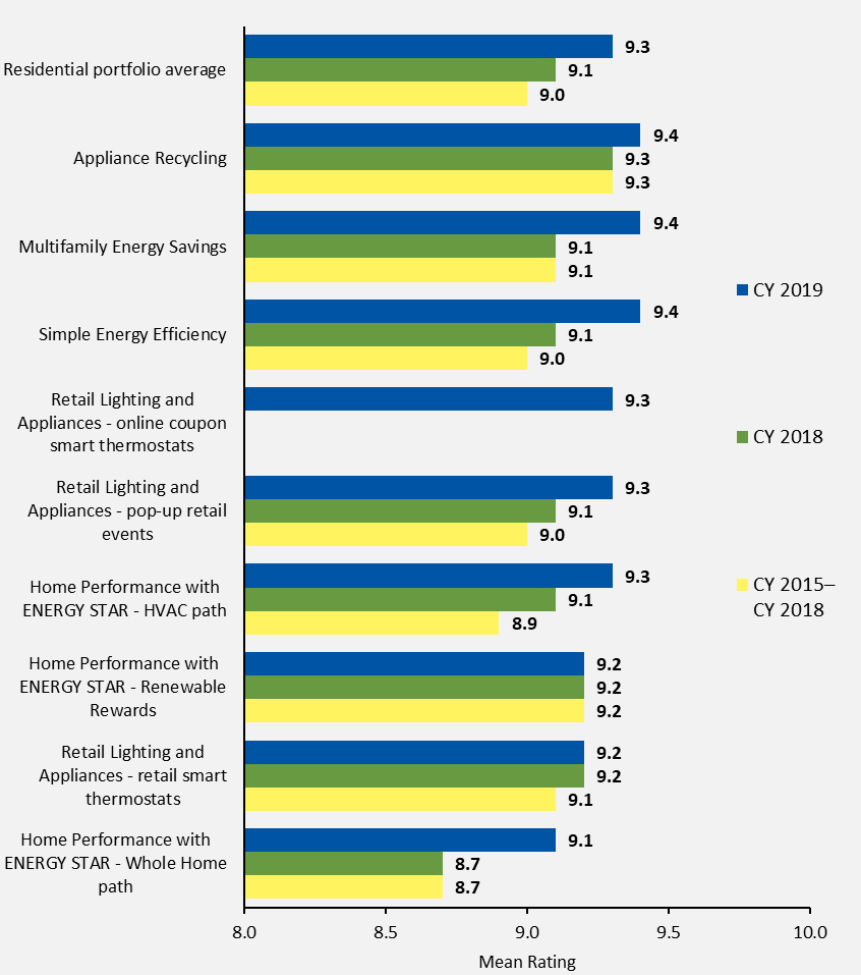
6 $p<0.05$ using binomial *t*-tests.

7 $p<0.05$ using a binomial *t*-test.

8 Ongoing participant satisfaction surveys for CY 2019 did not include the New Homes or Design Assistance Programs. Retail Lighting and Appliance Program surveys for CY 2019 did not cover the entire Program but were specific to channels or products within it (retail smart thermostats rebates, online coupon smart thermostats, and pop-up retail events that offered LEDs and power strips). Respondents for the Multifamily Energy Savings Program survey were building owners, not building residents.

Figure 9. CY 2019 Average Overall Satisfaction Ratings for Residential Programs



Source: Program Participant Satisfaction Mail/Online Survey Question. "Overall, how satisfied are you with the program?" Appliance Recycling CY 2018 (n=1,567), CY 2019 (n=1,561); Multifamily Energy Savings CY 2019 (n=37), CY 2019 (n=53); Simple Energy Efficiency CY 2018 (n=1,050), CY 2019 (n=1,336), Retail Lighting and Appliances: Online coupon smart thermostats CY 2019 (n=24); Pop-up retail events CY 2018 (n=143), CY 2019 (n=175); Retail smart thermostats CY 2018 (n=1,389), CY 2019 (n=804); Home Performance with ENERGY STAR: HVAC path CY 2018 (n=1,035), CY 2019 (n=1,405); Whole Home path CY 2018 (n=250), CY 2019 (n=224); Renewable Rewards path CY 2018 (n=216), CY 2019 (n=225).

Total CY 2015-CY 2018 is the participation-weighted average for all years in the quadrennium that the program was active. The residential portfolio average is the average of all programs surveyed during the year weighted by total program participation.

Nonresidential Segment Process Evaluation Findings

For the CY 2019 nonresidential program evaluation, the Evaluation Team collected limited data from participants because of the upcoming changes to the portfolio, set to take place in 2020. The evaluation focused on participant satisfaction and specific topics of interest to the Program Administrator and Program Implementers.

The Evaluation Team conducted in-depth interviews with Trade Allies who specify and install HVAC equipment to gather feedback about a possible midstream program design for certain types of equipment. The Team conducted online focus groups and one-on-one interviews with healthcare facility managers to garner insights around facility upgrades and decision-making processes and to test program concepts, such as retrocommissioning and strategic energy management (SEM), to gauge interest and identify challenges in this commercial segment.

Customer Satisfaction

During CY 2019, 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. The surveys used a scale from 0 to 10, where 10 meant *extremely satisfied* and 0 meant *not at all satisfied*. Figure 10 shows participants' average satisfaction ratings with nonresidential programs.

Participants gave the CY 2019 nonresidential programs average satisfaction ratings ranging from 9.1 for Large Energy Users to 9.5 for Schools and Government.[9] Ratings for all nonresidential programs were statistically higher than the portfolio target of 8.9.[10] In CY 2019, across all nonresidential programs surveyed, the participation-weighted average overall program satisfaction rating was 9.3, which was significantly above the portfolio baseline.[11] This represented an increase from the CY 2018 participation-weighted nonresidential portfolio average of 9.1, as well as from the CY 2015-CY 2018 quadrennium nonresidential portfolio average rating of 9.0.

The Evaluation Team calculated an NPS for each program based on the likelihood of the participant to recommend the program. Generally, a positive NPS is interpreted as good, and the closer the NPS is to +100, the more favorable the respondents are toward the program. All five nonresidential program components received a high NPS from participants: the School and Government offering had the highest NPS at +90, while the lowest nonresidential program NPS was for Small Business at +83.

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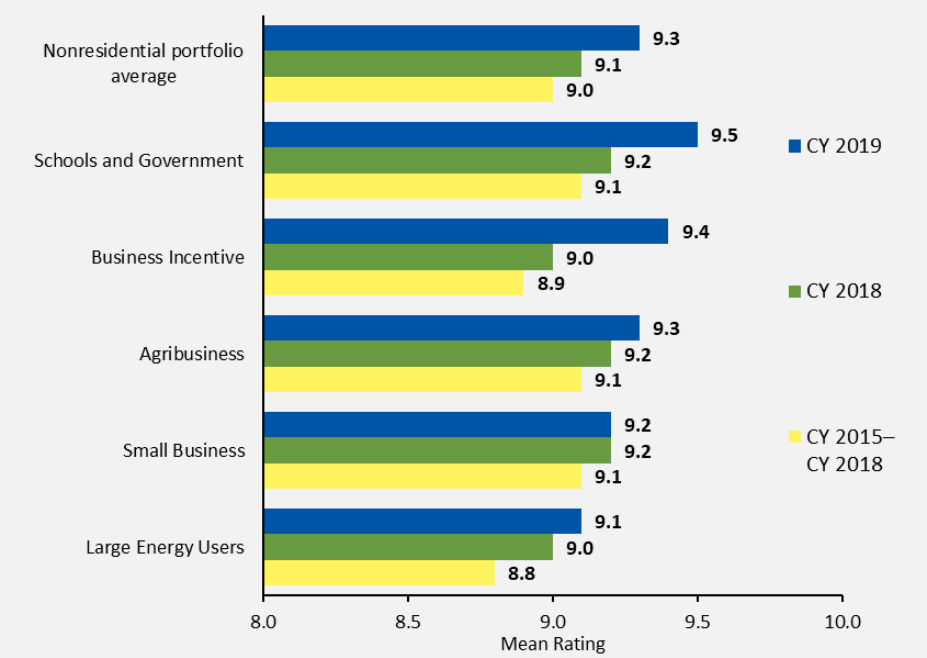
[9] For CY 2019, Agriculture, Schools and Government survey results were reported separately for Agribusiness respondents and Schools and Government respondents.

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

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

Figure 10. CY 2019 Average Overall Satisfaction Ratings for Nonresidential Programs



Source: Program Participant Satisfaction Mail/Online Survey Question. "Overall, how satisfied are you with the program?" Schools and Government CY 2018 (n=378), CY 2019 (n=263); Business Incentive CY 2018 (n=272), CY 2019 (n=331); Agribusiness CY 2018 (n=378), CY 2019 (n=108); Small Business CY 2018 (n=461), CY 2019 (n=720); Large Energy Users CY 2018 (n=128), CY 2019 (n=127).
Total CY 2015-CY 2018 is the participation-weighted average for all years in the quadrennium that the program was active. The nonresidential portfolio average is the average of all programs surveyed during the year weighted by total program participation.

Trade Ally Experience

The Program Administrator emailed an online survey to the 878 Trade Allies supporting the nonresidential programs. Surveys went to any Trade Ally who had received an incentive (or whose customer had received an incentive) in CY 2018 through at least one of the programs shown in Table 16.

The Program Administrator received completed surveys from 71 Trade Allies (an 8% response rate) who provided feedback about their program experience. Of these, 35% provide electrical or electrical-related services through the programs, 24% provide retail or distributor related services through the programs, and the remainder provide refrigeration, HVAC, consulting services, or other building services.

Table 16. CY 2019 Trade Ally Respondents by Program

Program	Emails Sent	Respondents (n)
Agriculture, Schools and Government	184	14
Business Incentive	367	21
Design Assistance	36	0
Large Energy Users	62	8
Renewable Energy Competitive Incentive [a]	65	8
Small Business	140	20
Total [b]	**878**	**71**

[a] Trade Allies may have participated in residential and nonresidential renewable energy projects.

[b] Some Trade Allies participated in more than one program.

Satisfaction with Focus on Energy

Satisfaction levels were high across most programs, with at least 50% of the Trade Ally respondents providing a rating of 4 or 5, using a 1 to 5 scale in which 1 is *very dissatisfied* and 5 is *very satisfied.* As shown in Table 17, all eight Large Energy Users Program Trade Allies who reported were *satisfied* or *very satisfied* with Focus on Energy. Of the 14 respondents who offered an explanation for a less than satisfied rating, four were dissatisfied with the size or speed of the incentive payment and three thought the program could be streamlined to make participation easier.

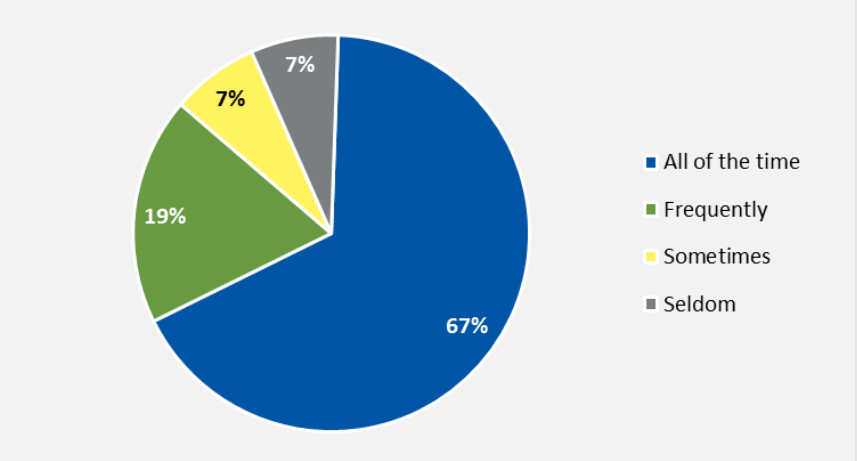
Table 17. CY 2019 Overall Trade Ally Satisfaction with Focus on Energy

Program	Small Business (n=20)	Business Incentive (n=21)	Renewables (n=8)	Agriculture, Schools and Government (n=14)	Large Energy Users (n=8)
5 - Very Satisfied	3	6	3	7	7
4	7	11	4	4	1
3	8	2	1	1	0
2	2	2	0	1	0
1 - Very Dissatisfied	0	0	0	1	0

Source: CY 2019 Trade Ally Surveys Question "Overall, how satisfied are you with Focus on Energy? (Scale 1-5, where 1=very dissatisfied and 5 = very satisfied)"

When asked how often they promote or include Focus on Energy incentives in their project proposals, most respondents (67% across all programs, n=70) said they do so *all of the time* (Figure 11).

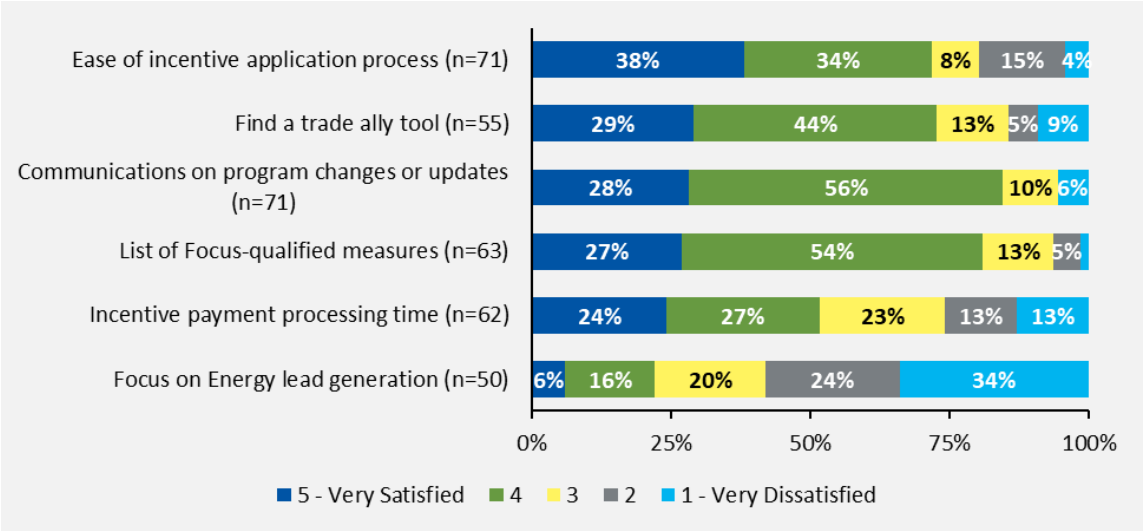
Figure 11. CY 2019 Trade Ally Program Incentive Promotion



Source: CY 2019 Trade Ally Survey Question "During the last year, how often did you promote or include Focus on Energy incentives in your project proposals?" (n=70)

When asked to rate their satisfaction with six specific aspects of the program, Trade Ally responses varied. Communications about program changes and the Focus on Energy's list of qualified measures received the greatest number of *very satisfied* or *satisfied* ratings. Respondents were least satisfied with Focus on Energy lead generation and incentive processing times (Figure 12). Trade Ally respondents in the Small Business Program reported the highest rate of dissatisfaction with incentive processing times and Focus on Energy lead generation (65% and 60%; n=20).[12]

Figure 12. CY 2019 Trade Ally Satisfaction with Program Aspects

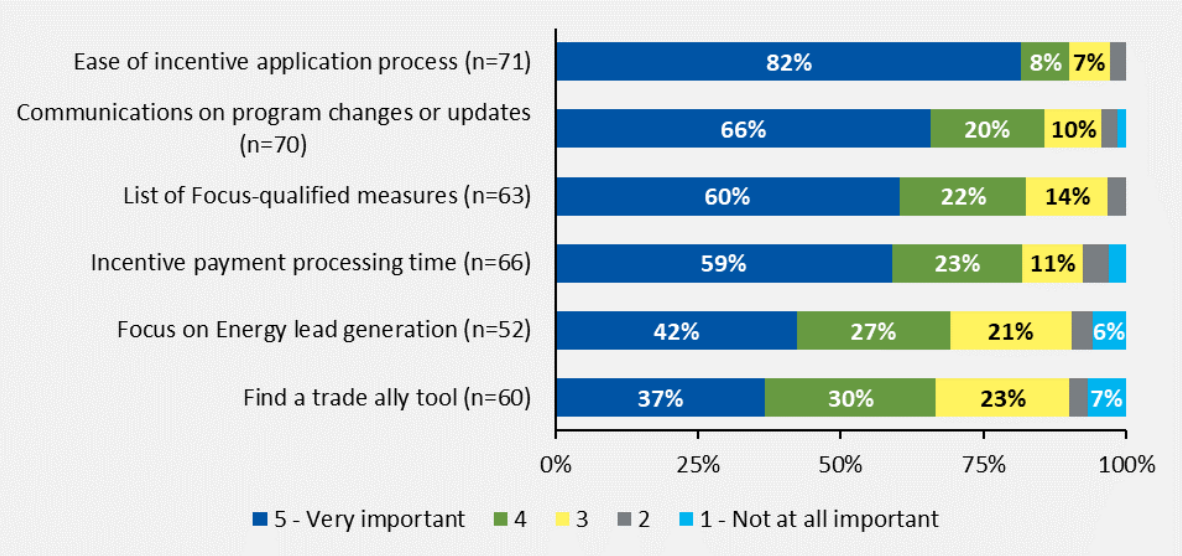


Source: CY 2019 Trade Ally Survey Question "Overall, how satisfied are you with…?"

[12] It is possible some Trade Allies misinterpreted this survey prompt, which was intended to determine whether Focus on Energy helped with lead generation in general. Focus on Energy does not directly provide Trade Allies with customer leads.

When asked about the importance of each of these program aspects, respondents most often rated the ease of the incentive application process as *very important* and find a trade ally tool of least importance (Figure 13).

Figure 13. CY 2019 Trade Ally Importance of Program Aspects



Source: CY 2019 Trade Ally Survey Question "How important is…"

Trade Ally Portal Preferences

Trade Allies were asked to rank the type of information they would find most useful should an online Trade Ally portal be made available. The majority of respondents across all programs said the status of the incentive application would be the most important feature of the online portal. Table 18 shows the aspects of a Trade Ally portal from most useful (1) to least useful (7), based on mean responses.

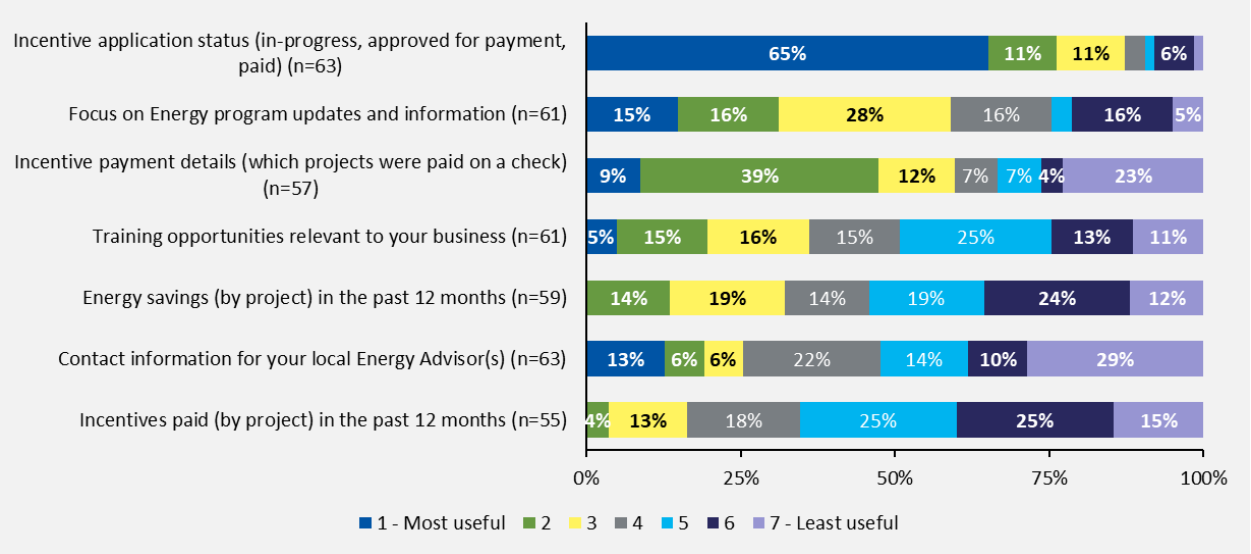
Table 18. CY 2019 Most Useful Information for Trade Ally Portal

Average Rank	Online Trade all Portal Information
1	Incentive application status (in progress, approved for payment, paid)
2	Focus on Energy program updates and information
3	Incentive payment details (which projects were paid on a check)
4	Training opportunities relevant to your business
5	Energy savings (by project) in the past 12 months
6	Contact information for your local Energy Advisor(s)
7	Incentives paid (by project) in the past 12 months

Figure 14 shows the percentage of respondents who rated the usefulness of each aspect, using the same ranking structure. The figure demonstrates the variability in how individual Trade Allies view these aspects. For example, though "Incentives paid (by project) in the past 12 months" was rated the least

useful aspect of the portal on average, two respondents (4%) ranked this aspect as the second most important feature.

Figure 14. CY 2019 Online Trade Ally Portal Information Preferences



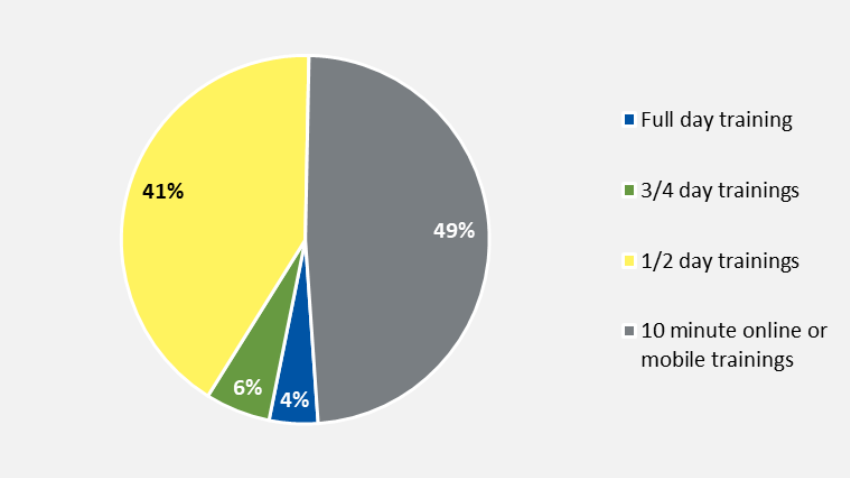
Source: CY 2019 Trade Ally Survey Question "If Focus on Energy were to provide your company with access to an online Trade Ally Portal, what information would you find most useful to have available? Please rank the following features in order of usefulness to you, where 1 is the MOST useful, and 7 is the LEAST useful…."

Interest in Training

Focus on Energy offers training to Trade Allies and customers throughout the year. When asked what type of training would be most beneficial to them, of 65 Trade Allies, 48% said a training on how to navigate the Focus on Energy programs, 32% said a technical training, and 20% said a sales training. However, half of the respondents in two programs—Agriculture, Schools and Government (n=12) and Renewables (n=8)—said a technical training would be the most beneficial.

When asked about the duration of training they or their staff would be most likely to attend, 49% of the Trade Allies who responded (n=70) preferred to attend short, online training or half-day training (Figure 15). Eighteen Trade Allies said they were willing to travel up to 100 miles to attend training, three were willing to travel 100 to 200 miles, and nine were unwilling to travel for training.

Figure 15. CY 2019 Trade Ally Training Duration



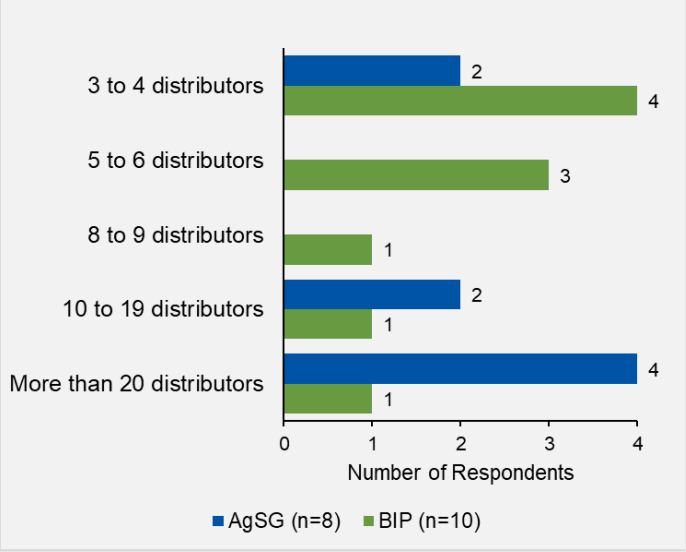
Source: CY 2019 Trade Ally Survey Question "What duration of training are you or your staff most likely to attend? (n=70)

Midstream Program Design Feedback

In November 2019, the Evaluation Team conducted 20 in-depth phone interviews with Trade Allies who provided program-eligible HVAC measures to customers who had participated in the Business Incentive Program or the Agriculture, Schools and Government Program. To ensure representative input, the Team completed interviews with contractors who had completed a high volume and a low volume of program-eligible projects in the past 12 months.

The interview first inquired about the size of the contractors' networks used for purchasing commercial HVAC equipment and how readily available energy-efficient models were. Trade Allies said they worked with a range of distributors—usually three or four and up to a dozen or more, especially when dealing with specialized equipment (Figure 16). Fifteen of 20 respondents said their distributors regularly stock energy-efficient commercial equipment, though most also noted specialty items, items with unique features, and equipment such as heat exchangers, compressors, custom-built units, and larger units usually require special order.

Figure 16. CY 2019 Size of Trade Allies' Distributor Network



The Evaluation Team asked Trade Allies for their initial thoughts about changing the incentive delivery for certain measures to a midstream offering. Trade Allies gave the pros and cons listed in Figure 17. Trade Allies found the concept of a midstream offering appealing because it could streamline the process and provide customers with an instant discount. On the other hand, many thought it would be difficult to prove that a price discount actually occurred or that not all distributors would participate because of required paperwork or interruption in cash flow.

Figure 17. CY 2019 Trade Allies' Reactions to Midstream Incentives

Positive Reactions	Negative Reactions
Streamlined paperwork (5)	Hard to prove discount passed down (11)
Increase in energy-efficient sales (4)	Paperwork/reimbursement delays will deter distributors (6)
Clear reporting of discount on customer invoices (1)	No need to change current system (2)
Distributors will stock eligible equipment (1)	Eligibility confusing if not all distributors commit (1)
	Decreased participation without customer awareness (1)
	Contractors lose business if they do not partner with participating distributor (1)
	Contractors lose competitive advantage (1)
	Increased stock could increase price (1)

Healthcare Segment Research

The Evaluation Team conducted four online focus groups with skilled nursing facilities (SNFs) and hospitals in Wisconsin. Eighteen facility managers or decision-makers took part in this qualitative research. The focus groups were segmented based on whether or not they had previously participated in the Business Incentive or Large Energy Users programs as well as on facility size. Detailed methodology and findings are in *Appendix K. Healthcare Focus Groups Findings* in Volume III.

Decision-Making Processes

The Evaluation Team assessed the healthcare facilities' internal decision-making processes regarding facility improvements and incorporating energy efficiency into those improvements. Facility managers were asked about the timing of capital project planning, key decision-makers, priorities for facility upgrades, and whether energy efficiency is considered when making facility plans.

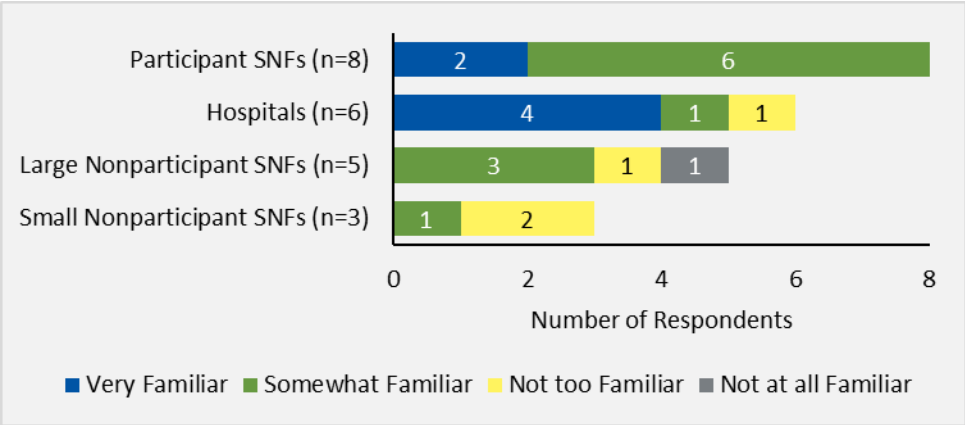
Most facilities have an annual capital budget process, and most large facilities require approval from executive leaders or a board of directors. Small SNFs, however, had a less formal approval process. Though all facilities consider upfront cost and payback period, only some hospitals and SNFs target a specific payback period. Half the hospitals target a payback period of one to five years, and half the SNFs target a payback period of half the measure life (e.g., a 10-year payback for a measure life of 20 years).

Large facility managers are more concerned about their energy costs than are small SNFs, but concern does not always translate into action or energy-savings goals. Only three hospitals had formal energy savings goals, while no SNFs did. Most facility managers upgrade or replace equipment for revenue generation, occupant comfort, or safety reasons rather than for cutting energy costs. Nevertheless, when making these upgrades, most large hospitals and SNFs consider installing energy-efficient equipment models.

Participation Barriers

Hospitals and participant SNFs had the highest awareness of ways to save energy and of Focus on Energy offerings (Figure 18). However, some respondents in all segments lacked awareness of either, and they also lacked the time and staff expertise to research these on their own.

Figure 18. CY 2019 Focus Group Segment Familiarity with Ways to Save Energy at their Healthcare Facilities



Source: Pre-focus group survey question "How familiar are you with ways to save energy at your healthcare facility?"

The Evaluation Team found that large and small facilities had critically different needs for obtaining information. Large facility managers desired more interaction with Focus on Energy representatives, but small SNFs lacked any time to meet. Large facility managers were more interested in participating in Focus on Energy programs than were the small facilities, because of challenges with dedicating the time and resources to understand the program and participate. Small facilities were also less able to handle high upfront costs and suggested that grants or loans would help them overcome this barrier.

When asked about what could help them overcome barriers, facilities of all types reported that detailed payback period forecasts and information on Focus on Energy incentives could help overcome the barrier of competing budget priorities. Also, all facility managers trust industry-specific healthcare associations as a source of information, which is an opportunity for Focus on Energy to get the word out about offerings.

Feedback on Program Offerings

The Evaluation Team gave one-page descriptions of retrocommissioning and strategic energy management (SEM) offerings to all facility managers (these descriptions can be found in *Volume III. Appendices*). They identified appealing program components, questions or points of confusion, and barriers to participation.

The largest barriers to the retrocommissioning offering were the program requirements for digital direct control (DDCs), building minimum size or age, and weekly staff time commitments. In addition, all SNF facility managers were concerned about not achieving enough energy savings to recoup the upfront audit cost. They were skeptical of the retrocommissioning savings estimates that were presented and expressed a desire to see detailed case studies of retrocommissioning that included such things as project costs, savings, and time commitments for either healthcare facilities or multifamily buildings similar in size to their facilities. The chance for long-term energy savings from retrocommissioning, however, along with program incentives and audit recommendations appealed to all facility managers.

SEM was viewed very positively, and several SNFs preferred it over retrocommissioning since there was no upfront cost. The largest barriers to participating in the SEM offering was meeting the required time commitments and dedicating staff time to create energy teams. Most of the hospitals that the Evaluation Team spoke with were interested in participating in SEM and desired more information about specific activities that would be required of staff as well as more information on cost savings.

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 2019-CY 2022 quadrennium. The Program Administrator and Program Implementers used the calculator to assess the cost-effectiveness of programs' 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 2019, presented in this section.

As directed by the PSC, 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.[13] 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 cost test (UAT), and the ratepayer impact measure test (RIM).

NTG ratios can be a significant driver of TRC, UAT, and RIM results. NTG ratios are applied to program impacts so they 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 1.0, savings are removed and, when the NTG ratio is greater than 1.0, 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 absence of the programs (such as program 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,[14] the conventional standard of cost-effectiveness analysis for energy efficiency programs in the United States. The modified TRC is described below, and the detailed descriptions and results for the expanded TRC, the UAT, and the RIM are in *Appendix F* in Volume III.

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[13] Public Service Commission of Wisconsin. June 6, 2018. *Quadrennial Planning Process III – Final Decision*. PSC Docket 5-FE-101, PSC REF#: 343909. http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=343909

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

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, as well as some non-energy benefits such as emission reduction benefits. Note that incentive costs are not included as TRC costs because they are deemed transfer payments, which is consistent with industry guidelines defining the TRC test. Incentive costs are used for other costs tests, however, such as the UAT.

The modified TRC used for the CY 2019 evaluation defines program cost-effectiveness from a regulatory perspective (as directed by the PSC) and is intended to measure the overall impacts of the programs' 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:

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

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 changes to emissions allowance prices for the CY 2019-CY 2022 quadrennium, cost-effectiveness results reported here are not directly comparable to results from the previous quadrennium (CY 2015-CY 2018). The changes to avoided costs tended to decrease the benefit/cost test results across all programs, when compared to the avoided costs used in the previous quadrennium.

Additionally, changes in the calculation of incremental measure costs further reduce the comparability between quadrenniums, as many measures, including most custom measures, saw their measure cost calculation approach revised between CY 2018 and CY 2019. As with avoided costs, these changes often decreased the benefit/cost ratio at the portfolio level compared to the previous quadrennium. These externalities have an impact on program and overall portfolio cost-effectiveness; however, they do not directly reflect the overall performance of the Focus on Energy program.

Value of Net Saved Energy

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

The PSC first established the methodology to estimate electric energy avoided costs in its June 18, 2012 Order under Docket 5-GF-191 (PSC REF#: 166932).[15] The PSC first established the methodology to estimate natural gas avoided costs in its Order of February 25, 2015, under Docket 5-FE-100 (PSC REF#: 232431).[16] The methodologies established under the aforementioned PSC Orders were maintained by the PSC in its Final Decision for the Quadrennial Planning Process III.[17]

The source for electric energy avoided costs in this CY 2019 evaluation comes from the annualized forecast avoided cost model developed by the Evaluation Team. This model relied on the Midcontinent Independent Transmission System Operator's locational marginal pricing for nodes in Wisconsin and on forecasts for 2019, 2024, and 2029.[18]

The source for natural gas avoided costs in this CY 2019 evaluation are based on Henry Hub price forecasts from the 2018 U.S. Energy Information Administration's *Annual Energy Outlook*.[19]

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 a line loss factor of 8% to account for distribution losses. Table 19 shows the avoided cost assumptions used for the cost-effectiveness tests in CY 2018 and CY 2019.

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

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

17 Public Service Commission of Wisconsin. June 6, 2018. *Quadrennial Planning Process III – Final Decision*. *PSC Docket 5-FE-101, PSC REF#: 343909.* http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=343909

18 Midcontinent Independent Transmission System Operator, Inc. Last updated 2019. "Day-Ahead Locational Marginal Pricing" https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/

19 U.S. Energy Information Administration. February 6, 2018. *Annual Energy Outlook*. https://www.eia.gov/outlooks/aeo/pdf/AEO2018.pdf

Table 19. Avoided Cost Comparison of CY 2018 and CY 2019

Avoided Cost	CY 2018	CY 2019
Electric Energy ($/kWh) [a]	$0.04747 to $0.06871	$0.03093–$0.04878
Electric Capacity ($/kW year)	130.26	$117.43 to 174.17
Natural Gas ($/therm)[b]	$0.802 to $1.278	$0.538–$0.764
Avoided Cost Inflation	0%	0%
Real Discount Rate	2%	2%
Line Loss	8%	8%

Emissions Benefits

The equation to determine emissions benefits requires three key parameters—lifecycle verified 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 per megawatt hour (MWh) and natural gas is expressed in tons per 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 the avoided emissions benefit.

The natural gas emissions factor has remained constant since CY 2011, and the U.S. Environmental Protection Agency's AVERT tool was used to calculate the electric emissions. This tool uses emissions factors specific to different regions in Wisconsin in order to get more tailored figures. To obtain emissions by program, the Evaluation Team mapped site zip code and utilities to AVERT regions. The Team allocated any saving that did not match to an AVERT region to a region using the ratio of the population that those regions cover. The Team then ran these savings by program and region through the AVERT tool to get the electric emissions benefits.

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*.[20] The Team used the carbon dioxide emissions price established by the PSC in their Final Decision for Quadrennial Planning Process III (PSC Ref#: 343909), which states, "The Commission finds it reasonable for Focus cost-effectiveness tests to continue valuing avoided carbon dioxide emissions using a market-based value of $15.00 per ton."[21]

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[20] S&P Global. Accessed April 2017. Platts MegaWatt Daily. http://nyarea.org/wp-content/uploads/11_23_16_EARNED-MEDIA_Platts-Megawatt-Daily_King-Coal-to-reign-again-%E2%80%94-for-the-winter-EIA.pdf

[21] Public Service Commission of Wisconsin. June 6, 2018. *Quadrennial Planning Process III – Final Decision*. *PSC Docket 5-FE-101, PSC REF#: 343909.* http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=343909

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

Table 20. Total Program Emissions Benefits by Segment

Program Year[a]	Residential	Nonresidential	Pilots	Rural	Total
CY 2018 Emissions Benefits	$34,598,669	$67,349,281	$4,915,161	$2,838,264	**$109,701,374**
CY 2019 Emissions Benefits	$24,187,924	$94,615,966	N/A	N/A	**$118,803,890**

[a] Reported emissions impacts are based on the sum of project-level benefits, both electric and gas

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.[22] Focus on Energy's fiscal agent, Wipfli, provided the CY 2019 program costs used for this evaluation.

Table 21 shows the CY 2018 and CY 2019 program and incentive cost values used for the cost-effectiveness tests.

Table 21. Sector Costs Comparison

Costs	CY 2018	CY 2019
Residential		
Incentive Costs	$24,760,071	$23,490,150
Administrative Costs	$972,610	$2,775,789
Delivery Costs	$14,420,186	$10,438,711
Total Residential Program Costs	**$40,152,867**	**$36,704,651**
Nonresidential		
Incentive Costs	$38,863,493	$40,345,267
Administrative Costs	$2,178,289	$2,135,458
Delivery Costs	$23,003,392	$21,263,700
Total Nonresidential Program Costs	**$64,045,174**	**$63,744,426**
Pilots		
Incentive Costs	$4,382,328	N/A
Administrative Costs	$153,616	N/A
Delivery Costs	$4,733,901	N/A
Total Pilots Program Costs	**$9,269,845**	N/A
Rural		
Incentive Costs	$7,886,441	$1,875,588
Administrative Costs	$133,862	$27,111
Delivery Costs	$5,083,364	$1,388,404
Total Rural Program Costs	**$13,103,667**	**$3,291,103**

[22] The Evaluation Team included the incentives as an incremental cost but not as a program cost.

Costs	CY 2018	CY 2019
Total		
Incentive Costs	$75,892,333	$65,711,006
Administrative Costs	$3,438,377	$4,938,358
Delivery Costs	$47,240,843	$33,090,816
Total Program Costs	**$126,571,553**	**$103,740,180**

Incremental Costs

The gross incremental costs are the additional costs incurred as a result of purchasing efficient equipment over and above purchasing a baseline nonqualified product. The Evaluation Team derived the gross incremental cost values used in this CY 2019 evaluation from the incremental cost study it conducted with the Program Administrator and Program Implementers. The incremental cost study allowed the Team to establish 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 evaluation of the previous quadrennium (CY 2015-CY 2018), the Evaluation Team assigned actual CY 2019 project costs from the program tracking databases to the renewable energy projects. Table 22 shows the CY 2018 and CY 2019 total measure net incremental costs used for the cost-effectiveness tests.

Table 22. Net Incremental Measure Cost Comparison

Costs	Residential	Nonresidential
CY 2018 Incremental Costs	$96,141,415	$84,727,293
CY 2019 Incremental Costs	$62,647,981	$134,864,170

Table 23 lists CY 2019 incentive costs by sector, with renewables incorporated.

Table 23. CY 2019 Incentive Costs by Sector (with Renewables Incorporated)

Costs	Residential	Nonresidential	Total
Incentive Costs	$23,490,150	$42,220,856	**$65,711,006**

Table 24 lists the findings of the benefit/cost analysis for Focus on Energy's CY 2019 programs by sector.

Table 24. CY 2019 Benefit and Costs Portfolio Breakout

Focus on Energy Benefits and Costs		Portfolio Breakout	Core Efficiency	Pilots	Rural	Renewables
Incentives	$65,711,006		$59,293,753	N/A	$2,075,570	$4,341,683
Modified TRC Benefits	$606,696,377		$558,745,917	N/A	$9,960,916	$37,989,543
Modified TRC Costs	$235,541,325		$206,395,446	N/A	$4,043,144	$25,102,735
Portfolio TRC Ratio	**2.58**	Alone	**2.71**	**N/A**	**2.46**	**1.51**
		With Core		**N/A**	**2.70**	**2.58**
		With Core and Pilots (All Efficiency)			**2.70**	**2.58**
		With Core, Pilots, and Rural				**2.58**

Table 25 lists the findings of the benefit/cost analysis for Focus on Energy's CY 2019 programs by sector, with rural measures incorporated into each sector for each cost-effectiveness test.

Table 25. CY 2019 Costs, Benefits, and Modified Total Resource Cost Test Results by Sector

	Residential	Nonresidential	Rural	Total
Administrative Costs	$2,775,789	$2,135,458	$27,111	$4,938,358
Delivery Costs	$10,368,186	$21,263,700	$1,458,929	$33,090,816
Incremental Measure Costs	$62,647,981	$132,307,066	$2,557,104	$197,512,151
Total TRC Costs	**$75,791,956**	**$155,706,224**	**$4,043,144**	**$235,541,325**
Electric Benefits	$77,102,530	$255,811,660	$7,658,349	$340,572,539
Natural Gas Benefits	$26,257,735	$120,852,301	$209,911	$147,319,948
Emissions Benefits	$25,422,131	$91,289,103	$2,092,656	$118,803,890
Total TRC Benefits	**$128,782,396**	**$467,953,064**	**$9,960,916**	$606,696,377
TRC Benefits Minus Costs	**$52,990,440**	**$312,246,840**	**$5,917,772**	**$371,155,052**
TRC Benefit/Cost Ratio[a]	**1.70**	**3.01**	**2.46**	**2.58**

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

Table 26 lists the CY 2018 and CY 2019 portfolio cost-effectiveness results for the modified TRC.

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

Calendar Year	Renewables	Residential	Nonresidential	Renewables	Total
CY 2018	Yes	2.37	4.95	N/A	**3.66**
	No	2.52	5.60	1.45	**3.66**
CY 2019	Yes	1.70	2.99	N/A	**2.58**
	No	1.79	3.11	1.51	**2.58**

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, plus 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 2019 portfolio-level cost-effectiveness results for these additional test perspectives.

Table 27. CY 2019 Portfolio-Level Cost-Effectiveness Results for Additional Benefit/Cost Tests

Test	Residential	Nonresidential	Rural	Total
Expanded TRC				**4.05**
UAT	2.84	5.91	2.21	**4.70**
RIM	0.49	0.85		**0.73**

The inclusion of economic benefits to the expanded TRC results in higher benefit/cost ratios compared to the portfolio-level modified TRC results. For the UAT, the results show that benefits from the residential programs were more than two times the costs, while the benefits from the nonresidential programs outweighed the costs by a factor of nearly six.

As expected, the benefit/cost portfolio values from the RIM are close to 1.0. 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.[23]

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

Outcomes and Recommendations

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

CY 2019 Outcomes and Recommendations

The Evaluation Team synthesized information from all CY 2019 evaluation activities to inform the following portfolio-level outcomes and recommendations. More information on supporting findings can be found in both this report and in the Volume II program-specific chapters.

Outcome 1. Participants are highly satisfied with Focus on Energy programs, and CY 2019 data show a statistically significant improvement over CY 2015-2018 quadrennium satisfaction ratings. The satisfaction ratings for nearly all residential and nonresidential programs in CY 2019 were statistically higher than the portfolio target of 8.9 out of 10, except for two program components that were statistically equivalent to the target.[24] In CY 2019, the average satisfaction rating for both the residential and nonresidential sectors was high, at 9.3, an increase from average sector ratings of 9.1 in CY 2018 and 9.0 over the CY 2015-CY 2018 quadrennium.

Outcome 2. HVAC Trade Allies the Evaluation Team surveyed had multiple concerns about the transition to midstream incentives for certain HVAC equipment. These market actors, both residential and nonresidential, will be a critically important audience on which to focus outreach efforts, provide program details, and solicit feedback from once the program is rolled out in 2020 to ensure successful market transition. Focus on Energy has already developed a fact sheet on the new program that covers several of the Trade Allies areas of concern, though it is not immediately visible on the Focus on Energy website.

Recommendation. The Evaluation Team recommends providing midstream program details to all participating Trade Allies who have specified or installed eligible equipment through multiple channels such as e-mails, direct mail, and in-person events. For Trade Allies who may not receive the outreach, the Team recommend posting the fact sheet to the Trade Ally section of the website and considering a feature under the "What's New" section on the Focus on Energy homepage. The Team worked with the Program Administrator to formulate questions that will gather feedback on the midstream program component during the annual Trade Ally online survey. After the survey is complete, the Program Administrator, as well as the implementer, should consider how to update outreach materials and web material to reflect Trade Allies remaining questions and any areas of confusion.

[24] The Team measured statistical significance using binomial *t*-tests with p<0.10 or better. The Home Performance with ENERGY STAR Program Whole Home path (CY 2019 rating of 9.1) and Retail Lighting and Appliance online coupon smart thermostats (CY 2019 rating of 9.3 based on 24 surveys) were statistically equivalent to the portfolio target.

Outcome 3. In some cases, the Evaluation Team and the Program Implementers used different versions of the TRM for calculating savings, which created inefficiencies. The Evaluation Team selects the appropriate TRM for evaluation based on application creation date in SPECTRUM. In some evaluated measures, *ex ante* reported savings were adjusted by the Program Implementer to use different deemed savings based on a newer or older TRM version. This resulted in differences in EULs, efficiencies, and deemed savings values. The Evaluation Team adjusted the initial *ex post* verified savings to reference the TRM applicable to the date the application was created in SPECTRUM.

Recommendation. Whenever possible, use the TRM in place at the time the project was paid or update all projects to reflect the latest TRM (but not both) to determine *ex ante* savings that are based on consistent decision-making criteria. Additionally, to improve coordination, add a data field to SPECTRUM with the TRM version used to calculate *ex ante* reported savings. This will help inform the Evaluation Team about which TRM to use for evaluation activities and maintain consistency between reported and evaluated savings. Whichever process is approved, formalize the details in the strategic evaluation plan.

Outcome 4. For some sites, the customer did not fully implement specified projects or was not able to operate at the specified capacities used to estimate reported energy savings. In some cases, the Evaluation Team found that verification reports were submitted before the project implementation was complete. This resulted in reporting incomplete or partial implementation of projects.

Recommendation. The Team recommends a change in process to ensure that verification visits to facilities are conducted only after the project is fully implemented. This will allow Focus on Energy to verify that the measure that has been provided an incentive is fully installed and operating. If major changes occur, the Program Implementer should update the baseline and adjust estimated energy savings in SPECTRUM to reflect this. This also applies to permanent production changes at the site that may require an adjustment to energy savings.

Outcome 5. Some larger and more complex projects lacked detailed savings calculations, reporting, and data collection. This lack of information caused some discrepancies in calculations in the reported and verified savings. Some of the largest discrepancies in project findings occurred when the Team installed power meters at sites and used actual data to inform savings analysis, resulting in verified savings that significantly deviated from the reported savings.

Recommendation. The Team recommends a more comprehensive review and analysis of project savings for larger custom projects that could be more complex and variable. For projects that are provided large incentives for high energy savings, the Team recommends setting a minimum requirement that involves a technical analysis summary (TAS) report, in which the Program Implementer provides details about the methodologies used and assumptions made to calculate savings. The Team also recommends a verification report in addition to the verification sheet, in which assumptions in the TAS are verified, pictures and invoices collected, and any changes to the project accounted for. Whenever possible, meter or trend data should also be included in the analysis to ensure a more accurate representation of savings.