

Focus on Energy Calendar Year 2021 Evaluation Report

VOLUME I

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Table of Contents

Executive Summary v

 Summary of Methods v

 Key Achievements vi

Introduction..... 1

 CY 2021 Evaluation 2

 Summary of Measures by Channel 2

 Overview of Evaluation Activities 4

Evaluation Findings 6

 Summary of Impacts by Offering 9

 Summary of Impacts by Measure Category 13

 Residential Process Evaluation Findings 17

 Nonresidential Process Evaluation Findings 25

Cost-Effectiveness Findings 32

 Test Description 32

 Interpreting Test Results 33

 Value of Net Saved Energy 34

 Emissions Benefits 35

 Program Costs 36

 Incremental Costs 37

Outcomes and Recommendations 41

 Residential 41

 Nonresidential 42

 Midstream 45

 Cost-Effectiveness 46

Figures

- Figure 1. Administrator’s Achievement of Four-Year (CY 2019-CY 2022) Verified Gross Lifecycle Savings Goal .. ix
- Figure 2. Evaluation Steps to Determine CY 2021 Net Savings..... 4
- Figure 3. Focus on Energy’s Achievement of Four-Year (CY 2019 - CY 2022) Net Lifecycle Savings Goal 7
- Figure 4. Focus on Energy Administrator’s Achievement of Four-Year (CY 2019-CY 2022) Verified Gross Lifecycle Savings Goal..... 8
- Figure 5. Focus on Energy Administrator’s Achievement of CY 2021 Verified Gross Lifecycle Savings Goal 9
- Figure 6. CY 2021 Verified Gross Lifecycle Savings Impacts by Channel..... 10
- Figure 7. CY 2021 Verified Gross Lifecycle Electric Energy Impacts by Offerings 11
- Figure 8. CY 2021 Verified Gross Lifecycle Natural Gas Energy Impacts by Offerings 11
- Figure 9. CY 2021 Average Overall Satisfaction Ratings for Residential Offerings 19
- Figure 10. Age of Survey Respondents 21
- Figure 11. Income Level of Survey Respondents 22
- Figure 12. Participation in Focus on Energy Programs 23
- Figure 13. Reasons for Nonparticipation 24
- Figure 14. CY 2021 Average Overall Satisfaction Ratings for Nonresidential Offerings 26
- Figure 15. Trusted Sources of Information on Energy Efficiency..... 28
- Figure 16. Specific Challenges to Implementing Energy Efficiency Projects and Upgrades 30
- Figure 17. Business Adjustments Due to the COVID-19 Pandemic..... 31

Tables

Table 1. CY 2021 First-Year Annual Savings by Channel	vi
Table 2. CY 2019, CY 2020, and CY 2021 First-Year Annual Verified Net Savings by Channel	vii
Table 3. CY 2021 Lifecycle Savings by Channel	viii
Table 4. CY 2019, CY 2020, and CY 2021 Verified Gross Lifecycle Savings by Channel.....	viii
Table 5. CY 2021 Cost-Effectiveness Results.....	x
Table 6. Residential and Nonresidential Solutions and Offerings	2
Table 7. CY 2021 Residential, Nonresidential, and Midstream Measure Categories	2
Table 8. CY 2021 Evaluation Activities and Sample Sizes by Channel.....	5
Table 9. Overall Portfolio Net Lifecycle Savings by Calendar Year	6
Table 10. Overall Portfolio Verified Gross Lifecycle Savings for CY 2019, CY 2020, and CY 2021.....	7
Table 11. Total Participation by Offering in CY 2021	10
Table 12. Summary of CY 2021 Annual Savings by Offering	12
Table 13. Summary of CY 2021 Annual Savings by Measure Category in the Residential Channel.....	13
Table 14. Summary of CY 2021 Annual Savings by Measure Category in the Nonresidential Channel.....	14
Table 15. Summary of CY 2021 Annual Savings by Measure Category in the Midstream Channel.....	16
Table 16. CY 2021 Residential Process Evaluation Activities by Solution and Offering	17
Table 17. Sample Size of Residential Participant Surveys Conducted in CY 2021	20
Table 18. Energy Efficiency Importance and Motivation for Property Managers and Owners	29
Table 19. Avoided Cost Comparison of CY 2019, CY 2020, and CY 2021	35
Table 20. Total Program Emissions Benefits by Channel.....	36
Table 21. Sector Costs Comparison	37
Table 22. Net Incremental Measure Cost Comparison.....	38
Table 23. CY 2021 Incentive Costs by Sector (with Renewables Incorporated)	38
Table 24. CY 2021 Benefit and Costs Portfolio Breakout.....	38
Table 25. CY 2021 Costs, Benefits, and Modified Total Resource Cost Test Results by Sector	39
Table 26. Cost-Effectiveness Results for Focus on Energy Portfolio.....	39
Table 27. CY 2021 Portfolio-Level Cost-Effectiveness Results for Additional Benefit/Cost Tests.....	40

Acronyms and Abbreviations

Acronym	Term
AVERT	Avoided Emissions and geneRation Tool
CY	Calendar year
EPA	Environmental Protection Agency
HVAC	Heating, ventilation, and air conditioning
kW	Kilowatt
kWh	Kilowatt per hour
LED	Light-emitting diode
MMBtu	Million British thermal unit
MMID	Master measure identifier
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
RECIP	Renewable Energy Competitive Incentive Program
RIM	Ratepayer impact measure test
SEER	Seasonal Energy Efficiency Ratio
SPECTRUM	Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management
T&D	Transmission and Distribution
TRC	Total resource cost test
TRM	Technical reference manual
UAT	Utility administrator cost test

Executive Summary

This report, presented in three volumes, describes the evaluation findings and impacts achieved by Focus on Energy for calendar year (CY) 2021 and over the CY 2019-CY 2022 quadrennium.

- Volume I (this report) is a summary of findings across all solutions, offerings, and measure categories in the portfolio.
- Volume II provides detailed findings for each Focus on Energy solution and offering.
- 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 Evaluation Dashboard tool allows users to review energy savings by year, customer sector, and measure category.¹

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

SUMMARY OF METHODS

Each year, the evaluation produces results for three consistent research areas—impact analysis, customer satisfaction, and cost-effectiveness—in addition to more targeted research that varies annually and is designed to meet Focus on Energy’s specific program evaluation needs. The three ongoing research areas of the evaluation are briefly described here. Specific annual evaluation efforts are described in the solution chapters of Volume II.

Impact Analysis

The evaluation team defined key terms, briefly presented here and described in more detail in the Glossary of Terms in Appendix B (Volume III):

- **Gross savings:** Reported change in energy consumption, demand, or both resulting from an efficiency offering
- **Verified gross savings:** Energy savings verified by the independent evaluation team²
- **Net savings:** Savings directly attributable to offering efforts (net of what would have occurred in absence of the offering)

¹The Wisconsin Focus on Energy Evaluation Dashboard tool is available here: <https://focusonenergy.com/evaluation-dashboard>

²The independent evaluation team comprises Cadmus, Apex Analytics, and Resource Innovations.

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 2021 and, in a few instances, applied evaluation results from previous years.

Customer Satisfaction

To monitor participants' satisfaction with Focus on Energy and its offerings, the evaluation team analyzes ongoing participant surveys, which the program administrator distributes to all participants for whom it has contact information. The team reports on various satisfaction topics, including overall satisfaction with the offering, with Focus on Energy as a whole, and a net promoter score (NPS). These analyses are further described in specific solution chapters of Volume II.

Cost-Effectiveness

The evaluation team used a Focus on Energy cost-effectiveness calculator to determine the cost-effectiveness of individual solutions and offerings as well as of the entire Focus on Energy portfolio. Results are provided in Volume I for the primary test and the modified total resource cost (TRC) test. Results of all five tests—including the modified TRC—are provided in Appendix I. Cost-Effectiveness and Emissions Methodology and Analysis in Volume III.

KEY ACHIEVEMENTS

Table 1 lists CY 2021 annual gross claimed savings, verified gross savings, and verified net savings for residential, nonresidential, and midstream offerings.

Table 1. CY 2021 First-Year Annual Savings by Channel

SAVINGS TYPE	UNIT	RESIDENTIAL	NONRESIDENTIAL	MIDSTREAM	TOTAL
Gross	MMBtu	1,323,524	3,111,472	47,679	4,482,675
	kWh	273,473,362	428,231,671	2,774,811	704,479,844
	kW	33,440	59,350	244	93,034
	therms	3,904,324	16,503,459	382,113	20,789,896
Verified Gross	MMBtu	1,299,932	3,081,470	48,245	4,429,647
	kWh	270,619,915	427,125,742	2,859,897	700,605,554
	kW	32,514	59,379	263	92,157
	therms	3,765,770	16,241,170	384,868	20,391,808
Verified Net	MMBtu	695,690	2,331,434	48,245	3,075,370
	kWh	123,385,300	324,752,442	2,859,897	450,997,640
	kW	13,053	44,912	263	58,229
	therms	2,746,998	12,233,791	384,868	15,365,657

Note: Totals may not match the sum of channel savings due to rounding.

Table 2 lists the verified net savings achieved in CY 2019, CY 2020, and CY 2021.

Table 2. CY 2019, CY 2020, and CY 2021 First-Year Annual Verified Net Savings by Channel

CALENDAR YEAR	UNIT	RESIDENTIAL	NONRESIDENTIAL	MIDSTREAM	TOTAL
CY 2019	MMBtu	582,347	2,857,821	N/A	3,440,169
	kWh	102,989,753	368,814,108	N/A	471,803,861
	kW	13,480	47,828	N/A	61,307
	therms	2,309,463	15,994,275	N/A	18,303,738
CY 2020	MMBtu	592,742	2,585,561	35,381	3,213,684
	kWh	99,974,109	349,002,995	656,841	449,633,945
	kW	13,874	49,314	211	63,399
	therms	2,516,308	13,947,625	331,400	16,795,333
CY 2021	MMBtu	695,690	2,331,434	48,245	3,075,370
	kWh	123,385,300	324,752,442	2,859,897	450,997,640
	kW	13,053	44,912	263	58,229
	therms	2,746,998	12,233,791	384,868	15,365,657
Quad III Totals	MMBtu	1,870,780	7,774,816	83,626	9,729,222
	kWh	326,349,162	1,042,569,546	3,516,738	1,372,435,446
	kW	40,408	142,053	475	182,936
	therms	7,572,769	42,175,692	716,268	50,464,728

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

The Public Service Commission of Wisconsin (PSC) ordered that the administrator of the Focus on Energy solutions and offerings track quadrennium savings achievements with respect to verified gross lifecycle savings targets.³ Lifecycle savings represent the savings that offerings 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 British thermal units (MMBtu). The PSC also 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. These goals were updated in the fall of 2021.⁴

The 2019-2022 quadrennium gross lifecycle MMBtu savings goal set by the PSC is 282,794,224 MMBtu. The 2019-2022 quadrennium kW savings goal set by the PSC is 360,784 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 quadrennium gross lifecycle savings targets for electric and natural gas presented in this report are 33,909,564,245 kWh and 1,670,948,583 therms, respectively.

³ 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

⁴ Public Service Commission of Wisconsin. October 21, 2021. Quadrennial Planning Process III – Final Decision. PSC Docket 5-FE-101, PSC REF#: 423549. <https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=423549>

Table 3 shows the lifecycle savings achieved by Focus on Energy in CY 2021.

Table 3. CY 2021 Lifecycle Savings by Channel

SAVINGS TYPE	UNIT	RESIDENTIAL	NONRESIDENTIAL	MIDSTREAM	TOTAL
Gross	MMBtu	16,335,281	49,591,512	743,049	66,669,842
	kWh	2,828,780,238	6,505,540,319	41,900,189	9,376,220,746
	kW	33,440	59,350	244	93,034
	therms	66,834,830	273,946,084	6,000,853	346,781,767
Verified Gross	MMBtu	16,119,330	49,516,438	753,010	66,388,778
	kWh	2,817,322,462	6,494,125,244	43,336,920	9,354,784,626
	kW	32,514	59,379	263	92,157
	therms	65,066,257	273,584,829	6,051,445	344,702,531
Verified Net	MMBtu	9,049,450	37,475,765	753,010	47,278,224
	kWh	1,403,092,847	4,931,330,466	43,336,920	6,377,760,233
	kW	13,053	44,912	263	58,229
	therms	42,620,968	206,500,650	6,051,445	255,173,062

Table 4 lists verified gross lifecycle savings achieved in CY 2019, CY 2020, and CY 2021.

Table 4. CY 2019, CY 2020, and CY 2021 Verified Gross Lifecycle Savings by Channel

CALENDAR YEAR	UNIT	RESIDENTIAL	NONRESIDENTIAL	MIDSTREAM	TOTAL
CY 2019	MMBtu	19,866,612	59,051,663	N/A	78,918,274
	kWh	4,120,568,612	7,571,848,059	N/A	11,692,416,671
	kW	32,950	67,532	N/A	100,481
	therms	58,072,316	332,165,170	N/A	390,237,486
CY 2020	MMBtu	21,000,820	49,352,516	489,340	70,842,676
	kWh	4,456,602,415	6,866,908,785	8,351,599	11,331,862,798
	kW	35,738	65,004	211	100,953
	therms	57,948,924	259,226,228	4,608,448	321,783,600
CY 2021	MMBtu	16,119,330	49,516,438	753,010	66,388,778
	kWh	2,817,322,462	6,494,125,244	43,336,920	9,354,784,626
	kW	32,514	59,379	263	92,157
	therms	65,066,257	273,584,829	6,051,445	344,702,531
Quad III Totals	MMBtu	56,986,762	157,920,617	1,242,350	216,149,729
	kWh	11,394,493,489	20,932,882,088	51,688,519	32,379,064,096
	kW	101,202	191,915	474	293,592
	therms	181,087,497	864,976,227	10,659,893	1,056,723,617

Figure 1 shows achievement toward the 2019-2022 quadrennium savings goals. Focus on Energy achieved 76% of the MMBtu savings goal, 95% of the electric energy savings goal, 81% of the electric demand reduction goal, and 63% of the natural gas savings goal.

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



Note: Percentages represent achievement to date (CY 2021) of the administrator’s established overall verified gross lifecycle goals.

The administrator also has a contractual goal to maximize participant satisfaction. In CY 2021 surveys, participants gave an average customer satisfaction rating of 9.5 on a 0- to 10-point scale, where 10 meant extremely satisfied and 0 meant extremely dissatisfied. The CY 2021 average customer satisfaction rating was statistically higher, at 9.5,⁵ than the portfolio target of 8.9.⁶

The administrator has a goal to ensure that the portfolio passes a benefit/cost analysis, specifically the modified TRC test. Table 5 lists findings from the evaluation team’s benefit/cost analysis of the CY 2021 portfolio. The residential and nonresidential channels and overall portfolio were cost-effective.

Table 5. CY 2021 Cost-Effectiveness Results

FOCUS ON ENERGY BENEFITS AND COSTS		PORTFOLIO BREAKOUT	CORE EFFICIENCY	RURAL	RENEWABLES
Incentives	\$51,054,123		\$43,783,750	\$3,530,287	\$3,397,534
Modified TRC Benefits	\$665,243,908		\$552,453,559	\$56,481,902	\$55,191,349
Modified TRC Costs	\$283,219,815		\$234,942,938	\$10,340,364	\$37,259,518
Portfolio TRC Ratio	2.35	Alone	2.35	5.46	1.48
		With Core		2.48	2.23
		With Core & Rural			2.35
		With Core & Rural & Renewables			2.35

⁵ $p < 0.05$ using binomial t-test.

⁶ The 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 administrate the calendar year (CY) 2019-CY 2022 quadrennium. The administrator, in collaboration with the implementers, is responsible for designing all Focus on Energy solutions and for the overall performance of these solutions to meet Wisconsin's energy-savings goals. The administrator is also responsible for managing and coordinating individual 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 administrator.

In CY 2021, Focus on Energy maintained three separate channels:

- The **residential channel** serves single-family, individual multifamily units, and multifamily buildings consisting of one to three units.
- The **nonresidential channel** serves multifamily (common areas and buildings with four or more units), commercial, industrial, school, government, and agribusiness customers.
- The **midstream channel** serves residential and nonresidential customers via distributors.

CY 2021 Evaluation

The evaluation team investigated the performance of eight solutions and 19 offerings that delivered energy savings during CY 2021. Table 6 lists the solutions and offerings evaluated in the residential and nonresidential sectors.

Table 6. Residential and Nonresidential Solutions and Offerings

Sector	Solution	Offering
Residential	Direct to Customer	Farmhouse Kits Online Marketplace Packs Retail Rural Retail Events
	Trade Ally	Heating and Cooling Insulation and Air Sealing Renewable Energy, Residential
	New Construction	Residential New Construction
Residential and Nonresidential	Midstream	Midstream
Nonresidential	Business and Industry	Agribusiness Commercial and Industrial Large Industrial
	Schools and Government	Government Schools
	New Construction	Prescriptive Energy Design Review
	Trade Ally	Renewable Energy, Nonresidential
	Renewable Energy Competitive Incentive Program	RECIP

Summary of Measures by Channel

The evaluation team assessed the electric and natural gas savings achieved by each measure installed in CY 2021 during its first year of operation as well as any impacts incurred by each measure during its effective useful life. Reporting on both first-year annual and lifecycle savings provides a full picture of each solution’s performance.

Table 7 lists all measure categories in the residential, nonresidential, and midstream solutions.

Table 7. CY 2021 Residential, Nonresidential, and Midstream Measure Categories

Measure Categories	
Residential Only	
Building Shell - Bonus	HVAC - Air Conditioner - Residential
Domestic Hot Water - Aeration	HVAC - Bonus
Domestic Hot Water - Bonus	HVAC - Tune-up/Repair/Commissioning
Domestic Hot Water - Insulation	Motors & Drives - Motor
Domestic Hot Water - Other	Renewable Energy - Geothermal
Domestic Hot Water - Showerhead	Vending & Plug Loads - Controls

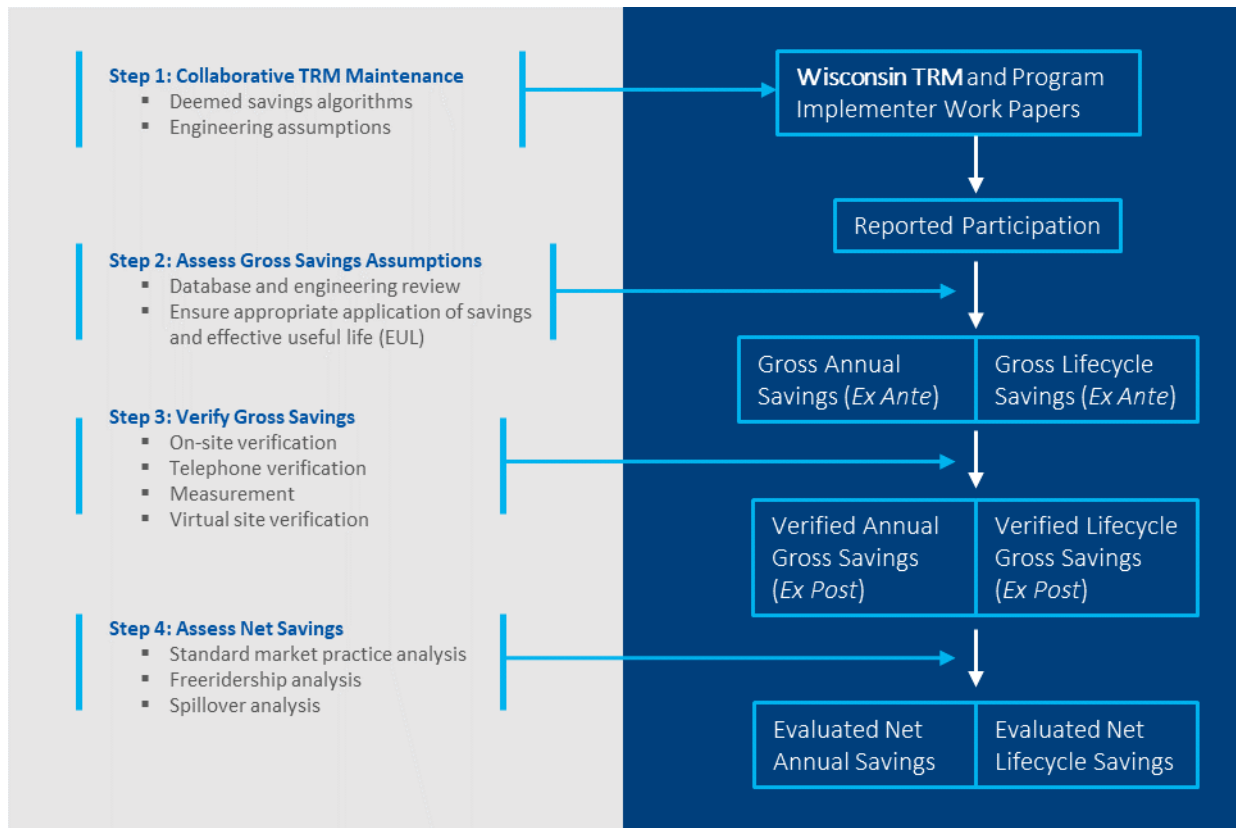
Measure Categories	
Residential and Nonresidential	
Boilers & Burners - Boiler	HVAC - Packaged Terminal Unit (PTAC, PTHP)
Boilers & Burners - Controls	HVAC - Rooftop Unit/Split System AC
Boilers & Burners - Tune-up/Repair/Commissioning	Lighting - Light Emitting Diode (LED)
Building Shell - Air Sealing	New Construction - Energy Design
Building Shell - Insulation	Other - Bonus
HVAC - Controls	Other - Other
HVAC - Furnace	Renewable Energy - Photovoltaics
Nonresidential Only	
Agriculture - Dryer	HVAC - Scheduling
Agriculture - Fan	HVAC - Steam Trap
Agriculture - Grain Dryer	HVAC - Unit Heater
Agriculture - Greenhouse	Information Technology - Other
Agriculture - Heat Exchanger	Information Technology - Supporting Equipment
Agriculture - Irrigation	Lighting - Controls
Agriculture - Livestock Waterer	Lighting - Delamping
Agriculture - Tune-up/Repair/Commissioning	Lighting - Other
Agriculture - Variable Speed Drive	Motors & Drives - Other
Agriculture - Water Heater	Motors & Drives - Variable Speed Drive
Boilers & Burners - Energy Recovery	New Construction - Design
Boilers & Burners - Insulation	Pools - Variable Speed Drive
Boilers & Burners - Variable Speed Drive	Process - Energy Recovery
Building Shell - Window	Process - Filtration
Compressed Air, Vacuum Pumps - Compressor	Process - Other
Compressed Air, Vacuum Pumps - Controls	Process - Process Heat
Compressed Air, Vacuum Pumps - Dryer	Process - Pump
Compressed Air, Vacuum Pumps - Energy Recovery	Process - Specialty Pulp & Paper
Compressed Air, Vacuum Pumps - Filtration	Process - Variable Speed Drive
Compressed Air, Vacuum Pumps - Other	Refrigeration - Controls
Compressed Air, Vacuum Pumps - Outside Air Intake	Refrigeration - Energy Recovery
Compressed Air, Vacuum Pumps - Reconfigure Equipment	Refrigeration - Heat Exchanger
Compressed Air, Vacuum Pumps - System Isolation	Refrigeration - Motor
Compressed Air, Vacuum Pumps - Tune-up/Repair/Commissioning	Refrigeration - Other
Domestic Hot Water - Energy Recovery	Refrigeration - Reconfigure Equipment
Food Service - Controls	Refrigeration - Refrigerated Case Door
HVAC - Chiller	Refrigeration - Strip Curtain
HVAC - Direct Fired Heating	Refrigeration - Tune-up/Repair/Commissioning
HVAC - Economizer	Renewable Energy - Biogas
HVAC - Energy Recovery	Renewable Energy - Wind Electric
HVAC - Fan	Training & Special - Other
HVAC - Filtration	Waste Water Treatment - Aeration
HVAC - Infrared Heater	Waste Water Treatment - Other
HVAC - Motor	
Nonresidential and Midstream	
HVAC - Variable Speed Drive	

Measure Categories	
Midstream Only	
Food Service - Dishwasher, Commercial	Food Service - Oven
Food Service - Fryer	Food Service - Refrigerator/Freezer - Commercial
Food Service - Griddle	Food Service - Steamer
Food Service - Hot Holding Cabinet	Refrigeration - Ice Machine
Residential, Nonresidential, and Midstream	
Domestic Hot Water - Water Heater	HVAC - Other

Overview of Evaluation Activities

Figure 2 depicts the four-step process the evaluation team conducted in CY 2021. This process is further explained below.

Figure 2. Evaluation Steps to Determine CY 2021 Net Savings



Step 1: Collaborative Technical Reference Manual (TRM) Maintenance. The evaluation team collaborated with the PSC and key Focus on Energy stakeholders to ensure that the solutions’ 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 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 team

reconciled this information with data from the administrator and the 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 team also recalculated or measured the actual performance of installed measures, particularly for hybrid and custom projects. The team applied the data collection and analysis methods appropriate for the specific solutions, offerings, 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 solutions. In deriving these ratios, the 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 an offering) and also accounted for—and added—*spillover* (savings that were the result of an offering’s influence, but for which no incentive was paid and for which no solution 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 comparisons between program activity and standard market activity. Some examples of comparisons with standard market activity include sales data analysis of participating and nonparticipating stores and billing data analysis of program and non-program participants.

Table 8 lists the specific data collection activities and sample sizes used in the residential, midstream, and nonresidential channels for the CY 2021 evaluation.

Table 8. CY 2021 Evaluation Activities and Sample Sizes by Channel

Evaluation Activity	Residential	Nonresidential	Midstream	Total CY 2021
On-Site, and Virtual Site Visits Evaluation, Measurement, and Verification ^a	10	153	0	163
Engineering Desk Reviews and Interviews	45	278	0	323
Participant Surveys and Interviews	549	358	61	968
Ongoing Participant Satisfaction Surveys ^b	5,086	470	0	5,556
Program Actor Interviews	6	6	0	12
Trade Ally and Market Actor Surveys/Interviews ^c	21	20	21	62
General Population Survey	658	160	0	818
Regression Modeling/Billing Analyses	0	6	0	6
Sales Data Analyses	1	0	0	1
System Energy Monitoring Data Collection	0	16	0	16
On-Site Logger Installation	0	0	0	0

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

^b This row includes only the 15% sample from all Packs offering ongoing participant satisfaction survey responses that were analyzed for the CY 2021 evaluation.

^c Excludes trade ally surveys conducted by the administrator or implementers.

Evaluation Findings

Table 9 lists the overall net lifecycle MMBtu, electricity, demand, and natural gas savings for Focus on Energy’s portfolio in CY 2019, CY 2020, and CY 2021.

Table 9. Overall Portfolio Net Lifecycle Savings by Calendar Year

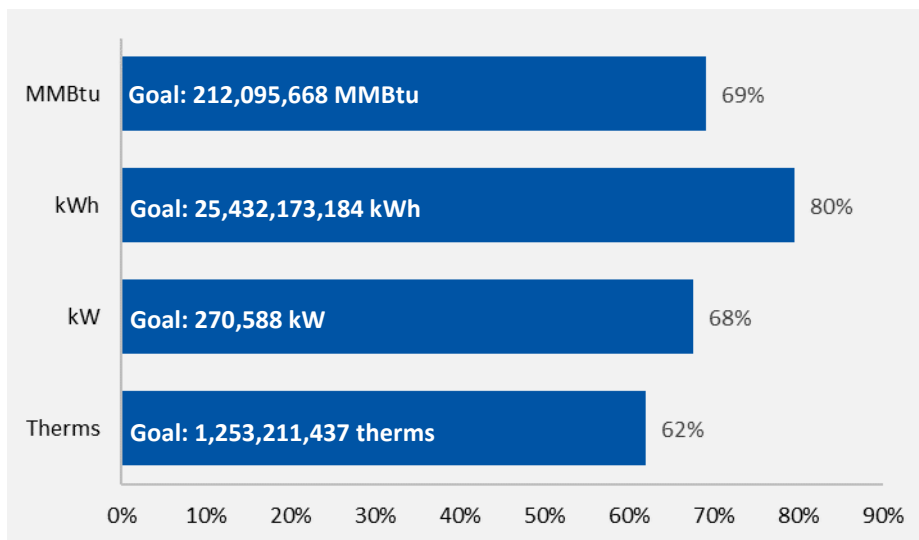
Calendar Year	Overall Savings (MMBtu)	Electric Savings (kWh)	Demand Reduction (kW)	Natural Gas Savings (therms)
CY 2019	52,150,133	6,988,011,090	61,307	283,070,389
CY 2020	47,245,270	6,864,758,985	63,399	238,227,128
CY 2021	47,278,224	6,377,760,233	58,229	255,173,062
Quad III Total	146,673,627	20,230,530,308	182,935	776,470,579

The PSC Final Decision for Quadrennial Planning Process III (PSC Ref#: 423549) sets four-year net lifecycle savings goals for the PSC of 212,095,668 MMBtu, 25,432,173,184 kWh, 270,588 kW, and 1,253,211,437 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 offering delivery in the changing markets.

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

The Focus on Energy offerings reached 69% of the MMBtu net savings goal, 80% of the electric energy net savings goal, 68% of the electric net demand reduction goal, and 62% of the natural gas quadrennium net savings goal to date. Figure 3 shows a comparison of Focus on Energy’s actual quadrennium verified net savings to the PSC’s established verified net savings goals 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 2021) 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 2019, CY 2020, and CY 2021.

Table 10. Overall Portfolio Verified Gross Lifecycle Savings for CY 2019, CY 2020, and CY 2021

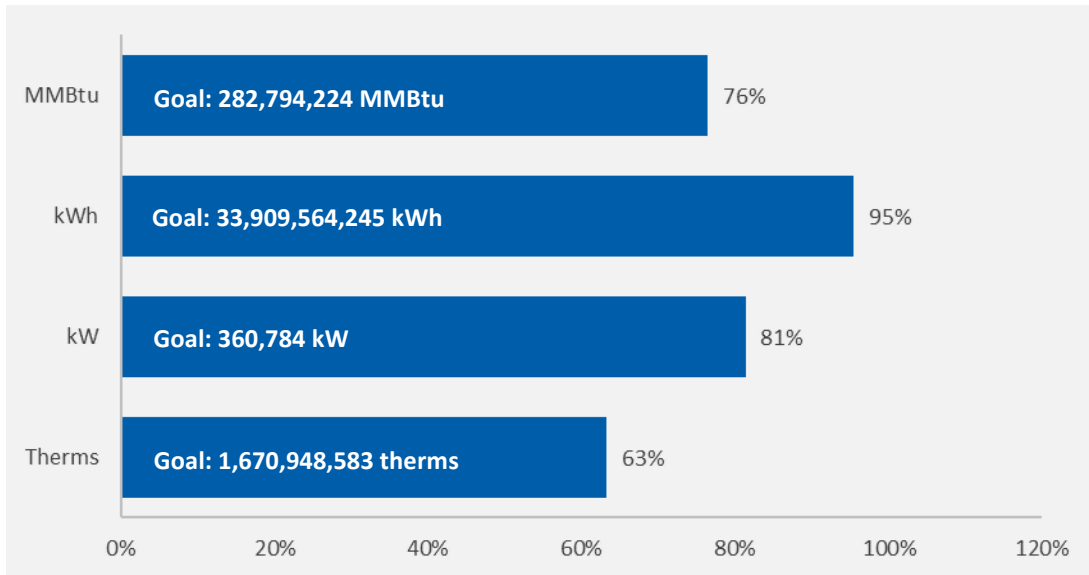
Calendar Year	Annual Savings (MMBtu)	Electric Savings (kWh)	Demand Reduction (kW)	Natural Gas Savings (therms)
CY 2019	78,918,274	11,692,416,671	100,481	390,237,486
CY 2020	70,842,676	11,331,862,798	100,953	321,783,600
CY 2021	66,388,778	9,354,784,626	92,157	344,702,531
Quad III Total	216,149,728	32,379,064,095	293,591	1,056,723,617

The PSC has ordered that the Focus on Energy administrator track quadrennium savings goals compared to verified gross lifecycle savings targets: 282,794,224 MMBtu, 33,909,565,245 kWh, 360,784 kW, and 1,670,948,583 therms (PSC Ref#: 423549). Similar to the discussion above regarding verified net lifecycle savings goals, this report presents kWh and therm savings achievement relative to the overall goals rather than the 90% threshold goals. The comparison of savings to the minimum goal thresholds will be presented at the end of the quadrennium.

Of the quadrennium goals, the administrator reached 76% of the MMBtu savings goal, 95% of the electric energy savings goal, 81% of the demand reduction goal, and 63% of the natural gas savings goal.

Figure 4 shows a comparison of the actual quadrennium savings totals to the administrator’s quadrennium savings goals.

Figure 4. Focus on Energy Administrator’s Achievement of Four-Year (CY 2019-CY 2022) Verified Gross Lifecycle Savings Goal



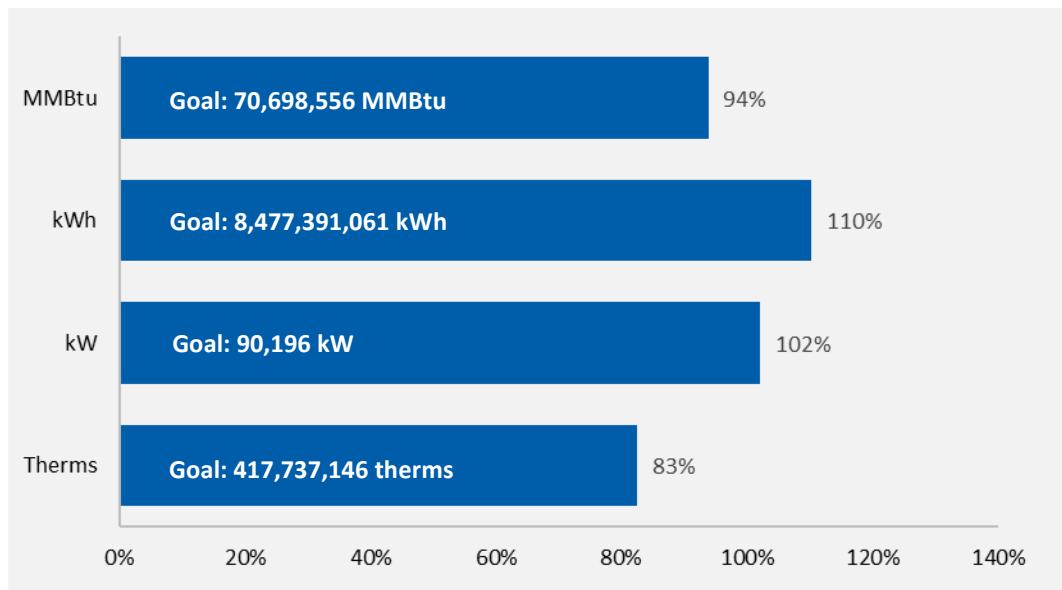
Note: Percentages represent achievements to date (CY 2021) of the administrator’s established overall verified gross lifecycle goals for the quadrennium.

The 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 2021, these targets represented 70,698,556 MMBtu, 8,477,391,061 kWh, 90,196 kW, and 417,737,146 therms.

The administrator reached 94% of the MMBtu savings goal, 110% of the electric energy savings goal, 102% of the electric demand reduction goal, and 83% of the natural gas verified gross lifecycle savings goal.

Figure 5 shows the CY 2021 actual savings totals compared to the administrator’s CY 2021 savings goals.

Figure 5. Focus on Energy Administrator’s Achievement of CY 2021 Verified Gross Lifecycle Savings Goal



Note: Percentages represent achievements to date of the administrator’s verified gross lifecycle goals for CY 2021.

Summary of Impacts by Offering

This section summarizes the CY 2021 savings and participation for each offering in the Focus on Energy portfolio. (Volume II presents more detail on savings for each offering and the approaches used for calculating these savings.) The evaluation team varied the calculation approach and activities by offering depending on the level of participation, savings achieved, and information available.

Across all offerings, the evaluation team applied equations for verified gross lifecycle, net annual, and net lifecycle savings:

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

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

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

Table 11 lists the total CY 2021 participation (measured as number of participating customers) in each offering and channel.

Table 11. Total Participation by Offering in CY 2021

Channel	Offering	CY 2021 Participation
Residential	Farmhouse Kits	243
	Online Marketplace	25,562
	Packs	102,265
	Retail ^a	949,459
	Rural Retail Events	1,496
	Heating and Cooling	27,207
	Insulation and Air Sealing	1,952
	Renewable Energy	2,028
	Residential New Construction	2,488
Residential Subtotal		1,112,700
Midstream	Midstream	1,555
Midstream Subtotal		1,555
Nonresidential	Agribusiness	917
	Commercial and Industrial	2,204
	Large Industrial	249
	Government	206
	Schools	267
	New Construction Prescriptive	151
	New Construction Energy Design Review	116
	Renewable Energy	168
	RECIP	5
Nonresidential Subtotal		4,283
Total		1,118,538

^a Of the CY 2021 Retail Offering participants, 5,233 were not Retail Lighting or Income-Qualified.

Figure 6 shows verified gross lifecycle savings by channel.

Figure 6. CY 2021 Verified Gross Lifecycle Savings Impacts by Channel

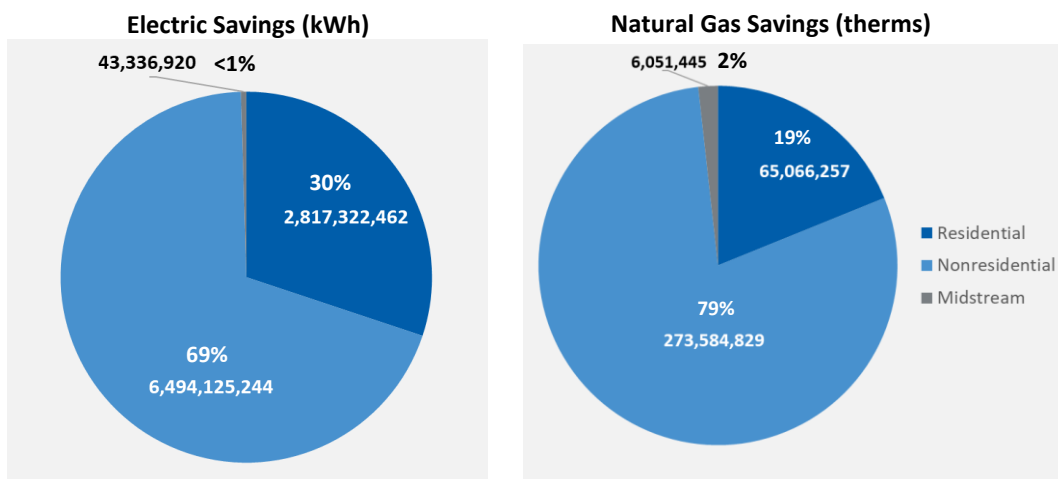


Figure 7 and Figure 8 show the verified gross lifecycle electric and natural gas energy savings by offering for residential, nonresidential, and midstream.

Figure 7. CY 2021 Verified Gross Lifecycle Electric Energy Impacts by Offerings

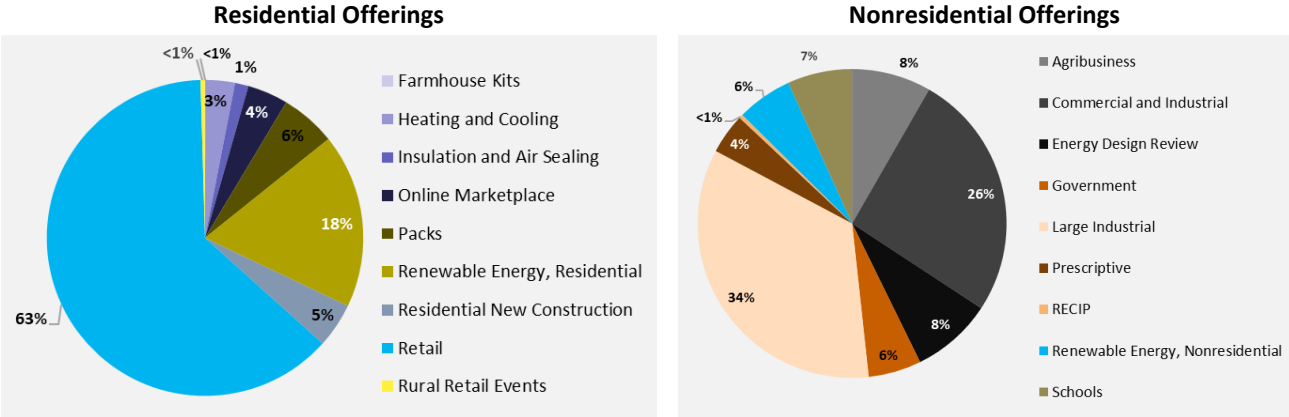


Figure 8. CY 2021 Verified Gross Lifecycle Natural Gas Energy Impacts by Offerings

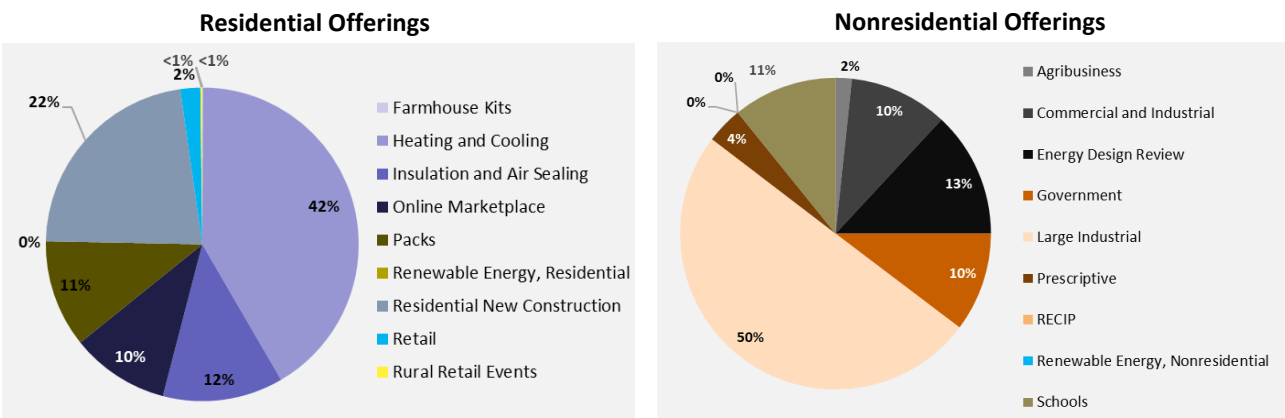


Table 12 lists the first-year annual gross savings, verified gross savings, and verified net demand reduction for electricity and natural gas by offering, channel, and overall portfolio.

Table 12. Summary of CY 2021 Annual Savings by Offering

Solution	Offering	Gross			Verified Gross			Verified Net		
		kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
Residential										
Direct to Customer	Farmhouse Kits	79,964	7	3,826	81,668	7	3,972	66,713	6	3,844
	Online Marketplace	13,668,679	688	768,706	12,877,678	601	653,200	10,792,210	493	554,748
	Packs	18,249,925	1,709	577,082	18,344,096	1,705	589,671	15,600,662	1,457	564,233
	Retail	208,051,209	22,043	137,277	205,351,601	21,356	133,830	79,591,032	7,030	84,922
	Rural Retail Events	1,919,088	213	18,423	1,615,289	140	11,273	1,344,022	116	10,845
Trade Ally	Heating and Cooling	4,963,353	266	1,516,665	6,054,068	315	1,490,203	5,252,667	227	1,145,569
	Insulation and Air Sealing	1,864,214	686	396,017	1,883,475	691	397,296	2,291,256	891	358,521
	Renewable Energy, Residential	20,376,171	6,875	-	20,111,281	6,744	-	8,446,738	2,833	-
New Construction	Residential New Construction	4,300,760	955	486,326	4,300,760	955	486,326	-	-	24,316
Residential Total		273,473,362	33,440	3,904,324	270,619,915	32,514	3,765,770	123,385,300	13,053	2,746,998
Midstream										
Midstream	Midstream	2,774,811	244	382,113	2,859,897	263	384,868	2,859,897	263	384,868
Midstream Total		2,774,811	244	382,113	2,859,897	263	384,868	2,859,897	263	384,868
Nonresidential										
Business and Industry	Agribusiness	32,683,280	4,238	240,760	32,356,447	4,195	240,760	27,826,545	3,608	207,053
	Commercial and Industrial	122,630,766	17,449	1,979,485	122,630,766	17,449	1,979,485	94,425,690	13,436	1,524,204
	Large Industrial	152,336,683	16,511	8,140,893	152,336,683	16,511	7,896,666	112,729,145	12,218	5,843,533
Schools and Government	Government	25,117,214	2,530	1,593,990	25,117,214	2,530	1,593,990	18,335,566	1,847	1,163,613
	Schools	32,099,882	5,387	2,176,609	32,099,882	5,387	2,176,609	23,432,914	3,932	1,588,925
New Construction	Prescriptive	19,477,412	2,973	565,446	18,698,315	2,943	565,446	15,145,635	2,384	458,011
	Energy Design Review	27,583,637	5,052	1,806,276	27,583,637	5,153	1,788,213	22,342,746	4,174	1,448,453
Trade Ally	Renewable Energy, Nonresidential	15,073,048	4,972	0	15,073,048	4,972	0	9,370,534	3,091	0
RECIP	RECIP	1,229,749	238	0	1,229,749	238	0	1,143,667	222	0
Nonresidential Total		428,231,671	59,350	16,503,459	427,125,742	59,379	16,241,170	324,752,442	44,912	12,233,791
Total All Offerings		704,479,844	93,034	20,789,896	700,605,554	92,157	20,391,808	450,997,640	58,229	15,365,657

Summary of Impacts by Measure Category

Table 13 lists CY 2021 residential energy savings, demand reduction, and incentive costs by measure category.

Table 13. Summary of CY 2021 Annual Savings by Measure Category in the Residential Channel

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars (%)
	kWh	kWh(%)	kW	kW (%)	therms	therms (%)		
Boilers & Burners-Boiler	0	0.00%	0	0.00%	157,671	4.19%	\$304,425	1.49%
Boilers & Burners-Controls	11,375	0.00%	0	0.00%	1,540	0.04%	\$1,750	0.01%
Boilers & Burners-Tune-up/Repair/Commissioning	0	0.00%	0	0.00%	370	0.01%	\$1,160	0.01%
Building Shell-Air Sealing	146,608	0.05%	11	0.04%	27,741	0.74%	\$985,957	4.82%
Building Shell-Bonus	0	0.00%	0	0.00%	0	0.00%	\$106,800	0.52%
Building Shell-Insulation	1,736,868	0.64%	679	2.09%	369,554	9.81%	\$1,093,961	5.34%
Domestic Hot Water-Aeration	1,081,222	0.40%	77	0.24%	213,021	5.66%	\$145,092	0.71%
Domestic Hot Water-Bonus	0	0.00%	0	0.00%	0	0.00%	\$66,000	0.32%
Domestic Hot Water-Insulation	1,998,250	0.74%	289	0.89%	238,547	6.33%	\$232,074	1.13%
Domestic Hot Water-Other	114,082	0.04%	15	0.05%	46,980	1.25%	\$82,501	0.40%
Domestic Hot Water-Showerhead	1,807,707	0.67%	88	0.27%	357,592	9.50%	\$336,701	1.64%
Domestic Hot Water-Water Heater	0	0.00%	0	0.00%	19,904	0.53%	\$23,500	0.11%
HVAC-Air Conditioner - Residential	2,206	0.00%	4	0.01%	0	0.00%	\$3,411	0.02%
HVAC-Bonus	0	0.00%	0	0.00%	0	0.00%	\$900	0.00%
HVAC-Controls	11,187,170	4.13%	0	0.00%	773,339	20.54%	\$1,314,473	6.42%
HVAC-Furnace	2,949,818	1.09%	0	0.00%	951,347	25.26%	\$3,072,075	15.01%
HVAC-Other	-1,089,999	-0.40%	14	0.04%	119,196	3.17%	\$187,300	0.91%
HVAC-Packaged Terminal Unit (PTAC, PTHP)	67,735	0.03%	8	0.03%	0	0.00%	\$3,100	0.02%
HVAC-Rooftop Unit/Split System AC	127,072	0.05%	211	0.65%	0	0.00%	\$29,250	0.14%
HVAC-Tune-up/Repair/Commissioning	0	0.00%	0	0.00%	2632	0.07%	\$22,555	0.11%
Lighting-Light Emitting Diode (LED)	225,550,736	83.35%	23,320	71.72%	0	0.00%	\$9,085,302	44.38%
Motors & Drives-Motor	9,960	0.00%	2	0.01%	0	0.00%	\$750	0.00%
New Construction-Energy Design	4,300,760	1.59%	955	2.94%	486,326	12.91%	\$1,569,208	7.66%
Other-Bonus	0	0.00%	0	0.00%	0	0.00%	\$342,851	1.67%
Other-Other	0	0.00%	0	0.00%	9	0.00%	\$1,025	0.01%
Renewable Energy-Geothermal	352,303	0.13%	76	0.23%	0	0.00%	\$55,500	0.27%
Renewable Energy-Photovoltaics	20,111,281	7.43%	6744	20.74%	0	0.00%	\$1,377,576	6.73%
Vending & Plug Loads-Controls	154,763	0.06%	20	0.06%	0	0.00%	\$27,497	0.13%

Note: This table does not include adjustment measure records. As a result, this sum will not match with other CY 2021 totals.

Table 14 lists CY 2021 nonresidential savings and incentive costs by measure category.

Table 14. Summary of CY 2021 Annual Savings by Measure Category in the Nonresidential Channel

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars (%)
	kWh	kWh (%)	kW	kW (%)	therms	therms (%)		
Aeration	2,713,804	0.64%	258	0.44%	0	0.00%	\$132,192.68	0.44%
Air Sealing	0	0.00%	0	0.00%	8,992	0.06%	\$3,085.00	0.01%
Biogas	627,691	0.15%	0	0.00%	0	0.00%	\$56,923.00	0.52%
Boiler	-244,927	-0.06%	-28	-0.05%	2,255,686	13.89%	\$1,865,477.00	6.20%
Bonus	0	0.00%	0	0.00%	0	0.00%	\$738,012.65	2.45%
Chiller	3,099,607	0.73%	718	1.21%	0	0.00%	\$327,569.04	1.09%
Compressor	10,119,817	2.37%	1445	2.43%	0	0.00%	\$276,780.00	0.92%
Controls	16,347,897	3.83%	1392	2.34%	1,400,507	8.62%	\$1,174,461.34	3.90%
Delamping	20,374	0.00%	3	0.01%	0	0.00%	\$334.00	0.00%
Design	23,313,045	5.46%	4434	7.47%	1,678,571	10.34%	\$3,508,529.26	11.66%
Direct Fired Heating	0	0.00%	0	0.00%	74,844	0.46%	\$57,804.25	0.19%
Dryer	433,187	0.10%	57	0.10%	170,436	1.05%	\$392,874.30	1.31%
Economizer	143,866	0.03%	2	0.00%	0	0.00%	\$3,800.00	0.01%
Energy Recovery	-1,656,820	-0.39%	-117	-0.20%	4,058,692	24.99%	\$2,068,281.24	6.87%
Fan	6,651,840	1.56%	1160	1.95%	45,662	0.28%	\$352,665.56	1.17%
Filtration	-193,201	-0.05%	-7	-0.01%	580,933	3.58%	\$367,659.30	1.22%
Furnace	33,678	0.01%	0	0.00%	117,271	0.72%	\$116,080.00	0.39%
Grain Dryer	2,036	0.00%	0	0.00%	3,439	0.02%	\$2,833.48	0.01%
Greenhouse	0	0.00%	0	0.00%	2,298	0.01%	\$259.20	0.00%
Heat Exchanger	1,875,487	0.44%	0	0.00%	0	0.00%	\$115,070.88	0.38%
Infrared Heater	0	0.00%	0	0.00%	11,534	0.07%	\$12,407.00	0.04%
Insulation	571	0.00%	0	0.00%	121,177	0.75%	\$72,866.13	0.24%
Irrigation	28,630	0.01%	20	0.03%	0	0.00%	\$2,600.00	0.01%
Light Emitting Diode (LED)	188916,869	44.23%	26077	43.92%	0	0.00%	\$8,598,684.37	28.57%
Livestock Waterer	673849	0.16%	0	0.00%	0	0.00%	\$19,520.00	0.06%
Motor	3,594,566	0.84%	424	0.71%	0	0.00%	\$92,925.00	0.31%
Other	48,233,661	11.29%	5092	8.57%	4,324,194	26.62%	\$4,351,598.36	14.46%
Outside Air Intake	169,711	0.04%	19	0.03%	0	0.00%	\$8,731.44	0.03%
Packaged Terminal Unit (PTAC, PTHP)	925,328	0.22%	50	0.08%	0	0.00%	\$33,210.00	0.11%

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars (%)
	kWh	kWh (%)	kW	kW (%)	therms	therms (%)		
Photovoltaics	15,607,728	3.65%	5203	8.76%	0	0.00%	\$1,974,631.61	6.56%
Process Heat	2,832	0.00%	1	0.00%	0	0.00%	\$399.00	0.00%
Pump	1,793,451	0.42%	217	0.36%	0	0.00%	\$85,401.39	0.28%
Reconfigure Equipment	2,701,652	0.63%	540	0.91%	0	0.00%	\$139,378.06	0.46%
Refrigerated Case Door	1,914,781	0.45%	256	0.43%	148,872	0.92%	\$116,872.00	0.39%
Rooftop Unit/Split System AC	769,493	0.18%	417	0.70%	123,242	0.76%	\$154,256.82	0.51%
Scheduling	3,106,674	0.73%	446	0.75%	148,250	0.91%	\$252,730.56	0.84%
Specialty Pulp & Paper	4,074,847	0.95%	482	0.81%	0	0.00%	\$161,775.00	0.54%
Steam Trap	0	0.00%	0	0.00%	426,789	2.63%	\$44,107.92	0.15%
Strip Curtain	945	0.00%	0	0.00%	0	0.00%	\$15.00	0.00%
Supporting Equipment	401,391	0.09%	46	0.08%	0	0.00%	\$20,637.64	0.07%
System Isolation	189,545	0.04%	13	0.02%	0	0.00%	\$6,124.90	0.02%
Tune-up/Repair/Commissioning	6,984,034	1.64%	0	0.00%	349,774	2.15%	\$123,213.07	0.41%
Unit Heater	0	0.00%	0	0.00%	20,728	0.13%	\$13,370.00	0.04%
Variable Speed Drive	79,341,285	18.58%	10002	16.84%	0	0.00%	\$1,538,103.18	5.11%
Water Heater	0	0.00%	0	0.00%	45,067	0.28%	\$53,587.60	0.18%
Energy Design	4,339,141	1.02%	750	1.26%	111,603	0.69%	\$523,118.91	1.74%
Wind Electric	67,378	0.02%	8	0.01%	0	0.00%	\$33,689.00	0.11%
Window	0	0.00%	0	0.00%	12,610	0.08%	\$4,754.24	0.02%

Note: This table does not include adjustment measure records. As a result, this sum will not match with other CY 2021 totals.

Table 15 lists CY 2021 midstream savings and incentive costs by measure category.

Table 15. Summary of CY 2021 Annual Savings by Measure Category in the Midstream Channel

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars (%)
	kWh	kWh (%)	kW	kW (%)	therms	therms (%)		
Dishwasher, Commercial	791,712	27.68%	39	14.65%	1,048	0.27%	\$28,750.00	4.00%
Domestic Hot Water-Water Heater	4,968	0.17%	0	0.09%	333	0.09%	\$4,500.00	0.63%
Fryer	2,055	0.07%	0	0.16%	116,994	30.40%	\$129,625.00	18.04%
Griddle	0	0.00%	0	0.00%	100	0.03%	\$150.00	0.02%
Hot Holding Cabinet	6,022	0.21%	1	0.38%	0	0.00%	\$600.00	0.08%
HVAC-Other ^a	1,571,766	54.96%	90	34.24%	230,183	59.81%	\$453,000.00	63.04%
Ice Machine	30,225	1.06%	3	1.31%	0	0.00%	\$1,350.00	0.19%
Other	96,447	3.37%	10	3.93%	8,949	2.33%	\$19,500.00	2.71%
Oven	71,286	2.49%	17	6.27%	12,741	3.31%	\$19,250.00	2.68%
Refrigerator/Freezer - Commercial	7,294	0.26%	1	0.32%	0	0.00%	\$1,950.00	0.27%
Steamer	62,194	2.17%	95	36.27%	14,520	3.77%	\$21,500.00	2.99%
Variable Speed Drive	215,928	7.55%	6	2.40%	0	0.00%	\$38,400.00	5.34%

Note: This table does not include adjustment measure records. As a result, this sum will not match with other CY 2021 totals.

^a HVAC-Other in the Midstream Channel is made up of exclusively ductless minisplit heat pumps.

Residential Process Evaluation Findings

For the CY 2021 process evaluation of residential offerings, the evaluation team collected information and perspectives from Focus on Energy participants, trade allies, the administrator, and the implementers (program actors). The team reached participants through offering-level phone or online surveys, an online or mailed participant satisfaction survey, or both. The team conducted interviews with trade allies of the Renewable Energy offering. The team also collected perspectives and information from participating and nonparticipating residential customers through a general population survey (details in Appendix K. Residential General Population Survey Findings in Volume III).

Table 16 shows the evaluation activity by residential offering.

Table 16. CY 2021 Residential Process Evaluation Activities by Solution and Offering

Solution	Offering	Participant Surveys	Ongoing Participant Satisfaction Surveys	Program Actor Interviews	Trade Ally Interviews
Direct to Customer	Online Marketplace	✓	✓	✓	
	Packs		✓	✓	
	Retail ^a		✓	✓	
Trade Ally	Heating and Cooling		✓	✓	
	Insulation and Air Sealing		✓	✓	
	Renewable Energy	✓		✓	✓
New Construction	Residential New Construction			✓	✓

^a The Retail offering includes Retail Products (smart thermostats), Retail Lighting, Pop-Up Retail, and Income Qualified.

In CY 2021, more than 400,000 residential customers in Wisconsin participated in Focus on Energy’s offerings. An estimated 713,000 Wisconsin customers purchased lighting measures through the Retail and Rural Retail Events offerings.

As listed in the summary of CY 2021 annual savings (Table 12 above), residential customers installed energy-efficient measures across a wide range of technologies and achieved verified gross electricity savings of 270,619,915 kWh and natural gas savings of 3,765,770 therms.

Customer Satisfaction

The administrator fielded online customer satisfaction surveys throughout CY 2021 for Trade Ally Solutions and four Direct to Customer offerings and subofferings (Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events). The evaluation team fielded supplementary mail surveys for offerings in Trade Ally Solutions during the first quarter only. More than 12,000 Focus on Energy residential participants completed a survey in CY 2021.⁷

Participants were asked to rate how satisfied they were with Focus on Energy's offerings on a scale from 0 to 10, where 10 means *extremely satisfied* and 0 meant *extremely dissatisfied*. Participants in all surveyed offerings gave higher or equivalent overall satisfaction ratings in CY 2021 compared with CY 2020. For all offerings with more than 20 survey responses in CY 2021, average satisfaction ratings were 9.3 or higher. The only statistically significant change was for Trade Ally Solutions (satisfaction increased to 9.5 in CY 2021 from 9.2 in CY 2020).⁸ The average satisfaction rating for every residential offering in CY 2021 was statistically higher than the portfolio target of 8.9.⁹

The participation-weighted average satisfaction across all surveyed residential offerings was 9.5 in CY 2021, which was statistically higher than the 9.4 in CY 2020 and statistically higher (in aggregate) than the portfolio target.¹⁰ Figure 9 shows average satisfaction ratings of surveyed participants for residential offerings in CY 2021 compared with ratings from CY 2020 and CY 2019.¹¹

⁷ The evaluation team reports ratings only to the first decimal place; therefore, it randomly sampled surveys with more than 2,000 responses so the precision level for statistical significance tests would not be narrower than 0.1 rating points, the minimum for a reported change in ratings. Without sampling, significance tests could indicate that two numbers that appear the same (to the first decimal place) are significantly different. The random sampling used a Monte Carlo technique so that reported ratings for the random sample and the ratings for the larger population are identical to the first decimal place. For the Packs offering, a total of 9,101 customers completed a survey; the Energy Savings Packs offering was the only survey with more than 2,000 responses in CY 2021. After removing duplicates and applying this sampling technique, a total of 5,086 residential customers completed the satisfaction surveys analyzed for CY 2021 reporting.

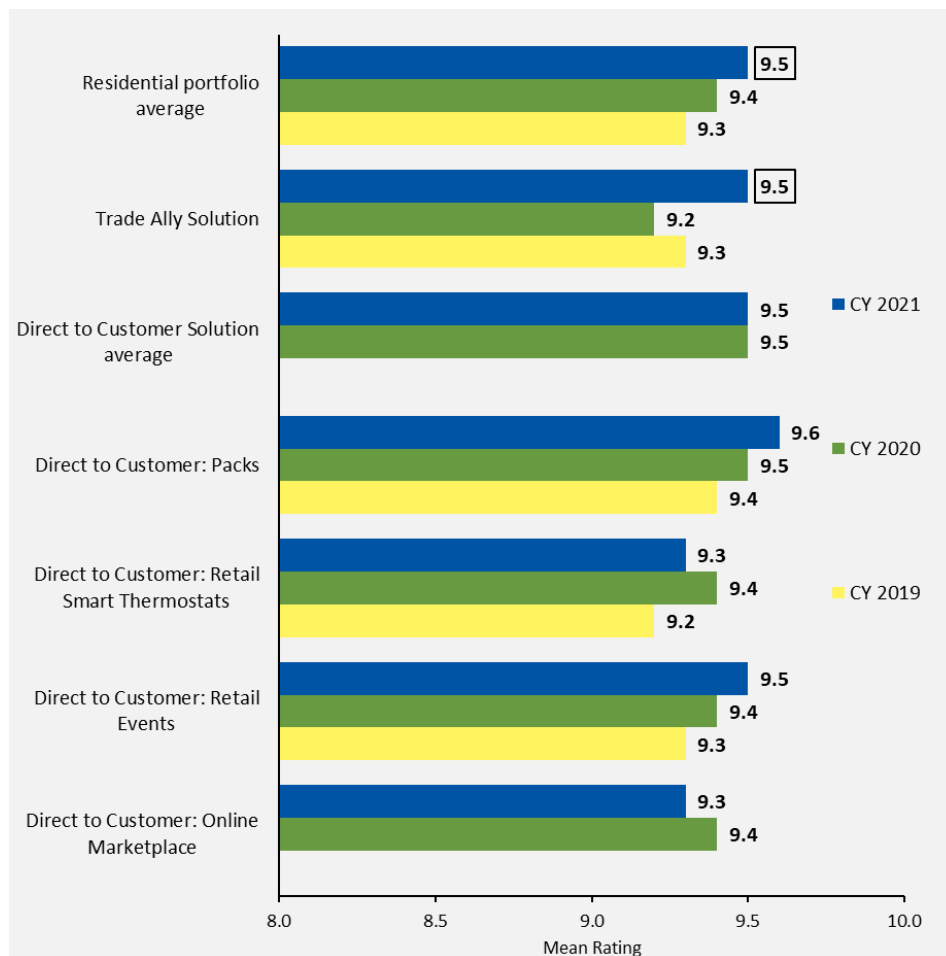
⁸ $p < 0.05$ using a binomial t -test.

⁹ $p < 0.05$ using binomial t -tests.

¹⁰ $p < 0.05$ using binomial t -tests.

¹¹ Ongoing participant satisfaction surveys were restructured in CY 2020 to match the restructuring of the portfolio. Results for the CY 2019 Trade Ally Solutions survey are a weighted average of results from the precursor programs (Home Performance with ENERGY STAR Whole Home and HVAC path surveys and the Renewable Rewards survey) that were consolidated into the Trade Ally Solutions. All offerings in the Direct to Customer Solution were compared with their equivalent CY 2019 predecessor programs.

Figure 9. CY 2021 Average Overall Satisfaction Ratings for Residential Offerings



Source: Ongoing Participant Satisfaction Mail/Online Survey Question. “Overall, how satisfied are you with your most recent experience with Focus on Energy?” Trade Ally Solutions CY 2019 (n=1,854 weighted average of three predecessor programs), CY 2020 (n=1,344), CY 2021 (n=1,409); Packs CY 2019 (n=1,336), CY 2020 (n=1,199), CY 2021 (n=1,377); Retail Smart Thermostats CY 2019 (n=804), CY 2020 (n=428), CY 2021 (n=158); Retail Events CY 2019 (n=175), CY 2020 (n=801), CY 2021 (n=398); Online Marketplace CY 2020 (n=1,069), CY 2021 (n=1,720). The Online Marketplace survey was not fielded before CY 2020. The Direct to Customer Solution average was not calculated for years prior to CY 2020. The residential portfolio average and Direct to Customer Solution average are the averages of all offerings surveyed during the year weighted by total participation. Boxes around percentages indicate a statistically significant difference from CY 2020 result at p<0.05 using a t-test.

Net Promoter Score

The evaluation team calculated a net promoter score (NPS) for each offering based on the likelihood of the participant to recommend it. 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. High NPS scores (+70 or higher) are theoretically predictive of customer behaviors, such as participating in another offering, implementing additional home energy improvements, and referring

Focus on Energy offerings to others. The closer the NPS is to +100, the more favorable the respondents are toward the offering. NPS scores over +80 are considered excellent, while scores that dip below 50 warrant investigation into a possible opportunity for improvement.

Residential offerings received high scores from participants, with an NPS higher than +80 for all CY 2021 offerings. Trade Ally Solutions had an NPS of +84 in CY 2021 (up from +77 in CY 2020), while the other offerings had NPS scores that were nearly identical to CY 2020. The highest scores for residential offerings in CY 2021 were +88 NPS for Energy Savings Packs and Retail Smart Thermostat offerings.

Awareness by Program Participants

In addition to ongoing participant satisfaction surveys, the evaluation team fielded surveys for specific offerings to collect information on customer awareness channels and demographics, motivations to participate, specific behaviors related to measures, and other information. Table 17 lists the CY 2021 target offerings and sample sizes of surveys for the Renewable Energy and Online Marketplace offerings.

Table 17. Sample Size of Residential Participant Surveys Conducted in CY 2021

Offering Surveyed	n	Mode
Renewable Energy	70	Phone
Online Marketplace	479	Online

Respondents most often heard about the offering from the same source as its delivery channel: email for Online Marketplace and from trade allies for Renewable Energy. The second most often mentioned source for both was from participation in another Focus on Energy offering.

Similar to results from CY 2020, 56% of the CY 2021 Online Marketplace participant respondents heard about it in an email from Focus on Energy or their utility. The next most mentioned was the 34% who heard about the Online Marketplace through their prior participation in a Focus on Energy offering, more than double the 16% in CY 2020. Of the Renewable Energy participant respondents, 51% said they heard about the offering from the trade ally, with 11% also aware from their participation in another Focus on Energy offering.

Responses about the best ways to inform customers about Focus on Energy offerings were consistent with the way the Online Marketplace conveys information respondents are currently informed: email, direct mail, Focus on Energy, or utility websites. In contrast, Renewable Energy participants said the best ways to inform customers about Focus on Energy offerings were social media (36%), television (19%), bill insert (17%), direct mail (14%), and trade allies (10%). The 10% for trade allies differs from the 51% of respondents who said they heard about the Renewable Energy offering from the trade ally.

Respondents indicated their awareness and participation in other offerings. Awareness by Online Marketplace participants ranged from approximately 50% for the Energy Saving Packs offering to 30% for Residential New Construction. Nearly all Online Marketplace respondents who were aware of the Energy Saving Packs offering had also participated in it, with the participation rate dropping to 50% for those aware of discounts for lighting and smart thermostats through the Retail offering and to 25% for

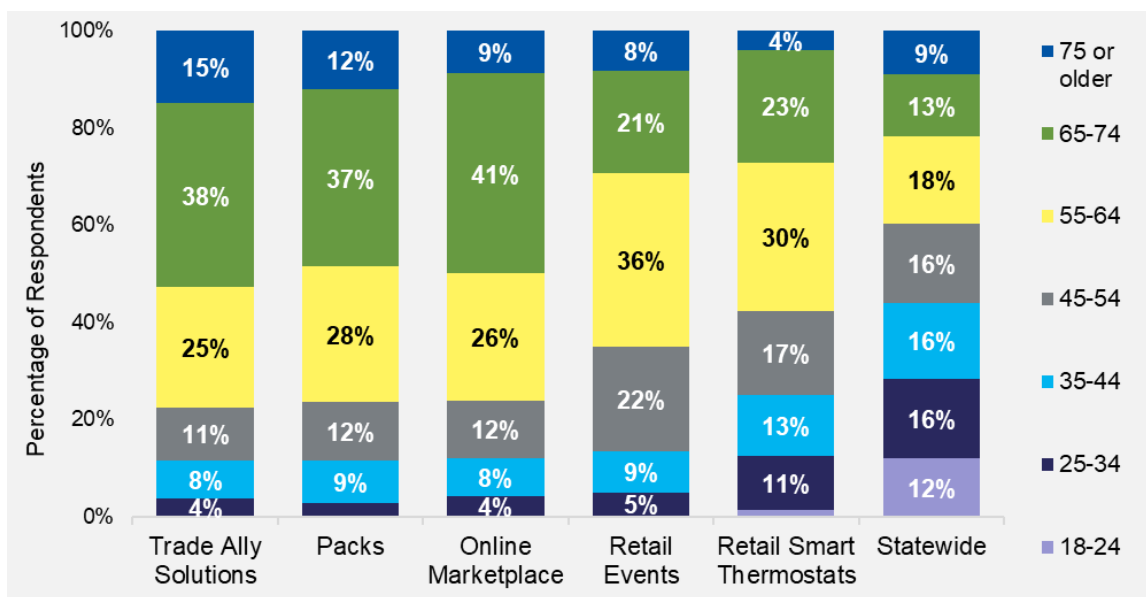
those aware of Heating and Cooling incentives. Almost no respondents had participated in the Residential New Construction offering. Renewable Energy participants were also most aware of Energy Saving Packs (80%), with most also having participated in that offering.

Customer Profile

The evaluation team assessed what market segments are participating in each offering and to what extent the offerings are reaching all segments of the market. The team used demographic data from ongoing participant satisfaction surveys and data from the U. S. Census Bureau’s 2020 American Community Survey in Wisconsin.

Figure 10 shows the age distribution of survey respondents by offering and of Wisconsin residents, according to the 2020 American Community Survey data.¹² The American Community Survey data indicate that the Wisconsin population is relatively evenly distributed across all age ranges. However, most of Focus on Energy’s offerings served participants aged 55 to 74. The exception is the Retail Smart Thermostat offering, in which customers were more evenly distributed across all age ranges over 25.

Figure 10. Age of Survey Respondents



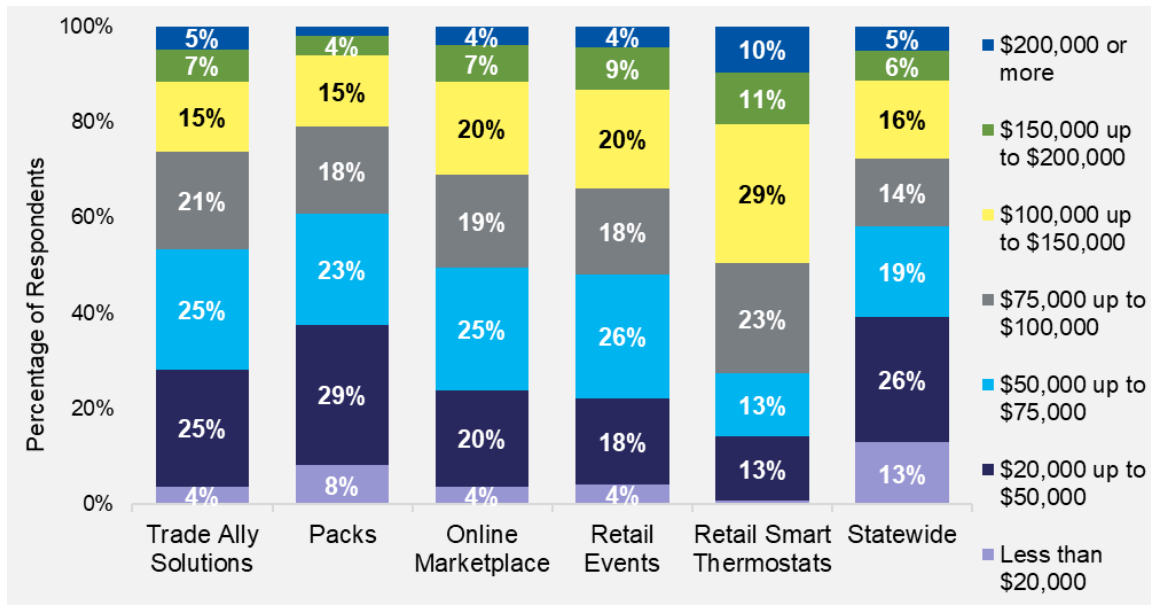
Offering source: Participant Satisfaction Survey Question. “Which of the following categories best represents your age?” Trade Ally Solutions (n=1,362), Packs (n=1,343), Online Marketplace (n=1,665), Retail Events (n=386), Retail Smart Thermostats (n=151). Statewide source: Census 2020 American Community Survey, Selected Social Characteristics in the United States.

Figure 11 shows the income range of participants relative to the general population. The American Community Survey data show that Wisconsin residents are evenly distributed across all income levels up to \$150,000, with smaller percentages of residents above \$150,000. Focus on Energy offerings reflect this distribution well but are slightly less likely to include customers in the lowest income bracket.

¹² U.S. Census. “Wisconsin.” Accessed March 2022. <https://data.census.gov/cedsci/profile?g=0400000US55>

Participants in the Retail Smart Thermostat offering were the most likely to be in higher income brackets, while participants in the Packs offering were the most likely to be in lower income brackets.

Figure 11. Income Level of Survey Respondents



Offering source: Participant Satisfaction Survey Question. “Which category best describes your total household income before taxes?” Trade Ally Solutions (n=1,008), Packs (n=980), Online Marketplace (n=1,214), Retail Events (n=293), Retail Smart Thermostats (n=113). Statewide source: Census 2020 American Community Survey, Selected Social Characteristics in the United States.

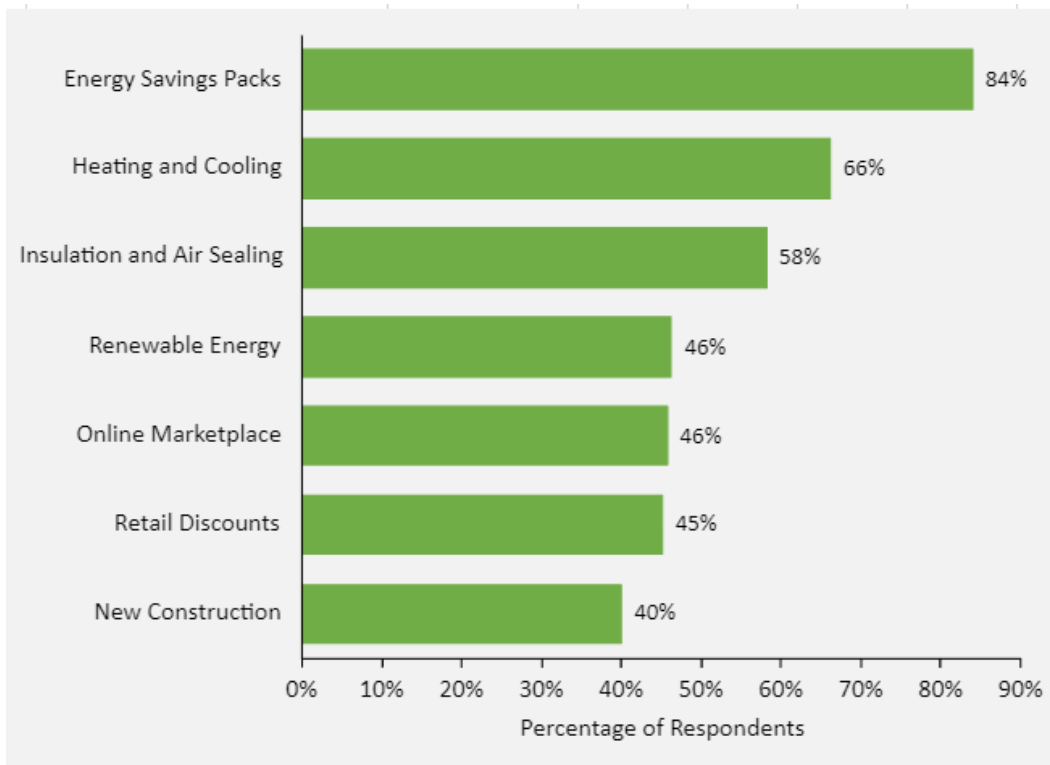
General Population Awareness and Participation

The evaluation team completed a survey (primarily online) with 658 residents of Wisconsin, both participants and nonparticipants, to assess awareness of Focus on Energy offerings, barriers to participation, and the impact of the COVID-19 pandemic on energy use and energy efficiency upgrade plans. The survey sought to identify whether responses from residents with limited incomes varied from responses from the general population.¹³ The team found that approximately a quarter of respondents were in the limited-income population. Unless noted otherwise, limited-income respondents were similar to the general population.

Most respondents (83%) were aware of Focus on Energy prior to receiving the survey, a large increase compared with 48% in the previous general population survey conducted in CY 2018. Just over 80% of those aware of Focus on Energy had participated in an offering. As shown in Figure 12, the most common offerings were Energy Savings Packs, Heating and Cooling, and Insulation and Air Sealing. Responses from limited-income respondents did not differ from the full population.

¹³ The evaluation team defined limited income by the eligibility criteria for Tier 2 incentives in Trade Ally Solutions.

Figure 12. Participation in Focus on Energy Programs



Source: General Population Survey Question C6. “What Focus on Energy offerings did you participate in?”
Multiple responses allowed (n=523)

The evaluation team asked the 523 respondents who were aware of Focus on Energy before the survey how they had heard about it. The most common was email (34% of limited-income; 41% of non-limited-income), mailing (28% limited-income; 32% non-limited-income), and participation in another Focus on Energy offering (21% limited-income; 23% non-limited-income).

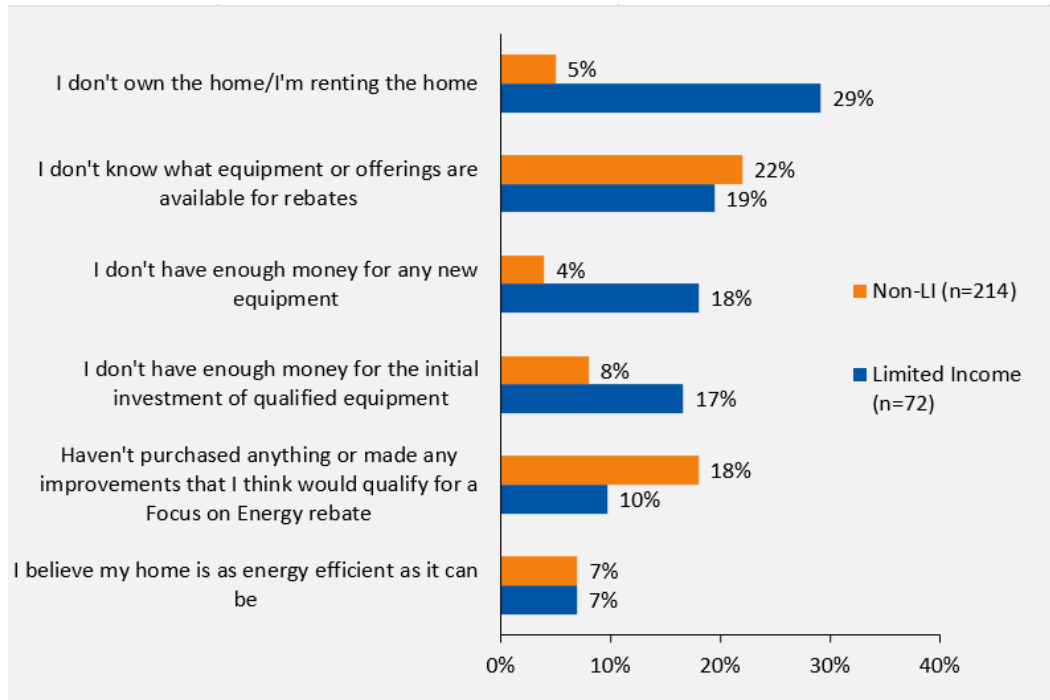
When asked about the biggest challenge in completing energy efficiency improvements, respondents reported the most common challenge was upfront costs (51% of all respondents). This is similar to the CY 2018 results, in which 56% said upfront cost was the biggest challenge.

Respondents who said they were aware of Focus on Energy prior to the survey but had not participated in a Focus on Energy offering were asked the reason. As shown in Figure 13, challenges for limited-income and non-limited-income groups diverged in a few areas. Compared with non-limited-income respondents, limited-income respondents more often reported not making improvements because they did not own the house and did not have the money for new equipment.

- For limited-income respondents, the most frequent responses were not owning the home (29%), being unaware of what equipment or offerings were available for rebates (19%), and not having enough money to cover either the improvement or initial down payment (35%).
- For non-limited-income respondents, the most frequent responses were being unaware of what equipment or offerings were available for rebates (22%), not purchasing anything or making any

improvements that they thought would qualify for a Focus on Energy rebate (18%), and not having enough money (12%).

Figure 13. Reasons for Nonparticipation



Source: General Population Survey Question E4. What are the reasons you have not participated in a Focus on Energy program? (n=214, n=72)

During hot summer months and cold winter months, limited-income respondents were more likely to think their utility bills are big financial burdens (61%) than were non-limited-income respondents (26%). This difference is statistically significant.

Most general population survey respondents said COVID-19 had no impact on the way they use energy. Of those who indicated their usage changed, more respondents said their energy usage increased than decreased, with the largest number reporting higher use of television and audio equipment, home office equipment, and lighting. Responses between limited-income and non-limited-income respondents were similar.

Nonresidential Process Evaluation Findings

For the CY 2021 nonresidential program evaluation, the evaluation team conducted phone surveys and in-depth interviews to assess customer experience and offering attribution and to gather feedback on the nonresidential portfolio. As in other years of the quadrennium, the team also conducted an online and mail-in satisfaction survey with all nonresidential participants.

Customer Feedback

During CY 2021, the administrator and the evaluation team fielded surveys online and by mail that asked participants in the Business and Industry, Schools and Government, and New Construction solutions to rate how satisfied they were with Focus on Energy's offerings and to provide recommendations for improving the solutions. In CY 2021, 470 Focus on Energy nonresidential participants completed a survey.

Customer Satisfaction

The surveys used a satisfaction scale from 0 to 10, where 10 meant *extremely satisfied* and 0 meant *not at all satisfied*. Figure 14 shows a three-year comparison of participants' average satisfaction ratings with nonresidential offerings.¹⁴

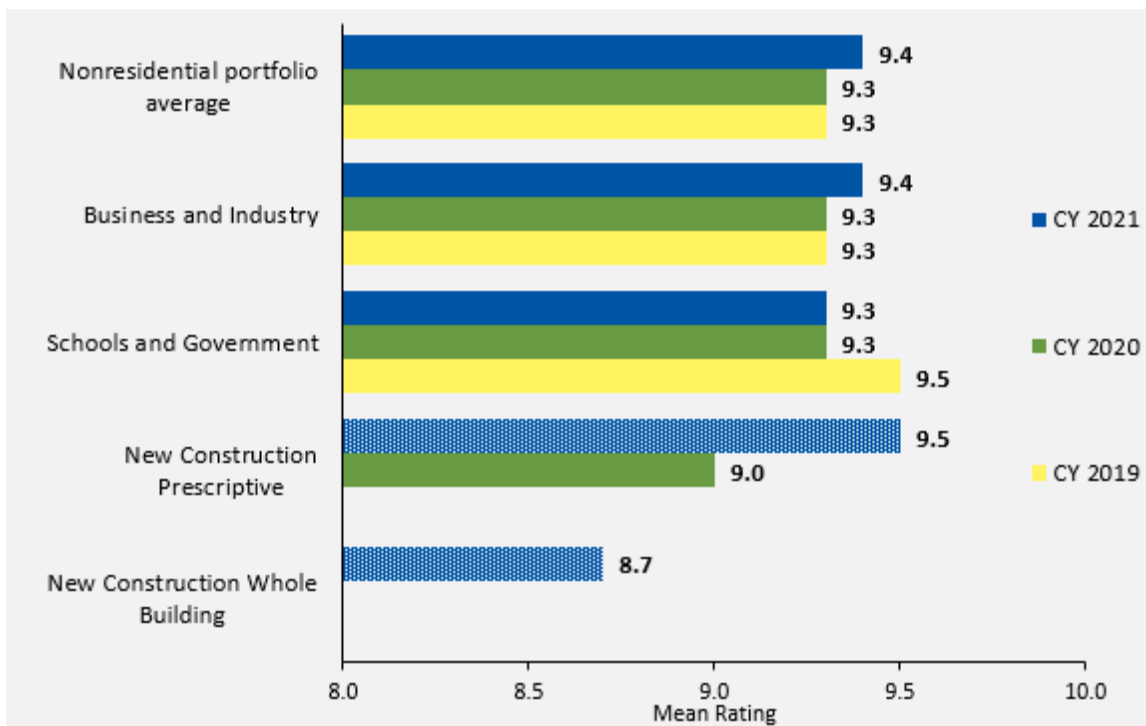
In CY 2021, across all nonresidential offerings surveyed, the participation-weighted average overall satisfaction rating was 9.4, an increase from 9.3 in CY 2020. Average ratings in CY 2021 were 9.4 for the Business and Industry Solution and 9.3 for the Schools and Government Solution, both significantly above the portfolio target of 8.9. Average ratings for the Nonresidential New Construction offerings were statistically equivalent to the target.¹⁵

The evaluation team calculated an NPS score for each offering based on the likelihood of the participant to recommend it. Generally, a positive NPS score of +60 or better is interpreted as good, and the closer the NPS is to +100, the more favorable the respondents are toward the offering. All three nonresidential offerings surveyed received a high NPS. The Schools and Government Solution had the highest NPS at +93, and the New Construction Prescriptive offering had the lowest NPS at +64.

¹⁴ Ongoing participant satisfaction surveys were restructured in CY 2020 to match the new portfolio structure. The CY 2019 results for the Business and Industry Solution survey are a weighted average of results from the precursor programs consolidated into the solution (Business Incentive, Large Energy Users, Small Business, Multifamily Energy Savings, and Agribusiness programs). The CY 2019 results of the Schools and Government Solution survey are from the precursor program called Agriculture, Schools and Government. The New Construction Prescriptive survey was fielded for the first time in CY 2020, and the New Construction Energy Design Review survey was fielded for the first time in CY 2021.

¹⁵ $p < 0.05$ using binomial t -tests.

Figure 14. CY 2021 Average Overall Satisfaction Ratings for Nonresidential Offerings



Source: Ongoing Participant Satisfaction Mail/Online Survey Question. “Overall, how satisfied are you with your most recent experience with Focus on Energy?” Business Incentive CY 2019 (n=1,339 weighted average of three predecessor programs), CY 2020 (n=848), CY 2021 (n=360); Schools and Government CY 2019 (n=263), CY 2020 (n=208), CY 2021 (n=92); New Construction Business Prescriptive CY 2020 (n=25), CY 2021 (n=11); New Construction Business Energy Design Review CY 2021 (n=7). New Construction Business Prescriptive survey was not fielded before CY 2020, and New Construction Business Energy Design Review survey was not fielded before CY 2021. The nonresidential portfolio average is the average of all programs surveyed during the year weighted by total program participation.

Shaded bars represent results from less than 20 surveys, interpret with caution.

Customer Recommendations

The most common recommendation for improving the nonresidential solutions were to improve communication (41% of Business and Industry respondents, n=22; 62% of Schools and Government respondents, n=13). Specific Schools and Government suggestions to improve communication typically focused on follow-up to rebate applications, requests for more information about saving energy, and more promotion for Focus on Energy offerings. Specific Business and Industry respondent suggestions to improve communication typically focused on making it easier to find the information required to submit applications and receiving faster responses from Energy Advisors. Only two New Construction participants provided suggestions for improvement: one Prescriptive participant suggested that trade allies could provide more support for invoicing, and one Whole Home participant suggested that Focus on Energy provide a consistent point of contact for design assistance.

General Population Summary Findings

The evaluation team completed a phone survey with 160 nonresidential customers and phone interviews with 20 commercial real estate property managers and owners. Through this research, the

team assessed nonresidential customer awareness of Focus on Energy, their decision-making practices around property improvements, their motivations and challenges around implementing energy efficiency upgrades, and opportunities for Focus on Energy to support businesses in making improvements. Only customers who had not received an incentive from Focus on Energy in the past 12 months were eligible to complete the survey, but the evaluation team did not screen out property managers who had received an incentive in the past 12 months.

This section provides a high-level summary of these findings. Detailed findings and methodologies are contained in the Business and Industry Solution chapter in Volume II and in Appendix M. Survey and Interview Instruments by Offering in Volume III.

Awareness and Motivations

Awareness levels and past participation were highest for lighting measures, followed by HVAC measures. Of the 160 surveyed nonparticipant customers, 51% were aware of Focus on Energy nonresidential incentives, which was not significantly different from nonparticipant survey results of CY 2018 (48%, n=140) or CY 2015 (53%, n=122). The surveyed nonparticipants were most frequently familiar with lighting incentives (68%, n=79) followed by incentives for heating and air conditioning (29%), which was consistent with CY 2018 survey results.

All 20 property manager and owner respondents were familiar with Focus on Energy. Of the 18 property managers who had participated in Focus on Energy, 10 received lighting incentives, and six received HVAC incentives.

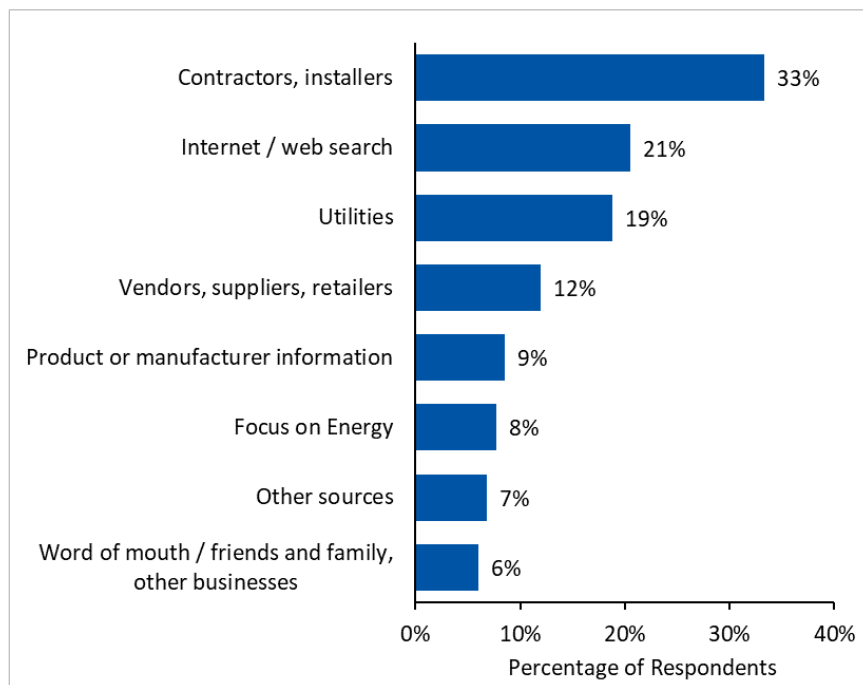
In CY 2021, contractors and vendors were phone survey respondents' top source of awareness about Focus on Energy incentives overall (22%, n=81) as well as their most trusted source of information about energy efficiency (33%, n=117). The evaluation team did not ask property managers or owners how they learned of Focus on Energy incentives or their most trusted sources of information.

CY 2021 results varied by industry:

- Healthcare respondents were least likely to mention contractors (18%, n=11) and product or manufacturer information (0%); their most-mentioned source was utilities (27%).
- Agriculture respondents were most likely to trust word of mouth/friends, family, and other businesses (20%, n=25).
- Retail respondents were most likely to trust the internet (37%, n=19), and they were the segment that was most likely to mention Focus on Energy (16%).
- No restaurant respondents mentioned Focus on Energy (0%, n=20).

Figure 15 shows respondents' trusted sources of information.

Figure 15. Trusted Sources of Information on Energy Efficiency



Source: Nonparticipant Survey Question D6. “Who or what sources do you seek out as a trusted source of information regarding energy efficiency?” (n=117). Responses total to more than 100% because multiple responses were allowed.

Reducing operating and utility costs is the most common benefit of energy efficiency for nonresidential customers. When asked to rank which of four statements about energy efficiency benefits was the most important to them overall, 67% of 154 respondents chose “energy efficiency saves my organization on its utility bills,” followed by “protects the environment” (18%), “makes my organization more productive” (10%), and “creates jobs and contributes to the Wisconsin economy” (5%).

Similarly, as shown in Table 18, of the eight property manager and owner interview respondents who said energy efficiency is *very important* to their company, six said the reason was to keep operating costs low. The only property manager who considered energy efficiency was *not important* to the company said it was because the tenants are responsible for energy costs. The evaluation team found no relationship between lease type and the importance that property managers and owners placed on energy efficiency.

Table 18. Energy Efficiency Importance and Motivation for Property Managers and Owners

Very Important (n=8)	Number of Mentions
Keep costs low	6
Environmental concerns	3
Stay competitive	1
Somewhat Important (n=11)	Number of Mentions
Tenants pay for energy	3
Important in major upgrades	2
Keep costs low	2
Environmental concerns	1
Low priority	1
Older building, efficiency upgrades challenging	1
Small building	1
Not Important (n=1)	Number of Mentions
Tenants pay for energy	1

Source: CY 2021 Real Estate Owner/Manager Interview Question Q10 “How important would you say energy efficiency is to your company? And why would you say that?” (n=20). Multiple responses were allowed.

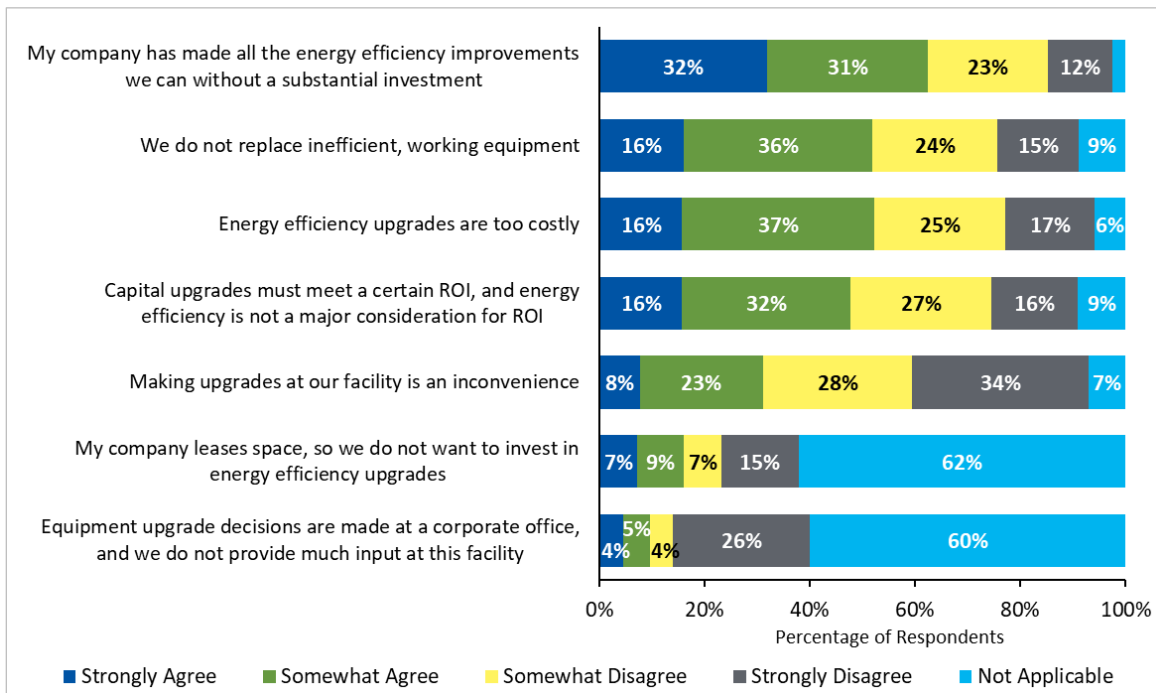
Opportunities to Reduce Barriers to Participation

For phone survey respondents, key barriers to participation were lack of knowledge about Focus on Energy and a belief that substantial financial investment would be required for any future energy efficiency improvements. Twenty-five percent said the reason for not participating in the last year was that they did not know enough about the Focus on Energy offerings. Fifteen percent said they had not made upgrades of any kind in the past year, 14% were new businesses or occupying a new building, and 14% did not have resources for the initial investment.

Phone survey respondents also rated their agreement with statements about specific barriers to implementing energy efficiency projects (Figure 16). Most respondents *strongly agreed* or *somewhat agreed* that their business has made all the energy efficiency improvements it could without substantial investment (62%), that they will not replace working heating and cooling equipment (52%), and that upgrades for their facility are too costly (52%).

The evaluation team did not ask property managers or owners about specific barriers but did suspect that property managers may be underestimating the importance of energy efficiency to tenants in terms of bill impacts and comfort levels. Though most property managers and owners said they thought energy efficiency was *very important* or *somewhat important* to their company, most said they thought their tenants, regardless of lease type, viewed energy efficiency as *not important* or only *somewhat important*.

Figure 16. Specific Challenges to Implementing Energy Efficiency Projects and Upgrades



Source: Nonparticipant Survey Question E1. “Please tell me whether you agree with these statements.” (n=153 to n=158). Percentages do not total to 100% due to rounding, and some percentages do not appear to match the narrative above due to rounding.

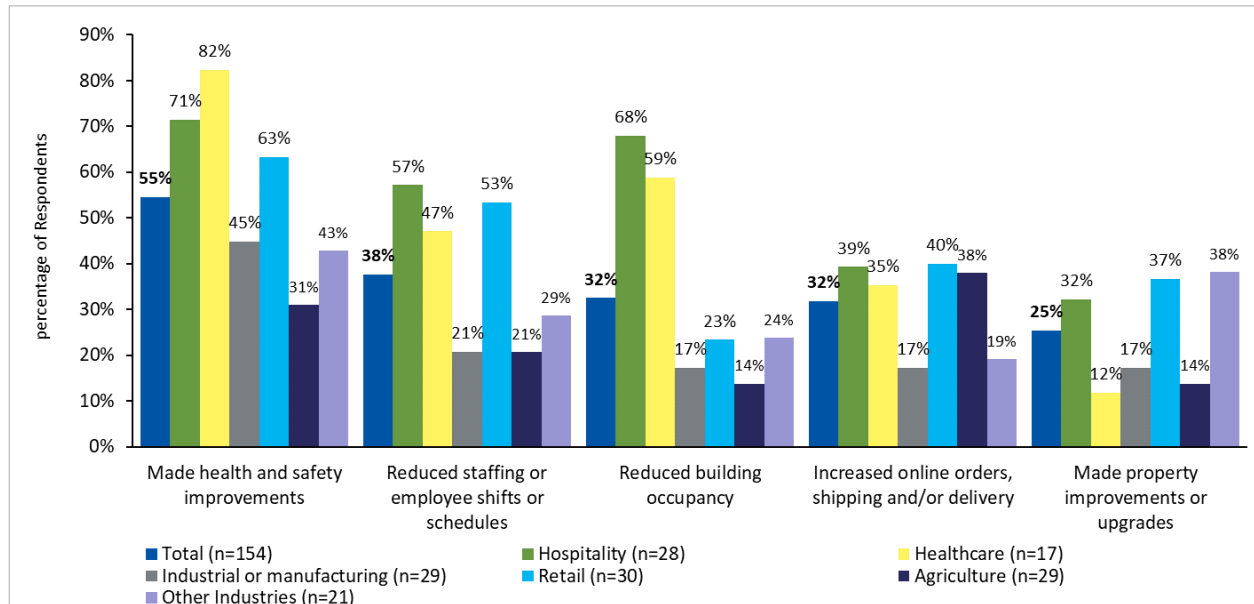
Phone survey respondents and interviewed property managers and owners most often said increased outreach and marketing of Focus on Energy incentives were ways to increase participation in Focus on Energy and were helpful types of support from Focus on Energy. When asked what would motivate them to participate in a Focus on Energy offering, 38% (n=68) said more advertising and information about what offerings were available, 34% said higher incentives, and 9% said lower costs for equipment and products. When asked how Focus on Energy can support property managers, owners, and their tenants, nine of 18 property managers and owners suggested more outreach to contractors, building owners and managers, and tenants about the Focus on Energy’s different offerings and solutions.

COVID-19 Impacts on Nonresidential Customers

As shown in Figure 17, phone survey respondents most commonly made improvements related to health and safety (55%), followed by reducing staffing or employee hours (38%) and reducing building occupancy (32%). Just 25% made property improvements or upgrades.

Of 19 property managers and owners, 10 said their tenants’ occupancy or staffing levels were affected by the COVID-19 pandemic. Six of 15 property managers and owners reconfigured commercial space or completed upgrades in response to the pandemic—two improved filtration systems, one completed a major renovation, one changed lighting, one reconfigured office space, and one reported doing a significant upgrade to one building because it was easy to do with the building empty. Of all upgrades, only one was reported to be energy-efficient (lighting upgrade).

Figure 17. Business Adjustments Due to the COVID-19 Pandemic



Source: Nonparticipant Survey Question G3. "In what ways did your business adjust to challenges associated with COVID-19?" Multiple responses accepted.

Overall, 53% of phone survey respondents had resumed their normal pre-COVID-19 operations as of late 2021, though these resumptions varied by segment from 69% of industrial or manufacturing businesses to 31% of healthcare businesses.

When asked whether they believe their tenants will return to pre-COVID-19 occupancy rates, five property managers and owners said *yes* and three said *no* (two did not respond to the question).

Some nonresidential customers put planned energy efficiency projects or upgrades on hold. Five interviewed property managers delayed building upgrades due to low budget available (n=16). Of the 160 surveyed property managers, 18% put planned energy efficiency projects on hold.

Cost-Effectiveness Findings

With the oversight of and in collaboration with the PSC and the evaluation team, the Focus on Energy administrator developed a specific cost-effectiveness calculator for the CY 2019-CY 2022 quadrennium. The administrator and implementers used the calculator to assess the cost-effectiveness of solutions' designs prior to their implementation each year.

To maintain consistency between planning and evaluation approaches—critical for understanding solution performance compared to expectations—the evaluation team used the same calculator as the administrator and implementers to evaluate the cost-effectiveness of the Focus on Energy offerings in CY 2021, as 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 solutions and offerings and of the entire Focus on Energy portfolio.¹⁶ The PSC also directed that four additional tests be conducted for advisory purposes: an expanded TRC that also includes net economic benefits, the utility administrator cost test (UAT), the ratepayer impact measure (RIM) test, and the societal test.

NTG ratios can be a significant driver of TRC, UAT, RIM, and societal test results. NTG ratios are applied to impacts so they reflect only the gains resulting from Focus on Energy. Therefore, NTG ratios account for the energy savings that would have been achieved without the efficiency solutions (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 solution (such as solution and administrative costs) are not impacted by the NTG ratio.

Test Description

The evaluation team—as well as the administrator in developing its calculator—used methods adapted from the California Standard Practice Manual,¹⁷ 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, RIM, and societal test are in Appendix I. Cost-Effectiveness and Emissions Methodology and Analysis in Volume III.

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

¹⁶ 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

¹⁷ 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

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 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 2021 evaluation defines solution cost-effectiveness from a regulatory perspective (as directed by the PSC) and is intended to measure the overall impacts of the solutions' 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 solutions 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 solution administrative costs, solution delivery costs, and net participant incremental measure costs:

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

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 solutions, 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 quadrennia, as the measure cost calculation approach for many measures, including most custom measures, was 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 solution and overall portfolio cost-effectiveness; however, they do not directly reflect the overall performance of the Focus on Energy solutions.

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).¹⁸ 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).¹⁹ The methodologies established under the aforementioned PSC Orders were maintained by the PSC in its Final Decision for the Quadrennial Planning Process III.²⁰

The source for electric energy avoided costs in this CY 2021 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 2029.²¹

The source for natural gas avoided costs in this CY 2021 evaluation are based on Henry Hub price forecasts from the 2018 U.S. Energy Information Administration's *Annual Energy Outlook*.²²

In its Final Decision of June 1, 2020, the PSC directed the Evaluation Working Group (EWG) to propose to the PSC a method for calculating avoided transmission and distribution (T&D) costs to be used for the purposes of evaluating Focus on Energy (PSC REF#: 390566). The PSC established the methodology to estimate avoided electric T&D costs for the CY 2019-CY 2022 Focus on Energy quadrennium, under PSC docket 5-FE-101 (PSC REF#: 406591), with the direction to revisit avoided T&D costs in the Quadrennial Planning Process IV. Avoided T&D costs are calculated based on a running average of costs associated

¹⁸ 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

¹⁹ 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

²⁰ 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

²¹ 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/>

²² U.S. Energy Information Administration. February 6, 2018. *Annual Energy Outlook*. <https://www.eia.gov/outlooks/archive/aeo18/pdf/AEO2018.pdf>

with T&D infrastructure as reported to the PSC. This value is then escalated to align with projected increases in construction costs.²³

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 2019, CY 2020, and CY 2021.

Table 19. Avoided Cost Comparison of CY 2019, CY 2020, and CY 2021

Avoided Cost	CY 2019	CY 2020	CY 2021
Electric Energy (\$/kWh) ^a	\$0.03093–\$0.04878	\$0.03093–\$0.05015	\$0.03093–\$0.05029
Electric Capacity (\$/kW year)	\$117.43–\$174.17	\$124.75–\$176.99	\$128.06–\$179.83
Natural Gas (\$/therm) ^b	\$0.538–\$0.764	\$0.524–\$0.777	\$0.546–\$0.785
Transmission and Distribution (\$/kW year)	N/A	\$66.34–\$68.61	\$66.40–\$68.74
Avoided Cost Inflation	0%	0%	0%
Real Discount Rate	2%	2%	2%
Line Loss	8%	8%	8%

^a The CY 2020 cost-effectiveness analyses used a time series that grows from \$0.03093 to \$0.06871 over 14 years in the forecast model.

^b The natural gas avoided costs grow from \$0.625 to \$1.278 over a 25-year period based on growth rates from U.S. Energy Information Administration. May 7, 2014. *Annual Energy Outlook 2014*. <https://www.eia.gov/outlooks/archive/aeo14/>

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 (EPA’s) AVOIDed Emissions and geneRation Tool (AVERT) 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. Previously to obtain emissions by program, the evaluation team mapped site zip code and utilities to AVERT regions; however, the EPA updated the regions so now all of Wisconsin

²³ Public Service Commission of Wisconsin. March 10, 2021. *Quadrennial Planning Process III*. Order PSC Docket 5-FE-101, REF#: 406591. <https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=406591>.

falls into a single region. With all savings allocated to one region the team aggregated them by solution and offering and ran them 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 EPA’s Cross State Air Pollution Rule.²⁴

The team used the carbon dioxide emissions price established by the PSC in its 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.”²⁵

Table 20 lists the emissions benefits for all offerings by channel.

Table 20. Total Program Emissions Benefits by Channel

Program Year ^a	Residential	Nonresidential	Midstream	Rural	Total
CY 2019 Emissions Benefits	\$24,187,924	\$94,615,966	N/A	\$2,092,656	\$118,803,890
CY 2020 Emissions Benefits	\$26,004,128	\$89,940,588	\$520,240	\$7,006,188	\$116,464,956
CY 2021 Emissions Benefits	\$20,085,064	\$82,221,328	\$1,124,349	\$6,455,256	\$109,885,997

^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.²⁶ Focus on Energy’s fiscal agent, Wipfli, provided the CY 2021 solution costs used for this evaluation.

Table 21 shows the CY 2019, CY 2020, and CY 2021 solution and incentive cost values used for the cost-effectiveness tests.

²⁴ Focus on Energy. December 11, 2020. *Carbon Pricing Methods*. Submitted to Public Service Commission of Wisconsin https://www.focusonenergy.com/sites/default/files/inline-files/Potential_Study-Research-Carbon_Pricing.pdf

²⁵ 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

²⁶ The evaluation team included the incentives as an incremental cost but not as a program cost.

Table 21. Sector Costs Comparison

Costs	CY 2019	CY 2020	CY 2021
Residential			
Incentive Costs	\$23,490,150	\$22,892,753	\$20,223,116
Administrative Costs	\$2,775,789	\$1,319,419	\$1,254,180
Delivery Costs	\$10,438,711	\$11,806,913	\$9,704,213
Total Residential Program Costs	\$36,704,651	\$36,019,085	\$31,181,509
Nonresidential			
Incentive Costs	\$40,345,267	\$28,976,029	\$26,582,145
Administrative Costs	\$2,135,458	\$1,279,291	\$1,240,528
Delivery Costs	\$21,263,700	\$15,956,836	\$15,968,398
Total Nonresidential Program Costs	\$63,744,426	\$46,212,156	\$43,791,071
Midstream			
Incentive Costs	N/A	\$401,575	\$718,575
Administrative Costs	N/A	\$9,657	\$45,810
Delivery Costs	N/A	\$525,541	\$585,951
Total Midstream Program Costs	N/A	\$936,773	\$1,350,336
Rural			
Incentive Costs	\$1,875,588	\$3,199,158	\$3,530,287
Administrative Costs	\$27,111	\$201,959	\$163,990
Delivery Costs	\$1,388,404	\$2,233,296	\$2,411,751
Total Rural Program Costs	\$3,291,103	\$5,634,413	\$6,106,028
Total			
Incentive Costs	\$65,711,006	\$55,469,515	\$51,054,123
Administrative Costs	\$4,938,358	\$2,788,738	\$2,704,508
Delivery Costs	\$33,090,816	\$30,544,175	\$28,670,313
Total Program Costs	\$103,740,180	\$88,802,428	\$82,428,944

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 2021 evaluation from the incremental cost study it conducted with the administrator and implementers. The incremental cost study allowed the evaluation 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 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 2021 project costs from the solution tracking databases to the renewable energy projects.

Table 22 shows the CY 2019, CY 2020, and CY 2021 total measure net incremental costs used for the cost-effectiveness tests.

Table 22. Net Incremental Measure Cost Comparison

Costs	Residential	Nonresidential	Midstream
CY 2021 Incremental Costs	\$78,610,182	\$169,406,055	\$3,828,757
CY 2020 Incremental Costs	\$75,928,043	\$172,974,089	\$2,118,513
CY 2019 Incremental Costs	\$62,647,981	\$134,864,170	N/A

Table 23 lists CY 2021 incentive costs by sector, with renewables incorporated.

Table 23. CY 2021 Incentive Costs by Sector (with Renewables Incorporated)

Costs	Residential	Nonresidential	Midstream	Total
Incentive Costs	\$20,420,912	\$29,914,636	\$718,575	\$51,054,123

Table 24 lists the findings of the benefit/cost analysis for Focus on Energy’s CY 2021 programs by sector.

Table 24. CY 2021 Benefit and Costs Portfolio Breakout

Focus on Energy Benefits and Costs		Portfolio Breakout	Core Efficiency	Rural	Renewables
Incentives	\$51,054,123		\$43,783,750	\$3,530,287	\$3,397,534
Modified TRC Benefits	\$665,243,908		\$552,453,559	\$56,481,902	\$55,191,349
Modified TRC Costs	\$283,219,815		\$234,942,938	\$10,340,364	\$37,259,518
Portfolio TRC Ratio	2.35	Alone	2.35	5.46	1.48
		With Core		2.48	2.23
		With Core and Rural			2.35
		With Core & Rural & Renewables			2.35

Table 25 lists the findings of the benefit/cost analysis for Focus on Energy’s CY 2021 programs by sector, with rural measures incorporated into each sector for each cost-effectiveness test.

Table 25. CY 2021 Costs, Benefits, and Modified Total Resource Cost Test Results by Sector

	Residential	Nonresidential	Midstream	Renewables	Total
Administrative Costs	\$1,196,648	\$1,315,478	\$45,810	\$146,573	\$2,704,508
Delivery Costs	\$9,830,367	\$17,770,491	\$585,951	\$483,504	\$28,670,313
Incremental Measure Costs	\$55,007,131	\$156,359,330	\$3,828,757	\$36,649,776	\$251,844,994
Total Non-Incentive Costs	\$66,034,146	\$175,445,299	\$4,460,517	\$37,279,853	\$283,219,815
Electric Benefits	\$58,370,732	\$264,281,053	\$2,120,897	\$39,831,174	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,398	\$-	\$133,749,777
Emissions Benefits	\$20,085,064	\$82,221,328	\$1,124,349	\$6,455,256	\$109,885,997
T&D Benefits	\$7,273,085	\$40,592,169	\$234,106	\$8,904,919	\$57,004,279
Total TRC Benefits	\$108,758,449	\$494,531,361	\$6,762,750	\$55,191,349	\$665,243,908
TRC Benefits Minus Costs	\$42,724,303	\$319,086,061	\$2,302,232	\$17,911,496	\$382,024,093
TRC Ratio	1.65	2.82	1.52	1.48	2.35
TRC Ratio without T&D Benefits	1.54	2.59	1.46	1.24	2.15

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

Table 26 lists CY 2019, CY 2020, and CY 2021 portfolio cost-effectiveness results for the modified TRC.

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

Calendar Year	Residential	Nonresidential	Midstream	Renewables	Total
CY 2019: Modified TRC Test Result with Renewables	1.70	2.99	N/A	N/A	2.58
CY 2019: Modified TRC Test Result Renewables Excluded	1.79	3.11	N/A	1.51	2.58
CY 2020: Modified TRC Test Result with Renewables	1.70	2.78	1.45	N/A	2.43
CY 2020: Modified TRC Test Result Renewables Excluded	2.07	2.86	1.45	1.24	2.43
CY 2021: Modified TRC Test Result with Renewables	1.49	2.78	1.52	N/A	2.35
CY 2021: Modified TRC Test Result Renewables Excluded	1.65	2.82	1.52	1.48	2.35

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, presented above, 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 administrator.
- The RIM is the ratio of avoided utility costs and the combination of participant incentives, administrative costs, and lost utility revenue.
- The Societal test has the same inputs as the expanded TRC, plus non-energy benefits

Table 27 lists the CY 2021 portfolio-level cost-effectiveness results for these additional test perspectives.

Table 27. CY 2021 Portfolio-Level Cost-Effectiveness Results for Additional Benefit/Cost Tests

Test	Residential	Nonresidential	Midstream	Rural	Renewables	Total
Expanded TRC						4.14
UAT	3.49	8.90	4.18	7.65	11.68	6.74
RIM	0.47	0.97	0.82			0.80

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 test are below 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 I. Cost-Effectiveness and Emissions Methodology and Analysis in Volume III as well as the Benefit/Cost Analysis CY 2009 Evaluation Report.²⁷

²⁷ 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 findings, this section presents high-level outcomes and recommendations. The team synthesized information from all CY 2021 evaluation activities to inform the following portfolio-level outcomes and recommendations. More information on supporting findings can be found in this report and in the solution chapters in Volume II.

Outcome 1. Participants continue to report increasingly high levels of satisfaction with Focus on Energy offerings. Overall, CY 2021 respondents gave the offerings they participated in an average satisfaction rating of 9.5, which was a statistically significant increase from 9.4 in CY 2020. The satisfaction ratings for all residential and nonresidential offerings in CY 2021 were statistically equivalent to or higher than the portfolio target of 8.9 out of 10.²⁸

Residential

Outcome 2. The CY 2021 residential general population survey revealed that awareness of Focus on Energy offerings increased significantly from 48% to 83% since the previous general population survey in CY 2018. Awareness was similarly high for the limited-income population. Over 80% of those aware of Focus on Energy had previously participated in an offering, with the most common participation in Energy Savings Packs.

Outcome 3. Limited-income respondents reported different reasons for not participating in Focus on Energy than non-limited-income respondents. The most common was not having enough money for energy upgrades or even an initial down payment to begin the installation process. The second most mentioned was not owning the home. Though offerings directed to limited-income customers are available, such as Energy Savings Packs and increased incentives for income qualified customers, major upgrades may be out of reach for customers who do not own their home or have enough money for the initial cost of the equipment or improvements.

Recommendation 1. If increasing participation of limited-income customers is a priority, consider providing a list of financing and tax credit resources that could be used in tandem with Focus offerings. Although the Focus on Energy website already includes links to financial resources, most do not apply to improvements to residences. A list specific to limited-income residential customers would be easier to navigate. For example, a list of credit unions that provide financing for clean energy projects and the Federal Renewable Energy Tax Credit (which gradually phase out at the end of 2023 and applies to solar PV systems, geothermal heat pumps). Case studies could be used to show how a project’s costs could be covered with a combination of Focus on Energy incentives, financing, and tax credits. Finally, consider if additional opportunities exist to engage with property managers or landlords of large properties to upgrade rental units during periods of vacancy or as part of routine maintenance.

²⁸ The evaluation team measured statistical significance using binomial *t*-tests with $p < 0.10$ or better. All surveyed offerings were statistically higher than the portfolio target except for Nonresidential New Construction offerings (CY 2021 rating of 9.2 based on 18 surveys), which was statistically equivalent to the portfolio target.

Outcome 4. In CY 2020 and CY 2021, the Direct to Customer Solution implementer introduced several new master measure identifiers (MMIDs) in Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management (SPECTRUM) that did not go through the prescribed TRM review and approval process.²⁹ In some cases, the evaluation team had difficulty identifying the appropriate savings for these measures or understanding the *ex ante* assumptions so it could assign verified savings and understand measure-level realization rates.

Recommendation 2. A new TRM process is being implemented in CY 2022 that will provide specific guidance for creating and approving new MMIDs and adding them to SPECTRUM, so the evaluation team should no longer find unexpected MMIDs in SPECTRUM in future. The evaluation team encourages the implementation team to remain engaged with this new process and to send notification when new measures need to be used or old measures may be retired.

Nonresidential

Outcome 5. The CY 2021 nonresidential general population survey revealed that awareness of Focus on Energy offerings remained steady from previous general population surveys. Contractors or vendors are the top sources for learning about Focus on Energy and the top trusted sources of information on energy efficiency. However, the COVID-19 pandemic may have long-lasting effects on preferences of nonresidential customers for ways to communicate about Focus on Energy incentives.

In CY 2021, 51% of respondents were aware of Focus on Energy offerings compared with 48% in CY 2018 and 53% in CY 2015. Industrial and agriculture businesses were most aware of Focus on Energy offerings (67%); awareness ranged from 40% to 44% for the other segments. Top sources of awareness of incentives were contractors or vendors (22%), word of mouth (14%), and utility communications (10%). The most trusted sources of information on energy efficiency were contractors (33%), the Internet (21%), and utilities (19%). Only 8% of respondents said they sought out Focus on Energy as a trusted source of information.

Though email remains the top preferred method of communication about Focus on Energy incentives, the results of the nonresidential general population survey show that preference for in-person communication declined significantly from CY 2018, while preference for telephone calls increased significantly, which may reflect the fact that more people were staying home, possibly due to COVID concerns.

Recommendation 3. Consider expanding outreach strategies by offering the opportunity to connect with a program representative via phone call. More customers appear to prefer direct personal contact with a phone call than in prior years.

²⁹ MMID refers to master measure identifier, which is used in the SPECTRUM database to identify measures by unique characteristics, such as equipment type, delivery path, and channel.

Outcome 6. There may be a near-term opportunity to expand nonresidential customer use of smart or automated devices through education about the benefits and partnerships with utility demand response programs. The nonresidential general population survey found that 62% of respondents believe their business has made all the energy efficiency improvements possible without substantial investment, and 52% are unwilling to replace working heating and cooling equipment. However, when asked if their facilities used smart thermostats, energy management system, or other automated or smart devices, only 17% of respondents reported using automated or smart equipment to control lighting, and only 31% used such equipment to control heating and cooling.

Use of this technology varies by industry segment, with agriculture respondents most often reporting they use lighting controls (30%) and retail respondents most often reporting they use controls for heating and cooling (48%). Nevertheless, when asked to rate their level of interest in a thermostat-based demand response offering and how receptive their business was in general to using software to control lighting, heating, cooling, and process systems, 66% were interested in a demand response offering, and 46% expressed the same level of interest in software controls in general.

Recommendation 4a. Consider ways to expand utility partnerships to co-promote their demand response programs and Focus on Energy rebates for smart thermostats.

Recommendation 4b. Consider educating customers about the energy and cost-savings opportunities of automated or smart devices, including smart thermostats, as a way to save energy and money without needing to replace existing equipment.

Outcome 7. Data tracking remained a challenge for the administrator and the evaluation team, with errors and misclassification in the nonresidential sector posing a risk to producing accurate evaluation results. Specifically, data entry for classifying new projects under solutions and offerings in the SPECTRUM database requires considerable manual effort for the implementers, and the evaluation team found that several projects were misclassified. To break out the offerings in the Business and Industry Solution, the evaluation team must manually sort by the available data fields in the SPECTRUM database. Some of these data fields may be out of date, leading to possible misclassification of projects.

To address these misclassifications, the evaluation team developed a new mapping methodology that requires cumbersome filtering and complex sequences to generate accurate offering-level impact summaries. These extra data classification steps pose a risk to creating replicable results.

Specifically, the program no longer collects data to qualify customers as small businesses for ease of program delivery, but if tracking the impacts for this segment is a priority, the evaluation team needs a reliable way to accurately differentiate projects in the Business and Industry Solution for CY 2022. Not having clear designations in SPECTRUM means a project may be misclassified by the implementation team and fall into the incorrect offering. For instance, the evaluation team cannot determine which projects fall into the small and medium Commercial Offering and small and medium Industrial Offering without a data field like small business or large energy user that accurately distinguishes between small/medium versus large. Similarly, the mapping approach developed by the evaluation team is a manual process applied to a large dataset, so there is a risk that inaccurately classified or missing data

will fall into the incorrect offering. As an example, in CY 2021, the offering for some schools and government projects was designated as “NULL,” which necessitated additional review and reclassification by the evaluation team.

Recommendation 5. Consider uniformly updating the SPECTRUM database with current and accurate headings for the solution, offering, and sub offering. If reprogramming new entry fields is not feasible in the near term, some existing entry fields could be temporarily reclassified to represent these designators. If reprogramming or reclassification of any kind is not feasible, the evaluation team and the administrator should discuss the filtering methodology early in the new year to ensure that all 2022 projects are correctly classified for the CY 2022 evaluation and analysis activities.

Outcome 8. COVID-19 continues to affect performance across nonresidential solutions. Overall participation in the nonresidential solutions declined 16% from CY 2020, when participation started to be affected by the COVID-19 pandemic. The Business and Industry Solution’s Large Industrial and Agribusiness offerings were the least impacted, as CY 2021 participation remained steady compared with 2020. Commercial and Industrial and New Construction Prescriptive offerings appeared to be the most impacted, with decreases in participation of 21% and 25%, respectively, compared with CY 2020. Lower participation rates likely contributed to slightly lower electric and gas savings compared with 2021 savings targets, particularly for the Business and Industry channel, which achieved 90% of its 2021 MMBtu goal.

As reported in the nonresidential general population survey (see Appendix M. Survey and Interview Instruments by Offering in Volume III), lower participation rates could be partly attributed to factors such as business closures, supply chain delays resulting in deferred or cancelled energy upgrade projects, lower revenues, and staffing and occupancy reductions. More hospitality, retail, or healthcare survey respondents reported being impacted by these factors than industrial or agriculture respondents in the Large Industrial and Agribusiness offerings.

The effects of COVID-19 on business operations and energy efficiency activities continued to be present in CY 2021, however participants surveyed in CY 2021 appear to be planning to work toward returning to more normal operations in CY 2022. In CY 2021, 78% of general population respondents said they had already returned or planned to return to pre-pandemic operations levels. Of the 29 nonparticipating respondents who reported delaying energy efficiency projects in 2020, 79% planned to complete those projects by the end of 2022.

Outcome 9. Several factors created discrepancies between *ex ante* and verified savings for nonresidential projects. Many of the issues cited in the CY 2020 evaluation and corresponding recommendations still apply to CY 2021.

CY 2020 Conclusion (Summary)	CY 2020 Recommendation (Summary)	CY 2021 Recommendation
<p>The evaluation team and program implementers used different versions of the TRM for calculating savings, which created inefficiencies.</p>	<p>Set a clear policy on which version of the TRM should be used (either the TRM in place at the time the project was paid or the latest TRM, but not both). Consider adding a data field to SPECTRUM with the TRM version used to calculate <i>ex ante</i> savings.</p>	<p>Same as CY 2020. Implementor should ensure that all MMID savings are consistently updated in SPECTRUM to reflect the current version of the TRM. Base <i>ex ante</i> savings on appropriate TRM using project’s creation date in SPECTRUM. Ensure all MMIDs are updated on TRM’s effective date to reduce SPECTRUM lag issues resulting from varied updates.</p>
<p>Some large and complex projects lacked detailed savings calculations, reporting, and data collection, which caused discrepancies with verified savings, particularly when the evaluation team used power metering to gather data on the site.</p>	<p>Provide more comprehensive review and analysis of project savings for larger custom projects that could be more complex and variable. Evaluation team recommends setting a minimum requirement that involves a technical analysis summary report, in which the implementer details the methodologies used and assumptions made to calculate savings. Team also recommends writing a verification report, in addition to the verification sheet, in which assumptions in the technical analysis summary report are verified, pictures and invoices collected, and any project changes accounted for. Whenever possible, include any meter or trend data in the analysis.</p>	<p>Same as CY 2020. The evaluation team recommends a more comprehensive review and analysis of project savings for large custom projects that could be more complex and variable than usual. Develop a standard protocol for developing savings estimates for these types of projects. This should also include a standard list of documentation required, such as project descriptions, invoices, photos, list of assumptions, etc. Suggested protocol elements are presented in the recommendations for the Business and Industry Solution.</p>

Midstream

Outcome 10. Although there is limited evidence that the Midstream Solution is changing distributors’ stocking practices for HVAC and commercial kitchen equipment, distributor feedback indicates that the solution does encourage them to recommend equipment with higher levels of efficiency. It is worth noting that this was the second year of implementing the Midstream Solution and changes to stocking practices tend to take multiple years to come into full effect, so this result is not unexpected. The distributor survey data will serve as a baseline for any changes observed in future years as the solution matures.

Recommendation 6. As was also recommended in CY 2020, to maximize the Midstream Solution’s impact and minimize freeridership, the implementer should continue to work with distributors to identify equipment categories and efficiency tiers that would most benefit from offering incentives. For example, if most ductless mini-split heat pumps carried by distributors are at least 18 SEER, consider limiting incentives to only higher SEER models. Also consider eliminating incentives for equipment with

significant market share and shifting these resources to increase incentives for equipment with higher incremental costs. This recommendation also applies to commercial kitchen equipment, particularly ice machines and fryers.

Cost-Effectiveness

Outcome 11. A handful of large energy user accounts had incorrect data regarding incremental measure costs, which led to an initial overestimate of incremental measure costs by approximately \$37 million. Had this overestimate not been identified and removed, the portfolio Modified – Total Resource Cost Test would have appeared approximately 10% lower.

Recommendation 7. Work with project implementation staff to ensure they know what information should be entered for the calculation of incremental measure costs and review these data regularly, particularly for large custom projects.