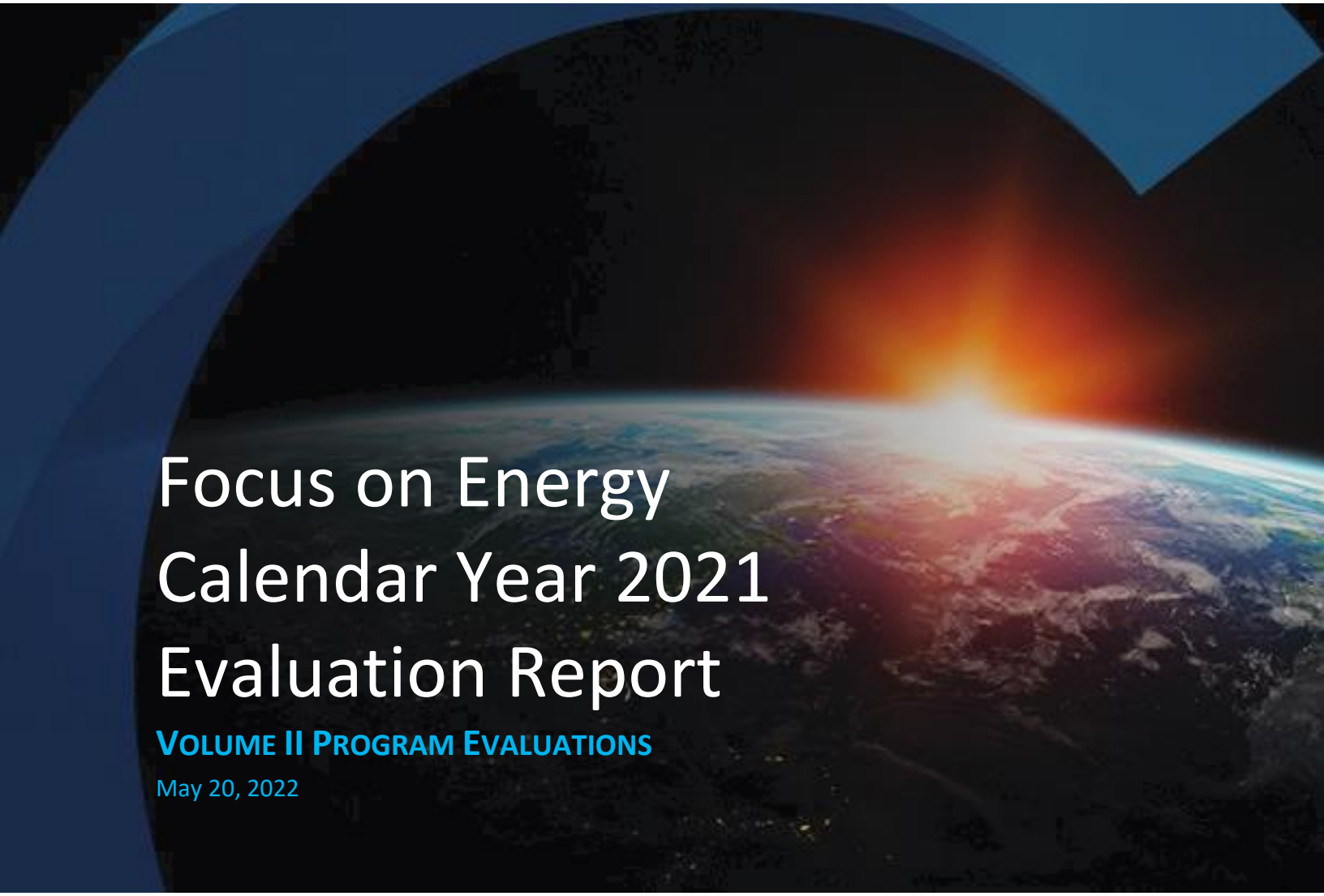
CADMUS



Focus on Energy Calendar Year 2021 Evaluation Report

VOLUME II PROGRAM EVALUATIONS

May 20, 2022

Prepared for:

Public Service Commission of Wisconsin
4822 Madison Yards Way
North Tower—6th Floor
Madison, WI 53705-9100

Prepared by:
Cadmus
Apex Analytics
Resource Innovations

CADMUS

Table of Contents

Tables

Figures

Acronyms

Acronym	Term
ACS	American Community Survey
AFUE	Annual fuel utilization efficiency
AHRI	Air-Conditioning, Heating, & Refrigeration Institute
AIA	American Institute of Architects
APS	Advanced power strip
AVERT	AVoided Emissions and geneRation Tool
BOC	Building Operator Certification
BPCs	Building performance consultants
Btu	British thermal unit
Btu/h	British thermal unit per hour
C&I	Commercial and Industrial
CARES Act	Coronavirus Aid, Relief, and Economic Security Act
CEE	Center for Energy and Environment
CY	Calendar year
DHW	Domestic hot water
DIY	Do-it-yourself
DOE	Department of Energy
DSM	Demand-side management
EISA	Energy Independence and Security Act
EMS	Energy management system
EUL	Expected useful life
GSL	General service lamps
HBA	Home builder association
ISR	In-service rate
kW	Kilowatt
kWh	Kilowatt hour
LED	Light-emitting diode
LTO	Limited time offer
Mbtu	Thousand British thermal units
Mbtu/h	Thousand British thermal units per hour
MMBtu	Million British thermal units
MMBtu/h	Million British thermal units per hour

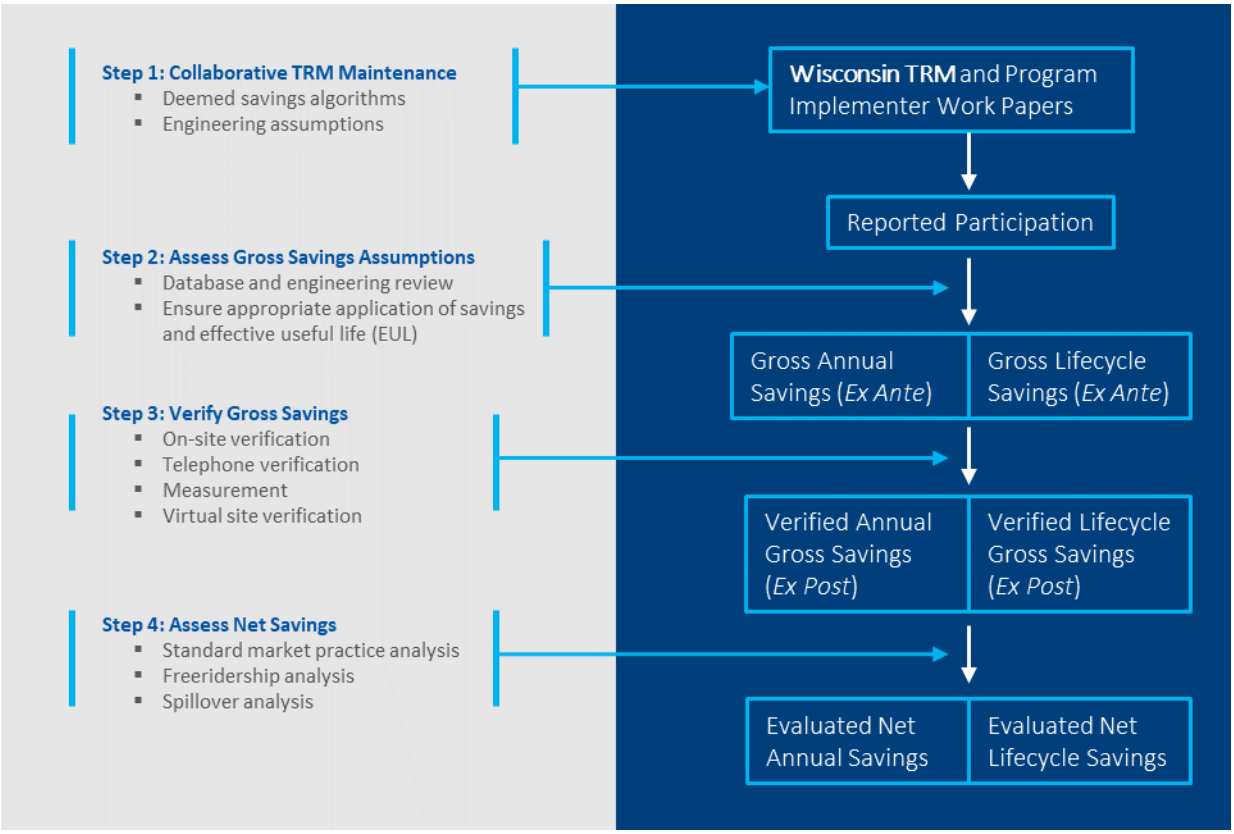
Acronym	Term
MMID	Master measure identifier
MThms	Thousand therms
MW	Megawatt
MWh	Megawatts per hour
NCP	National Consumer Panel
NG	Non-gas
NPS	Net Promoter Score
NTG	Net-to-gross
OLM	Online Marketplace
PEM	Practical Energy Management
POS	Point of sale
PSC	Public Service Commission of Wisconsin
PV	Photovoltaic
RECIP	Renewable Energy Competitive Incentive Program
RISE	Rural Industrial Striving for Efficiency
ROI	Return on investment
SEER	Seasonal energy efficiency rating
SEM	Strategic Energy Management
SKU	Stock keeping unit
SMP	Standard market practice
SPECTRUM	Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management
T&D	Transmission and distribution
TAS	Technical analysis summary
TRC	Total resource cost test
TRM	Technical reference manual
UMP	Uniform Methods Project
VPU	Virtual pop-up
VFD	Variable frequency drive
WUDC	Wisconsin Uniform Dwelling Code

Introduction

Volume II of the Focus on Energy calendar year (CY) 2021 evaluation report presents offering-specific evaluation findings and details about the evaluation approaches and results for the residential, midstream, and nonresidential offerings. This introduction presents additional information on the overall roles and responsibilities of the evaluation team as well as descriptions of standard evaluation practices and approaches the team used across multiple offering evaluations.[1]

The diagram presented here as Figure 1 in Volume II, and as Figure 2 in Volume I, is a useful summary of the steps involved in the calculation of net savings from the gross savings recorded in the offering tracking databases. In addition to these steps, there are many planning and coordination activities that are a part of the evaluation process. Following this introduction, Volume II presents offering-specific evaluation findings and greater details about evaluation approaches and results.

Figure 1. Evaluation Steps to Determine CY 2021 Net Savings



To accomplish evaluation steps 1 through 3, the evaluation team coordinates with staff from the Public Service Commission of Wisconsin (PSC), the program administrator, and program implementers to assess the measures expected to be installed across offerings in future years. To determine priorities for additional research, the evaluation team also reviews the deemed savings or algorithms contained in the

[1] The evaluation team comprises Cadmus, Apex Analytics, and Resource Innovations.

technical reference manual (TRM) and entered into Statewide Program for Energy Customer Tracking, Resource Utilization, and Data Management (SPECTRUM), the offering tracking database.

The evaluation team prioritizes measures for evaluation, measurement, and verification that demonstrate the highest priority by meeting one or more of the following criteria:

- New to the offerings
- Expected to contribute an increasing share of savings
- Experienced technical or other market changes (such as increased energy codes or standards)
- Have significant uncertainty around the savings calculation (independent measurement of key assumptions are dated)

The team then applies the findings from these activities to the savings calculations summarized in the evaluation report, which ultimately end up in the TRM.

Wisconsin Focus on Energy Technical Reference Manual

The Wisconsin Focus on Energy TRM is a document managed collaboratively by the program administrator, program implementers, evaluation team, and PSC staff. The information contained in the TRM presents the consensus calculations of the electric and gas energy savings and the electric demand reductions achieved from installing the energy efficiency and renewable energy technologies supported by Focus on Energy offerings. The TRM is publicly available on the Focus on Energy website.[2]

The values presented in the TRM fall into one of two categories:

- **Deemed savings.** Specific per-unit savings (or demand reduction) the program administrator, program implementers, evaluation team, and the PSC have accepted as reliable because the measures, and the uses for these measures, are consistent and because sound research supports the savings achieved.
- **Savings algorithms.** The equations used for calculating savings (or demand reductions) based upon project- and measure-specific details. The TRM also makes these calculations transparent by identifying and justifying all relevant formulas, variables, and assumptions.

The TRM is also a reference guide for how offering stakeholders classify measures in SPECTRUM, the offerings' tracking database. The evaluation team revises the document annually to account for any changes to the offerings and technologies.

Deemed Savings Report

The annual deemed savings report details changes or updates to deemed savings or savings algorithms in the TRM based upon evaluation measurement and verification activities. The evaluation team prepares and circulates the report for review among the primary members of the Focus on Energy team

[2] Public Service Commission of Wisconsin. April 2021. Wisconsin *Focus on Energy 2021 Technical Reference Manual.* Prepared by Cadmus. https://www.focusonenergy.com/sites/default/files/inline-files/Focus%20on%20Energy%202021%20TRM.pdf

including the administrator, the implementers, and the PSC. After this review process, the evaluation team incorporates the findings into the next iteration of the TRM.

Work Papers

Although evaluation activities often initiate updates to the TRM through the deemed savings report process, implementers can also initiate revisions or additions to the TRM. Instead of a deemed savings report, the implementers prepare work papers to present the savings assumptions for new measures or, when appropriate, revisions to the savings calculations for existing measures. They submit these work papers to the administrator, who forwards them to the evaluation team and the PSC for review, comment, and approval. Once a work paper receives final approval from the PSC, the evaluation team incorporates the work paper into the next iteration of the TRM.

Standard Evaluation Methods

The evaluation team uses several standard methods across evaluation cycles to assess the impact of Focus on Energy offerings: tracking database review, project audits, and on-site inspections. This introduction details each of these methods. The individual offering chapters that follow specify when the evaluation team applied these (or other methods) during the current or previous evaluation cycles.

Tracking Database Review

For each offering, the evaluation team reviews the tracking database, SPECTRUM, for completeness and quality of data. The review includes the following activities:

- Download and review data for projects completed during the offering year (January 1 to December 31 for each calendar year, based on the “payment approved date” in SPECTRUM)
- Check offering totals against offering status reports generated by SPECTRUM
- Verify the presence and completeness of key data fields (savings, incentives, quantities, etc.)
- Check for duplicate entries
- Reassign adjustment measures to original application IDs (where possible) using supplemental tracking databases from the program administrator

Project Audits (Engineering Desk Review)

The evaluation team reviews SPECTRUM for complete and accurate key project documentation, including the following information:

- Project applications
- Savings workbooks
- Savings calculations performed by participants or third-party contractors (if applicable)
- Energy audits or feasibility studies
- Customer metered data
- Customer billing data (monthly utility bills)

- Invoices for equipment or contracting services
- Other documentation submitted to Focus on Energy

Virtual Site Visit Inspections

For projects selected for evaluation, evaluation team inspectors verify the presence of equipment at a project site through verification video calls with participant facility staff. In these video calls, the inspectors receive a virtual tour of the project, along with video or photographic information to verify nameplate data and any necessary operating parameters. The inspectors may supplement these video conversations with additional options, such as allowing the customer to upload photographs and videos. The inspectors also work closely with the customer to ensure the process is streamlined and conducted efficiently to minimize the burden on the customer.

On-Site Inspections

For projects selected for evaluation, evaluation team inspectors verify the presence of equipment at a project site and collect data through a variety of methods, such as installing data loggers or taking spot measurements of power usage. Inspectors may also gather data by reviewing daily operations and maintenance logs, gathering operations data from central energy management systems, and reviewing historical trend data. Inspectors may also ask customers to initiate trends during a site visit to collect real-time energy consumption data and then follow up with the customer several weeks later to obtain the results.

Residential Solutions

This section presents the evaluation results for CY 2021 for these residential solutions and their offerings.

Direct to Customer Solution

- Online Marketplace
- Packs
- Retail
- Rural Farmhouse Kits
- Rural Retail Events

Trade Ally Solution

- Insulation and Air Sealing
- Heating and Cooling
- Renewable Energy

New Construction Solution

- Residential New Construction

Direct to Customer Solution

The Direct to Customer Solution is administered by APTIM. The implementer is ICF, which oversees the subcontractors, TechniArt and Crossmark. The solution provides customers with free energy-efficient products and services as well as incentives for purchasing efficient products through seven statewide offerings and two rural offerings:

- Two **Online Marketplace** offerings, Online Marketplace and Limited Time Offer (LTO), that promote discounted efficient products through an online store and limited time offer platform.
- **Packs** provides free packs of efficient products.
- Four **Retail** offerings provide discounts and rebates to customers who purchase efficient products through designated retailers or through special events coordinated by Focus on Energy. These offerings are Retail Lighting (upstream lighting), Retail Products (non-lighting measures), Pop-up Retail (in-person and virtual pop-up sales), and Income Qualified (free and discounted products distributed to limited-income customers).
- **Rural Farmhouse Kits** offers free packs of efficient products and insulation measures to customers in designated rural zip codes.
- **Rural Retail Events** offer discounted packs of efficient products to participating business employees or through community events in designated rural zip codes.[3]

Additional details about each offering are provided in the *Process Evaluation* section of this chapter.

Table 1 summarizes the impacts for CY 2021 for statewide and rural offerings as well as total impacts for the Direct to Customer Solution.

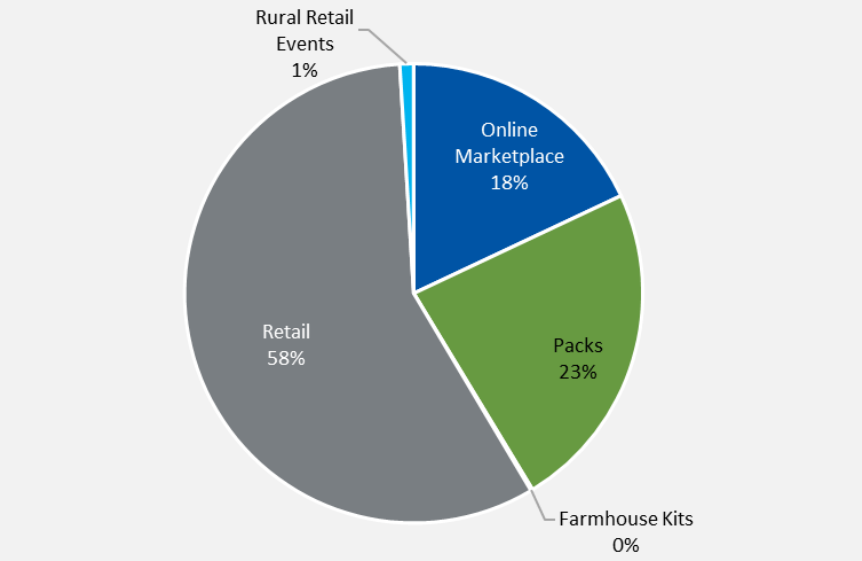
[3] Pop-up events were converted to virtual pop-up events in March 2020 following the onset of the COVID-19 pandemic.

Table 1. CY 2021 Direct to Customer Solution Summary

Item	Units	Statewide Direct to Customer Offerings	Rural Direct to Customer Offerings	Total Direct to Customer Solution
Incentive Spending	$	$10,858,758	$160,225	**$11,018,983**
Participation	Number of Participants	1,077,286	1,739	**1,079,025**
Verified Gross Lifecycle Savings	kWh	2,048,008,259	13,452,413	**2,061,460,671**
	kW	23,662	147	**23,809**
	therms	15,180,014	167,074	**15,347,088**
Verified Gross Lifecycle Realization Rate	% (MMBtu)	98%	80%	**97%**
Annual net-to-gross (NTG) Ratio	% (MMBtu)	51%	86%	**51%**
Net Annual Savings	kWh/year	105,983,904	1,410,735	**107,394,639**
	kW	8,980	122	**9,103**
	therms/year	1,203,903	14,688	**1,218,592**
Net Lifecycle Savings	MMBtu	4,932,086	54,650	**4,986,736**
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio with transmission and distribution (T&D) benefits	3.91	2.81	**3.89**

Figure 2 shows the proportion of savings by offering. The Retail offerings contributed the largest amount of net lifecycle MMBtu savings to the Direct to Customer Solution.

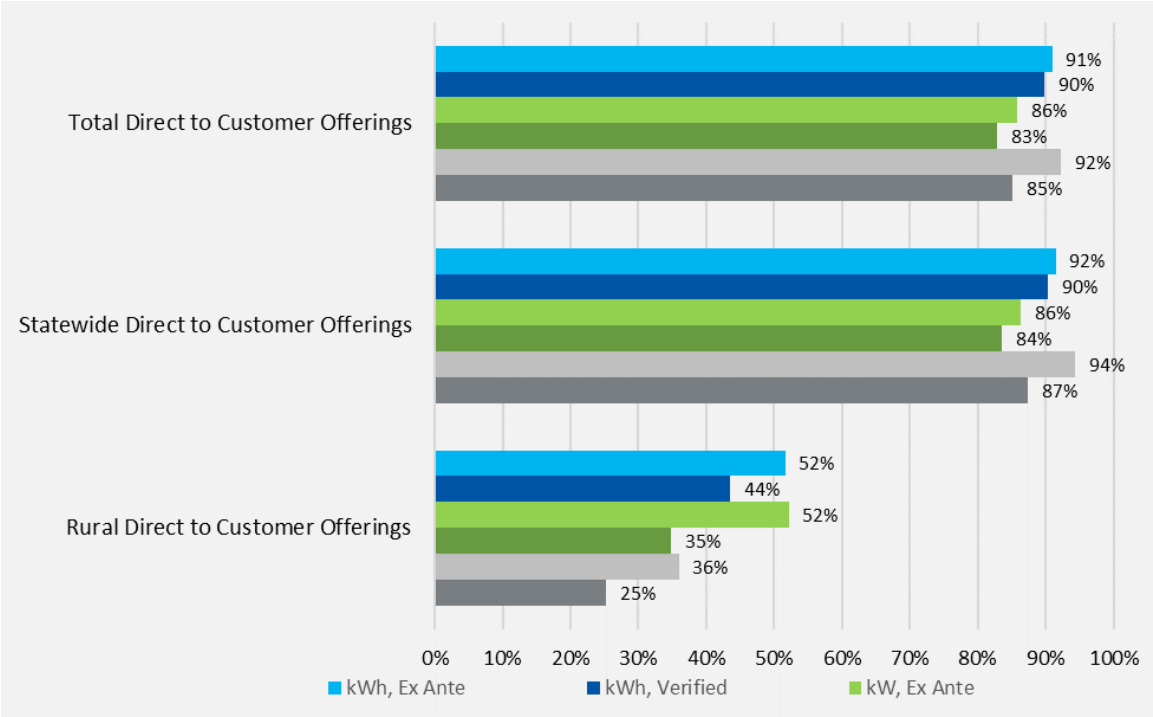
Figure 2. Net Lifecycle Savings by Offering



Achievement Against Goals

Figure 3 shows the percentage of gross lifecycle savings goals achieved by the Direct to Customer Solution in CY 2021. The solution did not achieve its electric or gas goals. The statewide offerings came close to the goal, while the rural offering achieved less than half its goal because the implementer had difficulty identifying eligible customers and reaching participation targets.

Figure 3. Direct to Customer Solution Achievement of CY 2021 Gross Lifecycle Savings Goals



Impact Evaluation

This section contains the findings for the CY 2021 impact evaluation at the solution level, followed by a discussion of each offering.

Impact Evaluation Methodology

The CY 2021 impact evaluation activities are shown in Table 2. Additional details about these activities and the associated findings can be found in the offering-specific discussions below and in Appendix G. Net Savings Analysis in Volume III.

Table 2. CY 2021 Data Collection Activities and Sample Sizes – Impact Evaluation

Activity	Online Marketplace	Packs	Retail	Rural Farmhouse Kits	Rural Retail Events	Total
Tracking Database Review	Census	Census	Census	Census	Census	**Census**
Lighting stock keeping unit (SKU) Database	N/A	N/A	Census	N/A	Census	**Census**
Participant Surveys	479	N/A	0[a]	N/A	N/A	**479**

[a] The evaluation team attempted to survey customers receiving income-qualified bulbs in the Retail channel but did not receive any responses.

To calculate gross verified savings, the evaluation team relied on the 2021 TRM and previous evaluation results, except where more recent data were available from the Online Marketplace survey (NTG and in-service rate [ISR]).

Verified Gross Savings Results for Direct to Customer Solution

Table 3 lists the first-year and lifecycle realization rates for CY 2021, and Table 4 contains a summary of verified first-year and lifecycle savings by offering. Overall, the solution achieved a first-year evaluated realization rate of 97%, weighted by total (MMBtu) energy savings. Detailed findings for each offering, including factors affecting the realization rates, are discussed in the next section.

Table 3. CY 2021 Direct to Customer First-Year and Lifecycle Realization Rates

Offering	First-Year Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Online Marketplace	94%	87%	85%	88%	93%	84%	87%
Packs	101%	100%	102%	101%	98%	101%	100%
Rural Farmhouse Kits	102%	100%	104%	103%	101%	102%	102%
Retail	99%	97%	97%	99%	99%	98%	99%
Rural Retail Events	84%	66%	61%	79%	84%	63%	78%
Overall Realization Rate	**98%**	**97%**	**92%**	**98%**	**99%**	**92%**	**97%**

Table 4. CY 2021 Direct to Customer First-Year and Lifecycle Verified Gross Energy Savings Summary

Offering	Verified First-Year Savings				Verified Lifecycle Savings		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Online Marketplace	12,877,678	601	653,200	109,259	116,995,975	6,616,018	1,060,792
Packs	18,344,096	1,705	589,671	121,557	159,408,187	7,220,542	1,265,955
Rural Farmhouse Kits	81,668	7	3,972	676	679,081	43,804	6,697
Retail	205,351,601	21,356	133,830	714,043	1,771,604,097	1,343,454	6,179,059
Rural Retail Events	1,615,289	140	11,273	6,639	12,773,331	123,270	55,910
Overall Energy Savings	**238,270,331**	**23,809**	**1,391,945**	**952,173**	**2,061,460,671**	**15,347,088**	**8,568,413**

Online Marketplace: Verified Gross Savings Results

The evaluation team assessed savings from most measures sold through the Online Marketplace in CY 2021. There were no savings for string lights, although incentives were paid on it.

The evaluation team used the 2021 TRM to calculate gross savings. Based on actual participation data, the team developed weighted average unit savings that reflected the distribution between single-family and multifamily participation. The team applied updated ISRs from the CY 2021 survey. For lighting measures, the team updated TRM delta watt assumptions using model number lookups and lumen matching, the same process described in the *Delta Watts Analysis for Retail Lighting* section of Retail and Rural Events verified gross savings.

Table 5 shows the *ex ante* and *ex post* verified savings for the offering.

Table 5. CY 2021 Online Marketplace *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
First-Year Gross Savings	13,668,679	688	768,706	12,877,678	601	653,200
Lifecycle Gross Savings	125,184,755	688	7,863,442	116,995,975	601	6,616,018

In-Service Rates

The evaluation team used the CY 2021 participant survey to update ISRs. For most measures, the team based the ISR on survey questions asking respondents to verify or correct the number of units they purchased and to report how many of those units were currently installed.

Like other Direct to Customer offerings, the team calculated LED lifetime ISRs following the approach recommended in the Uniform Methods Protocol (UMP).[4] This approach accounts for the fact that many people purchase lightbulbs and install them over time. The UMP estimates the trajectory of lighting installations annually for the effective useful life (EUL) of the bulb or until a program stops claiming lighting savings, whichever comes first.

The evaluation team adopted the latter approach, using a six-year trajectory. To account for the present value of future installations, the team discounted future savings annually at 2%. The team calculated separate single-family and multifamily ISRs for omnidirectional LEDs since several categories for master measure identifier (MMID) were almost exclusively installed in either single-family or multifamily sectors. For example, 96% of the MMID 5136 category were reported to be installed in single-family homes, while 95.5% of the MMID 5243 category were installed in multifamily homes. Though there were fewer respondents who purchased specialty bulbs (reflector, globe, decorative, three-way)

[4] National Renewable Energy Laboratory. October 2017. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures.* "Chapter 6: Residential Lighting Evaluation Protocol." Prepared by Apex Analytics, LLC. https://www.nrel.gov/docs/fy17osti/68562.pdf

compared to omnidirectional LEDs in the participant surveys, the team also calculated separate ISRs for specialty bulbs to align with sector-specific MMID categories.

Table 6 shows the *ex ante* and evaluated ISRs calculated from the CY 2021 participant survey. These values reflect CY 2021 quantities distributed through standard orders and LTO bundles of measures, where applicable. Faucet aerators had differing ISRs for quantities distributed through the LTOs compared to standard orders.

Table 6. ISRs for Online Marketplace Measures

Measure Name	*Ex Ante* Lifetime ISR	Verified First-Year ISR	Verified Lifetime ISR
Smart Thermostat	N/A	100%[a]	100%[a]
Advanced Power Strip, Tier 1	68%	88%	88%
Advanced Power Strip, Tier 2	55%	88%	88%
Showerhead LTO	65%	78%	78%
Showerhead OLM	65%	77%	77%
ShowerStart Thermostatic Shut-Off Valve	65%	78%	78%
Faucet Aerator LTO	54%	51%	51%
Faucet Aerator OLM	54%	82%	82%
LED, Omnidirectional, Single-Family	87%	59%	86%
LED, Omnidirectional, Multifamily	87%	50%	84%
LED, Reflector, Single-Family	87%	58%	86%
LED, Reflector, Multifamily	87%	38%	80%
LED, Globe, Single-Family	87%	53%	85%
LED, Globe, Multifamily	87%	66%	88%
LED, Decorative, Single-Family	87%	61%	87%
LED, Decorative, Multifamily	87%	50%	84%
LED, 3-way, Single-Family	87%	61%	87%
LED, 3-way, Multifamily	87%	50%	84%
Insulation, Domestic Hot Water (DHW) Pipe, Pack-based	40%	42%	42%
DHW, Temperature Turn Down, Pack Based	16%	10%	10%

[a] The CY 2021 participant survey found that 12% of Online Marketplace thermostats were not installed at the time of the survey; however, the team did not apply an ISR because the TRM algorithm is based on a previous billing analysis for downstream smart thermostats, which already accounts for the ISR.

Packs and Rural Farmhouse Kits: Verified Gross Savings Results

The evaluation team applied ISRs from CY 2020 participant surveys to *ex ante* savings. As Table 7 shows, the Packs realization rate decreased one percentage point from CY 2020 to CY 2021, while the Farmhouse Kits realization rate remained the same. Realization rate changes are almost entirely attributable to changes to the population-weighted ISR values. The team calculated population-weighted ISRs based on the proportions of single-family and multifamily participants. The weighted ISRs will change slightly as these proportions in the population change year to year.

Table 7. First-Year Realization Rates by Offering (MMBtu)

Offering	CY 2021	CY 2020	CY 2019
Packs	101%	102%	102%
Farmhouse Kits	102%	103%	97%

Table 8 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for the Packs Offering. Savings by measure can be found in Appendix E. Detailed Findings in Volume III.

Table 8. CY 2021 Packs *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
Statewide Packs Offering						
First-Year Gross Savings	18,249,925	1,709	577,082	18,344,096	1,705	589,671
Lifecycle Gross Savings	162,669,989	1,709	7,146,717	159,408,187	1,705	7,220,542
Rural Farmhouse Kits						
First-Year Gross Savings	79,964	7	3,826	81,668	7	3,972
Lifecycle Gross Savings	671,293	7	42,895	679,081	7	43,804
Total Packs and Farmhouse Kits						
First-Year Gross Savings	18,329,888	1,716	580,908	18,425,764	1,712	593,643
Lifecycle Gross Savings	163,341,282	1,716	7,189,612	160,087,268	1,712	7,264,346

In-Service Rates

In CY 2021, the evaluation team applied measure-level ISRs derived in CY 2020 from participant survey results. The team weighted ISRs based on the quantity of measures distributed through various packs in CY 2021 and the number of packs distributed to single-family or multifamily households, then applied the weighted ISRs to all similar measures in the offering. The resulting ISRs for CY 2021 are a factor of the relative quantities of the different types of packs provided to participants.

Table 9 shows first-year and lifetime ISRs used in verified savings as well as TRM ISRs used in *ex ante* savings. The distribution of packs in CY 2021 favored the measures with verified ISRs that were higher than the TRM ISR, which resulted in higher verified gross savings.

Table 9. Measure-Level ISRs – Packs Offering

Measure Name	TRM Lifetime ISR		Verified First-Year ISR		Verified Lifetime ISR	
	Single-Family	Multi-family	Single-Family	Multi-family	Single-Family	Multi-family
Advanced Power Strip, Pack-Based, Advanced Power Strip (APS) Tier 1	68%	68%	90%	88%	90%	88%
DHW Temperature Turn Down, Pack-Based	16%	16%	17%	13%	17%	13%
Faucet Aerator, Bathroom, 1.0 GPM, Pack-Based	54%	54%	55%	55%	55%	55%
Insulation, DHW Pipe, Pack-Based	40%	6%	35%	27%	35%	27%
LED, Pack-Based, 11 Watt	92%	92%	81%	91%	94%	97%
LED, Pack-Based, 5 Watt, B11	92%	92%	69%	74%	91%	93%
LED, Pack-Based, 5 Watt, G25	92%	92%	81%	76%	95%	93%
LED, Pack-Based, 8 Watt BR30	92%	92%	72%	73%	92%	92%
LED, Pack-Based, 9 Watt	92%	92%	79%	81%	94%	94%
Showerhead, Handheld, 1.5 GPM, Pack-Based	65%	65%	73%	58%	73%	58%
Showerhead, Upgraded, 1.5 GPM, Pack-Based	65%	65%	72%	66%	72%	66%

Table 10 shows verified ISRs for measures in the Farmhouse Kits Offering and TRM ISRs used in *ex ante* savings. Verified ISRs reflect weighted averages of packs delivered to single-family participants in the CY 2021 Packs Offering. Because the Packs Offering delivers packs to single-family and multifamily customers and Farmhouse kits are provided only to single-family customers, some ISRs in Table 10 differ from those in Table 9.

Table 10. Measure-Level ISRs – Farmhouse Kits Offering

Measure Name	TRM ISR	Verified ISR[a]
Faucet Aerator, Bathroom, 1.0 GPM, Pack-Based	54%	55%
Insulation, DHW Pipe, Pack-Based	40%	35%
Showerhead, Upgraded, 1.5 GPM, Pack-Based	65%	72%
LED, Pack-Based, 9 Watt	92%	96%
LED, Pack-Based, 11 Watt	92%	94%
High Performance EDPM Weatherstripping - Farmhouse Kit	N/A	N/A[b]
Outlet Gaskets (8), Switch Gaskets (4) - Farmhouse Kit	N/A	N/A[b]
LED Nightlight - Farmhouse Kit	N/A	N/A[b]

[a] First-year ISRs for non-LED measures; lifetime ISRs for LEDs per the UMP.

[b] There were no savings for these kits measures in CY 2021.

Domestic Hot Water Temperature Turndown

The review of the tracking database also found that *ex ante* savings includes zero savings for DHW temperature turndown measures for multifamily participants. This aligns with the TRM, which assumes multifamily participants do not have access to their water heater. However, the CY 2020 survey confirmed that some multifamily participants do have access to their water heaters and adjusted their water heater temperature after using the hot water temperature card in their pack.

There were 6,744 of these measures in the database. The evaluation team calculated verified *ex post* savings for these measures, and the omission of the *ex ante* savings contributed to a slight increase in the realization rate.

Retail and Rural Retail Events: Verified Gross Savings Results

The evaluation team assessed savings from all measures sold through the Retail offerings and Rural Retail Events in CY 2021. Where possible, the team calculated verified savings following algorithms and inputs in the TRM. However, some measures were not in the TRM, so the team relied on inputs and algorithms used for the same measures in similar programs and on CY 2020 participant survey results.

Table 11 lists new MMIDs and measures in the CY 2021 Retail tracking data. The table notes the reference measures the team used to calculate savings when a measure was not in the 2021 TRM as well as the adjustments made to the reference measure assumptions.

Table 11. New Retail Measure Savings Algorithm Sources

MMID	Measure	Reference MMID	Adjustments to Reference Measure
3017	Showerheads, Retail Store Markdown	4273, pack-based equivalent	Assumed a 50/50 mix of single-family and multifamily measures. Used ISRs from 2020 retail surveys.
4306	LED, Reflector, 12W, Retail Store Markdown, Long Lifetime	4308, standard lifetime equivalent	Standard EUL and incremental cost. Used ISRs from 2020 retail surveys.
4309	LED, Omnidirectional, Retail Store Markdown 750-1,049 Lumens, Long Lifetime	5144, standard lifetime equivalent	

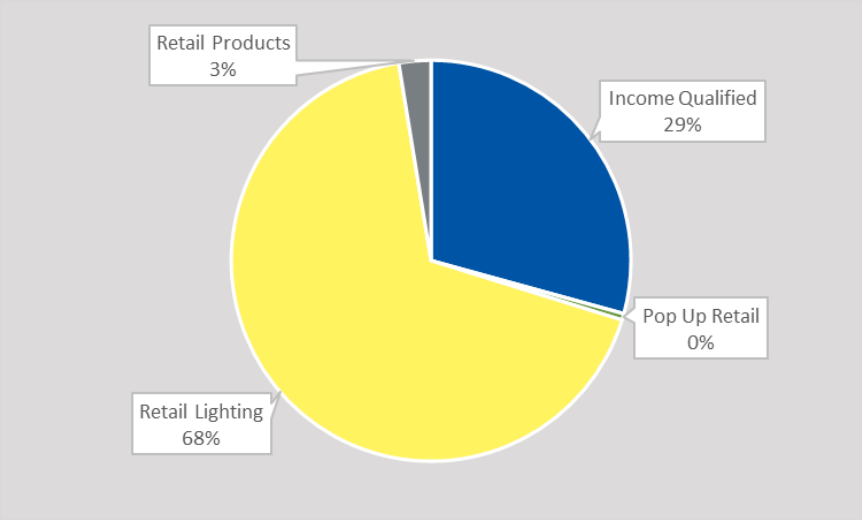
Table 12 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for the Retail offerings and Rural Retail Events. Savings by measure can be found in Appendix E. Detailed Findings in Volume III.

Table 12. CY 2021 Retail *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
Statewide Retail Offerings						
First-Year Gross Savings	208,051,209	22,043	137,277	205,351,601	21,356	133,830
Lifecycle Gross Savings	1,785,082,503	22,043	1,377,754	1,771,604,097	21,356	1,343,454
Rural Retail Events						
First-Year Gross Savings	1,919,088	213	18,423	1,615,289	140	11,273
Lifecycle Gross Savings	15,275,082	213	194,490	12,773,331	140	123,270
Total Retail Offerings and Rural Retail Events						
First-Year Gross Savings	209,970,296	22,256	155,700	206,966,890	21,496	145,103
Lifecycle Gross Savings	1,800,357,585	22,256	1,572,244	1,784,377,429	21,496	1,466,724

Figure 4 shows the breakdown of total first year energy savings by retail offering. Most savings are from lighting and income-qualified lighting.[5] Realization rates are over 97% for all offerings except Pop-Up Retail, which has a realization rate of 81%.

Figure 4. Verified MMBtu Savings by Retail Offering



Delta Watts Analysis for Retail Lighting

The evaluation team employed the lumen equivalence methodology to determine the baseline wattage for each bulb distributed through the offering. The difference between the baseline and efficient wattages provided the delta watts input.

Using model numbers, the team matched individual bulbs from the implementer's tracking database to its corresponding listing in the ENERGY STAR®-qualified product database. The ENERGY STAR database provided other product details for each bulb, including lumen output, rated wattage, type, and ENERGY STAR certification status. If these data were not available, the team used the values for lumens, efficient wattage, or both from the implementer's database or conducted internet searches based on product make and model numbers.

To determine the corresponding MMID, the evaluation team then categorized each bulb into specific bins based on the bulb lumen output and type. Each bin had an assumed baseline wattage for use in the delta watts calculation. The UMP provides lumen bins for standard, decorative, globe, and Energy

[5] A small number of smart thermostats was included in the program data under the retail lighting offering.

Independence and Security Act (EISA)-exempt lamps.[6] For example, the bins and associated baseline halogen watts for standard bulbs are shown in Table 13.

Table 13. EISA (Phase 1) Lumen Bins and Baseline Watts for Standard Bulbs

Lumen Bin	CY 2020 EISA Baseline	EISA
0–309	25	Not impacted by EISA
310–449	25	Impacted by EISA
450–799	29	
800–1,099	43	
1,100–1,599	53	
1,600–1,999	72	
2,000–2,600	72	
2,601–3,300	150	Not impacted by EISA
3,301–4,815	200	

Source: December 19, 2007. *Energy Independence and Security Act of 2007*. Public Law 110-140-. 121 Stat. 1492. https://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf
Note that in December of 2021, the Department of Energy's (DOE's) Office of Energy Efficiency and Renewable Energy again proposed a rule to codify the 45 lumen per-watt standard, with a comment period open through January 27, 2022.[7] The rule is expected to be finalized in 2022 and implemented in early 2023.

EISA affects bulbs only in the 310 to 2,600 lumen output range. The evaluation team applied a similar methodology to categorize specialty bulbs, reflectors, and EISA-exempt bulbs into their respective bins with different lumen ranges and different baselines.

To determine the lumen bins for reflectors, the evaluation team used the Mid-Atlantic TRM, which defines lumen bins for six categories of reflector types and diameters based on federal requirements.[8]

The average delta watts for each category compared to the *ex ante* delta watts are shown in Table 14 (Retail) and Table 15 (Rural Retail Events). The evaluation team based *ex ante* delta watts on values deemed in the TRM and not directly on the sales data, which can vary within each measure category. The team calculated the average verified gross delta watts by subtracting the wattage of the efficient bulb from the baseline wattage as determined from its lumen bin; this caused the variation shown

---

6 National Renewable Energy Laboratory. February 2015. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures.* "Chapter 21: Residential Lighting Evaluation Protocol." Prepared by Apex Analytics, LLC. http://energy.gov/sites/prod/files/2015/02/f19/UMPChapter21-residential-lighting-evaluation-protocol.pdf

7 Federal Register. Last updated December 13, 2021. "Energy Conservation Program: Backstop Requirements for General Service Lamps." https://www.federalregister.gov/documents/2021/12/13/2021-26807/energy-conservation-program-backstop-requirement-for-general-service-lamps

8 Northeast Energy Efficiency Partnership. October 2020. *Mid-Atlantic Technical Reference Manual*. Version 10.0. Mid-Atlantic Technical Reference Manual (TRM) V10 | Northeast Energy Efficiency Partnerships (neep.org)

between the *ex ante* delta watts and the evaluated delta watts. Similar to CY 2020, the comparison shows strong agreement between the verified and *ex ante* delta watts values for most categories.

For CY 2021, reflectors, globes, candelabras, and three-way bulbs are all separate categories. The EISA-exempt thee-way and high wattage omnidirectional bulbs have substantial deviation in delta watts, which resulted in higher than expected savings and realization rates.

Table 14. CY 2021 Retail Offering *Ex Ante* and Verified Gross Delta Watts

Measure	*Ex Ante* Delta Watts	Average Verified Gross Delta Watts
LED, Reflector	52.3	52.3
LED, Globe	34.5	35.8
LED, Decorative	41.1	41.2
LED, 3-Way	45.9	81.4
LED, Omnidirectional, 310–749 Lumens	23.3	23.1
LED, Omnidirectional, 750–1,049 Lumens	33.9	33.9
LED, Omnidirectional, 1,050–1,489 Lumens	42.2	42.5
LED, Omnidirectional, 1,490–2,600 Lumens	56.3	56.7
LED, Omnidirectional, 2,601–5,000 Lumens	96.8	130.0

Table 15. CY 2021 Rural Retail Events *Ex Ante* and Verified Gross Delta Watts

Measure	*Ex Ante* Delta Watts	Average Verified Gross Delta Watts
LED, Reflector	52.3	51.3
LED, Globe	34.5	37.4
LED, Decorative	41.1	36.1
LED, 3-Way	45.9	84.0
LED, Omnidirectional, 310–749 Lumens	23.3	21.8
LED, Omnidirectional, 750–1,049 Lumens	33.9	33.7
LED, Omnidirectional, 1,050–1,489 Lumens	42.2	40.3
LED, Omnidirectional, 1,490–2,600 Lumens	56.3	57.3
LED, Omnidirectional, 2,601–5,000 Lumens	96.8	154.6

In-Service Rates

Table 16 lists the measure-specific ISRs that the team applied. ISRs are based on the most recent participant survey (CY 2020) where available.

Table 16. Retail and Rural Retail Offering In-Service Rates

Offering	Measure	*Ex Ante* Lifetime ISR	Verified First-Year ISR	Verified Lifetime ISR	Verified ISR Source
Income Qualified	LED (Income Qualified)	78%	N/A	78%	TRM
Retail Products	Smart Thermostats	100%	100%[a]	100%[a]	CY 2020 Participant survey
Retail Lighting	LED (Upstream)	87%	56%	87%	TRM
Pop-Up Retail	LED Pack A-Line 60W Equivalent	87%	72%	92%	CY 2020 Participant survey
	LED Pack A-Line 75W Equivalent	87%	67%	90%	CY 2020 Participant survey
	LED Pack A-Line 100W Equivalent	87%	58%	88%	CY 2020 Participant survey
	LED Pack 3-Way	87%	57%	88%	CY 2020 Participant survey
	LED Pack Candelabra	87%	59%	88%	CY 2020 Participant survey
	LED Pack Globe	87%	61%	89%	CY 2020 Participant survey
	LED Pack Reflector	87%	64%	90%	CY 2020 Participant survey
	LED Pack Desk Lamp	87%	80%	94%	CY 2020 Participant survey
	Showerheads	65%	55%	55%	CY 2020 Participant survey
	Faucet Aerator: Bathroom	54%	40%	40%	CY 2020 Participant survey
	Faucet Aerator: Kitchen	54%	42%	42%	CY 2020 Participant survey
	DHW Temperature Turndown	16%	16%	16%	CY 2020 Packs Participant survey
	DHW Pipe Insulation	40% single-family 6% multifamily	25%	25%	CY 2020 Participant survey

[a] The CY 2020 participant survey found that 95% of Retail thermostats were installed at the time of the survey; however, the team did not apply an ISR because the TRM algorithm is based on a previous billing analysis for downstream smart thermostats, which already accounts for the ISR.

Verified Net Savings Results for Direct to Customer Solution

The evaluation team used a variety of methods to calculate measure-level NTG ratios for Direct to Customer offerings. The team selected an approach based on the measure type and the level of project and market data available for the delivery channel. Table 17 summarizes NTG approaches by offering.

Table 17. Direct to Customer Solution NTG Approaches

Offering	Measure	NTG Approach
Online Marketplace	All measures	Self-report from CY 2021 participant surveys
Packs/Rural Farmhouse Kits	All measures	Self-report from CY 2020 Packs participant surveys
Retail Lighting	Lighting	National lighting sales model
Income Qualified	Lighting	Assumed 100% NTG
Pop-Up Retail/Rural Retail Events	Pop-up Retail/Rural Retail Events	Self-report from CY 2020 participant surveys
Retail Products	Thermostats	Self-report from CY 2020 participant surveys

The evaluation team calculated an overall NTG estimate of 51% for the solution in CY 2021. Table 18 shows the weighted average NTG ratio by offering as well as the total first-year gross and net savings.

Table 18. Direct to Customer First-Year Net Savings and NTG

Offering	First-Year Gross Verified Savings (MMBtu)	First-Year Net Savings (MMBtu)	NTG Ratio
Online Marketplace	109,259	92,298	84%
Packs	121,557	109,653	90%
Rural Farmhouse Kits	676	612	91%
Retail	716,060	280,289	39%
Rural Retail Events	6,639	5,670	85%
Total	**954,191**	**488,522**	**51%**

Self-Report Surveys: Online Marketplace

The evaluation team used participant surveys to assess net savings for measures distributed through Online Marketplace. The survey question batteries for self-reported NTG values allowed the evaluation team to calculate measure-level freeridership (measures that would have been purchased without the offering's influence) and offering-level spillover (offering-induced energy-saving actions).

To calculate the measures' final NTG ratios, the evaluation team then combined self-reported freeridership and spillover results using the following equation. (Appendix G. Net Savings Analysis in Volume III provides a complete review of the team's self-report NTG analysis and findings.)

$$NTG = 1 - Freeridership\ + Participant\ Spillover$$

Table 19 shows CY 2021 freeridership and spillover results. The implementer indicated that a pamphlet of energy saving information is included with each shipment, which may explain the measured spillover.

Table 19. Freeridership and Spillover Results for Online Marketplace

Offering	Measure	Freeridership	Spillover	NTG (1 – Freeridership + Spillover)
Online Marketplace	Advanced Power Strips	17%	3%	86%
	Faucet Aerators	19%	3%	84%
	LEDs, Omnidirectional	23%	3%	80%
	LEDs, Reflectors	18%	3%	85%
	LEDs, 3-way	24%	3%	79%
	LEDs, Decorative	14%	3%	89%
	LEDs, Globe	21%	3%	82%
	Pipe Wrap	15%	3%	88%
	Showerheads	21%	3%	82%
	Smart Thermostats	17%	3%	86%

National Sales Data Model: Upstream Lighting

Following the upstream lighting NTG approach from previous years, the evaluation team used a national lighting sales model to determine upstream lighting attribution for the Wisconsin efficient lighting market. The model quantified the relationship between offering intensity (offering spending per household) and LED sales (the percentage of light bulb purchases that are LEDs). Based on this modeling, the evaluation team determined a comprehensive NTG estimate that captures freeridership, participant spillover, and nonparticipant spillover/market effects. This section provides a high-level overview of the team's analysis and findings. National sales data modeling findings are provided in more detail in Appendix G. Net Savings Analysis in Volume III.

Data Sources

The evaluation team relied on a variety of data sources for the analysis, primarily sales data prepared by the Consortium for Retail Energy Efficiency Data (CREED).[9] This consortium of program administrators, retailers, and manufacturers work together to collect the data necessary for better planning and evaluation of energy efficiency programs. LightTracker is CREED's first initiative, focused on acquiring full-category lighting data including incandescent, halogen, CFL, and LED bulb types for all distribution channels in the entire United States. As a consortium, CREED speaks as one voice for program administrators nationwide as they request, collect, and report on the sales data needed by the energy efficiency community.

The sales data were primarily generated from two sources: point-of-sale (POS) state sales data (representing grocery, drug, dollar, discount, mass merchandiser, and selected club stores) and National Consumer Panel (NCP) state sales data (representing home improvement, hardware, online, and selected club stores). The evaluation team also purchased raw datasets from third-party vendors and through a CREED initiative. The evaluation team then cleaned and processed all data for analysis.[10, 11] Besides the sales data made available through LightTracker, the model inputs were a combination of program data collected by the evaluation team and household and demographic data collected through various publicly available websites. These were the sources for the primary model input data:

- National bulb sales
  - POS data (grocery, drug, dollar, discount, mass merchandiser, and selected club stores)
  - NCP data (home improvement, hardware, online, and selected club stores)

---

9 LightTracker. "Consortium for Retail Energy Efficiency Data." creedlighttracker.com

10 The information contained herein is based in part on data reported by IRI, Inc., through its Advantage service for, and as interpreted solely by, LightTracker, Inc. Any opinions expressed herein reflect the judgment of LightTracker Inc. and are subject to change. IRI disclaims liability of any kind arising from the use of this information.

11 Data presented include LightTracker calculations based in part on data reported by Nielsen through its Strategic Planner and Homescan Services for the lighting category for the 52-week period ending approximately December 31, 2020, for the available state-level markets and Expanded All Outlets Combined (xAOC) and Total Market Channels. Copyright © 2020, Nielsen.

- U.S. Census Bureau import data (CFL and LED imports)
- DSM Insights, an E Source database of utility program data
- ENERGY STAR® Lighting program data (utility lighting program budgets)
- ENERGY STAR shipment data (released by the U.S. Environmental Protection Agency)
- North American Electrical Manufacturers Association shipment data
- American Community Survey (ACS) data (household characteristics and demographic data)
- Retailer square footage per state (based on internet searches)
- General population surveys, lighting saturation studies, and other secondary data collection made publicly available through evaluation reports

Modeling Methods

The primary objective of the model was to quantify the impact of state-level upstream lighting offering activity on the sales of LEDs, while controlling for demographic, household characteristics, and retail channel variables that could affect consumers' uptake of efficient lighting products.

Using the results of the regression models, efficient bulb sales data, and the program tracking databases, the evaluation team estimated NTG ratios for LEDs in 2021. The team derived NTG ratios by first using the model to predict the share of efficient bulbs with and without a program (determining the counterfactual of no program activity by setting the program spending variable to zero). This change in share represents the program lift, or net increase in the share of efficient bulbs resulting from program activity.

To then calculate NTG, the evaluation team multiplied the change in share by the total number of bulbs—for all bulb types—sold in 2021, as determined by the sales data analysis described above. This value represents the net impact of the program (i.e., the total lift in the number of LEDs sold), which the evaluation team then divided by the total number of program bulbs sold (the gross number of bulbs) to determine NTG:

$$NTGR = \frac{(\#\ LED\ bulbs\ sold\ with\ program - \#\ LED\ bulbs\ sold\ with\ no\ program)}{\#\ of\ program\ incented\ LED\ bulbs\ sold}$$

Results

As shown in Table 20, the estimated CY 2021 NTG modeled ratio for LEDs is 11.5%. This estimate considers current offering spending and current offering age; it does not include market effects (see *Upstream Lighting Market Effects* section below).

The evaluation team applied the NTG ratio that does not account for market effects (11.5%) to CY 2021 upstream lighting results. Adding market effects at the end of the quadrennium will result in a final quadrennium NTG ratio that is higher than the CY 2021 ratio.

Table 20. Wisconsin NTG Calculations

Calculation Term	Current Offering Spending and Age Influence
Total (All technologies) Wisconsin Bulbs 2021 (A)	23,876,096
Offering $ per Household Actual (B)	$2.65
Offering $ per Household Counterfactual (C)	$0.00
Offering Age Actual (D)	19
Offering Age Counterfactual (E)	18
LED Market Share Counterfactual (F)	75.6%
LED Market Share Modeled (G)	77.8%
LED Market Share Actual (H)	87.0%
Ratio Actual: Modeled (I = H/G)	1.119
Adjusted LED Market Share Counterfactual (J)	84.6%
LED Qty Counterfactual (K = A*J)	20,195,584
LED Qty Actual (L)	20,769,836
Net LEDs Modeled (M = L-K)	574,252
Claimed Bulbs 2021 (N)	4,975,935
NTG Modeled (O = M/N)	**11.5%**
Market Effects (P = Difference of NTG of columns)	**n/a**
Market Effects Lamps (Q = N*P)	**n/a**

Upstream Lighting Market Effects

As in past evaluations, the evaluation team continued calculating longer-term market effects for the upstream lighting offering using the same national sales data model it uses to calculate annual NTG. By adjusting offering age in the NTG model, the team is able to calculate the offering's impact on the market considering current and past offering influence. Following guidance from the Evaluation Working Group, the evaluation team will calculate market effects annually throughout the quadrennium but will apply results cumulatively at the end of the quadrennium.

Focus on Energy uses offering incentives and marketing to impact customer awareness and demand for energy-efficient lighting as well as retailer stocking and promotion of efficient lighting. Therefore, program age can be thought of as a proxy for these effects, measuring long-term trends due to multiple years of running programs. These effects should reflect positively, rather than negatively, in the NTG estimate. Table 21 shows the CY 2021 NTG using current program spending and setting the program age counterfactual to zero.

CY 2021 market effects is the difference between NTG with past program influence (40.1%) and NTG with current program influence (11.5%), or 28.6%.

Table 21. CY 2021 LED Net-to-Gross Calculations with Past Influence

Calculation Term	Current and Past Influence	Current Offering Spending and Age Influence
Total (All technologies) Wisconsin Bulbs 2021 (A)	23,876,096	23,876,096
Offering $ per Household Actual (B)	$2.65	$2.65
Offering $ per Household Counterfactual (C)	$0.00	$0.00
Offering Age Actual (D)	19	19
Offering Age Counterfactual (E)	0	18
LED Market Share Counterfactual (F)	70.3%	75.6%
LED Market Share Modeled (G)	77.8%	77.8%
LED Market Share Actual (H)	87.0%	87.0%
Ratio Actual: Modeled (I = H/G)	1.119	1.119
Adjusted LED Market Share Counterfactual (J)	78.6%	84.6%
LED Qty Counterfactual (K = A*J)	18,772,525	20,195,584
LED Qty Actual (L)	20,769,836	20,769,836
Net LEDs Modeled (M = L-K)	1,997,311	574,252
Claimed Bulbs 2021 (N)	4,975,935	4,975,935
NTG Modeled (O = M/N)	**40.1%**	**11.5%**
Market Effects (P = Difference of NTG of columns)	**28.6%**	**n/a**
Market Effects Lamps (Q = N*P)	**1,423,060**	**n/a**

Process Evaluation

The evaluation team collected primary data to assess how customers learned about the offerings in the Direct to Customer Solution, what motivated them to participate, and their overall satisfaction and experience.

Process Evaluation Methodology

The evaluation team conducted in-depth interviews with the administrator and the implementer and surveyed participants in Online Marketplace, one of the five Direct to Customer offerings. Table 22 lists specific data collection activities and sample sizes. Process activities and findings are described in the discussion below. Additional details about participant survey results can be found in Appendix M. Survey and Interview Instruments by Offering in Volume III.

Table 22. CY 2021 Data Collection Activities and Sample Sizes – Process Evaluation

Activity	Online Marketplace	Packs	Retail	Rural Farmhouse Kits	Rural Retail Events	Total
Stakeholder Interviews	2 across all offerings					**2**
Participant Survey	479	N/A	0	N/A	N/A	**479**
Customer Satisfaction Survey	1,728	1,381	559	N/A	Combined with Retail	**3,668**

Administrator and Implementer Interviews

In August and September 2021, the evaluation team interviewed the administrator and the implementer about how the new Direct to Customer Solution was working and to assess its objectives, performance, and implementation challenges and resolutions. The team also asked about marketing, engagement with customers, and impacts from COVID-19.

Participant Surveys

During December 2021 and January 2022, the evaluation team contacted a random sample of CY 2021 Online Marketplace participants to assess their experiences with the offering. The survey asked about awareness of Focus on Energy, marketing, customer decision-making, and satisfaction, among other topics. Respondents' feedback also informed the impact evaluation.

The evaluation team attempted to survey customers who received free LEDs at food banks through the Income Qualified Offering but received no responses. The team believes placing survey information inside the bulb packaging may have led to the lack of responses because recipients did not open the bulbs in a timely manner or disregarded the materials.

The evaluation team did not survey participants in any other Direct to Customer offerings for CY 2021.

Ongoing Participant Satisfaction Surveys

Throughout CY 2021, the solution administrator emailed Direct to Customer participants links to the web-based satisfaction survey. There were two objectives for these surveys:

- Understand customer satisfaction on an ongoing basis and respond to any changes in satisfaction before the end of the annual reporting schedule
- Help facilitate timely follow up with customers to clarify and address service concerns

Using contact information stored in SPECTRUM, the solution administrator ran a web-based satisfaction survey throughout the year to CY 2021 participants. The number of completed surveys reported by offering are shown in Table 22. The team randomly selected a subset of completed surveys for Packs for evaluation reporting.[12] The total of 559 completed surveys for the Retail offerings consisted of 401 for Retail Events and 158 for Retail Smart Thermostat. The survey for Direct to Customer offerings covered the same topics, including overall satisfaction, satisfaction with program staff and trade allies, likelihood of recommending Focus on Energy, and other feedback.

[12] In total, 9,101 customers completed a Packs survey. Since the evaluation team reports ratings only to the first decimal place, surveys with very large numbers of responses (over 2,000) were randomly sampled so that the precision level for statistical significance tests would not be narrower than 0.1 rating points, the minimum size of a reported change in ratings. Otherwise, significance tests could indicate that two numbers that are reported as the same (to the first decimal place) are significantly different. The random sampling used a Monte Carlo technique so that the reported ratings for the random sample and the ratings for the larger population are identical to the first decimal place.

Design and Delivery

Offerings within Direct to Customer Solution provide rebates and free or discounted measures to residential customers who order efficient products or services directly through Focus on Energy or a participating retailer or organization. This report presents Rural Farmhouse Kits with Packs and Rural Retail Events with Retail because they use similar delivery channels and measures.

Online Marketplace

Focus on Energy launched the Online Marketplace in the fall of 2019. The offering uses an online shopping platform to provide another delivery channel for the purchase of efficient products. The Online Marketplace is available to all residential customers of Focus on Energy participating utilities and is targeted to those who prefer to shop online or who have limited access to Focus on Energy discounts offered at physical retail locations. The implementer oversees TechniArt, the company that fulfills Online Marketplace orders and maintains the Online Marketplace platform.

Table 23 shows the energy efficiency products and discounts available at the Online Marketplace.

Table 23. Online Marketplace Products and Discounts

Measure	Discount
Smart Thermostats	$50 $25 bonus offering in late 2021
Advanced Power Strips	Tier 1: $10 Tier 2: $20
LEDs, Omnidirectional, Specialty, and Reflector Models	$1.75 - $3.20, varies by model
ShowerStart Thermostatic Shut-Off Valve	$10
Low-Flow Showerheads	$3.00-$11.61, varies by model
Faucet Aerators	$0.50-$2.32
LED String Lights	$3
DHW Temperature Card (only in limited time offer bundles)	$2.00
DHW Pipe Wrap (only in limited time offer bundles)	$4.00

The Online Marketplace also included limited time offer product bundles during CY 2021. The timing and measures contained in these product bundles are shown in Table 24. The DHW temperature card and pipe wrap were available only as part of limited time offer product bundles and could not be ordered individually through the Online Marketplace.

Table 24. Online Marketplace Limited Time Offer Product Bundles

Product Bundle Name	Month of Offering	Measures
Bathroom Bundle	February	• 8 globe LEDs • 1 handheld showerhead • 1 bathroom faucet aerator • 1 LED nightlight
Efficient Kitchen Product Bundle	June	• 10 reflector LEDs • 1 kitchen faucet aerator • 1 DHW temperature card • 1 15-foot roll pipe wrap
The All-In-One Savings Bundle	October	• 4 standard LEDs (60W equivalent) • 2 standard LEDs (75W equivalent) • 2 standard LEDs (100W equivalent) • 1 handheld showerhead • 2 bathroom faucet aerators • 1 kitchen faucet aerator

Packs and Kits Offerings

The Packs Offering gives single-family and multifamily customers the option to order one of five free energy-saving packs, each of which contains an assortment of energy-efficient items. Customers participate by requesting a pack through Focus on Energy's online web portal or call center. TechniArt typically processes, ships, and delivers pack orders within four weeks of receipt of request. Although program rules allow customers to order only one pack per address per year, a review of program data showed a small number of customers (approximately 40) ordered and received two of the same pack types at the same address in CY 2021.

Standard packs, in various combinations, contain general service and specialty LEDs; water-saving devices, such as faucet aerators and low-flow showerheads; and other energy-saving items, such as pipe-wrap insulation.

Farmhouse Kits are available to agricultural customers in designated rural zip codes and in non-rural zip codes that are associated with a farm. The kits include additional weatherization measures, such as weatherstripping, switch outlet covers, and gasket outlet covers. When first introduced, utility account representatives delivered the kits directly to agricultural customers. Due to the COVID-19 pandemic, Focus on Energy suspended in-person visits in CY 2020 and replaced them with invitation-only online portals, which continued to be the exclusive channel for delivering Farmhouse Kits through CY 2021. Customers eligible for Farmhouse Kits are also eligible to participate in Packs.

In CY 2021, the implementer attempted to market Farmhouse Kits through agricultural influencers and in conjunction with utilities but had limited success, in part due to low interest from utilities. The implementer noted that targeting residential agricultural customers by zip code was challenging (i.e., many agricultural customers live in zip codes not targeted, and many customers in targeted zip codes

are not agricultural). Table 25 shows the quantity of each measure in the Standard Packs (statewide) and Farmhouse Kits (rural zip codes). [13]

Table 25. Packs Offering Contents by Pack Type

Measure	Standard Packs						Farmhouse Kit
		Showerhead					
	Lightbulb	Fixed	Hand	Flood	Decorative	Pack with APS[a]	
LED A19 (800 lumens)	4	2			2	3	4
LED A19 (1,100 lumens)	2						4
LED BR30 Reflector				6			
LED G25 Globe		3	3				
LED B11 Candelabra					6		
Pipe Wrap (15 ft. roll)	1	1	1			1	1
Fixed Showerhead		1					1
Hand-Wand Showerhead			1				
Faucet Aerator		2	2				2
DHW Temperature Card	1	1	1			1	
Advanced Power Strip						1	
LED Nightlight							2
Weatherstripping							1
Outlet Gaskets							8 outlet, 4 switch

[a] The Focus on Energy Pack with APS was discontinued in February 2021.

Retail Offerings

The Retail offerings provide point-of-sale discounts, downstream rebates, and free products through Retail Lighting, Retail Products (i.e., non-lighting measures), Pop-up Retail, and Income Qualified. In CY 2021, these offerings were delivered through various channels, including brick-and-mortar retail stores, discounts through participating manufacturer websites, pop-up retail events for targeted customer groups (e.g., community groups or companies) and organizations that target limited-income customers.

The pop-up events were converted to online or virtual pop-up (VPU) events in March 2020 following the onset of the COVID-19 pandemic. A limited number of in-person events occurred during the latter half of the year, though most CY 2021 events continued to be virtual. The implementer oversaw TechniArt, which implemented pop-up retail events and fulfilled VPU event orders and Crossmark, which implemented events in brick-and-mortar stores.

[13] Following the transition from in-person to online delivery of Farmhouse Kits, the implementer allowed customers who did not live in designated rural zip codes to participate after verifying that the customers were agricultural.

In CY 2021, the administrator updated tracking processes to identify LEDs distributed through the Income Qualified Offering. The offering distributes LEDs through two channels:

- Free LEDs were distributed through nonprofit organizations, such as food banks or local events targeting underserved communities.
- Discounted LEDs were sold through retailers that target the limited-income community, such as dollar stores or nonprofit resale stores. These bulbs receive deeper discounts than those offered through Retail Lighting.

Table 26 lists measures, incentive types, and delivery channels available through the CY 2021 Retail channel.

Table 26. Retail Eligible Products by Incentive Type and Delivery Channel

Product	Incentive Type/Retail Channel					
	POS Discount Brick-and-Mortar Stores	POS Discount Pop-Up Events	POS Discount VPU Events	POS Instant Discount Manufacturer Websites	Downstream Rebate Any Retail Location	Free Distribution
LEDs	✓	✓	✓	✓		✓
Smart Thermostats				✓	✓	
Faucet Aerators			✓			
Showerheads			✓			
Pipe Insulation			✓			
Water Heater Temperature Turndown			✓			

Measures sold through VPU events were available in the following bundles:

- Energy and Water Saving Kit: contained eight LEDs of varying wattages, a showerhead, two faucet aerators, pipe wrap, and a DHW temperature card
- LED Starter Kit: contained 11 A-lamp LEDs of varying wattages and an LED desk lamp
- LED 6-Pack: contained six reflectors, candles, or globe LEDs
- LED 3-Pack: contained three outdoor reflector LEDs
- LED 2-Pack: contained two three-way LEDs

Individual LEDs could also be purchased for high wattage-equivalent LEDs (150-watt and 300-watt equivalents).

As part of the PSC's initiative to enhance Focus on Energy services to rural customers, the administrator assigned a separate budget to cover Rural Retail Events and tracked results against a separate savings target. The implementer managed Rural Retail Events the same way as standard Retail events.

Marketing and Outreach

In CY 2021, the implementer focused marketing engagement efforts on gaining new customers and encouraging multi-offering participation from existing customers by highlighting the services available through the Direct to Customer Solution. To that end, the implementer analyzed customer profiles as defined by Experian's Mosaic USA Consumer Segmentation and explored adjustments to paid media outreach. Marketing materials conveyed Focus on Energy branding and were sometimes cobranded with participating utilities. Some marketing materials also mentioned additional discounts offered by manufacturers and retailers for measures offered through the solutions. However, coordination with the manufacturers and retailers was limited and dependent on the advance notice the implementer received about when such discounts would be offered (e.g., Black Friday sales).

The implementer purchased media for advertising and tracked its effectiveness so it could shift funds to better performing channels as needed. The administrator maintained the Focus on Energy website with content provided by the implementer.

Awareness

In CY 2021, the evaluation team surveyed only Online Marketplace participants (detailed results from the Online Marketplace survey can be found in Appendix M. Survey and Interview Instruments by Offering in Volume III). The top sources of awareness for respondents were the same as in CY 2020: email (56%, n=475) and participation in other offerings (34%, n=475), which increased significantly from CY 2020 (16% participation in other offerings, n=570).

The CY 2021 Online Marketplace survey also asked what respondents thought would be the best way for Focus on Energy to inform the public about energy efficiency offerings. The results were nearly identical to the CY 2020 survey, with email from Focus on Energy most frequently mentioned (61%), followed by direct mail (25%), through participation in other offerings (24%), social media (23%), and Focus on Energy and utility websites (21%).

The largest overlap in participation in the Online Marketplace and other Direct to Customer offerings was the Packs Offering. Forty-seven percent (n=414) of CY 2021 respondents had ordered a pack, which is close to the 42% (n=576) in CY 2020. The percentage of Online Marketplace respondents who said they participated in Retail Lighting and Retail Product discounts increased significantly to 24% in CY 2021, up from 13% in CY 2020.[14]

Motivation for Participation

The evaluation team surveyed Online Marketplace participants in CY 2021 but did not survey Packs or Retail participants. Customer motivations for participating in the Online Marketplace Offering in CY 2021 were similar to CY 2020 results: saving energy and being more efficient was the most common motivation for purchasers of all Online Marketplace measures (30% to 50% by measure, n=44 to 155). Focus on Energy discounts were the second most common motivation for all participants, except those who purchased smart thermostats (18% to 25% for non-thermostat measures, n=44 to 155). Smart

[14] Statistically significant at $p<0.05$ using a t-test.

thermostat purchasers cited recommendations from Focus on Energy or their utility as their second most common motivation (18%, n=82).

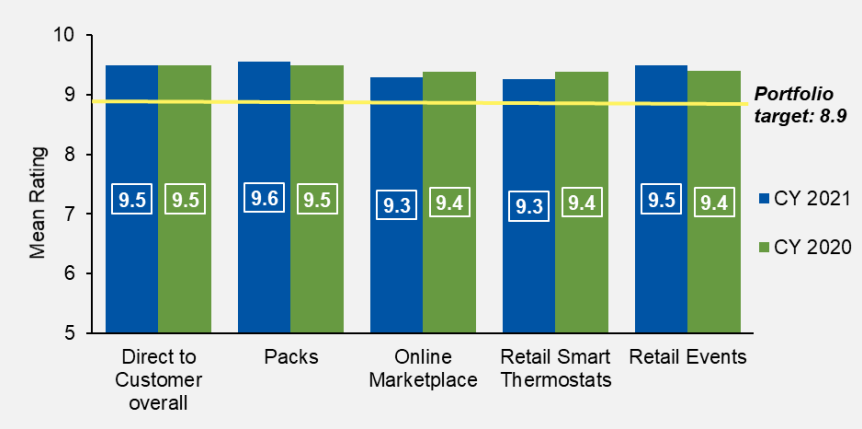
Detailed results from the Online Marketplace survey can be found in Appendix M. Survey and Interview Instruments by Offering in Volume III.

Customer Satisfaction Results for the Direct to Customer Solution

Throughout CY 2021, the solution administrator invited Direct to Customer Solution participants in the Packs, Online Marketplace, Retail Smart Thermostat, and Retail Events offerings to take web-based satisfaction surveys. Respondents answered questions related to satisfaction and the likelihood to recommend Focus on Energy on a scale of 0 to 10, where 10 indicated the highest degree of satisfaction or likelihood to recommend and 0 the lowest.[15]

Figure 5 shows that Direct to Customer Solution participants gave overall satisfaction ratings of 9.3 or higher in CY 2021 for the offerings they participated in, and all ratings were statistically higher than the CY 2021 portfolio target of 8.9.[16] Satisfaction ratings across all four Direct to Customers offerings in CY 2021 were statistically equivalent to CY 2020 ratings. The participation-weighted average satisfaction rating for all Direct to Customer Solution offerings was 9.5 for CY 2021.

Figure 5. Overall Satisfaction with Direct to Customer Solution Offerings



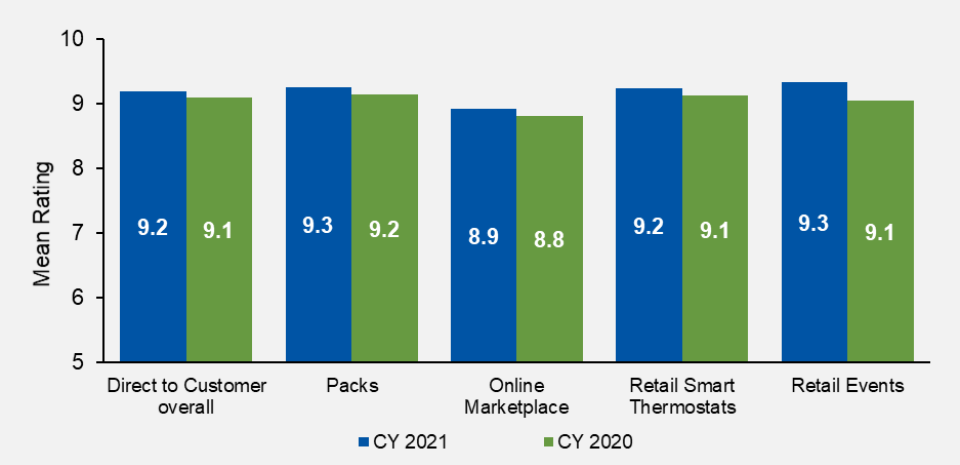
Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Participant Satisfaction Survey Question. "Overall, how satisfied are you with your most recent experience with Focus on Energy?" (CY 2021 Packs n=1,377, Online Marketplace n=1,720, Retail Smart Thermostats n=158, Retail Events n=398; CY 2020 Packs n=1,199, Online Marketplace n=1,069, Retail Smart Thermostats n=428, Retail Events n=801). "Direct to Customer overall" is the participation-weighted average of all surveyed Direct to Customer offerings. Boxes around ratings indicate a statistically significantly difference from the portfolio target ($p<0.05$ using t-tests).

[15] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped or did not know answers to questions.

[16] The program administrator's contract established a portfolio target of 8.9 to maintain or increase customer satisfaction.

Figure 6 shows that satisfaction with Focus on Energy staff was high across all offerings in CY 2021, averaging 9.2 overall and ranging from 8.9 to 9.3 by offering among respondents who had contact with staff.[17] CY 2021 ratings were statistically equivalent to CY 2020 ratings for all offerings.

Figure 6. Satisfaction with Focus on Energy Staff for Direct to Customer Solution Offerings

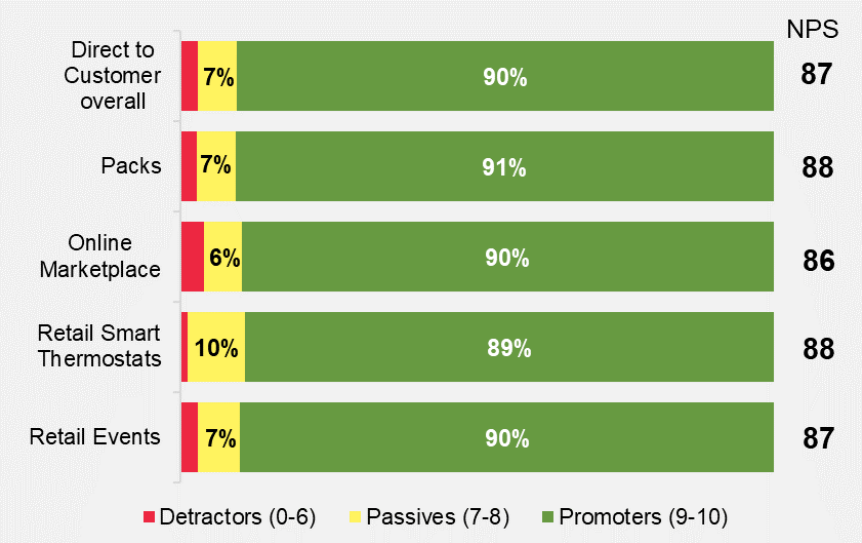


Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Offering Participant Satisfaction Survey Questions. "How satisfied are you with the Energy Advisor or Focus on Energy staff member who assisted you with your project (or order)?" (CY 2021 Packs n=164, Online Marketplace n=305, Retail Smart Thermostats n=34, Retail Events n=69; CY 2020 Packs n=113, Online Marketplace n=102, Retail Smart Thermostats n=103, Retail Events n=137). "Direct to Customer overall" is the participation-weighted average of all surveyed Direct to Customer offerings.

CY 2021 participants gave high ratings for their likelihood to recommend Focus on Energy, averaging 9.6 across all Direct To Customer offerings. Using these survey data, the evaluation team calculated a Net Promoter Score (NPS) based on customers' likelihood to recommend Focus on Energy. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). The Direct to Customer Solution offerings consistently received a high NPS between +86 and +88 in CY 2021, the same range of NPS for these offerings in CY 2020. The weighted average NPS for the Direct to Customer Solution was +87 overall. Net promoter scores and the distribution of promoters and detractors are shown in Figure 7.

[17] All surveys gave respondents the opportunity to rate staff, though they were not required to give a rating since their participation in an offering may not have involved any contact with staff.

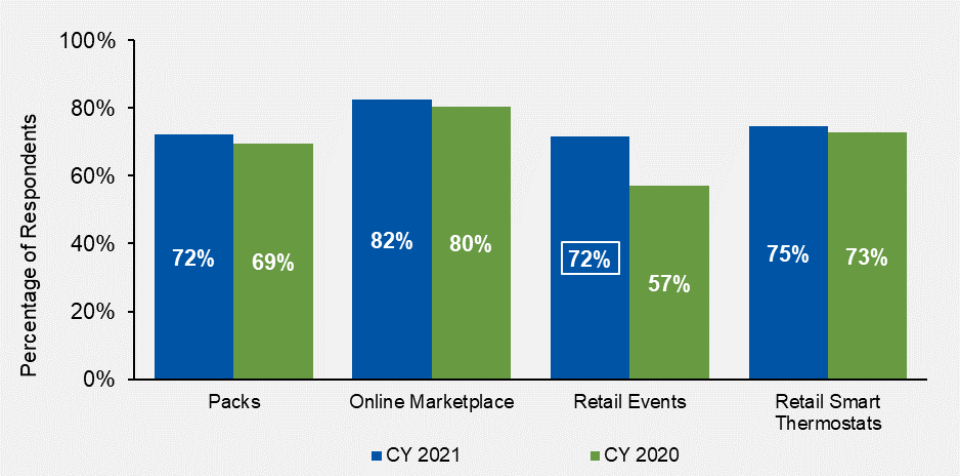
Figure 7. Net Promoter Scores for Direct to Customer Solution Offerings



Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Offering Participant Satisfaction Survey Question. "How likely are you to recommend Focus on Energy to others?" (Packs n=1,372, Online Marketplace n=1,718, Retail Smart Thermostats n=155, Retail Events n=396). "Direct to Customer overall" is the participation-weighted average of all surveyed Direct to Customer offerings. Note: Unlabeled segments represent 4% or less of respondents.

CY 2021 respondents were asked if they were aware, before receiving the satisfaction survey, that the offering they participated in was delivered in partnership with their local utility (Figure 8). Most were aware of their utility's partnership with Focus on Energy, ranging from 72% for Packs and Retail Events to 82% for Online Marketplace respondents. The percentage of Retail Events respondents who were aware (72%) increased significantly from CY 2020 (57%).

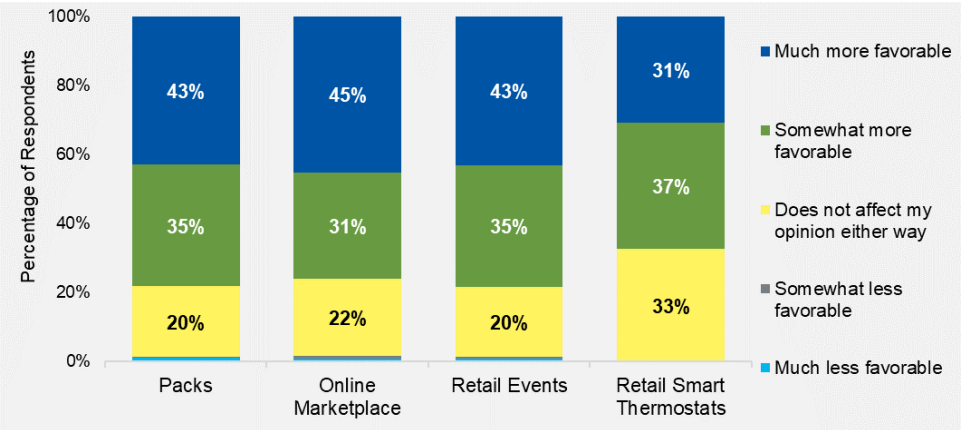
Figure 8. Awareness of Utility Partnership for Direct to Customer Solution Offerings



Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Offering Participant CY 2021 Satisfaction Survey Question. "The Focus on Energy program you participated in is offered in partnership with your local energy utility. Before taking this survey, was this something you were aware of?" (Packs n=1,363, Online Marketplace n=1,704, Retail Smart Thermostats n=154, Retail Events n=395). Same question from corresponding CY 2020 Satisfaction Surveys (Packs n=1,197, Online Marketplace n=1,065, Retail Smart Thermostats n=428, Retail Events n=797). Boxes around ratings indicate a statistically significantly difference between years (p<0.10 or better using t-tests)

CY 2021 participants were asked if Focus on Energy offerings affected their opinion of their utilities (Figure 9), and 67% to 78% (by offering) reported that their opinion had become *much more favorable* or *somewhat more favorable*. Very few respondents indicated that their opinion of their utility became less favorable; only 2% of Online Marketplace respondents' opinions became *much less favorable* or *somewhat less favorable*, and for the other offerings, no more than 1% gave those ratings.

Figure 9. Effect of Direct to Customer Solution Offerings on Participants' Opinion of Utilities



Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Offering Participant Satisfaction Survey Question. "How have these offerings affected your opinion of your energy utility, if at all?" (Packs n=1,272, Online Marketplace n=1,626, Retail Events n=365, Retail Smart Thermostats n=150).
Note: Unlabeled segments represent 2% or less of respondents.
Percentages may not sum to 100% due to rounding.

Participant Feedback and Suggestions for Improvement

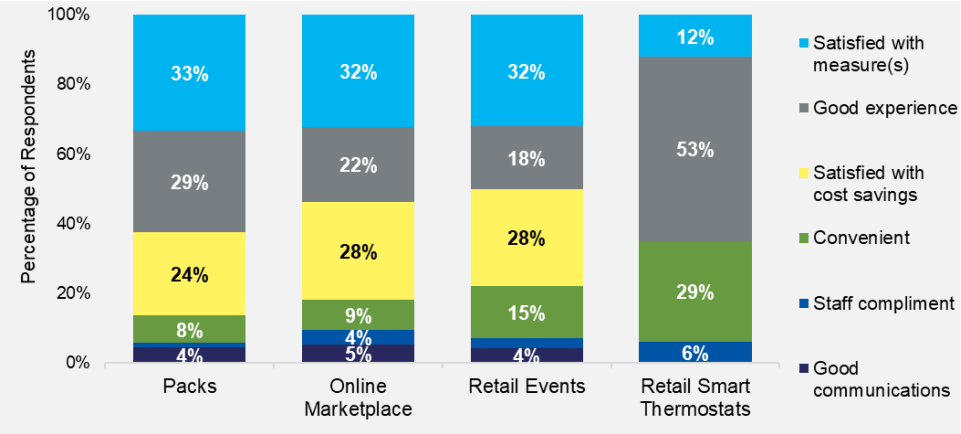
The evaluation team asked participants for comments and suggestions to improve the offerings, which the team then coded into mentions. Table 27 summarizes the number and types of comments and suggestions by offering. Most survey respondents did not offer any comments or suggestions, though the most likely to do so were Online Marketplace and Retail Events participants (26%). Most comments from Packs and Retail Events respondents were positive (68% and 72%, respectively). Comments from Online Marketplace and Retail Smart Thermostat respondents were about equally divided between positive comments (54% and 49%, respectively) and suggestions for improvement (46% and 51%, respectively).

Table 27. Customer Comments and Suggestions for Direct to Customer Solution by Offering

Offering	Total Surveys	Gave Comments	Percent Giving Comments	Total Mentions	Percent Positive Comments	Percent Suggestions for Improvement
Packs	1,381	252	18%	366	68%	32%
Online Marketplace	1,728	445	26%	577	54%	46%
Retail Events	401	105	26%	139	72%	28%
Retail Smart Thermostats	158	33	21%	35	49%	51%

The positive mentions for each offering are shown in Figure 10. Satisfaction with the measures provided by the offering were the most common positive mentions from Packs (33%), Online Marketplace (32%), and Retail Events (32%) respondents, which were also the most common positive comments for these offerings in CY 2020. Comments from Retail Smart Thermostat respondents were the most likely to reference the convenience of the offering (29%), which was also true in CY 2020. Satisfaction with cost savings (e.g., incentives, discounts, and lower utility bills) were frequently mentioned by Retail Events (28%), Online Marketplace (28%), and Packs (24%) respondents but not by Retail Smart Thermostat respondents (0%). Between 18% and 53% of mentions per offering reflected a generally positive experience (e.g., non-specific comments such as “all is good” and “thanks for the program”).

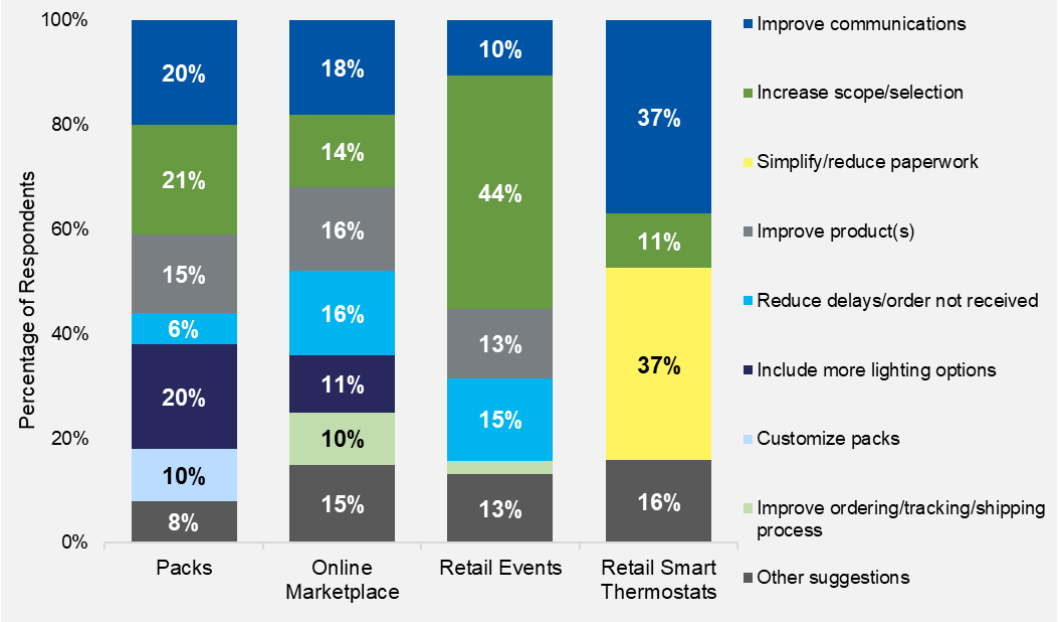
Figure 10. Positive Comments about Direct to Customer Solution Offerings



Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Offering Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement." (Total positive mentions Packs n=250, Online Marketplace n=309, Retail Events n=100, Retail Smart Thermostats n=17). Note: Unlabeled segments represent 3% or less of respondents.

Figure 11 shows suggestions for improvement. The most common from Retail Smart Thermostat (37%) and Online Marketplace respondents (18%) was to improve communications about the offering, and this was also the second most common suggestion from Packs respondents (20%). These results were consistent with CY 2020 suggestions by offering, though there was a decrease in Retail Events suggestions about improving communications (10% in CY 2021 compared to 26% in CY 2020). Suggestions about improving communications typically focused on follow-up to orders and rebate applications, more or clearer information about items offered, requests for more information about saving energy, and more promotion for Focus on Energy offerings.

Figure 11. Suggestions for Improving Direct to Customer Solution Offerings



Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Offering Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement." (Total suggestions for improvement Packs n=116, Online Marketplace n=268, Retail Events n=39, Retail Smart Thermostats n=18). Note: Unlabeled segments represent 3% or less of respondents.

The most common suggestions from Packs (21%) and Retail Events (44%) respondents were to increase these offerings' scope and selection to include more items and services, similar to the percentage of respondents in CY 2020. Fewer CY 2021 suggestions from Online Marketplace respondents referenced increasing scope and selection (14%) compared to CY 2020 respondents (22%). Packs respondents were more likely to suggest offering more lighting options in CY 2021 compared to CY 2020 (20%, up from 11%), while Online Marketplace respondents were less likely to suggest this (11%, down from 18%). This corresponds to the Online Marketplace providing a wider variety of lighting measures in CY 2021, while Packs did not add new lighting measures.

Online Marketplace respondents were the most likely to suggest reducing delays in the delivery process (16%), which was an increase from CY 2020 (8%). Reducing delays was suggested less often in CY 2021 than CY 2020 by Packs (6%, down from 10%) and Retail Events respondents (15%, down from 20%).

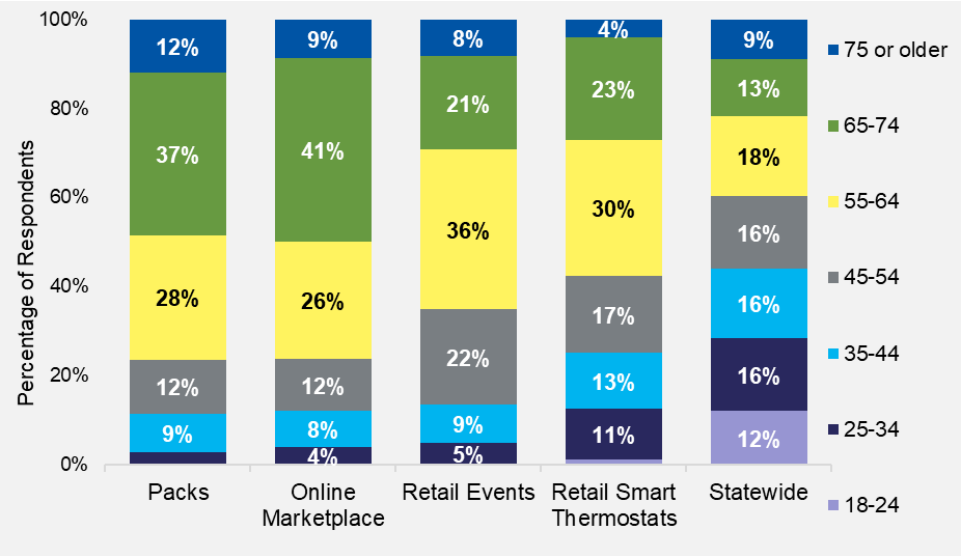
Some suggestions were unique to specific offerings. Retail Smart Thermostat respondents suggested simplifying and reducing the paperwork to receive rebates (37%), while Packs respondents suggested allowing more customization of the measures in the packs (10%). Ten percent of Online Marketplace suggestions related to issues with ordering, shipping, and tracking, which was like CY 2020 suggestions for this offering (9%).

Suggestions categorized as "other" included increasing incentives and discounts, allowing more frequent participation, increasing or eliminating limits on order quantities, and improving customer service.

Demographics

The customer satisfaction survey asked respondents their age (Figure 12), income (Figure 13), and how many people lived in their household. Compared to the other Direct to Customer Solution offerings, Retail respondents had the highest percentages of age 54 or younger (42% Smart Thermostats, 35% Events) though these respondents still tended to be older than the statewide average (60% age 54 or younger). Retail Smart Thermostat respondents also had the highest percentage with incomes over $100,000 (50%). Packs respondents were the most likely to have incomes under $50,000 (38%), and their income distribution was like the statewide distribution (39% incomes under $50,000).

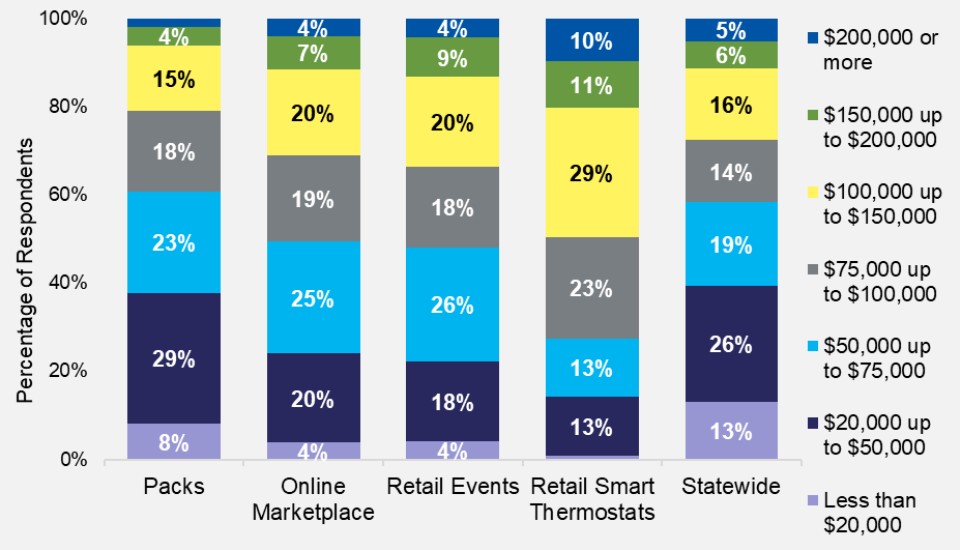
Figure 12. Direct to Customer Solution Participants' Age



Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Offering Participant Satisfaction Survey Question. "Which of the following categories best represents your age?" (Packs n=1,343, Online Marketplace n=1,665, Retail Events n=386, Retail Smart Thermostats n=151). U.S. Census 2020 ACS, Selected Social Characteristics in the United States.

Note: Unlabeled segments represent 3% or less of respondents.

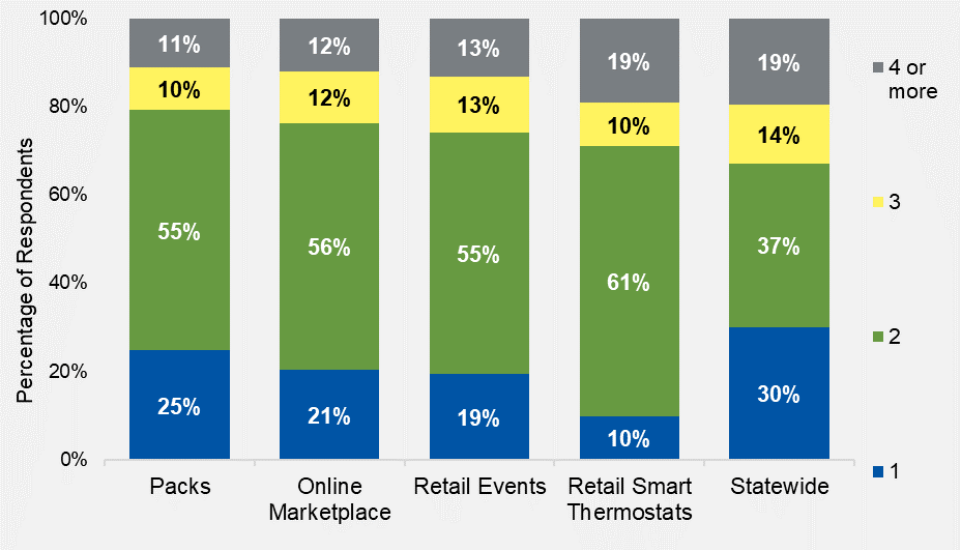
Figure 13. Direct to Customer Solution Participants' Income



Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Offering Participant Satisfaction Survey Question. "Which category best describes your total household income before taxes?" (Packs n=980, Online Marketplace n=1,214, Retail Events n=293, Retail Smart Thermostats n=113). U.S. Census 2020 ACS, Selected Social Characteristics in the United States.
Note: Unlabeled segments represent 3% or less of respondents.

As shown in Figure 14, most respondents from all four offerings were two-person households (55% to 61% by offering), higher than the statewide average (37%). Packs respondents were the most likely to live in single-person households (25%) and Retail Smart Thermostat respondents were the least likely (10%), while the inverse was true for households of three or more (20% Packs and 29% Retail Smart Thermostats).

Figure 14. Direct to Customer Solution Participants' Household Size



Source: Packs, Online Marketplace, Retail Smart Thermostats, and Retail Events Offering Participant Satisfaction Survey Question. "Counting yourself, how many people live in your household on a full-time basis today? Please include everyone who lives in your home and exclude anyone just visiting or children who may be away at college or in the military."
(Packs n=1,330, Online Marketplace n=1,654, Retail Events n=379, Retail Smart Thermostats n=152). U.S. Census 2020 ACS, Selected Social Characteristics in the United States.

LED Market Share

Using the same national lighting sales data used to calculate upstream lighting NTG (see *National Sales Data Model: Upstream Lighting* section above), the evaluation team assessed some of the key factors driving LED market share specifically in Wisconsin.

Some of the key lighting program attributes the team developed were these:

- **Market share distribution.** LED market share distribution for the United States, Wisconsin versus the U.S., as well as across each state and across retail channels.
- **Program intensity.** LED lighting market share relative to overall program expenditures per household.
- **Program incentives.** Average LED lighting program incentives per bulb.
- **ENERGY STAR market share distribution.** LED market share distribution in Wisconsin compared to states that do not run an upstream lighting program.

Market Trends

Figure 15 shows the national market share of the four bulb types (incandescent, halogen, CFL, and LED) across the past six years. LEDs continue to gain substantial market share, rising from 19% in 2015 to 76% in 2021. From 2015 to 2017, LEDs largely displaced sales of CFLs only. In 2018, LEDs began to displace inefficient bulbs. Even so, inefficient lighting (incandescent bulbs and halogens) still represented almost a quarter of the lighting market in 2021.

Figure 15. Year-Over-Year Total U.S. Market Share by Lamp Type

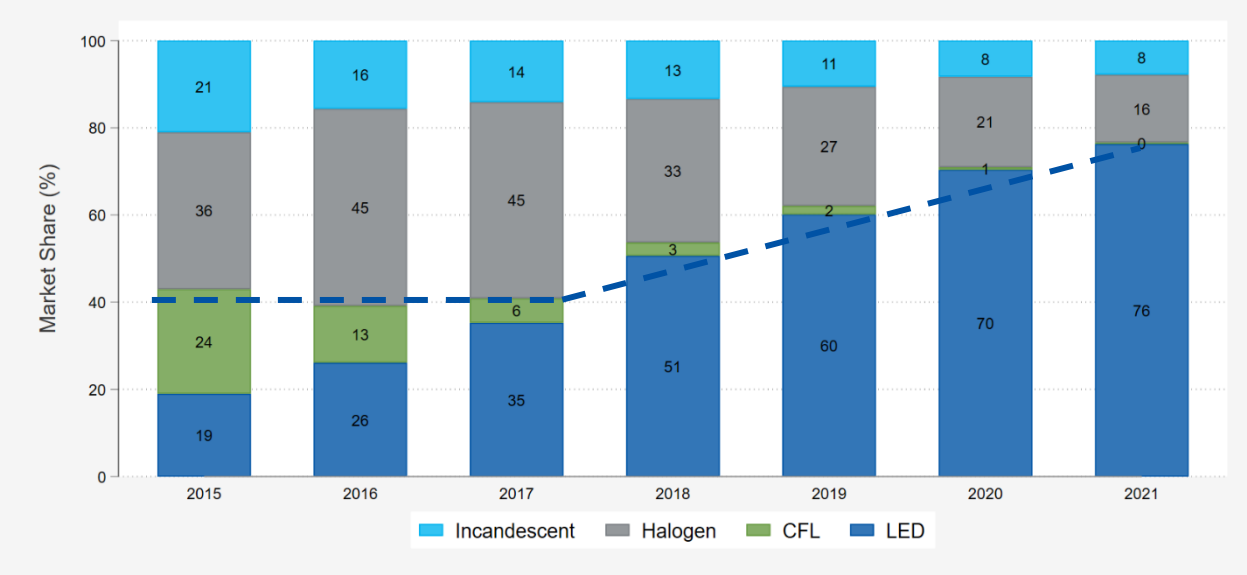


Figure 16 compares the data in Figure 15 to Wisconsin market shares. In terms of LED market share, Wisconsin distanced itself from the national market share in 2016. Since then, Wisconsin LED market share has consistently been greater than national market share by upwards of ten percentage points.

Figure 16. Wisconsin and Total U.S. Year-Over-Year LED Market Share

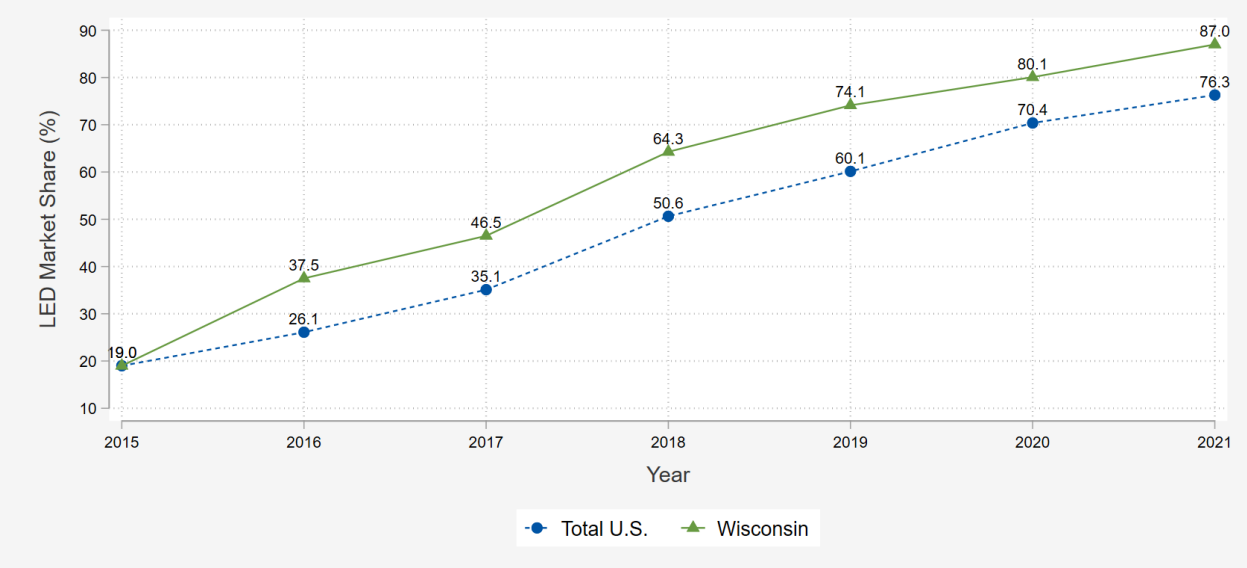
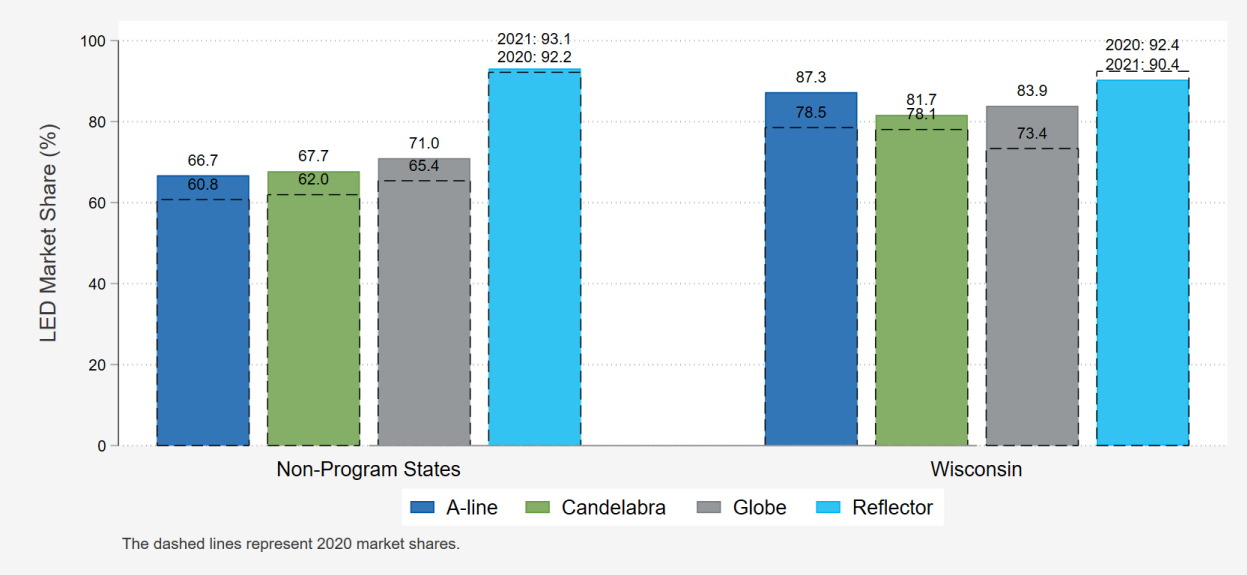


Figure 17 shows the LED market share by lamp style. Breakouts are shown for non-program states and Wisconsin across 2020 and 2021.[18] The market shares differ by style, with LEDs representing a majority of all bulb styles even in states without programs. LED market shares in Wisconsin tended to exceed LED market shares in non-program states by several percentage points. For A-lines in particular, the LED market share in Wisconsin was around 20 percentage points higher than the share in non-program states in both years. Reflectors were on the other end of the spectrum, where the 2021 LED market share in Wisconsin slightly trailed the market share in states without upstream lighting programs.

Figure 17. LED Market Share by Lamp Style (2020-2021)



Analysis of the sales data model revealed that LEDs had greater market share in Wisconsin's non-POS retail channels than the POS retail channels, as shown in Figure 18.[19] In 2021, approximately 93% of the lighting purchases made in Wisconsin's non-POS channel were LEDs, compared to approximately 68% in the POS channel. LED market share has increased in both retail channels since 2016. Figure 19 shows a similar distribution between program states and non-program states.

[18] The non-program states in 2021 were Alabama, Kansas, Kentucky, Mississippi, Nebraska, Tennessee, and Wyoming. The team did not include states that adopted EISA standards or states that offered programs prior to 2021 but not in 2021 in the non-program bin.

[19] In total, approximately 75% of bulbs were purchased in the non-POS channels.

Figure 18. Wisconsin LED Market Share by Retail Channel

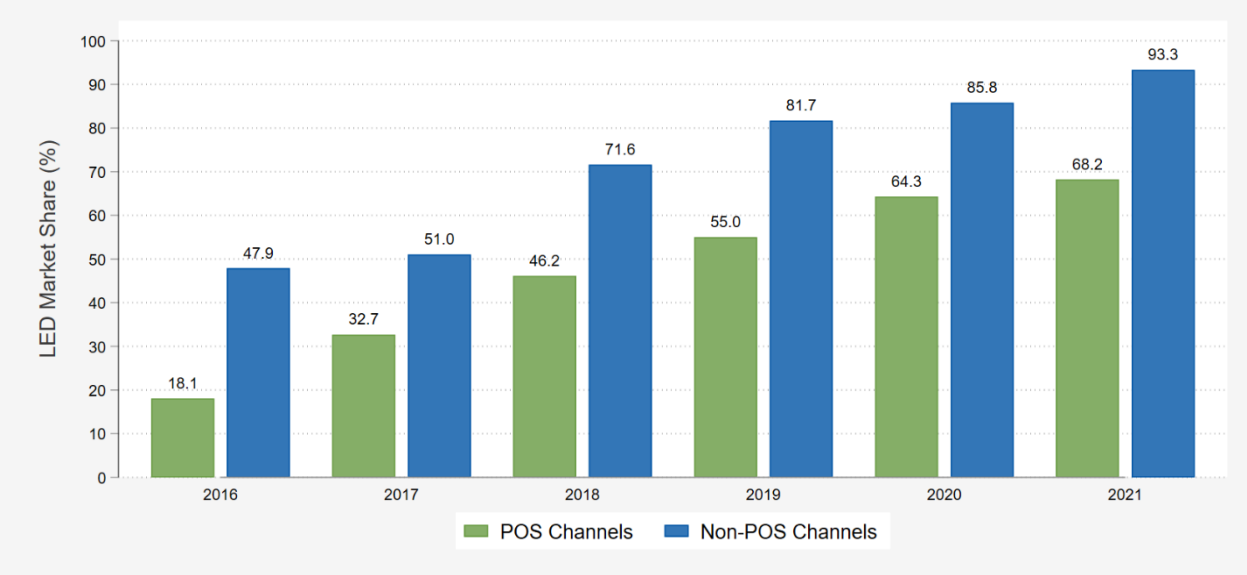
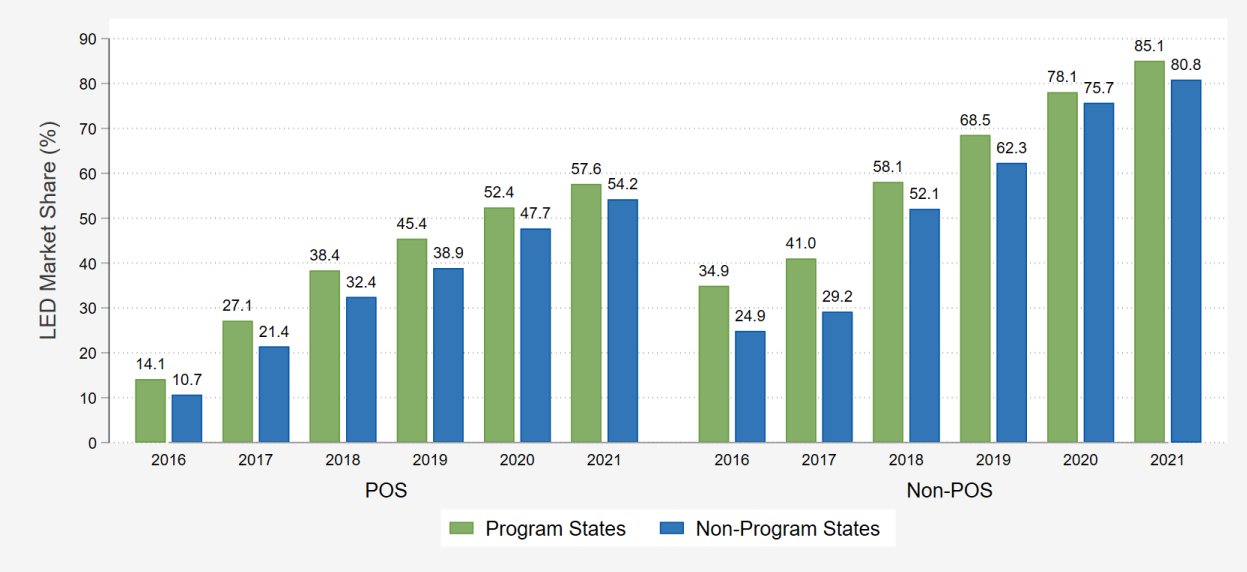
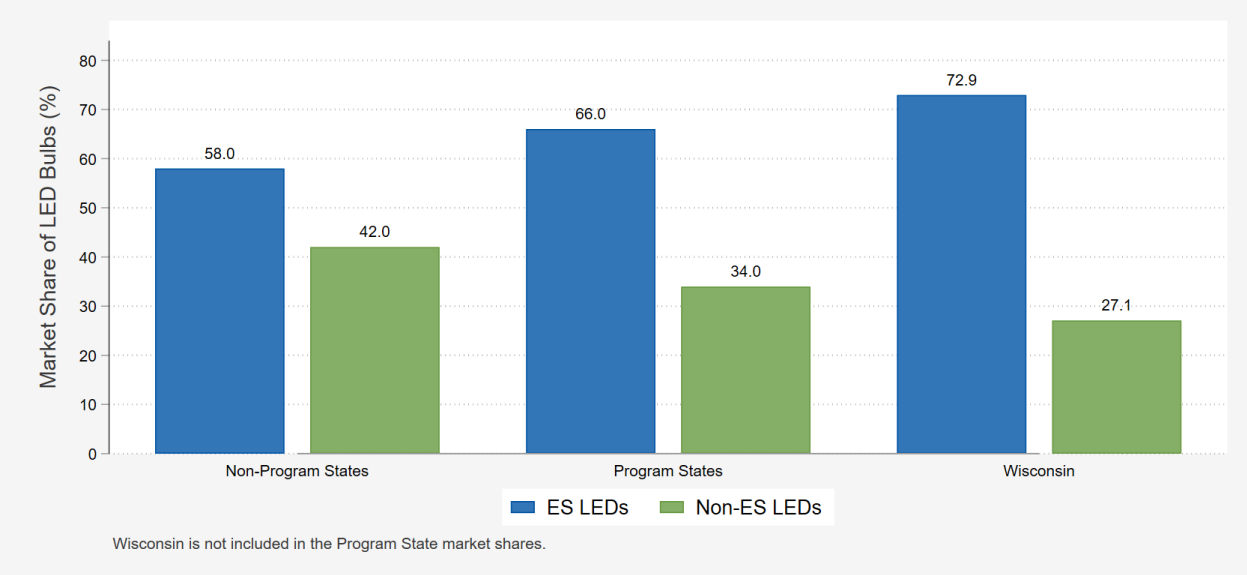


Figure 19. LED Market Share by Retail Channel and Program Status



The evaluation team looked at ENERGY STAR LED distribution when there was sufficient resolution.[20] In Figure 20, the POS retail channel shows that 73% of LED purchases in Wisconsin were ENERGY STAR LEDs, compared to 66% of LED purchases in other program states (excluding Wisconsin).

Figure 20. ENERGY STAR LED Wisconsin Share (2021 POS Channels)



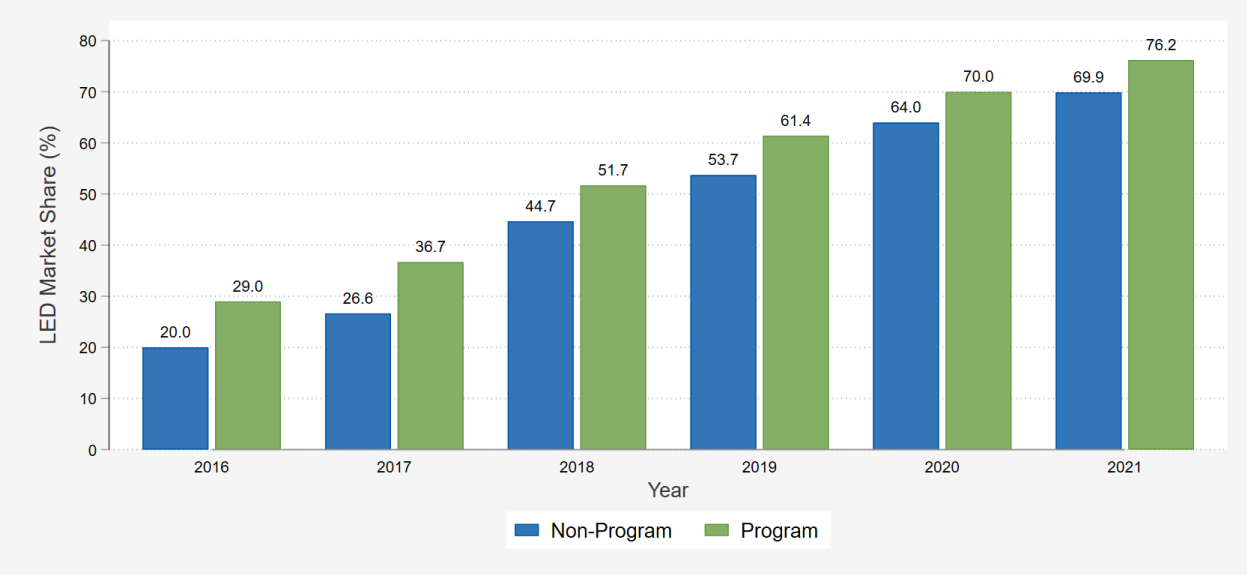
Program Activity

Figure 21 shows the state-level LED share as a function of program activity (program state or non-program state). It is important to note that the number of states in each bin varies by year. In 2021, there were seven states in the non-program bin and 34 states in the program bin.[21] There are two key takeaways from the figure: first, LED share was higher in program states, although the gap decreased from about ten percentage points in 2016 and 2017 to about four percentage points in 2021. Second, LED share in non-program states typically lagged LED share in program states by about one year (e.g., in 2018, the average LED market share was 52% in program states, and in 2019, non- program states had an LED market share of about 54%).

[20] Because the ENERGY STAR website does not include the universal product codes of all qualifying lamps, the evaluation team had to identify ENERGY STAR-qualified lamps using make, model, and rated lifetime. In total, the evaluation team was successful at attributing 98% of LED sales with an ENERGY STAR attribute (i.e., an LED was designated ENERGY STAR or was not). The team excluded the remaining 2% of LEDs. This analysis was conducted using only the POS data, as the panel data did not contain sufficient sample size to stratify by ENERGY STAR designation.

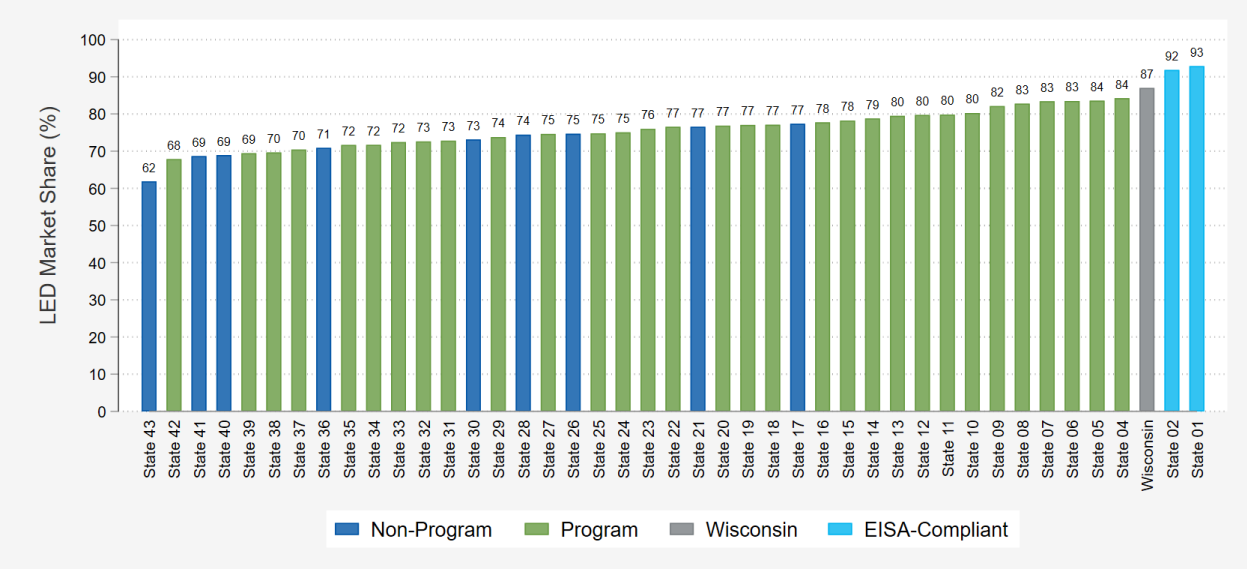
[21] As noted elsewhere, the non-program states in 2021 were Alabama, Kansas, Kentucky, Mississippi, Nebraska, Tennessee, and Wyoming. A couple of additional states partially implemented EISA but are not shown in the figure.

Figure 21. Relationship Between Program Activity and LED Sales



Similarly, Figure 22 shows how LED sales in Wisconsin compared to the 43 modeled states. States highlighted in green represent states with programs. Darker blue bars represent states that did not offer a lighting program, and lighter blue bars represent states that have fully adopted EISA standards. There are a handful of program states with low LED market shares, but states without programs generally have lower LED market shares. Most of the non-program states have LED market share below 76% (the national LED market share).

Figure 22. LED Sales Distribution Across States (2021)



Program Intensity

Figure 23 shows the distribution of programs lamps per household for states in which the evaluation team had sufficient data. Approximately 1.8 LED lamps per household were distributed through Wisconsin's upstream lighting offering. Across states, the mean and median were both approximately 1.2 lamps per household.

Figure 23. Average Number of Program Lamps per Household (2021)

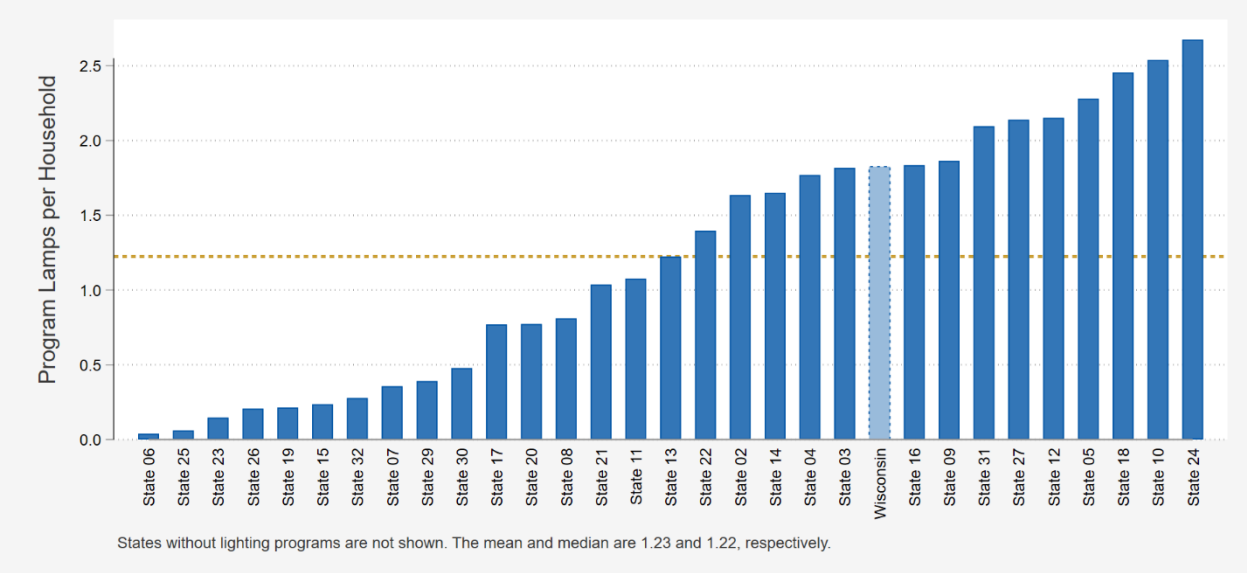
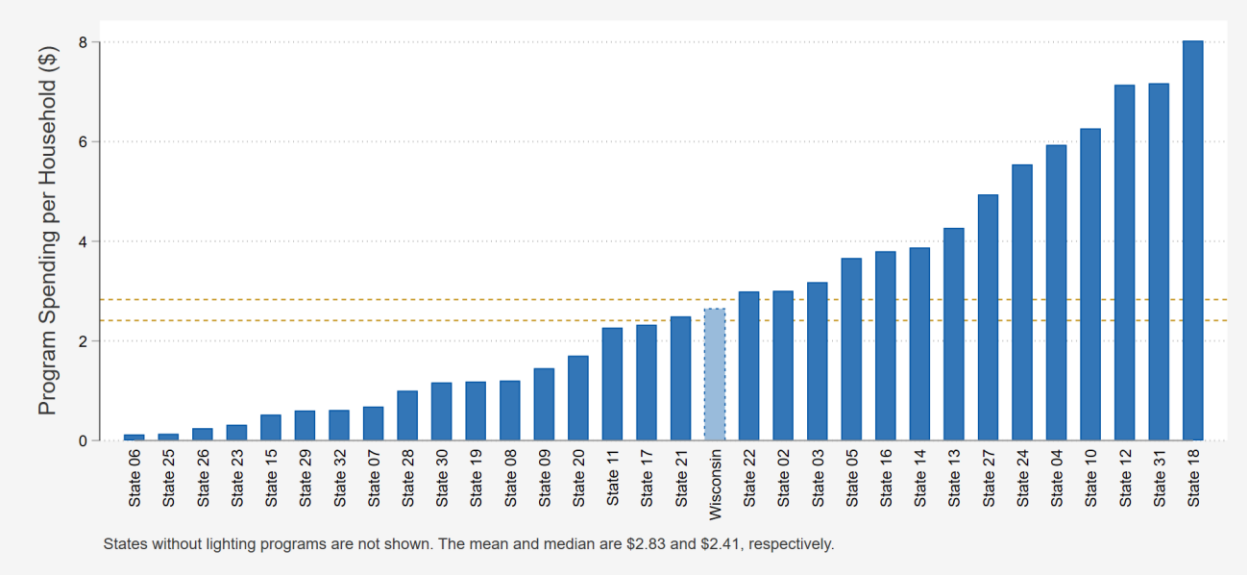


Figure 24 shows the distribution of program spending per household for states in which the team had sufficient data. In most states, upstream lighting offerings spend fewer than $5 per household. Across states, the average and median values were $2.83 and $2.41 per household. Wisconsin's upstream lighting offering falls slightly below the mean $2.65 per household.

Figure 24. Average Program Spending per Household (2021)



The evaluation team compared the average incentive per LED across states in which LED incentive information was collected (Figure 25). A calculation of incentive dollars divided by bulb units yielded average incentive per bulb. LED incentives ranged from approximately $0.75 to $2.75 per LED bulb on average, with most states offering between $1 and $2 per LED. The mean and median LED incentive were $1.70 and $1.69, respectively. At $1.08 per LED, Wisconsin falls on the lower end of the distribution.

Figure 25. Average Upstream Lighting Incentive Per LED (2021)

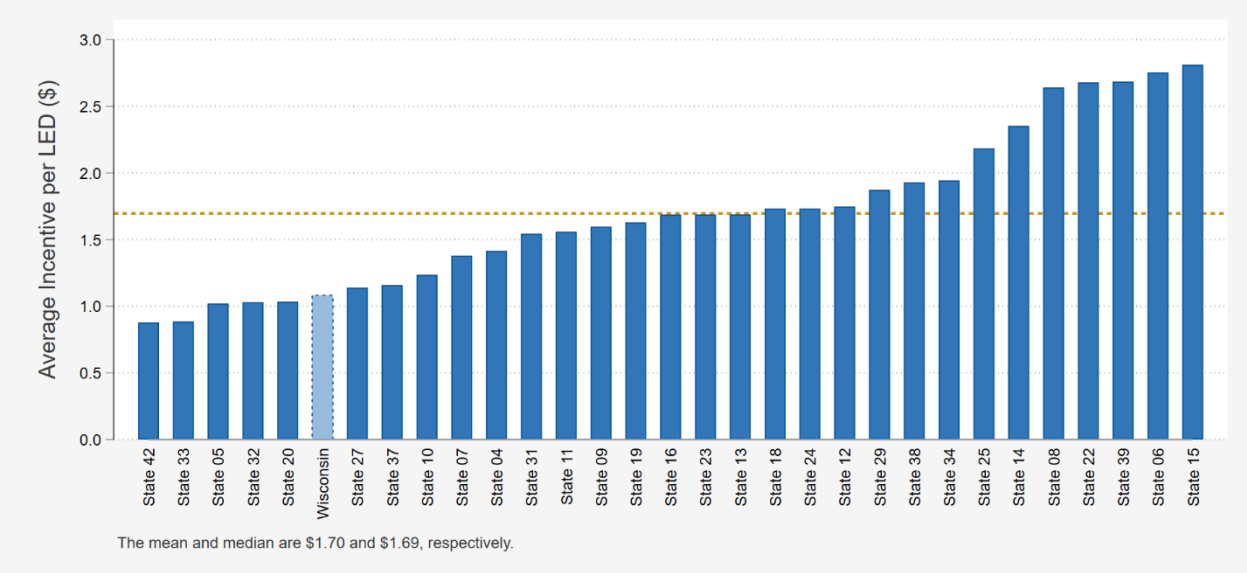
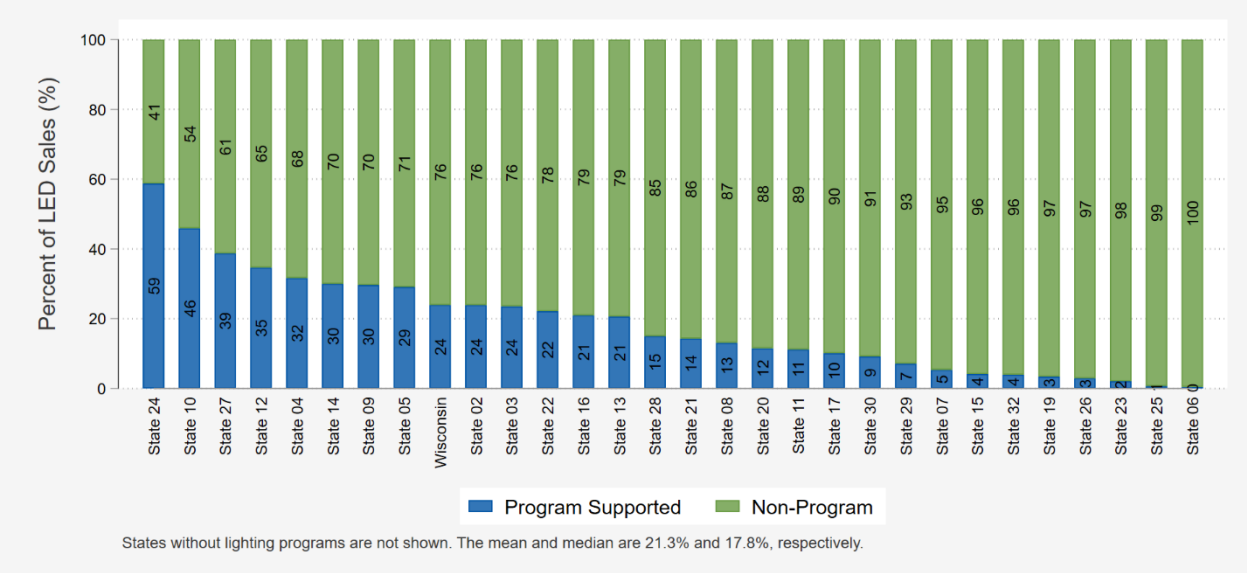


Figure 26 shows the percentage of LED sales, by state, that were attributed to an upstream lighting program (where this percentage was calculated by dividing the number of incented LED bulbs by the

total LED bulbs sold in the state). Across all states, the average percentage was 21.3% and the median was 17.8%. Wisconsin falls slightly above average at 24.0%.

Figure 26. Percentage of LED Sales Supported by Upstream Lighting Program (2021)



It is clear from the data used for the national sales model that program spending was at least partially responsible for an increased market share of LED sales. Although these figures help illustrate program activity in relation to LED sales, the regression analysis provided information about what other factors could be influencing the marketplace and a better understanding of the programmatic impacts. The next section presents the key findings from the national sales model.

Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management (DSM) offering. The benefit/cost test used in Wisconsin is a modified version of the total resource cost (TRC) test. Appendix I. Cost Effectiveness and Emissions Methodology and Analysis in Volume III includes a description of the TRC test. Table 28 lists the CY 2021 incentive costs for the Direct to Customer Solution.

Table 28. CY 2021 Direct to Customer Incentive Costs

Offerings	Incentive Costs
Appliance Recycling	$125
Online Marketplace	$1,585,413
Packs	$1,467,133
Retail	$4,451,817
Farmhouse Kits	$8,852
Pop Up Retail	$236,467
Income Qualified	$3,269,176
Total	**$11,018,983**

The evaluation team found that the CY 2021 Direct to Customer Solution was cost-effective when including the T&D benefits (3.89), and when excluding them (3.60). Table 29 lists the evaluated costs and benefits.

Table 29. Direct to Customer Costs and Benefits

Cost and Benefit Category	Total
Costs	
Administrative Costs	$657,093
Delivery Costs	$4,653,089
Incremental Measure Costs	$15,115,224
Total Non-Incentive Costs	**$20,425,406**
Benefits	
Electric Benefits (kWh)	$37,605,953
Electric Benefits (kW)	$12,762,660
T&D Benefits (kW)	$5,892,567
Gas Benefits	$7,400,192
Emissions Benefits	$15,789,970
Total TRC Benefits with T&D benefits	**$79,451,342**
Net TRC Benefits with T&D benefits	**$59,025,936**
TRC Benefit/Cost Ratio with T&D benefits	**3.89**

Outcomes and Recommendations

The evaluation team offers the following outcomes and recommendations based on the CY 2021 evaluation.

Outcome 1. Customer satisfaction was high across all Direct to Customer offerings. CY 2021 satisfaction ratings for all offerings surveyed were statistically equivalent to CY 2020. These offerings maintained high ratings ranging from 9.3 (Online Marketplace and Retail Smart Thermostats) to 9.6 (Packs).

Outcome 2. In CY 2021, the implementer introduced several new MMIDs in SPECTRUM that did not go through the prescribed TRM review and approval process. This made it challenging to identify appropriate savings for these measures or to understand *ex ante* assumptions.

Recommendation 1. The evaluation team, program administrator, and PSC staff are working to implement an updated TRM process in CY 2022. This new process should help set clear steps for when and how implementers can add new measures to SPECTRUM. The evaluation team encourages the implementer to engage in the development of this TRM process and become familiar with it.

Outcome 3. Additional fields in the implementer's supplemental SKU data report could improve the accuracy of Retail Lighting and Pop-up Event savings. To calculate LED savings for bulbs distributed through the Retail Lighting offerings, the evaluation team relies on the implementer's SKU data, which

includes bulb-specific counts and details that are not available in SPECTRUM. Currently, the SKU data do not include MMIDs or ENERGY STAR identifiers, which could result in the evaluation team applying incorrect baselines or assigning bulbs to different MMIDs than the implementer. The implementer reported that it tracks these fields and will attempt to add them to the SKU report for future evaluations.

Outcome 4. Despite the low annual NTG ratio of 11.5%, Focus on Energy's Retail Lighting offering (i.e., upstream lighting) continued to have an impact and was an important source of cost-effective savings. For example, the upstream lighting offering led to an additional 2 million LEDs sold in Wisconsin in 2021, a savings to customers of approximately $6.9 million on their energy bills. In addition, even if Focus on Energy claims net energy savings for only four of every 10 LEDs distributed through the program, that still comes to a program cost of acquisition of approximately $3.75 for each LED claimed by Focus on Energy's offering—a savings of approximately 28 kWh.[22] The acquisition cost for Focus on Energy is reasonable compared to other efficiency measures.

Outcome 5. In April 2022, the DOE finalized rules to re-instate the previously planned lighting efficiency standards that will prohibit the production and sales of general service lamps (GSLs) that do not meet a 45 lumen per watt minimum efficiency.[23] However, the team cautions against significantly reducing the upstream lighting offering prior to enforcement of the DOE rules; several other jurisdictions have experienced stagnation and backsliding when upstream lighting offerings are simply turned off or budgets are cut substantially.[24]

Recommendation 2. To combat high rates of freeridership prior to the rules being enforced, the team recommends the following:

- **Target styles other than reflectors.** In states without lighting programs, LEDs account for more than 90% of reflector sales. In other words, nine of every 10 reflectors purchased will be LED absent Focus on Energy incentives.
- **Target store types where LED sales are lagging.** The sales data analysis continued to show that retailers in POS data—grocery, dollar, drug, discount, and mass merchandiser—have a lower

[22] Calculated based on an incentive of $1.50/bulb. For example, if Focus on Energy incents 10 LEDs that would be $15 (10*$1.50/bulb), and if claiming savings on four of those that would be $15/4 = $3.75/bulb. For simplicity this can also be calculated by dividing the incentive price by the NTG (i.e., $1.50 / 0.4 = $3.75).

[23] Specifically, the DOE rules expand the definition of GSLs to include reflectors and candelabras that were previously exempt from the standards and requires all GSLs to meet a 45 lumen/watt minimum efficiency. Companies are allowed to produce and import noncompliant bulbs until January 2023 and retailers are allowed to sell them until July 2023. Source: Enforcement Policy Statement—General Service Lamps, issued April 26, 2022. GSL_EnforcementPolicy_4_25_22.pdf (energy.gov)

[24] For example, after Illinois utilities cut off incentives for A-line LEDs in 2019, their market share dropped from 67% in 2018 to 62% in 2019. During the same period, A-line LED share increased from 54% to 58% nationally.

LED market share than the big box and major club stores. Targeting retailers in these distribution channels can maximize program influence.

Recommendation 3. As the new DOE rules are enforced, Focus on Energy should consider shifting to direct-install offerings that would replace currently installed inefficient bulbs with LEDs, hosting collection sites for working inefficient bulbs, or purchasing inefficient bulbs directly from retailers to prevent customers from stocking up on them at the end of the enforcement period.

Outcome 6. The Income Qualified path in the Retail offering accounted for 20% of verified gross first year savings (by MMBtu) for Direct to Customer Solutions in CY 2021. Verified gross impacts are based on assumptions in the TRM, which may not reflect real-world conditions. The evaluation team attempted to survey recipients of free LEDs distributed through the Income Qualified path but did not receive any survey responses.

Recommendation 4. If the Income Qualified path is expected to contribute a large share of savings in the future, the implementer and the evaluation team should collaborate to obtain relevant feedback on how the bulbs are used to improve the reliability of these savings.

Outcome 7. **In CY 2021, Online Marketplace offered limited time offers of various measure packs, which may not reflect future offerings.** For faucet aerators, ISRs for measures delivered through limited time offers (51%) were significantly lower than ISRs for standard Online Marketplace aerators (82%).

Recommendation 5. If the implementer does not offer aerators through limited time offers in CY 2022, future savings should be based on the ISR for standard Online Marketplace aerators (82%).

Outcome 8. The Farmhouse Kits offering is more like Packs in CY 2021 than in years prior to COVID-19, when kits were hand delivered to agricultural customers during farm visits by utility representatives. Despite changing to a delivery approach that is more scalable, Farmhouse Kits participation declined in CY 2021 compared to the prior two years. Further, Farmhouse Kits measures that generate savings are the same as measures in Packs, making Farmhouse Kits duplicative with Packs.

Recommendation 6. Focus on Energy should consider whether Farmhouse Kits in its current form is a productive way to serve the rural community. Perhaps allowing organizations serving rural customers (e.g., local libraries or volunteer organizations) to order packs in bulk for distribution within the community would minimize transportation costs to remote regions, while leveraging existing social networks. In this approach, the implementer would need to work with the evaluation team to support evaluation efforts, such as either collecting participant pack recipient contact data or including evaluation survey information with the distributed packs.

Trade Ally Solutions

Trade Ally Solutions is administered by APTIM and implemented by CLEAResult. It provides incentives to customers who make efficiency upgrades through three statewide offerings:

- **Insulation and Air Sealing.** Incentives for contractor-assisted or do-it-yourself residential insulation and air sealing improvements.
- **Heating and Cooling.** Incentives for residential HVAC equipment improvements.
- **Renewable Energy.** Incentives for residential and business solar photovoltaic (PV) installations. Includes a Rural Renewables bonus for residential customers in designated rural zip codes.

The Insulation and Air Sealing and Heating and Cooling Offerings include incentive tiers for energy efficiency improvements:

- Tier 1 offers incentives to all homeowners.
- Tier 2 offers enhanced incentives to homeowners with a household income at or below 80% of the state median income.

Additional details about each offering are provided in the *Process Evaluation* section of this chapter.

Table 30 summarizes the impacts for the Trade Ally Solutions for CY 2021, including impacts for statewide and rural offerings as well as total impacts for the whole solution.

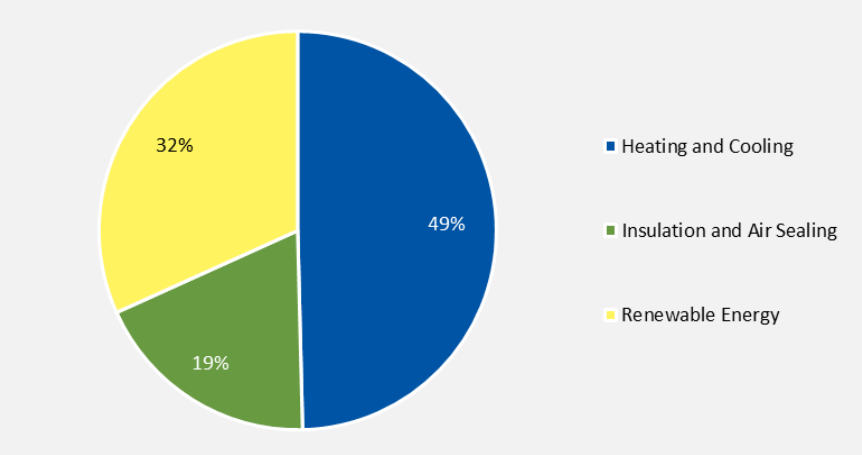
Table 30. CY 2021 Trade Ally Solutions Summary

Item	Units	Heating and Cooling/Insulation and Air Sealing Offerings	Renewable Energy Offering, Residential	Renewable Energy Offering, Commercial	Total Trade Ally Solutions
Incentive Spending	$	$6,281,445	$1,377,576	$1,895,278	$9,554,299
Participation	Number of Participants	29,159	2,028	168	31,355
Verified Gross Lifecycle Savings	kWh	124,084,068	502,782,023	376,826,207	1,003,692,298
	kW	1,006	6,744	4,972	12,723
	therms	35,129,381	0	0	35,129,381
Verified Gross Lifecycle Realization Rate	% (MMBtu)	101%	99%	100%	100%
Annual NTG Ratio	% (MMBtu)	82%	42%	62%	71%
Net Annual Savings	kWh/year	7,543,924	8,446,738	9,370,534	25,361,196
	kW	1,118	2,833	3,091	7,042
	therms/year	1,504,090	0	0	1,504,090
Net Lifecycle Savings	MMBtu	3,269,258	720,507	799,307	4,789,071
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio with T&D Benefits	**0.65**	**1.05**	**2.21**	**1.01**

[a] Residential Renewable Energy spending includes $330,000 paid for Rural Bonuses and the Commercial Renewable Energy incentives include $145,286 paid for Rural Bonuses.

Figure 27 shows the proportion of savings by offering for Trade Ally Solutions. The Heating and Cooling Offering contributed the largest net lifecycle MMBtu savings to the Trade Ally Solutions.

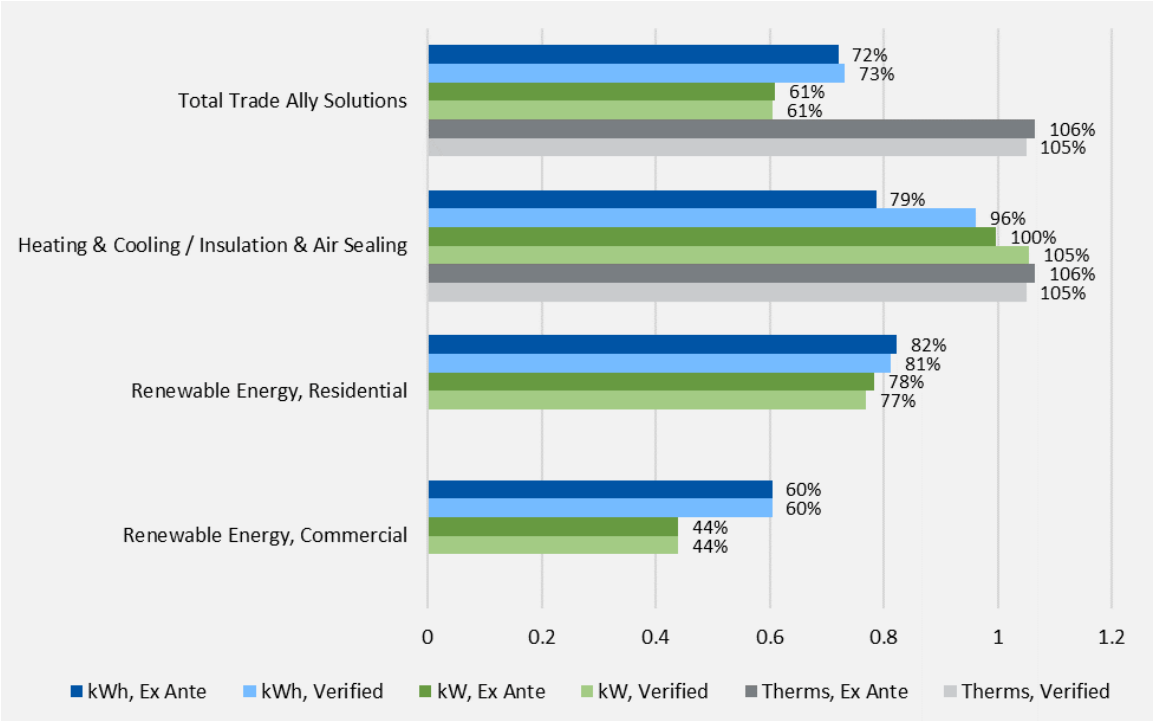
Figure 27. Net Lifecycle Savings by Offering



Achievement Against Goals

Figure 28 shows the percentage of gross lifecycle savings goals achieved by Trade Ally Solutions and its offerings in CY 2021. Overall, the Trade Ally Solutions exceeded its therm savings goal but not its kW and kWh savings goals. The overall kW and kWh results are driven by the Residential and Commercial Renewable Energy Offerings, which contributed to 87% of the total gross kWh savings and 92% of the total gross kW impact. The Renewable Energy Offering did not meet its goals because the market, specifically the network of solar PV installers, was working at maximum capacity and unable to support the additional activity required for the offering to meet its goal.

Figure 28. Trade Ally Solutions – Heating and Cooling and Insulation and Air Sealing Achievement of CY 2021 Gross Lifecycle Savings Goals



The 100% *ex ante* gross lifecycle savings reflects the implementer's contract goals for CY 2021. Verified gross lifecycle savings contribute to the administrator's portfolio-level goals.
Note: Focus on Energy had goals for the commercial and residential Renewable Energy offerings and had a combined goal for the Heating and Cooling and Insulation and Air Sealing offerings.

Impact Evaluation

This section contains the findings for the CY 2021 impact evaluation at the solution level, followed by a discussion of each offering.

Impact Evaluation Methodology

The evaluation team conducted an impact evaluation of the CY 2021 Trade Ally Solutions using a combination of primary and secondary data. Table 31 lists specific data collection activities and sample sizes used in the CY 2021 evaluation. Additional details about these activities and their findings can be found in the offering-specific discussions below and in Appendix M. Survey and Interview Instruments by Offering in Volume III.

Table 31. CY 2021 Data Collection Activities and Sample Sizes for Impact Evaluation

Activity	Heating and Cooling	Insulation and Air Sealing	Renewable Energy, Residential	Renewable Energy, Commercial	Total
Tracking Database Review	Census	Census	Census	Census/Random	**Census**
Participant Surveys	N/A	N/A	70	38	**108**
Desk Reviews	N/A	5	40	12	**57**
Site Visit	N/A	N/A	10	10	**20**

[a] Heating and Cooling and Insulation and Air Sealing participants were not surveyed in CY 2021 because they were surveyed in CY 2020.

Verified Gross Savings Results for Trade Ally Solutions

Table 32 lists the first-year and lifecycle realization rates for CY 2021, and Table 33 contains a summary of verified first-year and lifecycle savings by offering. Overall, Trade Ally Solutions achieved a first-year evaluated realization rate of 100%, weighted by total (MMBtu) energy savings. Detailed findings for each offering, including factors affecting the realization rates, are discussed in detail in the next sections.

Table 32. CY 2021 Trade Ally Solutions First-Year and Lifecycle Realization Rates

Offering	First-Year Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Heating and Cooling, Tier 1	121%	119%	100%	102%	133%	100%	102%
Heating and Cooling, Tier 2	208%	-	89%	90%	208%	89%	90%
Heating and Cooling, Total	**122%**	**119%**	**98%**	**101%**	**135%**	**98%**	**101%**
Insulation and Air Sealing, Tier 1	101%	101%	100%	100%	102%	101%	101%
Insulation and Air Sealing, Tier 2	100%	100%	100%	100%	100%	100%	100%
Insulation and Air Sealing, Total	**101%**	**101%**	**100%**	**100%**	**101%**	**100%**	**101%**
Renewable Energy, Residential	99%	98%	-	99%	99%	-	99%
Renewable Energy, Commercial	100%	100%	-	100%	100%	-	100%
Renewable Energy, Total	**99%**	**99%**	-	**99%**	**99%**	-	**99%**
Overall Realization Rate	**102%**	**99%**	**99%**	**100%**	**102%**	**99%**	**100%**

Table 33. CY 2021 Trade Ally Solutions First-Year and Lifecycle Verified Gross Energy Savings Summary

Offering	Verified First-Year Savings				Verified Lifecycle Savings		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Heating and Cooling, Tier 1	5,931,591	315	1,315,723	151,811	82,811,989	23,535,889	2,636,143
Heating and Cooling, Tier 2	122,477	0	174,480	17,866	2,449,531	3,485,642	356,922
Heating and Cooling, Total	**6,054,068**	**315**	**1,490,203**	**169,677**	**85,261,520**	**27,021,531**	**2,993,065**
Insulation and Air Sealing, Tier 1	1,686,087	597	337,320	39,485	34,874,788	6,908,329	809,826
Insulation and Air Sealing, Tier 2	197,388	94	59,976	6,671	3,947,760	1,199,520	133,422
Insulation and Air Sealing, Total	**1,883,475**	**691**	**397,296**	**46,156**	**38,822,548**	**8,107,849**	**943,247**
Renewable Energy, Residential	20,111,281	6,744	0	68,620	502,782,023	0	1,715,492
Renewable Energy, Commercial	15,073,048	4,972	0	51,429	376,826,207	0	1,285,731
Renewable Energy, Total	**35,184,329**	**11,717**	**0**	**120,049**	**879,608,230**	**0**	**3,001,223**
Overall Savings	**43,121,872**	**12,723**	**1,887,498**	**335,882**	**1,003,692,298**	**35,129,381**	**6,937,536**

Heating and Cooling: Verified Gross Savings Results

For the Heating and Cooling Offering, the evaluation team conducted a database review and a TRM review to inform verified gross savings. The offering had a gross lifecycle realization rate of 101% MMBtu.

Table 34 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for the Heating and Cooling Offering. Savings by measure can be found in Appendix E. Detailed Findings in Volume III.

Table 34. CY 2021 Heating and Cooling *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
Heating and Cooling Offering Tier 1						
First-Year Gross Savings	4,904,343	266	1,320,906	5,931,591	315	1,315,723
Lifecycle Gross Savings	62,036,174	266	23,639,666	82,811,989	315	23,535,889
Heating and Cooling Offering Tier 2						
First-Year Gross Savings	59,010	-	195,759	122,477	-	174,480
Lifecycle Gross Savings	1,180,200	-	3,911,220	2,449,531	-	3,485,642
Total Heating and Cooling Offering						
First-Year Gross Savings	4,963,353	266	1,516,665	6,054,068	315	1,490,203
Lifecycle Gross Savings	63,216,374	266	27,550,886	85,261,520	315	27,021,531

The evaluation team calculated energy and demand savings following guidance in the 2021 TRM for most measures. For MMID 2658 (water heater, indirect, 90% annual fuel utilization efficiency [AFUE] boiler, non-gas [NG]), there was no work paper, so the team set verified gross savings and incremental costs equal to *ex ante* savings and incremental costs. All other exceptions to TRM guidance are noted below. For CY 2021, these exceptions consist of updates to energy and demand savings based on actual efficiency and capacity ratings for installed air conditioners and natural gas furnaces.

Natural Gas Furnaces

The evaluation team combined natural gas furnace make and model information in SPECTRUM with AFUE rating and input capacity (MMBtu/h) data that were compiled and provided by the implementer.[25] The team then calculated the AFUE and capacity ratings weighted by the number of units of every make and model within each MMID.

For gross verified therm savings, the team calculated differences in consumption between actual installed units and baseline units by using manufacturer and model number information from rebated units to determine the actual output capacities and AFUEs of installed units. For baseline units, the team adopted TRM-deemed AFUEs by participant sector (92.8% for single-family, 80.0% for multifamily). The team assumed both baseline and actual installed furnaces had the same output capacities.

Table 35 shows the average capacities, efficient and baseline AFUEs, and efficient and baseline energy consumption for each furnace MMID. The capacities and actual installed AFUEs reflect weighted averages according to the actual units installed within each MMID.

Table 35. CY 2021 Natural Gas Furnace Input Capacity and AFUE Ratings

Measure Name	MMID	Average Actual Capacity[a]	Reported Baseline		Average Actual Installed		Verified therm savings
			AFUE	therms[b]	AFUE	therms[b]	
Tier 1 Furnace Measures							
MF NG Furnace, Multi-stage+, 95% AFUE	4950	73.3	80.0	860.9	95.7	694.0	166.9
MF NG Furnace, Multi-stage+, 96% AFUE	4951	55.5	80.0	603.5	96.1	474.2	129.3
MF NG Furnace, Multi-stage+, 97% AFUE	4952	66.4	80.0	737.9	97.2	572.4	165.4
MF NG Furnace, Multi-stage+, 98%+ AFUE	4953	67.3	80.0	793.4	97.8	619.9	173.5
MF NG Furnace, Single-stage, 95% AFUE	4958	60.1	80.0	689.5	95.8	552.3	137.2
MF NG Furnace, Single-stage, 96% AFUE	4959	48.7	80.0	535.0	96.2	420.8	114.2
NG Furnace, Multi-stage+, 95% AFUE	4962	61.5	92.8	532.1	95.2	513.9	18.3
NG Furnace, Multi-stage+, 96% AFUE	4963	69.9	92.8	669.3	96.1	640.4	28.9
NG Furnace, Multi-stage+, 97% AFUE	4964	76.3	92.8	734.2	97.2	692.6	41.6
NG Furnace, Multi-stage+, 98%+ AFUE	4965	69.7	92.8	680.8	97.6	638.7	42.1
NG Furnace, Single-stage, 95% AFUE	4970	65.0	92.8	614.4	95.4	593.3	21.1
NG Furnace, Single-stage, 96% AFUE	4971	64.2	92.8	612.0	96.2	584.6	27.4
Tier 2 Furnace Measures							
MF NG Furnace, Multi-stage+, Tier 2, 96% AFUE	4955	49.6	80.0	523.8	96.1	408.4	**115.4**
MF NG Furnace, Multi-stage+, Tier 2, 97% AFUE	4956	60.0	80.0	619.1	97.4	468.0	**151.1**
MF NG Furnace, Single-stage, Tier 2, 95% AFUE	4960	42.0	80.0	417.2	95.0	326.0	**91.2**
MF NG Furnace, Single-stage, Tier 2, 96% AFUE	4961	44.7	80.0	510.8	96.2	405.8	**105.0**

[25] Data provided by the implementer contained efficiency and capacity data for more than 1,100 unique furnace model numbers. The team merged this information with Heating and Cooling Offering data using the make and model numbers tracked in SPECTRUM through a combination of automatic and manual matching. The implementer's workbook provided efficiency and capacity information for 99.8% of installed Tier 1 natural gas furnaces and 99.2% of installed Tier 2 natural gas furnaces.

Measure Name	MMID	Average Actual Capacity[a]	Reported Baseline		Average Actual Installed		Verified therm savings
			AFUE	therms[b]	AFUE	therms[b]	
NG Furnace, Multi-stage+, Tier 2, 95% AFUE	4966	60.0	80.0	617.3	95.0	487.0	**130.3**
NG Furnace, Multi-stage+, Tier 2, 96% AFUE	4967	63.9	80.0	719.3	96.1	570.6	**148.7**
NG Furnace, Multi-stage+, Tier 2, 97% AFUE	4968	67.4	80.0	742.3	97.1	575.9	**166.4**
NG Furnace, Multi-stage+, Tier 2, 98%+ AFUE	4969	66.5	80.0	759.0	98.2	584.3	**174.7**
NG Furnace, Single-stage, Tier 2, 95% AFUE	4972	62.1	80.0	688.2	95.2	551.6	**136.5**
NG Furnace, Single-stage, Tier 2, 96% AFUE	4973	60.6	80.0	683.4	96.1	541.8	**141.6**

[a] Average Actual Capacity is based on capacity of units installed and rebated in CY 2020.

[b] All furnace therm savings assume 1,158 estimated full load hours.

For multistage natural gas furnace MMIDs introduced in the 2020 TRM, the evaluation team also used furnace make and model information to assign Air-Conditioning, Heating, & Refrigeration Institute (AHRI) average annual auxiliary electrical energy consumption (E_{AE}) values to actual installed units.[26] The team calculated kWh savings as the difference between MMID-average E_{AE} values and TRM-deemed baseline E_{AE} values. For each multistage furnace MMID, Table 36 shows the average E_{AE} derived from AHRI and tracking data as well as the TRM baseline E_{AE} value (which is the same for single-family and multifamily participants).

Table 36. CY 2021 Multistage Natural Gas Furnace EAE Ratings

Measure Name	MMID	Reported Baseline E_{AE}	Average Actual Installed E_{AE}[a]	Verified kWh Savings
Tier 1 Furnace Measures				
MF NG Furnace, Multistage+, 95% AFUE	4950	482.8	382.7	**100.1**
MF NG Furnace, Multistage+, 96% AFUE	4951	482.8	277.1	**205.7**
MF NG Furnace, Multistage+, 97% AFUE	4952	482.8	301.6	**181.2**
MF NG Furnace, Multistage+, 98%+ AFUE	4953	482.8	303.4	**179.4**
NG Furnace, Multistage+, 95% AFUE	4962	482.8	324.2	**158.6**
NG Furnace, Multistage+, 96% AFUE	4963	482.8	353.1	**129.7**
NG Furnace, Multistage+, 97% AFUE	4964	482.8	354.0	**128.8**
NG Furnace, Multistage+, 98%+ AFUE	4965	482.8	344.4	**138.4**
Tier 2 Furnace Measures				
MF NG Furnace, Multistage+, Tier 2, 96% AFUE	4955	468.5	253.1	**215.4**
MF NG Furnace, Multistage+, Tier 2, 97% AFUE	4956	468.5	213.0	**255.5**
NG Furnace, Multistage+, Tier 2, 95% AFUE	4966	468.5	321.0	**147.5**
NG Furnace, Multistage+, Tier 2, 96% AFUE	4967	468.5	329.1	**139.4**
NG Furnace, Multistage+, Tier 2, 97% AFUE	4968	468.5	290.4	**178.1**
NG Furnace, Multistage+, Tier 2, 98%+ AFUE	4969	468.5	310.6	**157.9**

[a] Average Actual Installed E_{AE} is based on units installed and rebated in CY 2021.

[26] Using make and model information, the evaluation team successfully matched AHRI data to 99.6% of installed Tier 1 natural gas furnaces and 98.2% of Tier 2 natural gas furnaces.

Air Conditioners

For the remaining air conditioners rebated through Trade Ally Solutions prior to the discontinuation of air conditioner measures, the evaluation team used make and model information in SPECTRUM to assign efficiency (SEER) and input capacity ratings from the AHRI database to each installed air conditioner.[27] The team then derived an average efficiency and capacity value for air conditioners (MMID 4974). To determine verified kWh savings, the team calculated differences in consumption between actual installed measures (using actual SEERs) and baseline measures (using the TRM-deemed baseline SEER). The team assumed efficient and baseline measures featured the same average output capacities. Table 37 shows the average efficiency and capacity ratings for air conditioners based on AHRI and tracking data as well as the TRM baseline efficiency.

Table 37. CY 2021 Air Conditioner Input Capacity and SEER Ratings

Measure Name	MMID	Capacity	Reported Baseline		Actual Installed		Verified kWh Savings
			SEER	kWh[a]	SEER	kWh[a]	
Air Conditioner 16+ SEER	4974	30.7	13.0	968.2	16.8	751.0	**217.2**

[a] All air conditioner kWh savings assume 410 estimated full load hours.

Verified Gross Savings Adjustment Summary

For furnace and air conditioner measures for which the evaluation team adjusted savings, the following describes the two changes that comprise the differences between *ex ante* and verified gross savings:

- **Actual installed efficiencies.** Actual efficiencies for installed air conditioners (SEER) and natural gas furnaces (AFUE) were consistently higher than their TRM-deemed efficiencies.[28] Slightly higher efficiency levels contribute to higher verified gross savings relative to *ex ante* savings.
- **Actual installed input capacities.** Actual capacities of installed air conditioners were larger than deemed, contributing to higher verified gross kWh savings relative to *ex ante* savings. For all natural gas furnaces combined, verified gross therm savings were slightly higher than *ex ante* savings.

Insulation and Air Sealing: Verified Gross Savings Results

For the Insulation and Air Sealing Offering, the evaluation team conducted a database review and consulted the TRM to inform verified gross savings. For air sealing measures, the team conducted desk reviews of five projects to verify *ex ante* savings according to each project's information and inputs. The team encountered no discrepancies and accepted *ex ante* savings for all air sealing measures. For

[27] Using make and model information, the evaluation team successfully matched AHRI data to 99.6% of installed Tier 1 air conditioners.

[28] For example, MMID 4970 (NG Furnace, Single-stage, 95% Annual fuel utilization efficiency [AFUE]) had an average actual AFUE of 95.3%. See Table 35 and Table 37 for actual installed efficiencies for all furnace and air conditioner MMIDs, respectively.

insulation measures, the team updated *ex ante* savings by applying TRM energy savings and demand reduction values. The offering had a gross lifecycle realization rate of 101% MMBtu.

Table 38 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for Insulation and Air Sealing. Savings by measure can be found in Appendix E. Detailed Findings in Volume III.

Table 38. CY 2021 Insulation and Air Sealing *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
Insulation and Air Sealing, Tier 1						
First-Year Gross Savings	1,666,826	591	336,041	1,686,087	597	337,320
Lifecycle Gross Savings	34,331,505	591	6,869,338	34,874,788	597	6,908,329
Insulation and Air Sealing, Tier 2						
First-Year Gross Savings	197,388	94	59,976	197,388	94	59,976
Lifecycle Gross Savings	3,947,760	94	1,199,520	3,947,760	94	1,199,520
Insulation and Air Sealing, Total						
First-Year Gross Savings	1,864,214	686	396,017	1,883,475	691	397,296
Lifecycle Gross Savings	38,279,265	686	8,068,858	38,822,548	691	8,107,849

Renewable Energy: Verified Gross Savings Results

For the CY 2021 evaluation of the Renewable Energy Offering, the team performed engineering desk reviews as well as in-person site visits of a sample of 50 residential and 22 commercial projects. The evaluation team then extrapolated sample findings to the larger offering population.

The team also compared PVWatts calculator results for each sample site to the TRM method to quantify the difference between the simplified TRM approach and full modeling of each site in PVWatts. Explanations of these activities along with the results by residential and commercial sector follow.

Sampling

The residential impact evaluation used a random sample of 50 projects. For the commercial impact evaluation, the selection process used both purposive and proportional sampling of 22 projects.

The purposive sampling selected the largest saving projects, resulting in five projects. Because these projects were sampled with certainty (100% of eligible highest saving measures were sampled), the results were not extrapolated to the total population. These measures are referred to as census measures.

The proportional sampling measures were randomly selected from the remaining population of offering measures. These measures are referred to as randomly sampled measures. The cumulative realization rate of the randomly sampled measures by offering was extrapolated to the remainder of the corresponding population.

Engineering Desk Review

The evaluation team reviewed all available project documentation in SPECTRUM on 40 residential and 12 commercial projects. The review included an assessment of the savings calculations and methodology applied by the implementer. The evaluation team used the Focus on Energy TRM and associated work papers to determine methodology and data in nearly all cases.

Verification Site Visits

The evaluation team conducted on-site verification site visits on 10 residential projects and 10 commercial projects, which involved an engineering desk review in addition to the site visit. The team verified the type and quantity of equipment installed as well as project characteristics such as the tilt, azimuth, orientation, and shading. The site contact was interviewed on the performance of the equipment. The team used the verified input parameters for the TRM calculations.

Results

Table 39 shows the CY 2021 solar PV energy and demand realization rates by sector. The evaluation team found a consistent use of the methodology and deemed values from the 2020 TRM for all but one residential project,[29] resulting in a 98% realization rate.

Table 39. CY 2021 Solar PV Realization Rates by Savings Type

Sector	kWh	kW
Residential	98%	98%
Commercial	100%	100%

Table 40 shows the *ex ante* and *ex post* verified savings for the residential and commercial Renewable Energy Offering by sector and overall.

Table 40. CY 2021 Renewable Energy *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
Renewable Energy, Residential						
First-Year Gross Savings	20,376,171	6,875	-	20,111,281	6,744	-
Lifecycle Gross Savings	509,405,279	6,875	-	502,782,023	6,744	-
Renewable Energy, Commercial						
First-Year Gross Savings	15,073,048	4,972	-	15,073,048	4,972	-
Lifecycle Gross Savings	376,826,027	4,972	-	376,826,207	4,972	-
Total Renewable Energy						
First-Year Gross Savings	35,449,219	11,847	-	35,184,329	11,717	-
Lifecycle Gross Savings	886,231,306	11,847	-	879,608,230	11,717	-

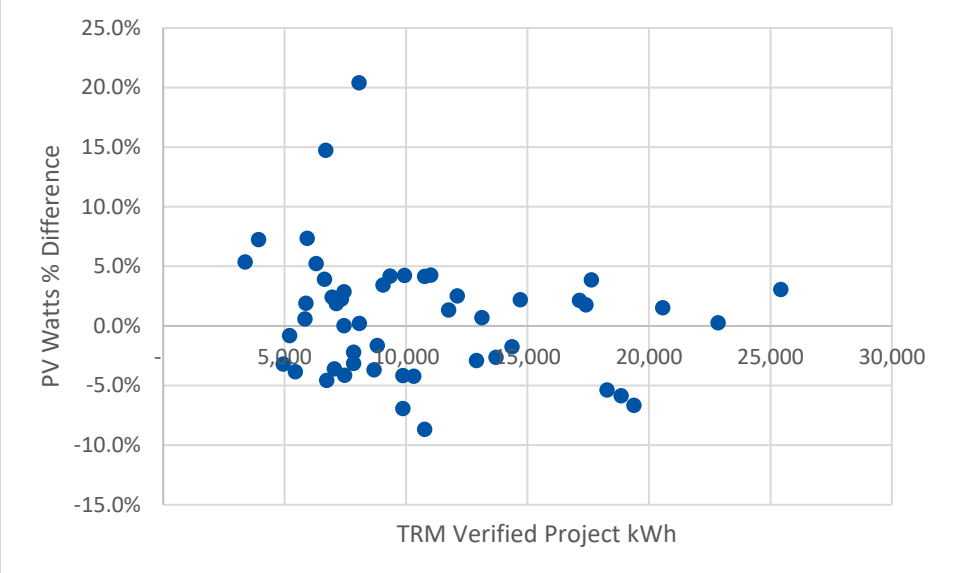
[29] Half of this project's savings were disallowed because a portion of the panels were facing north.

TRM and PVWatts Comparison

Although the TRM is the official methodology to determine impacts, it is based on PVWatts calculations that are "a general representation of typical PV systems installed in Wisconsin." As such, the evaluation team would expect some variance for individual projects but low overall variance for the population.

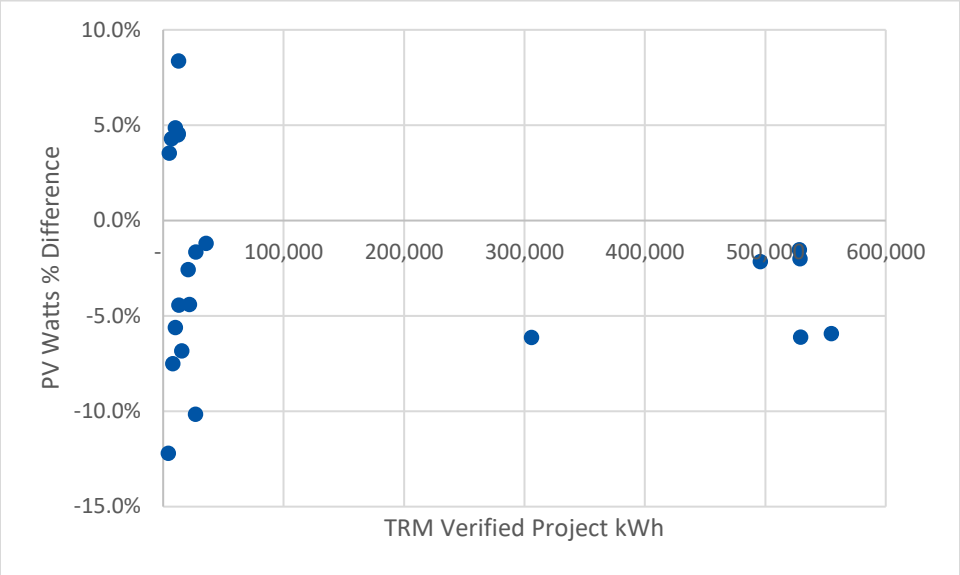
In addition to the TRM savings review, the evaluation team performed an energy production calculation using PVWatts for each of the 72 sampled projects. For the 50 residential projects, the comparison of TRM derived savings to those found using PVWatts resulted in a 100.3% overall realization rate, indicating the PVWatts calculation was just slightly higher on average. This is supported by the distribution shown in Figure 29, with data points scattered with both positive and negative kWh production differences. This distribution is also consistent across project size.

Figure 29. CY 2021 Residential Solar PV System Output Percentage Difference PVWatts vs. TRM



The findings for the commercial projects were slightly different, with a 96.3% overall average realization rate, indicating that production calculated in PVWatts was around 4% less than production calculated from the TRM. Figure 30 supports this finding with a greater number of projects occurring in the negative percentage difference. Also, notably, it appears that the larger the project, the more likely for the TRM to overstate production savings, with the only positive differences occurring on smaller projects under 15,000 kWh.

Figure 30. CY 2021 Commercial Solar PV System Output Percentage Difference PVWatts vs. TRM



Verified Net Savings Results for Trade Ally Solutions

The evaluation team used a variety of NTG analyses to calculate measure-level NTG ratios for all offerings in Trade Ally Solutions. The team selected the NTG approach based on the project type and the data available for measures in the offering, as shown in Table 41. These approaches are further detailed in the following sections.

Table 41. CY 2021 Trade Ally Solutions NTG Approaches

Offering	NTG Approach
Heating and Cooling, Tier 1	CY 2020 standard market practice analysis Self-report responses from CY 2020 participant surveys
Heating and Cooling, Tier 2	Assumed 100% NTG
Insulation and Air Sealing, Tier 1 and Tier 2	CY 2020 billing analysis
Renewable Energy, Residential	Self-report from CY 2021 participant surveys
Renewable Energy, Commercial	Self-report from CY 2021 participant surveys

The evaluation team calculated an overall lifecycle NTG estimate of 69% for CY 2021. Table 42 shows the weighted average NTG ratio by offering.

Table 42. CY 2021 Trade Ally Solutions First-Year Net Savings and NTG

Offering	Total First-Year Verified Gross Savings (MMBtu)	Total First-Year Net Savings (MMBtu)	NTG Ratio
Heating and Cooling, Tier 1	151,811	114,613	**75%**
Heating and Cooling, Tier 2	17,866	17,866	**100%**
Heating and Cooling, Total	**169,677**	**132,479**	**78%**
Insulation and Air Sealing, Tier 1	39,485	38,147	**97%**
Insulation and Air Sealing, Tier 2	6,671	5,522	**83%**
Insulation and Air Sealing, Total	**46,156**	**43,670**	**95%**
Renewable Energy, Residential	68,620	28,820	**42%**
Renewable Energy, Commercial	51,429	31,972	**62%**
Renewable Energy, Total	**120,049**	**60,793**	**51%**
Total Trade Ally Solutions	**335,882**	**236,941**	**71%**

Heating and Cooling Offering

In CY 2020, the evaluation team analyzed 2019 market and home assessment data (using a standard market practice, or SMP, analysis) to calculate NTG ratios for furnaces and air conditioners. The team also administered a participant survey to solicit self-response information that informed freeridership and spillover estimates for all other measures, such as boilers, heat pumps, and smart thermostats, in the Heating and Cooling offering. The team carried forward the results of the CY 2020 SMP analysis to inform the market-based baseline efficiency ratings used to calculate net verified energy and demand savings for air conditioners and natural gas furnaces.[30]

Natural Gas Furnaces

Table 43 lists the average of actual AFUE values, market savings (therms), and market-based freeridership scores for natural gas furnaces rebated through the offering. Efficient AFUE values are informed by actual installed furnaces tracked in SPECTRUM, while market baseline AFUE values are informed by the CY 2020 SMP analysis.

[30] For more information about the CY 2020 SMP analysis, see the Trade Ally Solutions chapter in the CY 2020 annual report. Cadmus. May 21, 2021. *Focus on Energy Calendar Year 2020 Evaluation Report. Volume II Program Evaluations.* Prepared for Public Service Commission of Wisconsin. https://www.focusonenergy.com/sites/default/files/inline-files/Evaluation_Report-2020-Volume_II.pdf

Table 43. CY 2021 Natural Gas Furnace Therm Savings and Market-Based Freeridership

Measure Name	MMID	Efficient AFUE [a]	Actual Installed		Market		Market-Based Freeridership
			Baseline AFUE [b]	therm savings	Baseline AFUE [c]	therm savings	
MF NG Furnace, Multistage+, 95% AFUE	4950	95.7	80.0	166.9	86.7	88.8	**47%**
MF NG Furnace, Multistage+, 96% AFUE	4951	96.1	80.0	129.3	86.7	69.9	**46%**
MF NG Furnace, Multistage+, 97% AFUE	4952	97.2	80.0	165.4	86.7	93.6	**43%**
MF NG Furnace, Multistage+, 98%+ AFUE	4953	97.8	80.0	173.5	86.7	100.2	**42%**
MF NG Furnace, Single-stage, 95% AFUE	4958	95.8	80.0	137.2	86.7	73.1	**47%**
MF NG Furnace, Single-stage, 96% AFUE	4959	96.2	80.0	114.2	86.7	62.1	**46%**
NG Furnace, Multistage+, 95% AFUE	4962	95.2	92.8	18.3	93.3	14.2	**23%**
NG Furnace, Multistage+, 96% AFUE	4963	96.1	92.8	28.9	93.3	24.2	**16%**
NG Furnace, Multistage+, 97% AFUE	4964	97.2	92.8	41.6	93.3	36.4	**13%**
NG Furnace, Multistage+, 98%+ AFUE	4965	97.6	92.8	42.1	93.3	37.3	**11%**
NG Furnace, Single-stage, 95% AFUE	4970	95.4	92.8	21.1	93.3	16.7	**21%**
NG Furnace, Single-stage, 96% AFUE	4971	96.2	92.8	27.4	93.3	23.1	**16%**

[a] Efficient AFUE derived from actual installed furnaces tracked in SPECTRUM; used as the efficient case to calculate verified gross and net savings.

[b] Baseline AFUE deemed by the TRM; used as the base case to calculate verified gross savings.

[c] Market baseline AFUE determined using CY 2020 SMP methodology; used as the base case to calculate verified net savings.

Air Conditioners

Table 44 lists the average of actual SEER values, market savings (kWh), and market-based freeridership scores for air conditioners rebated through the offering. Efficient SEER values are informed by actual installed furnaces tracked in SPECTRUM, while market baseline SEER values are informed by the CY 2020 SMP analysis.

Table 44. CY 2021 Air Conditioner kWh Savings and Market-Based Freeridership

Measure Name	MMID	Efficient SEER [a]	Actual Installed		Market		Market-Based Freeridership
			Baseline SEER [b]	kWh Savings	Baseline SEER [c]	kWh Savings	
A/C 16+ SEER	4974	16.8	13.0	217.2	13.6	175.1	**19%**

[a] Efficient SEER derived from actual installed air conditioners tracked in SPECTRUM; used as the efficient case to calculate verified gross and net savings.

[b] Baseline SEER deemed by the TRM; used as the base case to calculate verified gross savings.

[c] Market baseline SEER determined using SMP methodology; used as the base case to calculate verified net savings.

Renewable Energy Offering Net-to-Gross

The evaluation team conducted the CY 2021 participant survey to assess net savings for the Renewable Energy Offering for the residential and commercial sector. The survey's self-report NTG battery included questions that allowed the team to calculate freeridership (measures that would have been purchased without the offering's influence) and spillover (offering-induced energy-saving actions).

To calculate measures' final NTG ratios, the evaluation team then combined self-reported freeridership and spillover results using the following equation. Appendix G. Net Savings Analysis in Volume III provides a complete review of the team's self-report NTG analysis and findings.

$$NTG = 1 - Freeridership + Participant\ Spillover$$

Table 45 shows the CY 2021 self-report freeridership and spillover results and final NTGs for each offering.

Table 45. CY 2021 Renewable Energy Freeridership and Spillover Results, Residential and Commercial

Sector	Freeridership	Spillover	NTG (1 – Freeridership + Spillover)
Residential	58%	0%	42%
Commercial	38%	0%	62%

Process Evaluation

The CY 2021 process evaluation focused on how participants in the Renewable Energy Offering learned about it, motivations that influenced their participation, and their overall experience. The evaluation also investigated how Renewable Energy trade allies interacted with the offering and their overall level of satisfaction with the it and its components. Heating and Cooling and Insulation and Air Sealing participants were not surveyed in CY 2021 because they were surveyed in CY 2020.

Solution Design and Delivery

The Trade Ally Solutions encourage customers to save energy and improve home comfort by offering incentives to reduce the upfront cost of efficient home upgrades and the installation of efficient heating and cooling equipment or solar PV systems. Residential customers of participating Focus on Energy utilities are eligible to participate as well as business customers who install a solar PV system. Requirements for each offering differ depending on the customer type.

The Trade Ally Solutions provide incentives through three offerings (Insulation and Air Sealing, Heating and Cooling, and Renewable Energy) that target unique home improvement markets. These offerings are delivered primarily through certified trade allies who work with customers to complete improvements and apply for incentives. As a result, much of the outreach is targeted directly at the trade allies to encourage participation. Descriptions for the offerings are detailed in the next sections.

Insulation and Air Sealing

The Insulation and Air Sealing offering provides incentives for installing efficient building shell measures. The offering is available to single-family and multifamily customers through two paths:

- **Trade Ally Installed.** Customers can hire a trade ally contractor (found on the Focus on Energy website) to conduct an energy assessment and identify areas of improvement. Following the home energy assessment, customers choose which insulation and air sealing improvements to make and work with a trade ally to complete the project and apply for incentives. Customers

can also opt to forego the assessment and air sealing incentive and still receive an incentive for having insulation installed by a trade ally contractor. Customers wishing to complete ENERGY STAR-qualified air sealing must complete an energy assessment to receive the incentive.

- **Do-It-Yourself (DIY).** Customers can self-install attic insulation and air sealing to receive a $200 cashback incentive. Both attic insulation and air sealing must be installed according to Focus on Energy's DIY Guide to Insulation and Air Sealing. In addition, at least 600 square feet of attic area must be improved to an insulation level of R42 or greater. This incentive is available only to one-, two-, or three-unit buildings.

The Insulation and Air Sealing Offering provides two incentive tiers, Tier 1 (standard tier) and Tier 2 (income-qualified tier). Customers qualify for Tier 2 incentives if their household income is at or below 80% of the state median income by household size. Customers who live in single-family homes or own multifamily buildings with three or fewer units under one roof are eligible for a flat incentive offered for each measure. Customers who own multifamily dwellings of four or more units under a single roof are eligible for incentives based on the square footage of spaces.

Focus on Energy updated insulation and air sealing incentives in April 2021. Table 46 shows measures and tiered incentives for single-family and multifamily participants in buildings with three or fewer units, before and after April 2021.

Table 46. Single-Family and Multifamily (three or fewer units)
Insulation and Air Sealing Measures and Incentive

Measure	January 1 - March 31, 2021		April 1 - December 2021	
	Tier 1 Incentive	Tier 2 Incentive	Tier 1 Incentive	Tier 2 Incentive
ENERGY STAR-Qualified Air Sealing	$500	$800	$450	$750
Attic Insulation	$400	$500	$350	$450
Foundation Insulation	$100	$150	$100	$150
Wall Insulation	$300	$300	$300	$300
Duct Sealing and Insulation	$50	$50	$50	$50
DIY Attic Insulation and Air Sealing	$200	$200	$200	$200

Table 47 shows measures and incentives for customers who own multifamily dwellings with four or more units under one roof, before April 2021.

Table 47. Multifamily (four or more units)
Insulation and Air Sealing Measures and Incentives before April 1, 2021

Measure	January 1 - March 31, 2021, Incentive
Air Sealing	$0.20 per sq. ft. of conditioned space
Attic Insulation, Existing ≤ R-11	$0.50 per sq. ft. of attic space
Attic Insulation, Existing R-12 to R-19	$0.20 per sq. ft. of attic space
Wall Insulation	$0.80 per sq. ft. of wall area

Effective as of April 1, 2021, Focus on Energy combined multifamily incentives for air sealing and attic insulation and discontinued the wall insulation incentive. Table 48 shows measures and incentives for customers who own multifamily dwellings with four or more units under one roof, starting April 1, 2021.

Table 48. Multifamily (four or more units)
Insulation and Air Sealing Measures and Incentives after April 1, 2021

Measure	April 1 – December 2021 Incentive
Air Sealing and Attic Insulation, Existing ≤ R-11	$0.70 per sq. ft. of attic space
Air Sealing and Attic Insulation, Existing R-12 to R-19	$0.40 per sq. ft. of attic space
Air Sealing and Attic Insulation, Existing R-20 to R-38	$0.25 per sq. ft. of attic space

Heating and Cooling

The Heating and Cooling Offering provides incentives to residential customers looking to upgrade their HVAC equipment. Participating customers must live in a single-family dwelling or multifamily dwelling with three or fewer units under a single roof. Multifamily dwellings of four or more units under a single roof are also eligible if the heating or cooling equipment is for a single unit. Eligible equipment includes furnaces, dual fuel heat pumps, air source heat pumps, boilers, geothermal or ground source heat pumps, and smart thermostats. Customers work with trade allies to identify equipment eligible through the offering and apply for an incentive.

The Heating and Cooling Offering provides two incentive tiers, like the Insulation and Air Sealing Offering. Tier 2 participation has the same eligibility requirements as those in the Insulation and Air Sealing Offering. Table 49 shows incentives from January 1 to April 14, 2021, by tier type for the Heating and Cooling Offering.

Table 49. Heating and Cooling Measures and Incentives

Measure	January 1 - April 14, 2021	
	Tier 1 Incentive	Tier 2 Incentive
95% AFUE Single- or Multistage Natural Gas Furnace	$50	$350
96% AFUE Single- or Multistage Natural Gas Furnace	$100	$450
97%+ AFUE Multistage Natural Gas Furnace	$150	$550
Air Source Heat Pump 16+ SEER, 8.4+ HSPF (propane, oil, or electric furnace only; cannot be a mini-split or ductless system)	$300	$300
ECM Replacement (must replace existing PSC Motor)	$25	$25
95%+ AFUE Natural Gas Home Heating Boiler	$400	$550
Indirect Water Heater Installed at the same time as a qualifying boiler	$100	$150
95%+ AFUE Natural Gas Combination Boiler	$500	$675
Smart Thermostat installed by a qualified HVAC contractor. For use with natural gas furnace, natural gas boiler, or air source heat pump only.	$50	$50
Single Package Vertical Unit, ≥ 90%+ Thermal Efficiency, Natural Gas, ≥ 10.0 EER Cooling	$150	$150
Single Package Vertical Unit, ≥ 90%+ Thermal Efficiency, Natural Gas	$100	$100
Packaged Terminal Heat Pump < 8,000 BTUh, ≥ 10.7 EER and ≥ 3.1 COP	$100	$100
Packaged Terminal Heat Pump 8,000-9,999 BTUh, ≥ 10.4 EER and ≥ 3.0 COP	$100	$100
Packaged Terminal Heat Pump 10,000-12,999 BTUh, ≥ 9.9 EER and ≥ 2.9 COP	$100	$100
Packaged Terminal Heat Pump ≥ 13,000 BTUh, ≥ 9.3 EER and ≥ 2.9 COP	$100	$100
Certified Geothermal or Ground Source Heat Pump	$750	$750

Effective as of April 15, 2021, Focus on Energy added dual-fuel heat pump incentives to the offering. Table 50 shows measures and incentives for customers by tier type for the Heating and Cooling Offering, starting April 15, 2021.

Table 50. Heating and Cooling Measures and Incentives

Measure	April 15 - December, 2021	
	Tier 1 Incentive	Tier 2 Incentive
95% AFUE Single- or Multistage Natural Gas Furnace with ECM[a]	$50	$350
96% AFUE Single- or Multistage Natural Gas Furnace with ECM[a]	$100	$450
97%+ AFUE Multistage Natural Gas Furnace with ECM[a]	$150	$550
Dual-Fuel Heat Pump (Air Source Heat Pump with new or existing Propane or Oil Furnace) Ducted Heat Pump 15+ SEER, 8.5+ HSPF[a]	$300	$300
Dual-Fuel Heat Pump (Air Source Heat Pump with new or existing Natural Gas Furnace) Ducted Heat Pump 15+ SEER, 8.5+ HSPF[a]	$1,000	$1,000
ECM Replacement (must replace existing PSC Motor)	$25	$25
95%+ AFUE Natural Gas Home Heating Boiler	$400	$550
Indirect Water Heater Installed at the same time as a qualifying boiler	$100	$150
95%+ AFUE Natural Gas Combination Boiler	$500	$675
Smart Thermostat installed by a qualified HVAC contractor. For use with natural gas furnace, natural gas boiler, or air source heat pump only.	$50	$50
Single Package Vertical Unit, ≥ 90%+ Thermal Efficiency, Natural Gas, ≥ 10.0 EER Cooling	$150	$150
Single Package Vertical Unit, ≥ 90%+ Thermal Efficiency, Natural Gas	$100	$100
Packaged Terminal Heat Pump < 8,000 BTUh, ≥ 10.7 EER and ≥ 3.1 COP	$100	$100
Packaged Terminal Heat Pump 8,000-9,999 BTUh, ≥ 10.4 EER and ≥ 3.0 COP	$100	$100
Packaged Terminal Heat Pump 10,000-12,999 BTUh, ≥ 9.9 EER and ≥ 2.9 COP	$100	$100
Packaged Terminal Heat Pump ≥ 13,000 BTUh, ≥ 9.3 EER and ≥ 2.9 COP	$100	$100
Certified Geothermal or Ground Source Heat Pump	$750	$750

[a] Measures that underwent a change or addition to the incentive after April 15, 2021.

Renewable Energy

The Renewable Energy Offering provides incentives to residential customers living in a single-family home and to businesses that install a solar PV system. Customers work with trade allies to verify that their system meets eligibility requirements and to reserve an incentive. Customers can apply to receive their reserved incentive after their solar electric system installation is complete. Residential rural customers who live in eligible zip codes can receive a bonus of up to $500 for installing a qualified system. Business customers classified as agricultural producers may also qualify for an incentive match of up to $10,000.

Focus on Energy increased incentives in October 2021 for nonprofits and other groups that did not qualify for the federal tax credit. These incentive increases were launched as part of the Special Sector Solar pilot, which is discussed in further detail in the *Pilots* section below.

Table 51 and Table 52 show residential and commercial Renewable Energy incentives for CY 2021.

Table 51. Renewable Energy Incentives, Residential

Incentive	Rural Residential Bonus[a]
$500 per system	$500

[a] Rural residential customers living in eligible zip codes can receive a $500 bonus for installing a qualified system.

Table 52. Renewable Energy Incentives, Commercial

System Size in kW (DC)	Incentive	Max Incentive
Up to 5 kW	$200 per kW (DC)	$1,000
5-10 kW	$1,000 + $150 per kW above 5 kW	$1,750
10-100 kW	$1,750 + $125 per kW above 10 kW	$13,000
100-300 kW	$13,000 + $100 per kW above 100 kW	$33,000
300-500 kW[a]	$33,000 + $85 per kW above 300 kW	$50,000

[a] Solar PV systems 500 kW and above were capped at the maximum incentive of $50,000.

Pilots

In CY 2021, Focus on Energy ran several pilots, including Healthy Homes, Special Sector Solar, and Multifamily Strategic Energy Management.

The Healthy Homes pilot launched in CY 2020 and partners the Focus on Energy Insulation and Air Sealing offering with hospitals to target homes of juvenile patients with asthma and allergies. The pilot offers traditional insulation and air sealing packages with an added focus on indoor air quality. Measures in this package include fans, dehumidifiers, air purifiers, additional filtration for forced air systems, and loggers to track indoor air quality over time. The program implementer and community organizations track progress through asthma control tests and look at results three, six, and 12 months after the improvements are made. The pilot implementer said it had been difficult to find participants thus far because of the requirements to participate and general difficulty of working with medical professionals during the COVID-19 pandemic.

The Special Sector Solar pilot launched in the fourth quarter of CY 2021 as a branch of the Renewable Energy Offering, rather than as a separate offering, with higher incentives for qualified participants. This offering targets sectors such as nonprofits, schools, government, and Tribal Nations. The offering incentives help organizations that do not qualify for the solar investment tax credit by offsetting the cost of installing solar electric systems. Through this offering, special sector organizations who install qualifying equipment are eligible to receive up to $81,000 in incentives. The implementer said it anticipates about 10% of Renewable Energy projects to qualify for the Special Sector Solar incentives in CY 2022.

The Multifamily Strategic Energy Management pilot focuses on entire commercial buildings with multifamily units. The pilot launched in November 2021 and recruited five participants of a target of seven. The implementer expected to begin full pilot implementation in January 2022, including meetings with building operator staff, and to report savings in CY 2022.

Process Evaluation Methodology

The process evaluation involved in-depth interviews with the administrator, the implementer, and trade allies participating in the Renewable Energy Offering as well as a phone survey with residential and business Renewable Energy participants. Table 53 summarizes the data sources that informed this process evaluation. Additional details about these activities and their findings can be found in the offering-specific discussions in Appendix M. Survey and Interview Instruments by Offering in Volume III.

Table 53. CY 2021 Data Collection Activities and Sample Sizes – Process Evaluation

Activity	Insulation and Air Sealing	Heating and Cooling	Renewable Energy, Residential	Renewable Energy, Commercial	Total
Stakeholder Interviews	2				**2**
Trade Ally Interviews	-- [a]	-- [a]	11		**11**
Participant Surveys	-- [b]	-- [b]	70	38	**108**
Satisfaction Surveys	1,418			0	**1,418**

[a] Insulation and Air Sealing and Heating and Cooling trade allies were not interviewed in CY 2021 because they were interviewed in CY 2019 as part of the previous evaluation.

[b] Insulation and Air Sealing and Heating and Cooling participants were not surveyed in CY 2021 because they were surveyed in CY 2020 as part of the previous evaluation.

Administrator and Implementer Interviews

The evaluation team interviewed the administrator and the implementer in July and August 2021 to learn how well the Trade Ally Solutions' offerings were working and to assess objectives, performance, and implementation challenges and resolutions. The team also asked them about their marketing, engagement with trade allies and customers, and impacts from the COVID-19 pandemic.

Trade Ally Interviews

In October and November 2021, the evaluation team conducted in-depth interviews with 11 trade allies, from a population of 67 trade allies who participated in the Renewable Energy Offering in CY 2021. The purpose of the interviews was to learn what aspects of the offering worked well for trade allies and to identify potential areas for improvement. The interviews focused on three specific areas of trade ally interaction with the offering—recruitment and satisfaction, marketing, and customer and trade ally Experience. Detailed findings are available in Appendix G. Net Savings Analysis in Volume III.

Participant Surveys

During fall 2021 and early 2022, the evaluation team contacted a random sample of CY 2021 residential Renewable Energy participants and the full population of CY 2021 business Renewable Energy participants to assess their participation experiences through phone surveys. The team collected 70 residential responses (n=873) and 38 business responses (n=65) from sampled participants with phone numbers in the tracking data. Survey interviewers asked about awareness of Focus on Energy, marketing, decision-making, and satisfaction, among other topics. Detailed findings are available in Appendix G. Net Savings Analysis in Volume III.

Ongoing Participant Satisfaction Surveys

Throughout CY 2021, the solution administrator emailed participants in the Trade Ally Solutions links to the web-based satisfaction surveys. The evaluation team supplemented these results by fielding paper surveys by mail during the first quarter of the year only.

There were two objectives for these satisfaction surveys:

- Understand customer satisfaction on an ongoing basis and respond to any changes in satisfaction before the end of the annual reporting schedule.
- Help to facilitate timely follow-up with customers to clarify and address service concerns.

Using contact information stored in SPECTRUM, the administrator ran web-based satisfaction surveys throughout the year to CY 2021 participants. In the first quarter of CY 2021, the team also mailed a paper survey to participants with no email address on file. Responses from both survey modes were combined to conduct the analysis. A total of 1,418 Trade Ally Solutions participants responded to the CY 2021 survey (1,187 online surveys and 231 paper surveys). The survey covered several topics including overall satisfaction, satisfaction with offering staff and trade allies, likelihood of recommending Focus on Energy, and other feedback.

Changes Due to COVID-19

In CY 2020, stakeholders reported many changes due to COVID-19, such as temporarily suspending field work, updating interaction procedures, and moving certain activities online. Many of these same changes carried over into CY 2021. Though in-person services had fully resumed at the time of the interview, the implementer said it still offered virtual site visits where it made sense.

Stakeholders said participation for all offerings remained high in CY 2021, possibly because customers continued to spend more time at home and gave more thought to making improvements. Stakeholders said this was especially true for solar PV projects through the Renewable Energy Offering.

The implementer also mentioned a disruption in the supply chain for cooling equipment at the time of the interview and said many smaller contractors had experienced delays in obtaining equipment because larger contractors were bulking up their inventories. However, because the air conditioner incentive was no longer offered, the implementer said the delays had not caused any issues with the offering.

These responses are indicative of the current state of operations at the time of the interview (July and August 2021) and may not be representative of the entire year as COVID-19 impacts changed frequently.

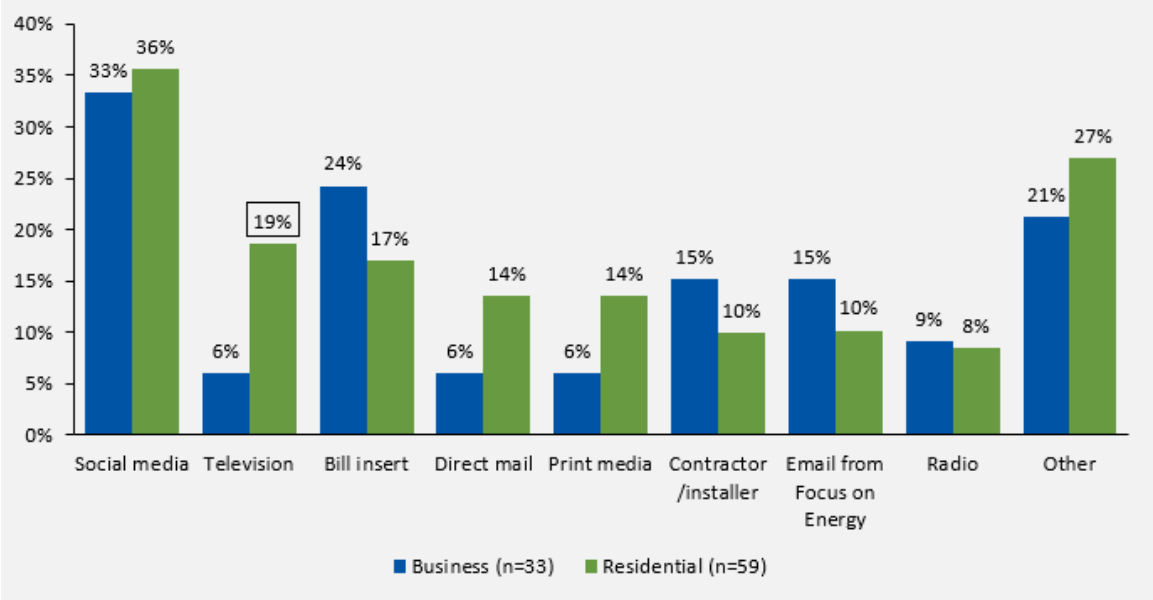
Marketing and Outreach

Trade Ally Solutions marketing and outreach focused on promoting the benefits of the offerings and sharing customer testimonials. The implementer reported an increased focus on comfort and the health benefits of improving indoor air quality. The implementer said marketing efforts that included a customer testimonial tended to perform better.

The evaluation team asked the 11 trade allies participating in the Renewable Energy Offering about specific marketing and promotion methods they have used with their customers. Most trade allies said they had acquired new customers through either word of mouth (eight respondents) or online advertising (six respondents). They also reported that the most common marketing messages they use to recruit customers for installation of solar PV systems were financial savings (five respondents) and environmental benefits (three respondents). Nine of the trade allies said they did not need or use any marketing materials provided by Focus on Energy.

In the CY 2021 participant survey, both business and residential customers said that installers, contractors, and trade allies were the most prevalent source of information for hearing about the Renewable Energy Offering (47%, n=107). In addition, both business and residential customers said they thought social media was the best way to inform the public about energy efficiency offerings (35%, n=92). Figure 31 shows the breakdown of responses by customer type. Examples of "other" ways to inform customers included billboard/outdoor ad, family/friends/word-of-mouth, and Focus on Energy or utility website.

Figure 31. Best Ways to Inform Customers about Energy Efficiency Offerings



Source: CY 2021 Renewable Energy Offering Participant Survey, Question QB8. "What do you think is the best way for Focus on Energy to inform the public about energy efficiency offerings?" (total n=92). Percentages sum to more than 100% because multiple responses were accepted. Boxes around percentages indicate a statistically significant difference from CY 2019 result at $p<0.05$ using a t-test.

Survey respondents were also asked if they were aware of and had participated in other Focus on Energy offerings. Over half of the respondents from the business and residential groups (64%, n=107) reported being aware of other offerings. These respondents most frequently reported awareness of the Energy Efficient Packs Offering (65%), followed by the Insulation and Air Sealing Offering (28%, n=68). Among the respondents who were aware of other offerings, most said they had also participated in another offering (81%, n=67). Similar to those who were aware of other offerings, respondents most

frequently said they participated in the Energy Efficiency Packs Offering (65%) and the Insulation and Air Sealing Offering (31%, n=52).

Incentives

Ten of the 11 trade allies said they had not noticed any effect in customer sales or demand due to changes in offering incentives. In addition, just over half of trade allies (six respondents) said they believed the incentive had some effect in motivating customers to participate, while the other five respondents said it had little effect.

Respondents were asked about the incentives they received and how much of an influence they made in their decision to purchase a solar PV system. Most respondents (72%) said they received the federal tax credit along with the Focus on Energy offering rebate (n=108). Of the respondents who received multiple incentives, 94% said that receiving multiple incentives was either *very important* or *somewhat important* in their decision to install their solar PV system (n=89). In addition, 74% said they would not have completed the same solar PV project if they had not received multiple incentives (n=82).

Trade Ally Experience and Satisfaction

When asked a series of questions relating to their participation in the offering, nine of the 11 trade allies said the offering had a positive impact on their businesses overall. Specifically, they said Focus on Energy did an *excellent* or *good* job on certain components of the offering, such as notifying trade allies about operational and incentive changes (nine respondents), making paperwork easy to submit (nine respondents), and providing the right amount of support (seven respondents).

Trade allies also reported on common barriers to participation. Beyond cost, the most common barriers to participation were the length of payback and return on investment (five respondents) and location challenges for solar PV systems (four respondents).

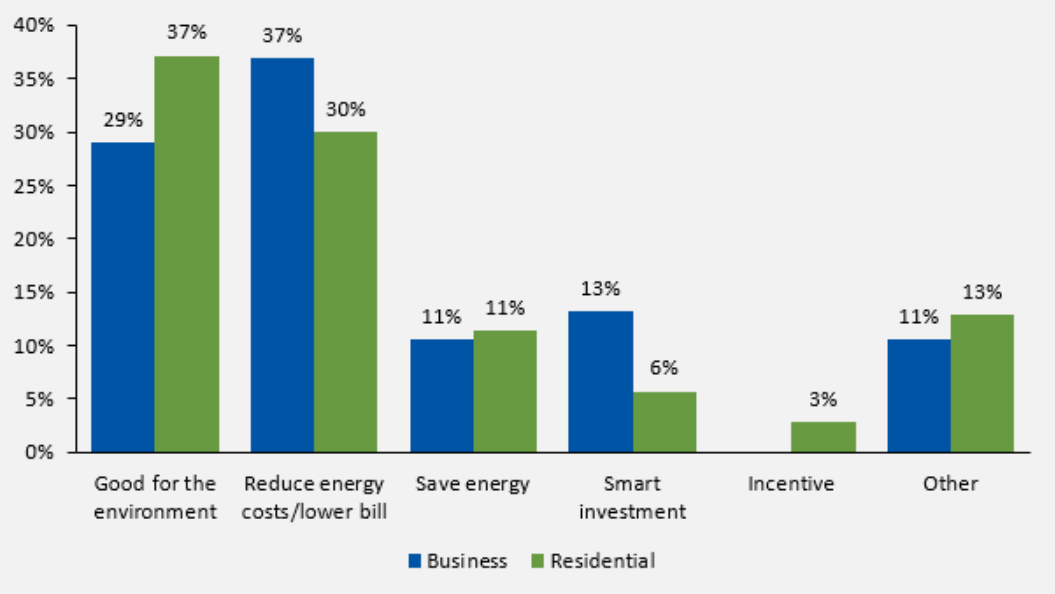
Nine trade allies reported updating business and customer interaction procedures due to COVID-19, which included incorporating more virtual offerings and interactions and updating safety protocols.

In addition, nine trade allies said their company is currently able to handle the level of customer demand they are facing. Trade allies who said they were actively looking to increase their workforce said they look for candidates who are already trained in the solar field but are willing to train new hires.

Participant Motivation and Experience

In the Renewable Energy participant survey, both business and residential customers identified environmental benefits and reducing energy costs/lowering bills as their top motivations for purchasing their new solar PV systems, though results differed slightly between the groups. Thirty-seven percent of business respondents said their top motivation was reducing energy costs, while 29% said their top motivation was environmental benefits (n=38). Inversely, 37% of residential respondents said their top motivation was environmental benefits, while 30% said their top motivation was to reduce energy costs (n=70). Figure 32 shows the breakdown of responses by customer type.

Figure 32. Motivation to Install Solar PV System

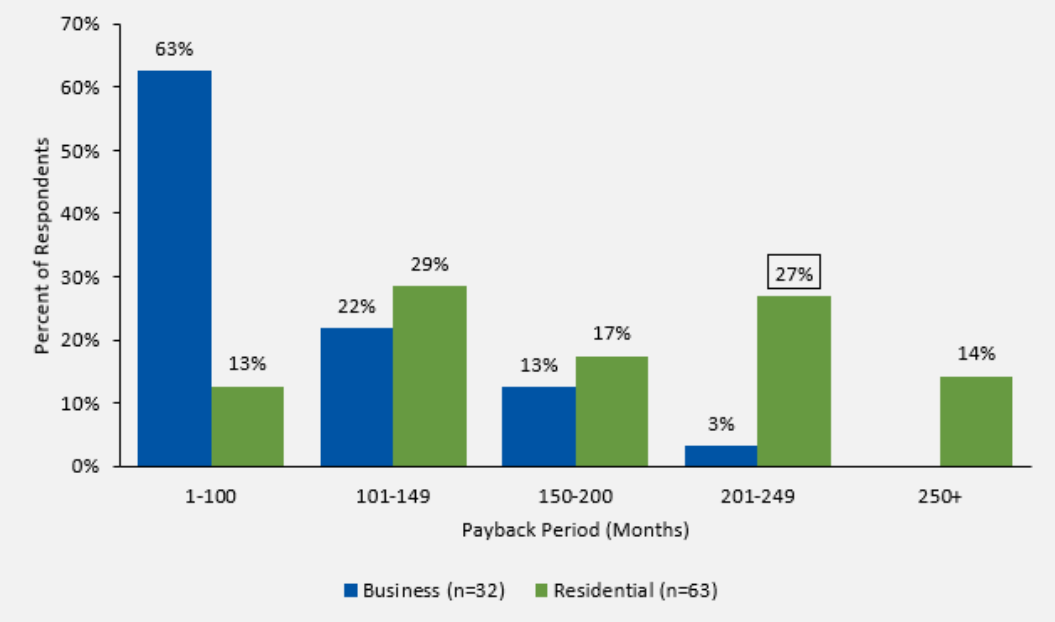


Source: CY 2021 Renewable Energy Offering Participant Survey, Question QB2. "What factor was the most important motivation for you to purchase the new solar PV system?" (total n=108).

Respondents were also asked about the length and importance of the payback period for their solar PV systems. As shown in Figure 33, business respondents tended to have shorter payback periods than residential respondents. Business respondents were also more likely to put importance on the length of their payback period when deciding to install their solar PV system. Among business respondents, 82% (n=38) said the length of the payback period for their system was *very important* or *somewhat important* in their decision compared to 66% (n=70) of residential respondents who said the same.

The survey also asked respondents if they had experienced any unscheduled maintenance or downtime on their solar PV system since it was installed. Eighty-nine percent of business respondents (n=38) and 84% of residential respondents (n=70) said they had not experienced any downtime. Respondents who did experience problems reported issues with system components, such as the PV modules, array wiring, microinverter, DC optimizer, string inverter, monitoring system, and other parts. Three of the four business respondents who experienced this downtime said their system was back up and running at the time of the survey, while all 11 residential respondents who reported downtime said their systems were back to operating normally.

Figure 33. Length of Payback Period (in Months)



Source: CY 2021 Renewable Energy Offering Participant Survey, Question QE6. "How long was the payback period for your solar PV system? – Length of payback period in months" (total n=95).
Boxes around percentages indicate a statistically significant difference at p<0.05 using a t-test.

Customer Satisfaction

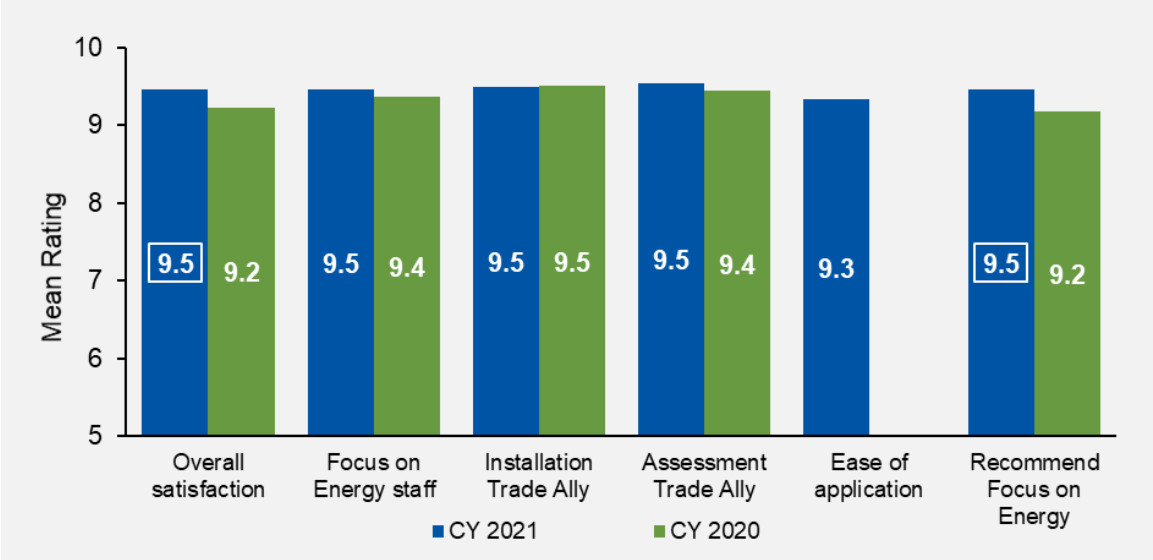
Throughout CY 2021, the solution administrator invited Trade Ally Solutions participants to take web-based satisfaction surveys. During the first quarter of CY 2021, the evaluation team also fielded a paper survey by mail to gather additional responses. Respondents answered questions related to satisfaction and likelihood on a scale of 0 to 10, where 10 indicates the highest degree of satisfaction or likelihood to recommend Focus on Energy and 0 the indicates the lowest degree of satisfaction[31]

Figure 34 shows that Trade Ally Solutions participants gave the offerings they participated in an average overall satisfaction rating of 9.5 in CY 2021, which was statistically higher than CY 2020 ratings for this solution (9.2) and the portfolio target (8.9).[32] Respondent ratings for likelihood to recommend Focus on Energy (9.5) also increased significantly from CY 2020 (9.2). Respondents gave high average satisfaction ratings of 9.5 for Focus on Energy staff and the trade allies who did the assessments and installations, consistent with ratings from CY 2020. CY 2021 respondents gave average ratings of 9.3 for the ease of applying for incentives (this question was not asked in previous years).

[31] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped or did not know answers to questions.

[32] The administrator's contract established a portfolio target of 8.9 to maintain or increase customer satisfaction.

Figure 34. Satisfaction and Likelihood Ratings for the Trade Ally Solutions

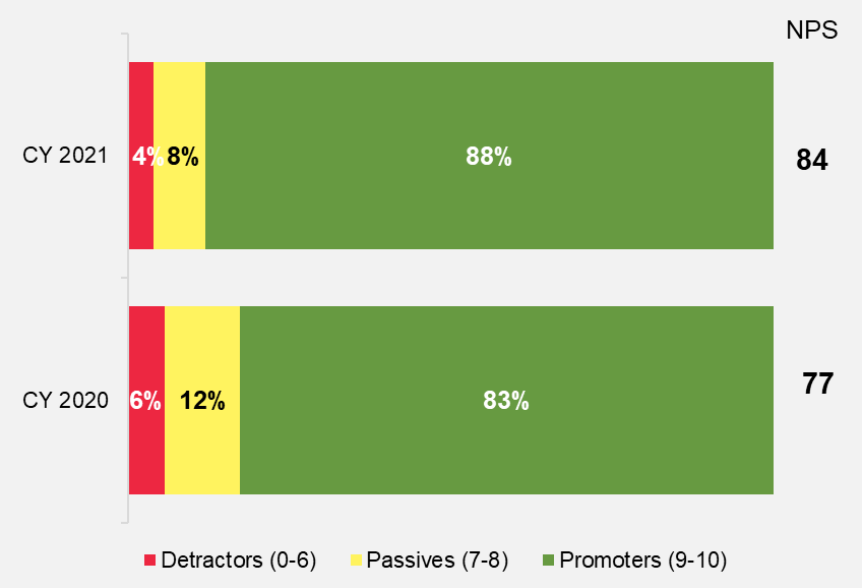


Source: Trade Ally Solutions Participant Satisfaction Survey Questions. "Overall, how satisfied are you with your most recent experience with Focus on Energy?" (CY 2021 n=1,409; CY 2020 n=1,344). "How satisfied are you with the Energy Advisor or Focus on Energy staff member who assisted you with your project?" (CY 2021 n=479; CY 2020 n=434). "How satisfied are you with the contractor that provided your home upgrades?" (CY 2021 n=1,260; CY 2020 n=1,163). "How satisfied are you with the contractor that completed your Home Assessment?" (CY 2021 n=900; CY 2020 n=797). "How satisfied are you with the ease of submitting your rebate application?" (CY 2021 n=1,193; this question was not asked in the CY 2020 survey). "How likely are you to recommend Focus on Energy to others?" (CY 2021 n=1,405; CY 2020 n=1,343).

Boxes around ratings indicate a statistically significant difference at $p<0.05$ using a t-test.

Using these survey data, the evaluation team calculated a NPS based on customers' likelihood to recommend Focus on Energy. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). The Trade Ally Solutions' NPS increased to +84 for CY 2021 from +77 for CY 2020 (Figure 35).

Figure 35. Net Promoter Scores for Trade Ally Solutions

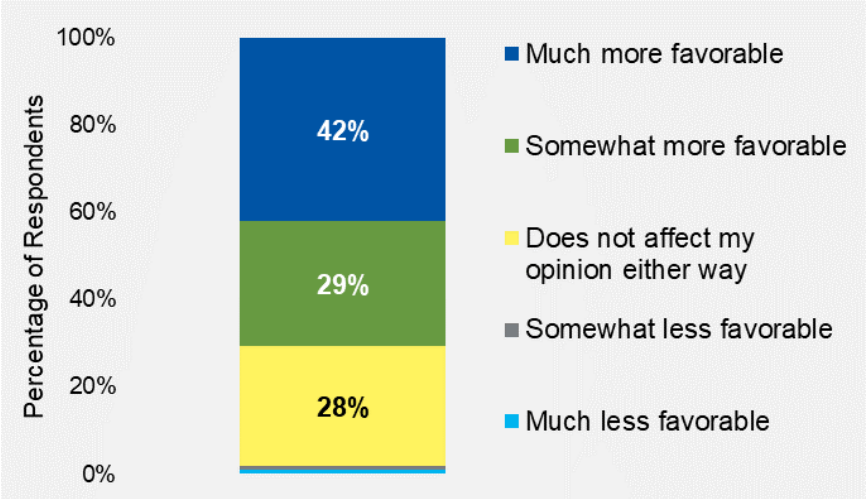


Source: Trade Ally Solutions Participant Satisfaction Survey Question. "How likely are you to recommend Focus on Energy to others?" (CY 2021 n=1,405; CY 2020 n=1,343).

Respondents were asked if they were aware that Trade Ally Solutions was offered in partnership with their local utility before receiving the satisfaction survey, and 59% (n=1,397) were aware in CY 2021, a significant increase from 53% in CY 2020.[33] Respondents were also asked if Focus on Energy offerings affected their opinion of their utilities. As Figure 36 shows, 71% said their opinion had become *much more favorable* or *somewhat more favorable,* while only 2% of participants said their opinion had become *much less favorable* or *somewhat less favorable*. These results were very similar to CY 2020 (69% more favorable, 2% less favorable).

[33] The difference between years is statistically significant at $p<0.05$ using a t-test.

Figure 36. Focus on Energy Offerings Impact on Trade Ally Solutions Participants' Opinion of Utilities



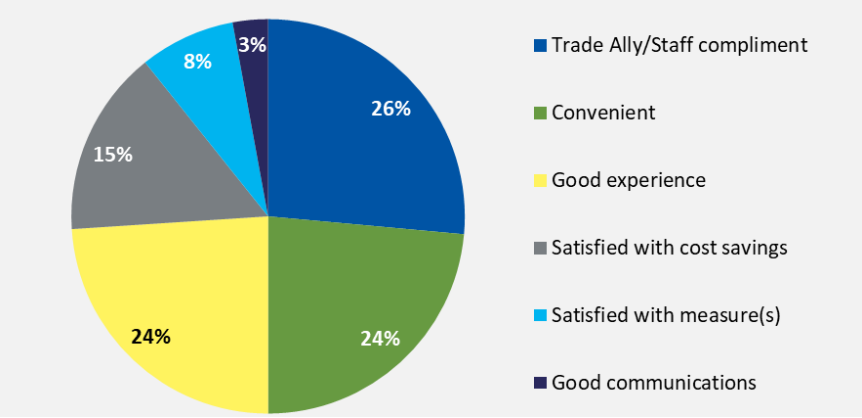
Source: Trade Ally Solutions Participant Satisfaction Survey Question. "How have these offerings affected your opinion of your energy utility, if at all?" (n=1,281). Note: Unlabeled segments represent 3% or less of respondents.

Participant Feedback and Suggestions for Improvement

During the customer satisfaction surveys, the evaluation team asked participants if they had any comments or suggestions for improving the solution. Of the 1,418 participants who responded to the survey, 20% provided open-ended feedback, which the team coded into a total of 357 mentions. Of these mentions, 242 were positive or complimentary comments (68%), and 115 were suggestions for improvement (32%).

The positive responses are shown in Figure 37, with most comments reflecting compliments for trade allies and Focus on Energy staff (26%), satisfaction with the ease and convenience of participation (24%), or a generally positive experience (24%). The largest difference from CY 2020 positive comments was an increase in mentions of convenience (24% up from 11%); this may relate to the resumption of in-person services following their suspension in CY 2020 during the COVID-19 pandemic.

Figure 37. Positive Comments about the Trade Ally Solutions

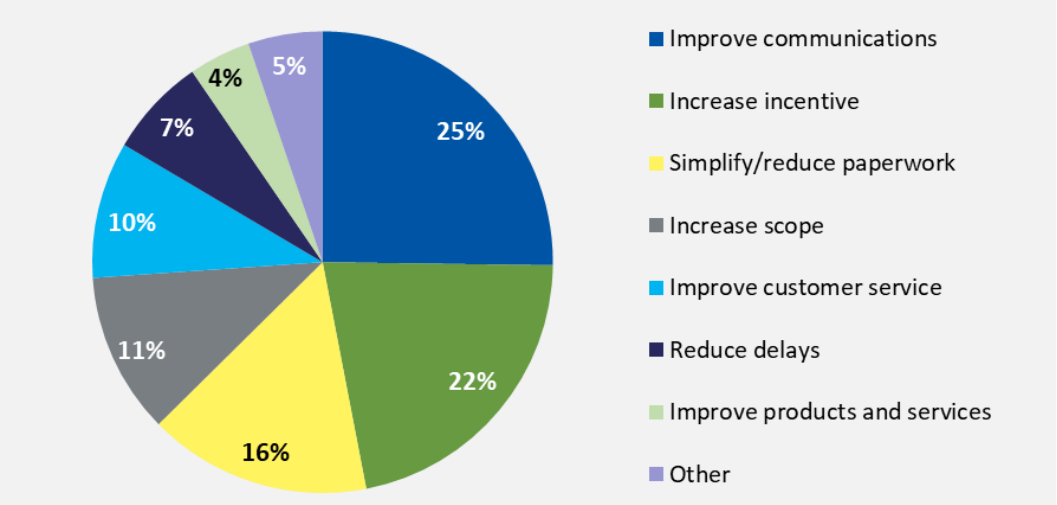


Source: Trade Ally Solutions Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement."
(Total positive mentions n=279)

Suggestions for improvement are shown in Figure 38. The most common suggestions were to improve communications (25%), increase incentives (22%), and simplify and reduce paperwork (16%). Far fewer suggestions in CY 2021 related to reducing delays (7%) compared to CY 2020, when 22% mentioned reducing delays, which corresponds to the increase in mentions of convenience and resumption of in-person services in CY 2021.

Suggestions about improving communications typically focused on follow-up to rebate applications, requests for more information about saving energy, and more promotion for Focus on Energy offerings. Some suggestions about increasing incentives related to customers who thought they should be eligible for higher Tier 2 incentives or that that all participants should receive the same incentive amounts. Most suggestions about simplifying and reducing paperwork indicated that these respondents filled out their own application forms, whereas many positive comments praising trade allies indicated that the contractor had filled out the forms.

Figure 38. Suggestions for Improving the Trade Ally Solutions

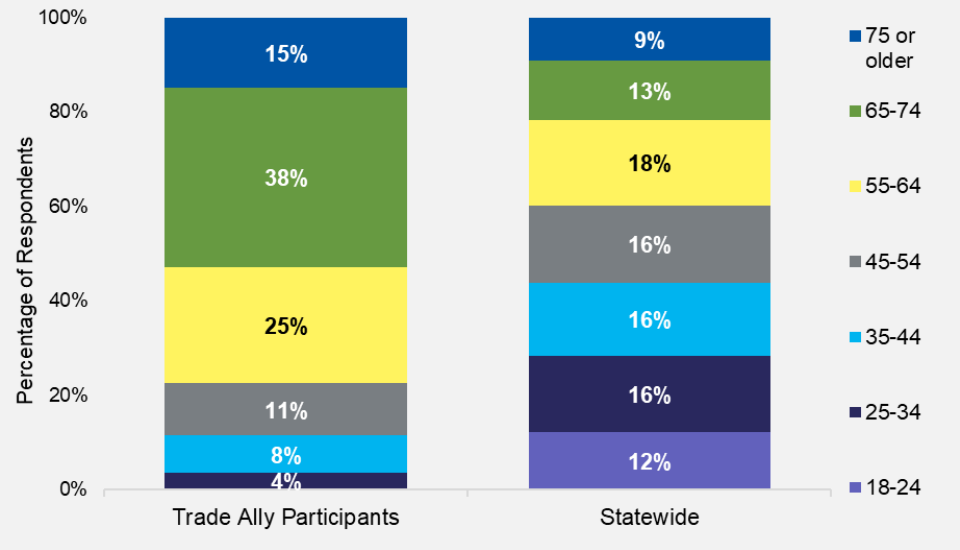


Source: Trade Ally Solutions Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement." (Total suggestions for improvement mentions n=115)

Demographics

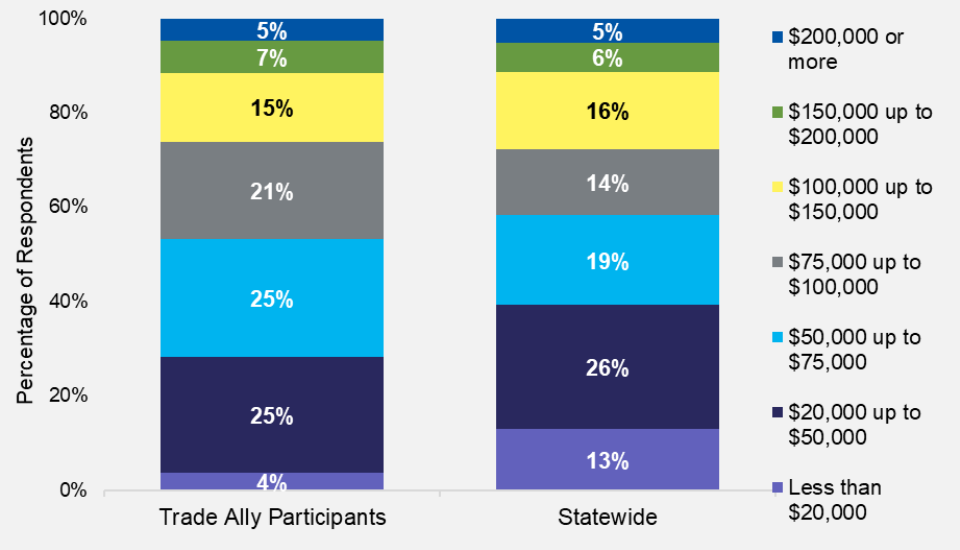
The customer satisfaction survey asked respondents their age (Figure 39) and income (Figure 40). The self-reported median age of Trade Ally Solutions participants was between 65 and 74, and only 23% were age 54 or younger, indicating participants tended to be older than the statewide average (60% age 54 or younger). Respondents' median reported household income between $50,000 and $75,000, with 26% earning more than $100,000, comparable to the statewide rate (28% with income over $100,000).

Figure 39. Trade Ally Solutions Participants' Age



Source: Trade Ally Solutions Participant Satisfaction Survey Question. "Which of the following categories best represents your age?" (n=1,362). U.S. Census 2020 ACS, Selected Social Characteristics in the United States.
Note: Unlabeled segments represent 3% or less of respondents.

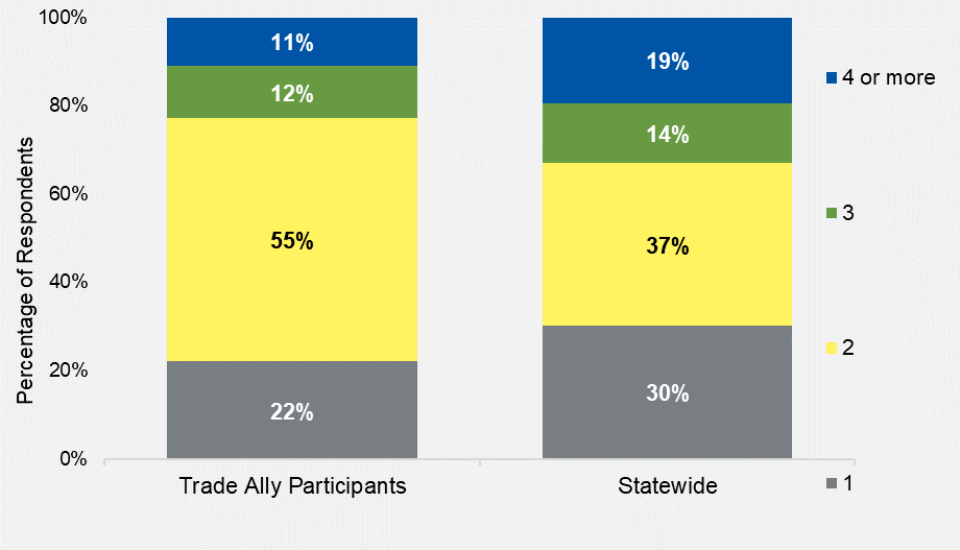
Figure 40. Trade Ally Solutions Participants' Income



Source: Trade Ally Solutions Participant Satisfaction Survey Question. "Which category best describes our total household income before taxes?" (n=1,008). U.S. Census 2020 ACS, Selected Social Characteristics in the United States.

Most respondents lived in two-person households (55%), which was higher than the statewide rate (37%), as shown in Figure 41.

Figure 41. Trade Ally Solutions Participants' Household Size



Source: Trade Ally Solutions Participant Satisfaction Survey Question. "Counting yourself, how many people live in your household on a full-time basis today? Please include everyone who lives in your home and exclude anyone just visiting or children who may be away at college or in the military." (n=1,347). U.S. Census 2020 ACS, Selected Social Characteristics in the United States.

Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of DSM offering. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix I. Cost Effectiveness and Emissions Methodology and Analysis in Volume III includes a description of the TRC test.

Table 54 lists the CY 2021 incentive costs for the Trade Ally Solution.

Table 54. CY 2021 Trade Ally Solution Incentive Costs

Offering	Incentive Costs
Heating and Cooling/Insulation and Air Sealing	$6,243,874
Residential Renewables	$1,377,576
Commercial Renewables	$1,895,278
Healthy Homes – Rural	$37,571
Total	**$9,554,299**

The evaluation team found that the CY 2021 Trade Ally Solution was cost-effective when including the T&D benefits (1.01), but not when excluding them (0.88). Table 55 lists the evaluated costs and benefits.

Table 55. Trade Ally Solution Costs and Benefits

Cost and Benefit Category	Total
Costs	
Administrative Costs	$572,733
Delivery Costs	$4,847,766
Incremental Measure Costs	$75,740,125
Total Non-Incentive Costs	**$81,160,623**
Electric Benefits (kWh)	$21,855,837
Electric Benefits (kW)	$24,233,947
T&D Benefits (kW)	$9,965,996
Gas Benefits	$15,250,617
Emissions Benefits	$10,339,549
Total TRC Benefits with T&D benefits	**$81,645,947**
Net TRC Benefits with T&D benefits	**$485,324**
TRC Benefit/Cost Ratio with T&D benefits	**1.01**

Outcomes and Recommendations

The evaluation team offers the following outcomes and recommendations based on the CY 2021 evaluation.

Outcome 1. Survey respondents recommended social media for raising awareness of Focus on Energy. Customers identified social media as the best way to inform them of offerings. The percentage of

business respondents who said social media is the best way to raise awareness increased from 7% in 2019 to 33% in 2021, while residential respondents increased from 17% in 2019 to 36% in 2021.

Recommendation 1. Continue to use social media to provide relevant updates. Information about program and incentive changes can be sent via social media channels to reach large audiences. Content regarding topics such as changes in policy, changes with the federal tax credit, or new pilot offerings can help inform customers and increase potential participation in the offerings. Providing information about other types of incentives on social media can also build awareness of how to make solar PV more affordable for customers and encourage greater participation.

Outcome 2. Most Renewable Energy trade allies indicated they do not need marketing materials from Focus on Energy, but they were interested in learning more about emerging topics. Most trade allies said they acquire new customers through word-of-mouth marketing or their own online advertising. Despite this, trade allies did indicate areas of emerging technology where they could use additional information or support. These topics included microgrid/solar plus storage, battery storage, and interconnection studies.

Recommendation 2. Consider developing educational materials for trade allies regarding emerging technologies planned for future inclusion in Focus on Energy offerings. Though Renewable Energy trade allies indicated they did not have a need for current marketing materials, they did want to learn more about emerging technologies and their associated opportunities.

Outcome 3. Participants whose trade allies helped fill out application forms reported a better experience. Most respondents who suggested simplifying and reducing paperwork indicated that they filled out their own application forms. In contrast, respondents submitting positive comments praising trade allies indicated that the contractor had filled out the forms for the customer.

Recommendation 3. Encourage contractors to continue to help customers fill out application forms as this seems to lead to higher satisfaction. In addition, developing resources such as an application checklist could be helpful to ensure all the needed information is included by whoever fills out the paperwork.

Residential New Construction Solution

The Residential New Construction offering is administered by APTIM and implemented by Willdan. Delivery of the offering is subcontracted to Performance Systems Development.

The Residential New Construction offering provides Wisconsin builders with technical training and support, as well as incentives, to construct homes that meet Focus on Energy's prescriptive performance and modeled energy performance requirements. Additional details about the offering are provided in the *Process Evaluation* section of this chapter.

Table 56 lists actual spending, savings, participation, and cost-effectiveness of the offering in CY 2021. The evaluation team is also conducting a market effects study of the offering and will calculate market effects at the end of the Focus on Energy quadrennium in CY 2022.

Table 56. CY 2021 Residential New Construction Offering Summary

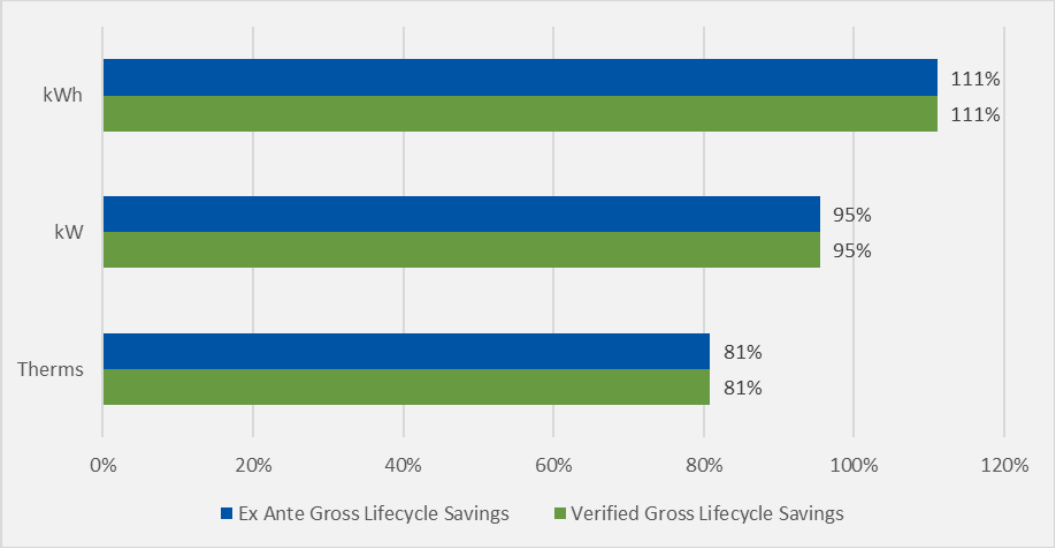
Item	Units	CY 2021
Incentive Spending	$	$1,742,908
Participation	Number of Participants	2,488
Verified Gross Lifecycle Savings	kWh	128,995,699
	kW	955
	Therms	14,589,788
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%
Annual NTG Ratio[a]	% (MMBtu)	4%
Net Annual Savings	kWh/year	0
	kW	0
	Therms/year	24,316
Net Lifecycle Savings	MMBtu	72,949
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	**0.50**

[a] Does not include market effects.

Achievement Against Goals

Figure 42 shows the percentage of gross lifecycle savings goals achieved by the Residential New Construction offering in CY 2021. This offering achieved 111% of its kWh goal, 95% of its kW goal, and 81% of is natural gas (therms) savings goal.

Figure 42. CY 2021 Residential New Construction Offering
Achievement of Gross Lifecycle Savings Goals



The 100% *ex ante* gross lifecycle savings reflects the program implementer's contract goals for CY 2021. Verified gross lifecycle savings contribute to the program administrator's portfolio-level goals.

Impact Evaluation

This section describes the methodology used to evaluate the Residential New Construction offering and presents the findings from the CY 2021 impact evaluation.

Impact Evaluation Methodology

Table 57 lists the specific data collection activity and sample size used in the impact evaluation. In CY 2021, the evaluation team conducted a tracking database review, relying on findings from the CY 2019 evaluation to determine verified savings.

Table 57. Residential New Construction Offering
CY 2021 Data Collection Activity and Sample Size, Impact Evaluation

Activity	Sample Size
Tracking Database Review	Census

Gross Savings Approach

The evaluation team reviewed the tracking data in the SPECTRUM database to verify gross savings of the Residential New Construction offering. The review involved two tasks:

- Thorough review of the data to ensure that totals in SPECTRUM matched totals reported by the program administrator
- Check for complete and consistent application of data fields (including measure names, application of first-year savings, and application of effective useful lives)

Net Savings Approach

In CY 2021, the evaluation team applied the electric and natural gas NTG ratios calculated in the CY 2019 evaluation. The CY 2019 evaluation included a comprehensive analysis of energy consumption data (billing data) of newly constructed Focus on Energy-certified homes and uncertified homes.

Table 58 lists the electric and gas NTG ratios estimated during the CY 2019 billing analysis.

Table 58. CY 2019 Residential New Construction Offering Program Billing Analysis Results

Savings Type	NTG Rate
Electric	0%
Gas	5%

Verified Gross Savings Results for Residential New Construction

Table 59 lists the CY 2021 first-year and lifecycle realization rates for the Residential New Construction offering. Overall, the offering achieved a first-year evaluated realization rate of 100%, weighted by total energy savings (MMBtu).

Table 59. CY 2021 Residential New Construction Offering First-Year and Lifecycle Realization Rates

First-Year Realization Rate				Lifecycle Realization Rate		
kWh	kW	therms	MMBtu	kWh	therms	MMBtu
100%	100%	100%	100%	100%	100%	100%

Table 60 lists verified first-year and lifecycle savings for the offering.

Table 60. CY 2021 Residential New Construction Offering First-Year and Lifecycle Gross Verified Energy Savings Summary

Verified First-Year Savings				Verified Lifecycle Savings		
kWh	kW	therms	MMBtu	kWh	therms	MMBtu
4,300,760	955	486,326	63,307	128,995,699	14,589,788	1,899,112

Verified Net Savings Results for Residential New Construction

The evaluation team calculated an overall NTG estimate of 4% for the offering in CY 2021. Table 61 also shows total first-year gross and net savings.

Table 61. CY 2021 Residential New Construction Offering Lifecycle Net Savings and NTG

Total Lifecycle Gross Verified Savings (MMBtu)	Total Lifecycle Net Savings (MMBtu)	NTG Ratio
1,899,112	72,949	4%

Process Evaluation

The evaluation team designed the CY 2021 process evaluation activities to monitor the performance and participating home construction practices of the Residential New Construction offering. This section details the evaluation activities and findings.

Process Evaluation Methodology

In CY 2021, the evaluation team interviewed the administrator and the implementer, as well as 10 builders who participated in the offering. The team also processed CY 2021 participating home REM/Rate files to update trends in participating home building characteristics. Table 62 summarizes CY 2021 process evaluation activities.

Table 62. CY 2021 Residential New Construction Offering Data Collection Activities and Sample Sizes, Process Evaluation

Activity	Sample Size
Stakeholder Interviews	2
Program Home Database Update	2,477[a]
Participant Builder Interviews	10

[a] The implementer provided 2,488 REM/Rate files to the evaluation team. Of these files, the evaluation team processed 2,411 files into a database. The remaining 11 files could not be uploaded due to processing errors with the REM/Rate software.

Offering Design and Delivery

Focus on Energy delivers the Residential New Construction offering throughout Wisconsin through the administrator (APTIM), the implementer (Willdan), implementer subcontractor, participating trade allies (home builders), and building performance consultants (BPCs). Participating home builders hire BPCs affiliated with the offering to guide them on better building techniques and to model and verify the new homes' energy performance using REM/Rate, a home energy software tool.

The administrator said there are relatively few BPCs compared to the volume of participating homes, which can extend the time for BPCs to submit home data for certification. The administrator also said that many of the participating BPCs are nearing retirement age. To address concerns about a shortage of BPCs and to build on previous efforts to recruit BPCs, Focus on Energy launched a pilot in CY 2021 to recruit and train 10 new BPCs to the Residential New Construction offering. In CY 2021, the pilot recruited three new BPCs to the offering.

In addition to the advisory role played by BPCs, Focus on Energy also offers training on advanced building techniques to help home builders meet offering requirements and construct more efficient homes. This training is also open to nonparticipating builders and subcontractors. In CY 2021 the New Construction offering did not hold in-person training sessions due to the COVID-19 pandemic. Instead, Focus on Energy offered a limited number of online training sessions.

The offering pairs builders with BPCs to construct new homes that are between 25% and 100% more efficient than homes built to meet the minimum requirements of the Wisconsin Uniform Dwelling Code

(WUDC). The offering continued a tiered design in CY 2021, with increasing incentives for more efficient homes. However, the offering modified the incentive design in CY 2021 to include a fixed incentive based on the energy savings tier and a variable incentive based on MMBtu savings within the tier. In CY 2021, Focus on Energy also modified the offering's previously mandatory building standards, which include mechanical home ventilation requirements, to be voluntary and introduced bonus incentives for highly efficient furnaces, heat pump water heaters, and continuous exterior insulation.

Participating homes are classified into four tiers based on their performance compared to the WUDC. Homes must be at least 25% more efficient than minimum code requirements to be certified through the offering, and builders can receive an incentive for homes that are at least 30% more efficient than code.

Though offering requirements are expressed as a particular percentage better than code, since CY 2018, Focus on Energy has measured the energy savings of participating homes from a market characteristics baseline that is based on results from the 2017 market characterization study. The BPCs calculate these savings directly in REM/Rate. The evaluation team is currently conducting a market characterization study that will provide updated baseline characteristics and expects to deliver the findings in CY 2022.

Participation

Table 63 lists incentives and participation for each home certification level, and Table 64 lists incentives and participation by bonus measure. Incentives varied by performance level and by whether a participating electric or natural gas utility delivered the space heating fuel (on average, incentives were higher for homes that received heating fuel from a participating utility). In CY 2021, participation was primarily in the middle performance tier, homes between 30% and 34.9% more efficient than minimum code requirements. In addition, the bonus incentives for heat pump water heaters and continuous exterior insulation saw uptake (13% and 11% of participating homes, respectively), whereas the bonus incentives for highly efficient furnaces saw relatively little uptake.

Table 63. CY 2021 Residential New Construction Certification Level Incentives and Participation

Certification Level	CY 2021 Incentives[a]		CY 2021 Participation	
	Fixed	Per MMBtu Savings	Space Heating Fuel Provided by Participating Utility	Space Heating Fuel Not Provided by Participating Utility
25%-29.9% more efficient than code	$0	$0	584	11
30%-34.9% more efficient than code	$150/$350	$15	1,054	36
35%-39.9% more efficient than code	$200/$550	$30	591	23
40%-100% more efficient than code	$200/$1,000	$40	173	16

[a] The first fixed incentive amount is for homes that receive heating fuel from a participating utility and the second amount is for homes that did not receive heating fuel from a participating utility. Only participants who received space heating fuel from a participating utility received a per MMBtu incentive.

Table 64. CY 2021 Residential New Construction Bonus Incentives and Participation

Bonus Type	CY 2021 Fixed Incentive	CY 2021 Participation
98% AFUE Furnace Bonus	$150	6
Heat Pump Water Heater Bonus	$200	330
Continuous Exterior Insulation Bonus	$400	267

Approximately 23% of participating homes received bonuses, primarily in the two middle efficiency tiers. Though some homes in the highest efficiency tier received bonuses for heat pump water heater and continuous insulation, most homes that received bonuses received only one per home.

Table 65. Percentage of Homes Receiving Bonuses

Certification Level	No Bonus Received	Bonus Received	Bonus Type			
			98% AFUE Furnace Only	Heat Pump Water Heater Only	Continuous Exterior Insulation Only	Multiple Bonuses
25%-29.9% more efficient than code	23%	0%	0%	0%	0%	0%
30%-34.9% more efficient than code	34%	10%	0.2%	4%	6%	0%
35%-39.9% more efficient than code	16%	9%	0%	6%	2%	0%
40%-100% more efficient than code	4%	3%	0%	2%	1%	1%
All Homes	**77%**	**23%**	**0%**	**12%**	**9%**	**2%**

COVID-19 Impact

Though the administrator and the implementer said the COVID-19 pandemic slowed down the overall volume of construction in CY 2020, they also said that in CY 2021 the market appeared to rebound despite labor and supply shortages continuing to make construction difficult. Participating builders also reported that in CY 2021 they were unable to meet demand for new homes.

The pandemic prevented offering staff from conducting in-person training with building professionals as it had in previous years.

Marketing

In CY 2021, the implementer continued to market certified homes to potential homebuyers through the Parade of Homes, though marketing directly to potential homebuyers is not a focus of the offering. Focus on Energy is a member of six of Wisconsin's 21 home builder associations (HBAs)—one in each geographical region of Wisconsin—and uses HBA member rosters to identify and recruit builders not yet participating in the offering.

Participating Builder Interview Results

The evaluation team interviewed 10 builders who participated in the offering in CY 2021. The interviews focused on building practices, program participation, and the overall Wisconsin residential new construction market. The reflected the diversity of the CY 2021 participating builder population.

Table 66 shows the total population of participating builders and the interviewed builders by the volume of Focus on Energy-certified homes built.

Table 66. Builders Interviewed by Size

Category Size	Participating Builders in CY 2021	CY 2021 Offering Homes Constructed	Completed Interviews[a]
10 or fewer (smaller volume)	90	15%	3
11 to 50 (medium volume)	17	24%	3
51 to 150 (large volume)	9	34%	3
Over 150 (very large volume)	1	27%	1

[a] Because the larger builders make up a very large proportion of the certified homes, the team sought to strike a balance between interviewing smaller builders who did not build a large share of the certified homes and of larger builders who, while fewer, built a large share of certified homes.

Table 67 shows the total number of certified homes built in CY 2021 by region, as well as the geographic focus of the homes built by interviewed builders.

Table 67. Builders Interviewed by Region

Region[a]	Certified Offering Homes in CY 2021	Completed Interviews[b]
South Central	950	5
West Central	158	1
Northeast	408	2
Southeast	927	2
Northern	40	0

[a] The regional designations are from the Wisconsin Department of Natural Resources.
[b] Due to the small sample size for builders in the Northern region, the evaluation team was unable to interview any builder from that region.

Builders reported building between one and 565 homes in CY 2021. Most builders reported that they built about the same number of homes in CY 2021 compared to the previous year, but two builders reported a reduction in volume and one builder reported an increase in volume. Overall, participation in Residential New Construction has been consistent since CY 2004 (see Figure 44 in the *Construction Activity* section). Both builders who reported a decrease in homes built said they had expected to build more homes but were hindered by labor and supply shortages. Another builder could have sold more homes and had been unable to meet market demand for new homes.

Six builders reported that all of their homes were certified through the offering, including the largest-volume builder. Four builders said some of their homes were certified, while others were not. One of the larger-volume builders (51 to 150 homes built in CY 2021) said that only two or three homes are typically not certified in a year due to homebuyers requesting specific home features, such as wood-burning stoves, that are not allowed in certified homes. The builder said that non-certified homes were generally built to the same efficiency standard as certified homes. Smaller builders reported a few reasons for not certifying all homes, including not certifying attached homes that were built to a different standard, missing small details in construction, or not being able to arrange BPC site visits on time.

Offering Participation

The 10 interviewed builders had participated in the offering an average of nine years, with the longest participating builder, a large-volume builder in the Southeast region, reporting 15 years of participation. The shortest was four years of participation reported by a smaller-volume builder in the Southeast region.

When asked what the benefits of participating in the offering are, the builders offered the following:

- **Quality assurance.** Almost all builders (eight respondents) said that a benefit of participating in the offering was its role in ensuring a high-quality home was built. A medium-volume builder in the South Central region pointed out that the offering's inspection process "shows how well homes are built […] and different challenges from different [subcontractors] come out," which allows the builder to "make decisions about who we use." The very large-volume builder (South Central region) said that the offering "assures us of the quality of our homes" and "holds our trade partners up to a higher level of performance and improves the quality of their work."

  Two builders added that the offering not only provides quality assurance benefits but also ensures consistent building practices. A medium-volume builder in the Northeast region said that participation "keeps everything consistent" and provides a "standard product."
- **Marketing.** Almost all builders (eight respondents) said that new homes certification and participation offered marketing value for their homes. A medium-volume builder in the South Central region said, for example, that participation "is a marketing tool for us number one." A large-volume builder in the West Central region stated that participation and certification "shows that our homes are better than others."
- **Financial rewards.** Most builders (six respondents) said that the offering's financial incentives are a benefit to participation. A large-volume builder in the West Central region said, for example, that "financial incentives are a big draw to the solution as they cancel out many added costs of efficiency." Another small volume builder in the South Central region said that "even though it's a breakeven, we can justify the added costs by the incentives paying for the costs of the rater."
- **Certification.** Several builders (four respondents) also said that certification provides value beyond marketing by providing valuable information about the home to buyers. The very large-volume builder in the South Central region said, for example, that certification "puts data behind our building practices into the hands of our customers." Another small-volume builder in the South Central region said that certification provides information to buyers about "what's behind the walls."
- **Ongoing learning.** Three builders also reported that participating in the offering helps them gain knowledge on how to build better homes. A smaller-volume builder in the South Central region stated, for example, that program participation "gives us knowledge and guidance as to how efficient our homes are so we can keep improving."

When asked about challenges to participation, three builders said that they did not have any challenges. Other builders reported the following challenges:

- Scheduling inspections with BPCs (four respondents)
- Participating in rural areas where utilities do not participate in Focus on Energy (one respondent, a smaller-volume builder in the South Central region)
- Changes to the offering design, especially when the changes happen during an active project (three respondents)
- Additional time to build a certified home if issues are identified (two respondents).

Program Changes

The team asked builders how changes introduced in CY 2021 affected their participation in the offering. Builders provided feedback about the bonus incentives (heat pump water heaters, highly efficient furnaces, continuous exterior insulation), revised incremental incentive structures, and mechanical ventilation:

- **Bonus incentives.** Half of the builders (five respondents) offered feedback on the bonus incentives for heat pump water heaters, one builder said the furnaces bonus, and one builder said the continuous exterior insulation bonus. Feedback on the bonus incentives was generally positive, with several builders reporting that offering the bonus incentives had impacted their building practices. The very large-volume builder said "it definitely takes some energy to change up anything you've done […] but it was ultimately well worth it [to switch to heat pump water heaters] and we have not received one complaint." Another large-volume builder in the West Central region said "heat pump water heaters are now a standard offering." Regarding the highly efficient furnace bonus incentive, a large-volume builder in the West Central region said that "efficient furnaces are also now offered on their lower-end homes (which are also certified). Before the incentive, it was not worth it to do those."

  A medium-volume builder in the Northeast region said that the bonus incentive is "great because we were offering heat pump water heaters before." Another large-volume builder in the West Central region said that the builder "has been doing house wrap insulation for a long time" but appreciated the incentive.
- **Building performance incentive structure.** One large-volume builder in the Southeast region appreciated the revised incentive structure, saying that it "helps us focus on what [we] can do to get better and obtain more rebates to offset the cost" of building higher performing homes.
- **Mechanical home ventilation.** A medium-volume builder in the Northeast region said that the offering's new guidance on automatic bathroom switches was "frustrating from a cost perspective." The builder did not see the benefit bathroom switches brought to the home.

  In CY 2021, the Residential New Construction offering made the previously required mechanical home ventilation requirements voluntary and included the recommendation: "An appropriately sized bathroom exhaust fan can be used to satisfy the whole-house ventilation

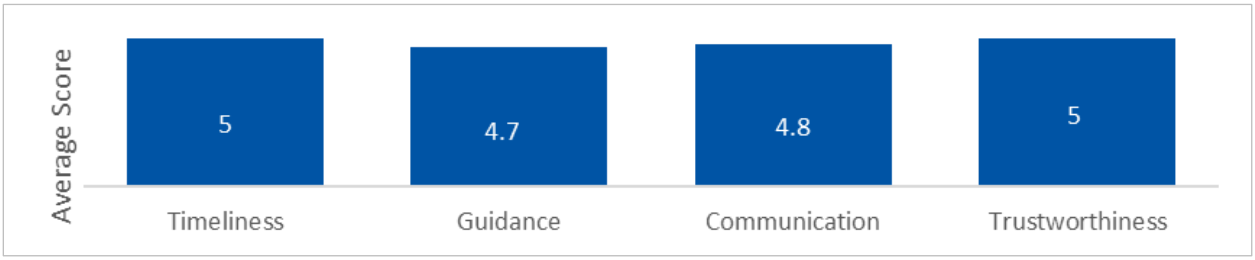
recommendation. [If chosen,] the control device or switch operating the fan must meet Residential Energy Services Network recommendations."[34]

Building Performance Consultants

The builders provided very positive feedback on the BPCs' work to certify homes and measure their energy savings. BPCs conduct two visits to the homes (during framing and after construction is complete) and provide advice to builders on constructing energy-efficient homes.

Builders were asked to provide a rating regarding the consultants' timeliness, guidance, communication, and trustworthiness using a scale of 1 to 5, where 1 represents *unsatisfactory* and 5 represents *highly satisfactory*. Figure 43 shows the 10 builders' average scores on each aspect of performance.

Figure 43. Feedback on Building Performance Consultants



The 10 builders stated that BPCs provide valuable advisory services, identify issues and solve problems in the homes during construction, assist with staff training, and assist with homebuyer education.

All 10 builders said that BPCs serve as valuable advisors in building homes. One large-volume builder in the Southeast region said, for example, that "our guy really loves what he does and gives us feedback and models different wall systems for us. It's such an important relationship. It's not just a transaction to us. He is also intrigued by new systems and products. We have the benefits of a strong relationship." Another medium-volume builder in the Southeast region said that the BPC is "a great connection with an outside, neutral source."

Three builders reported that BPCs, through the inspection process, identify potential issues with homes and provide solutions. A medium-volume builder in the Northeast region said, for example, that the BPC "finds problem areas [and provides solutions] before the build gets too far." Three builders also said that BPCs provided training for staff, and one small-volume builder in the South Central region said that the BPC had even offered "to provide education to homeowners to maximize the savings from their homes."

Builders did not point to any issues with the BPCs except that scheduling inspections can be difficult. Two builders said that BPCs are in short supply. A medium-volume builder in the Northeast region said, for example, that "there are tons and tons of home inspectors, but very few [professionals] that certify homes."

[34] Focus on Energy. 2021 Guide – New Homes Offering. P. 8

Training

Focus on Energy offers training to builders and other industry professionals about advanced building practices. Of the nine builders who answered questions about training, four said they were not aware of attendance by anyone in their company. Five builders said they or someone in their company had attended training organized by Focus on Energy:

- Three builders said that they had personally participated in training.
- Two builders said that they had not attended personally, but that members of their staff had.

Two builders also said that they attended training events that were not organized by Focus on Energy, including training offered by Building Knowledge Canada and the Better Buildings: Better Business conference.

Two builders offered feedback on past training. A small-volume builder in the South Central region said that the training sessions "are important to stay abreast of what's changing not only in construction but in the new offerings and incentives."

Regarding topics of interest for future training, builders suggested the following topic areas: heat pumps, heat recovery ventilation systems, exclusive training for builders (suggested by a large-volume builder in the West Central region), indoor air quality, and dew points. Regarding the best time to host training, all six builders who offered feedback said that winter was the best time, given the slowdown in construction activity.

Other Program Participation

Only one builder, a large-volume builder in the Southeast region, currently participated in other new construction programs: the U.S. Department of Energy's Net Zero Energy Ready Home Program and Wisconsin Green Built. Several other builders said that they had participated in the ENERGY STAR, Wisconsin Green Built, and LEED programs in the past, but that they were not currently participating.

Builder Practices

The 10 builders provided information about how their building practices had evolved over recent years, what factors influence them to adjust practices, the role of subcontractors, and how they market their homes.

Changes to Building Practices

Four builders said they had made no significant changes to their building practices in the last three years, but the other six builders reported the following:

- Adopted heat pump water heaters (five respondents)
- Added timers to bathroom fans (two respondents)
- Added one-inch foam continuous exterior wall insulation (two respondents)
- Began offering highly efficient furnaces (one respondent)
- Moved toward building net-zero-energy ready homes (one respondent)
- Made management changes (one respondent)

- Made spray foam insulation in attics standard (one respondent)
- Focused on minimizing leakage in duct systems (one respondent).

Influence on Changing Building Practices

Builders reported a range of influencing factors when making choices to adapt their building practices. The primary influencing factor was input or advice from their subcontractors (eight respondents) and Focus on Energy BPCs (six respondents).

Subcontractors

Builders did not point to any specific skills or certifications needed for their subcontractors beyond standard certifications. A medium-volume builder in the Northeast region said, however, that "we run them through our expectations […] that we hold them to." The 10 builders were primarily general contractors who subcontract most of the building of homes. To a limited extent, a few of the builders also maintained in-house crews to frame homes, as shown in Table 68. Two medium-volume builders (in the Southeast and Northeast regions) specified that they provide significant oversight over their subcontractors, especially with new workers cycling into the construction trades.

Table 68. Builder Subcontracting Practices

	Framers	Insulation	HVAC
Builders who use subcontractors	7	9	10

Eight builders said their relationship with subcontractors can influence their decisions on adjusting their building practices. A medium-volume builder in the South Central region said, for example, that they "rely on subcontractors to come with suggestions [for improvements] and then research that point." A small-volume builder in the South Central region said they consult with subcontractors on "anything new, as contractors have more knowledge and experience based on what they've done for other builders." Another medium-volume builder in the Southeast said that "we expect our trades to bring ideas to us on what we can change to improve quality and reduce cost." Another small-volume builder in the Northeast region said that "all [contractors] go to continuing education, as well as seminars for their vendors and they always talk about the newest, latest and greatest. They teach me so much." Two medium-volume builders (in the South Central and Northeast regions) said that though contractors provide inputs, the builder makes the final decision on practices. One builder said, for example, that "contractors have some influence, but are not the main source of information."

Focus on Energy and Building Performance Consultants

Six builders said that Focus on Energy and BPCs influence changes in their building practices. A medium-volume builder in the West Central region said that Focus on Energy "provides a knowledge base for building better homes." Another medium-volume builder in the South Central region said that they meet with their BPC "once a year and review and come up with ways to improve." Another medium volume-builder in the Southeast region said that "we talk to [the BPC] quite often and take his suggestions."

Builders specified that Focus on Energy impacted their choice to adopt heat pump water heaters in their homes, giving credit to the incentive and information resources. A small-volume builder in the South Central region said, that "we would have used a traditional gas heater because it's more affordable, but the incentive allowed us to upgrade and now the home is more energy-efficient and more affordable for the homeowner." Another large-volume builder in the West Central region said that "the [heat pump water heater] incentive helps sufficiently pay for the difference in cost for the change [from a standard hot water heater]." One very large-volume builder in the South Central region said that adopting heat pump water heaters was not a simple decision, but that "the program had a very big effect on us moving to heat pump water heaters and to do the research and testing and the ultimate decision to switch over."

Regarding longer-term changes to home construction practices, five builders said that Focus on Energy had influenced them to adopt whole-home ventilation (which was previously a requirement for certifying homes), five builders said that they had implemented air sealing techniques consistently due to program influence, and three builders said they had improved insulation practices.

Other Influencing Factors

Other factors influencing builders to change their construction practices included a general desire to innovate and build better homes (one large-volume builder in the Southeast region), improving the health and safety of homes (one small-volume builder in the South Central region), and getting feedback from customers or warranty claims (one large-volume and one medium-volume builder, both in the Southeast region). Two large-volume builders (one in the Southeast region and one in the West Central region) said they do their own online research to identify new approaches to building homes, including through conferences (such as the Better Buildings: Better Business conference), home builder association networks, and discussions with manufacturers. One smaller-volume builder in the Northeast region said that much of their adopted changes regarding insulation came through "trial and error" and "general life experience." One large-volume builder in the West Central region and a medium-volume builder in the South Central region) also said that availability of materials, ease of implementation, and cost were factors when considering changes.

Builder Marketing

Eight builders said that they promoted their homes as energy-efficient—although the extent to which they promote energy efficiency and conduct marketing activity varied greatly from builder to builder—and that marketing efforts are generally limited. Eight builders said they market their homes through the internet, but this primarily meant maintaining a website with information about their homes. Additionally, some builders said they market their homes through social media, word of mouth, real estate staff and multiple listing services, radio, the Parade of Homes, and television.

When discussing the energy efficiency of their homes, two builders said they highlighted Focus on Energy certification, and others used terms such as improvements above code requirements, Energy360, more affordable, and energy-efficient. A large-volume builder in the Southeast region said they "are careful not to get technical with language" and focus on communicating in a way that lay audiences can understand.

Eight builders provided feedback on customer interest and inquiries about energy efficiency and mostly suggested that customers had little interest. For example, a low-volume builder in the Southeast region said that "we hardly ever hear about it, it's a benefit but not a top point" for the customer. Another medium volume builder in the South Central region said that "we give them a sheet with all the [energy efficiency] information, but other than that they don't ask much at all." However, a large-volume builder in the Southeast region said customer interest can evolve over the course of a home-buying process, where early in the purchase process customers will "opt for square footage" over "efficient HVAC and insulation," but that after living in a certified home for a year "they get it."

Market Changes

The evaluation team asked builders about market trends that they had seen emerge in the last three years. Though many builders have experienced a labor shortage for many years, eight builders said access to labor had become particularly difficult over the last three years. Five builders, including builders in various volume tiers and regions, reported more difficulty accessing building supplies. Five builders said that demand for new homes surpasses builders' ability to supply new homes and that home prices were being driven upward. Two smaller-volume builders in the South Central region reported that the cost of building supplies had increased. The market changes affected builders in several ways:

- **Longer construction timelines:** Half of the builders reported more difficulty in scheduling subcontractors in the last two years, which one builder attributed to COVID-19. Scheduling subcontractors also impacted construction timelines: several builders reported that in recent years the time it takes to complete a home has increased. For example, a medium-volume builder in the Southeast region said this resulted in "longer lead times" and "the timeline we give our customers."
- **Utilization of subcontractors:** A large-volume builder in the Southeast region reported using contractors more efficiently, such as no longer asking framers to install trim or windows, but rather scheduling them to focus solely on framing.
- **Reducing the number of homes constructed:** A small-volume builder in the South Central region said that they have needed to reduce the overall number of homes that they are able to build, due to supply and labor shortages.
- **Building larger homes and less affordable homes:** A medium-volume builder in the Northeast region said that the market incentivized them to builder larger, more expensive homes. The builder said that "next year we will be focused more on expensive and bigger homes. We can't serve every customer and we can make more money on larger homes."

The evaluation team asked builders if they thought that the Residential New Construction Solution had impacted the energy efficiency of new homes that were not certified through Focus on Energy. Four builders said the solution impacted the new construction market by increasing demand for energy-efficient homes from homebuyers. A medium-volume builder in the South Central region said, for example, that the solution "is showing new homeowners that these [well-built, efficient] homes exist." Another large-volume builder in the West Central region said that "some builders that are not in the

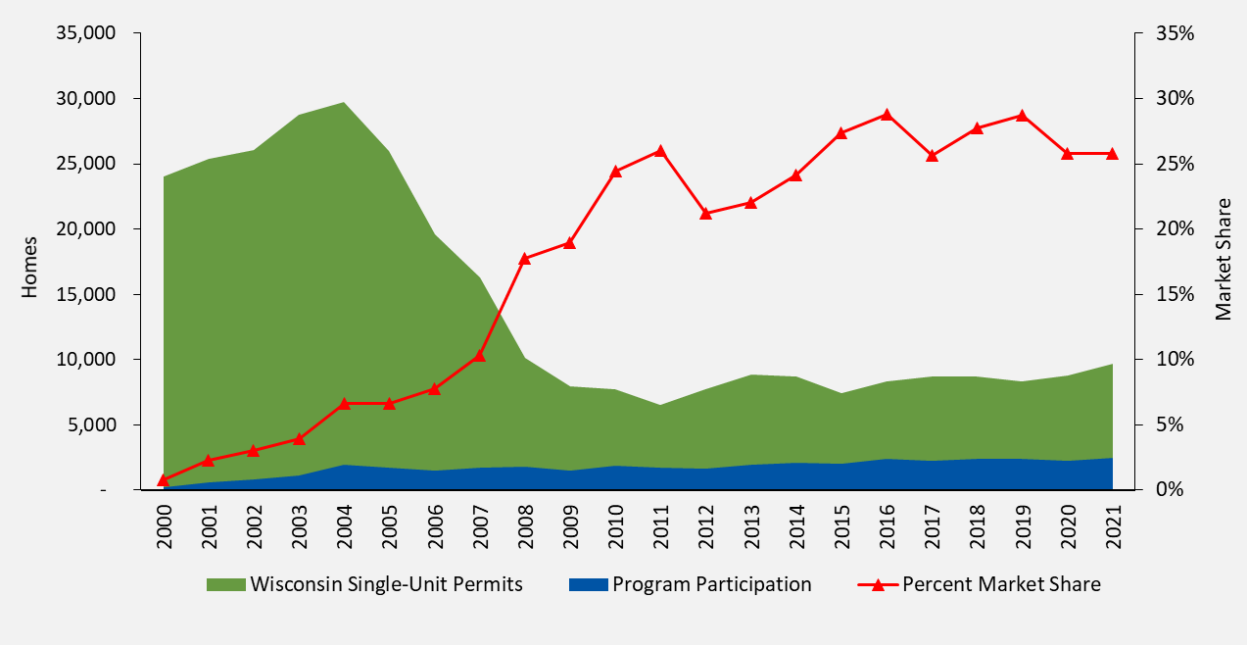
program are building more efficient homes because customers are demanding it." A smaller-volume builder in the South Central region also said that the Residential New Construction Solution affected building practices in the market as "knowledge from the offering seeps into nonparticipating homes as contractors learn to do things the 'Focus way.'"

Construction Activity

The evaluation team tracks program market share and other new construction metrics as part of the Residential New Construction market effects evaluation. The team will assess market effects in CY 2022, at the end of the Focus on Energy quadrennium.

Figure 44 shows the historical participation rate and market share as a percentage of single-family new construction permits. Though the administrator and implementer reported that COVID-19 had slowed the pace of new construction in CY 2020, permits had decreased in CY 2019 prior to the pandemic and began to rebound in CY 2020.

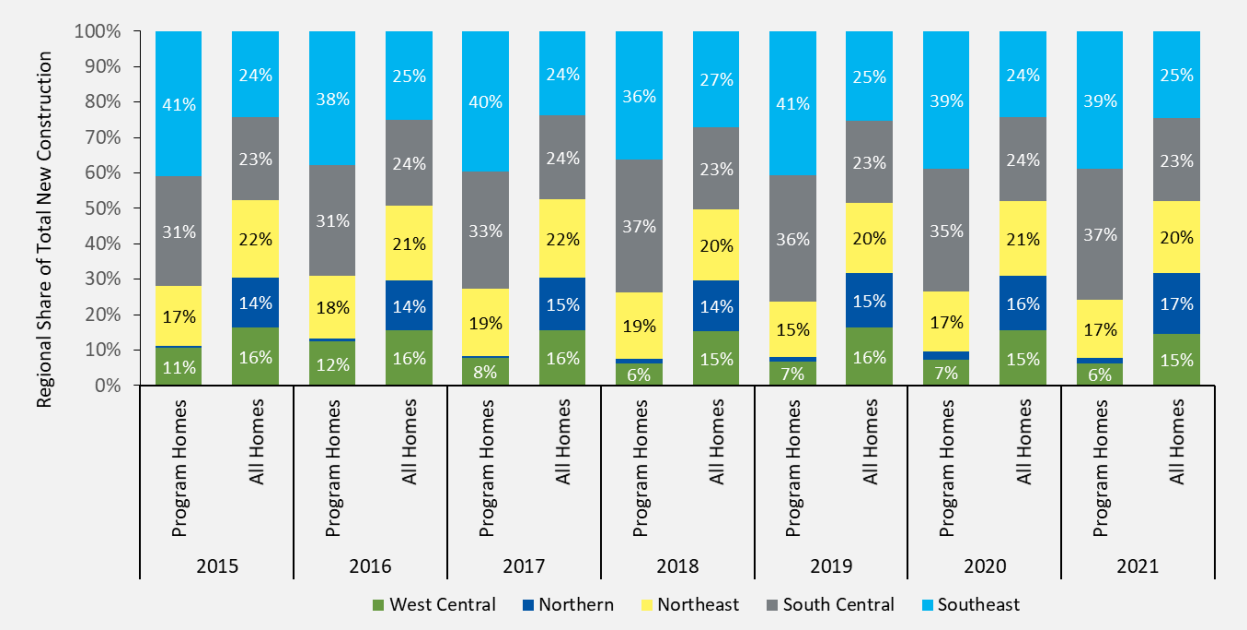
Figure 44. Residential New Construction Offering Participation and Market Share (CY 2000-CY 2021)



Overall, participation in the Residential New Construction Solution has been consistent since CY 2004, whereas the overall market has fluctuated. Participation as a percentage of market share has been approximately 25%. The implementer said no builders had stopped participating in the solution in CY 2021 and that the participation of major builders has been steady over many years.

Since CY 2015, between 71% and 74% of statewide residential new construction has been in urban counties.[35] In comparison, between 89% and 91% of program homes have been built in urban areas during the same period. Figure 45 shows the overall regional share of Residential New Construction homes and overall new construction in Wisconsin. The figure illustrates that Residential New Construction homes are disproportionally concentrated in the Southeast and South Central regions of Wisconsin, which include the large urban areas of Milwaukee (Southeast) and Madison (South Central). The Northern and West Central regions of Wisconsin have a smaller relative percentage of Residential New Construction homes compared to the overall market.

Figure 45. Regional Share of the New Construction Market (CY 2015-CY 2021)



The lower participation rates in the Northern and West Central regions may be because several utilities that do not participate in Focus on Energy programs are located there, such as Bayfield Electric Cooperative or Jackson Electric Cooperative. The implementer also said natural gas service is limited in the more rural areas of northern Wisconsin and that Focus on Energy has historically had relatively few BPCs in the Northern region. Since most homes in Wisconsin are not electrically heated, incentives for homes that receive natural gas from a Focus on Energy participating utility are higher than for homes that do not.

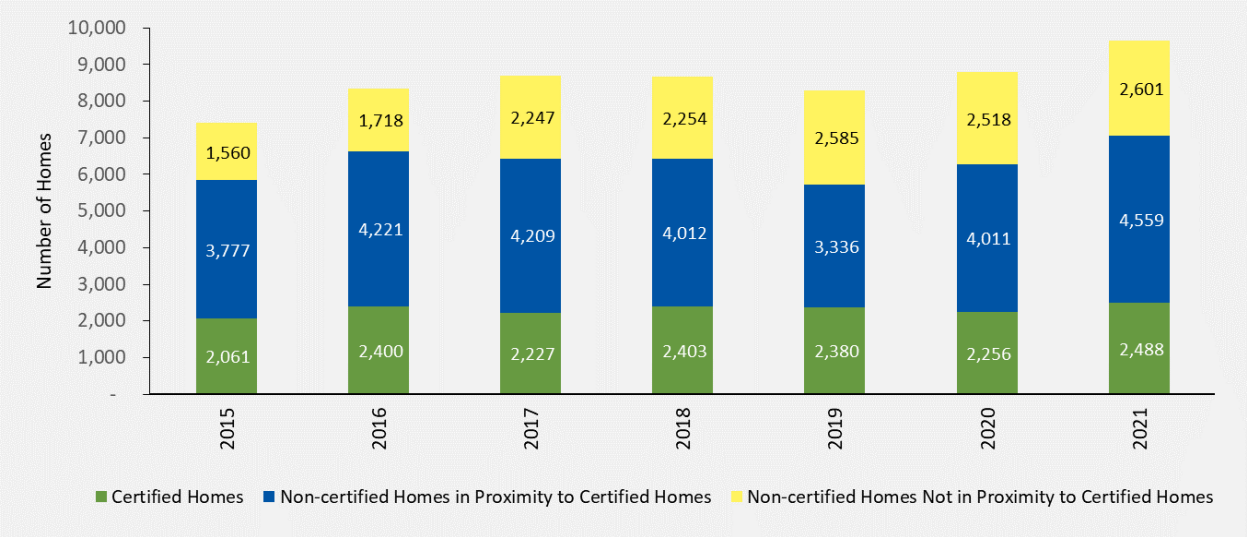
To expand participation, Focus on Energy conducts outreach with builders through home builder associations and conducts targeted recruitment. In CY 2021, outreach focused on builders in rural areas of Wisconsin.

[35] The evaluation team used urban/rural county designations from the Wisconsin Department of Health Services. "WISH: Urban and Rural Counties." Accessed April 2022. www.dhs.wisconsin.gov/wish/urban-rural.htm

In the CY 2019 evaluation, the evaluation team found that standard market homes, homes not built through the offering, have different per-square-foot energy use depending on if they are in close proximity to Focus on Energy-certified homes or are not. After convening a Delphi panel of market experts, the team found that market homes would consume more energy in the absence of a program. The analysis focused on market homes constructed in areas with Focus on Energy activity.

To measure the solution's market effects at the end of the Focus on Energy quadrennium, the team is tracking the number of market homes constructed in counties with at least 5% of new construction activity coming from Focus on Energy-certified homes, as well as the number of market homes constructed in counties with less than 5%. As illustrated in Figure 46, most market homes are in counties with at least a 5% market share of Focus on Energy-certified homes.

Figure 46. Non-Certified Homes by Proximity to Certified Homes (CY 2015-CY 2021)

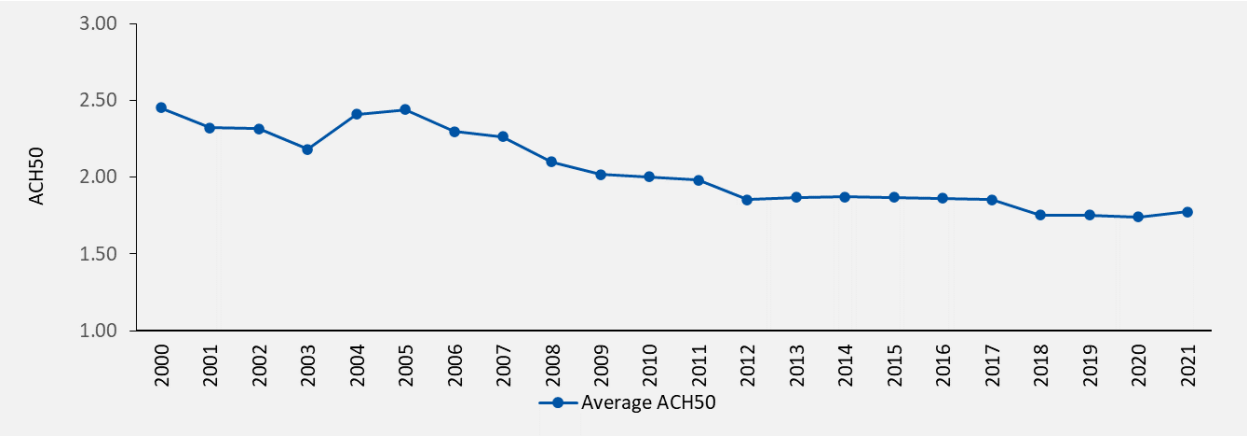


Building Practices

In CY 2019, the evaluation team created a database of historical participating home REM/Rate files. The team updated this database in CY 2020 and again in CY 2021 with participating home files to show how characteristics of these homes evolve over time.

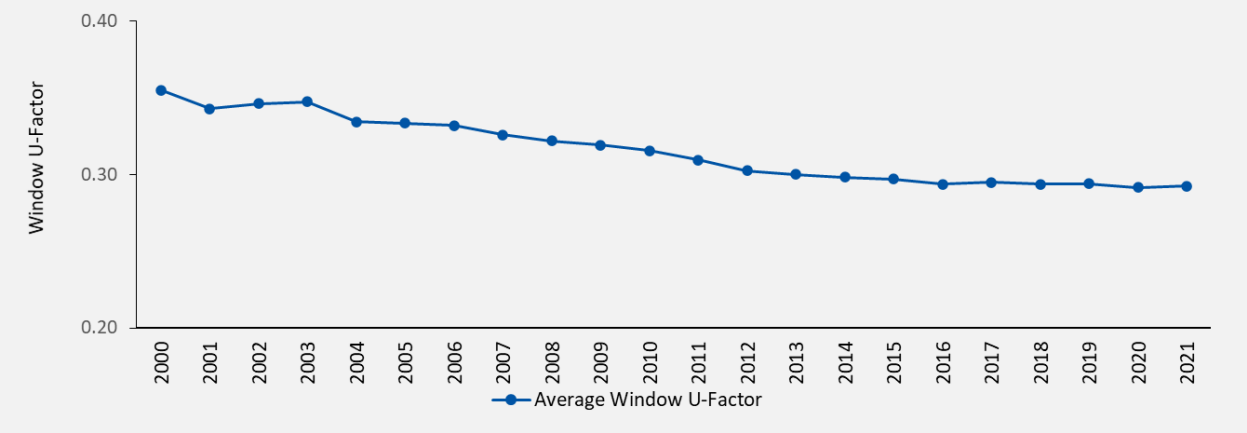
In CY 2021, homes participating in the solution showed a slight decrease in air-tightness, despite the introduction of the continuous exterior wall insulation bonus incentive (continuous exterior insulation can decrease air-leakage from a home). However, overall airtightness, as measured in ACH50, has been consistent since CY 2018 and has improved significantly since CY 2005 (Figure 47).

Figure 47. Residential New Construction Offering
Average Home Airtightness (CY 2000-CY 2021)



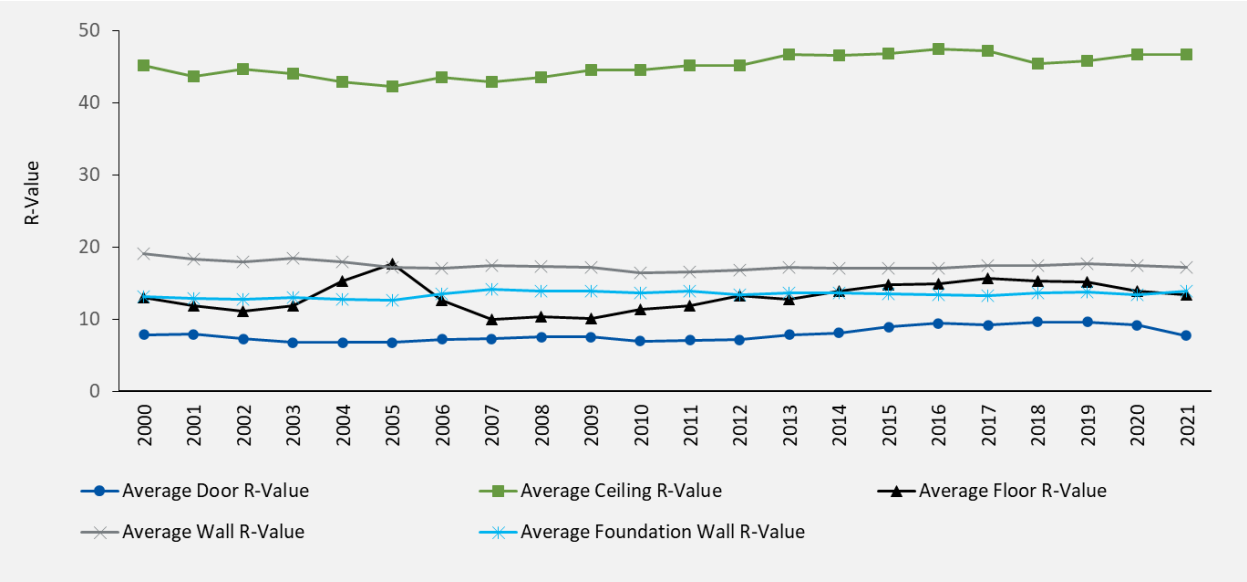
Window efficiency has improved for participating homes, as shown by decreases in average window U-factors, since CY 2000 (Figure 48). However, the efficiency of windows has been relatively consistent since CY 2016.

Figure 48. Residential New Construction Offering
Average Window U-Factor (CY 2000-CY 2021)



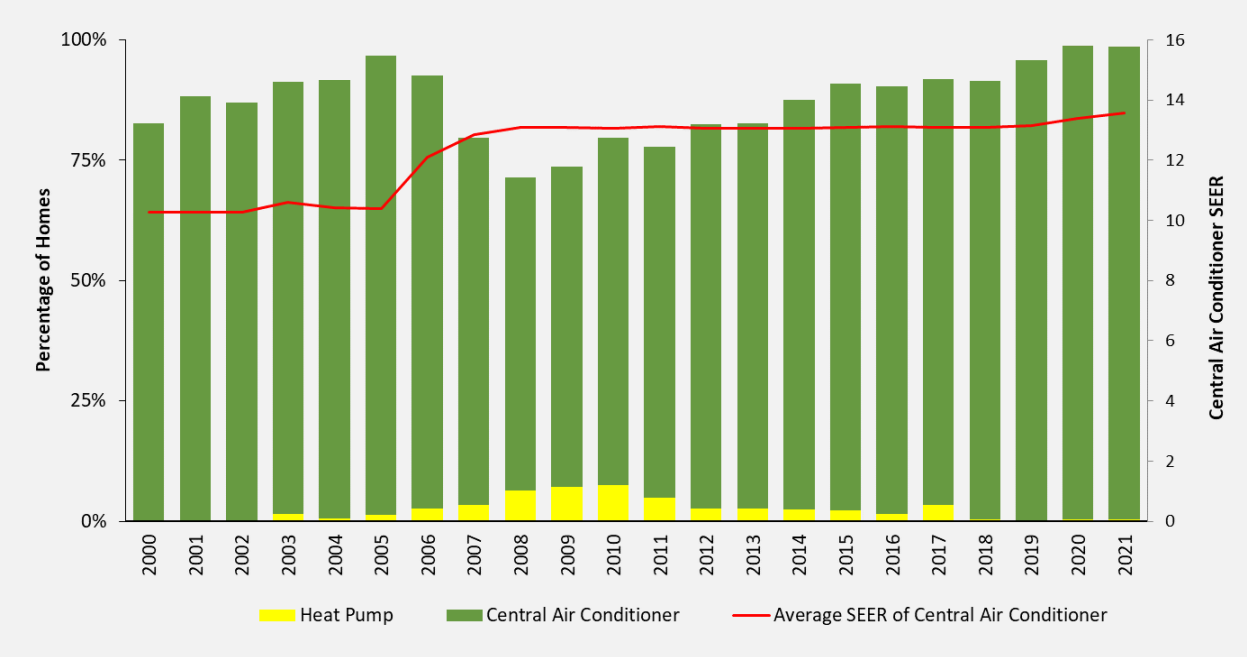
As with other participating home characteristics, various measures of home insulation levels have remained steady through CY 2021 (Figure 49).

Figure 49. Residential New Construction Offering
Average Home Insulation Levels (CY 2000-CY 2021)



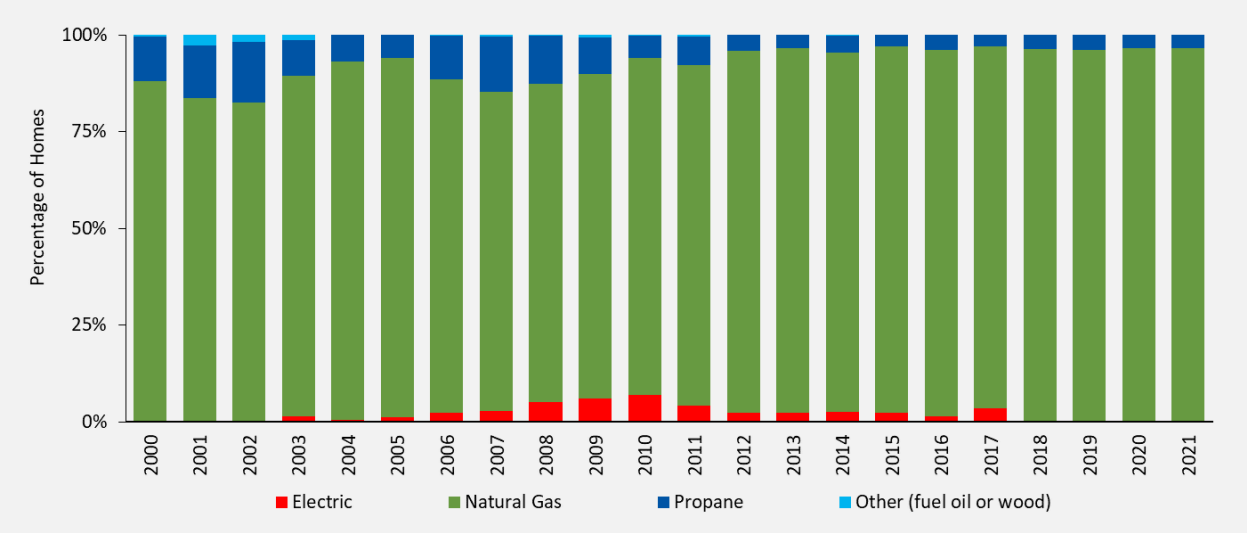
As in CY 2020, nearly all homes participating in the CY 2021 Residential New Construction had central air conditioners installed (Figure 50). Since CY 2020, average efficiency of central air conditioners in participating homes has increased compared to the federal minimum standard of SEER 13, whereas between CY 2007 and CY 2019, the SEER value of central air conditioners aligned with the federal standard.

Figure 50. Residential New Construction Offering
Average Home Cooling Systems Central Air Conditioner SEER Level (CY 2000-CY 2021)



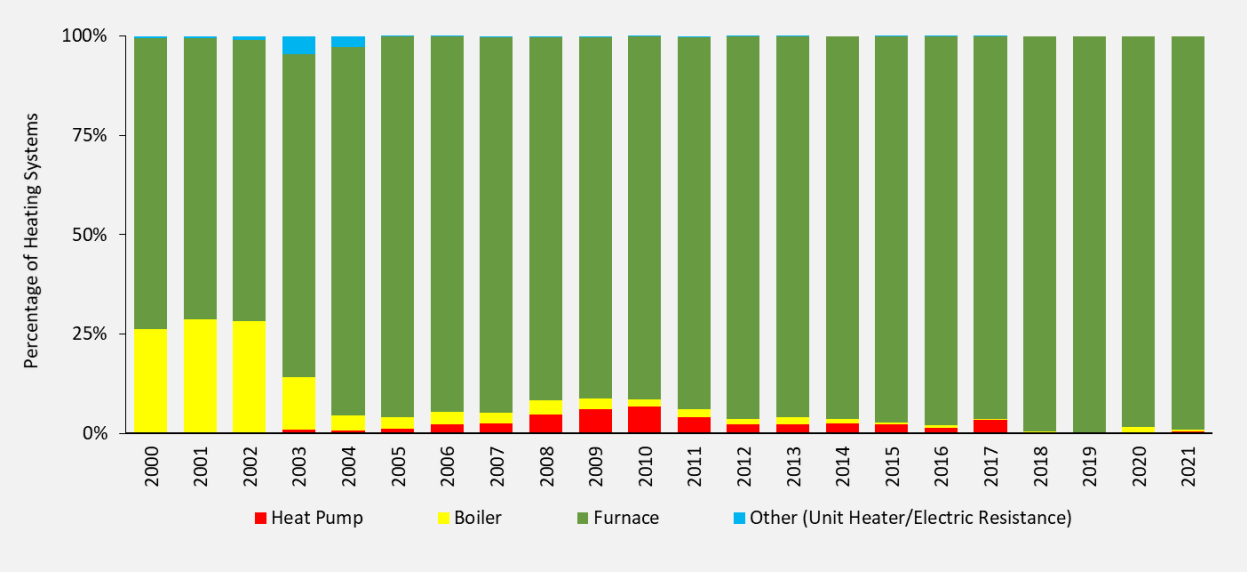
In CY 2021, participating homes continued to be heated primarily by natural gas (Figure 51). A small percentage of participating homes are heated by propane.

Figure 51. Residential New Construction Offering
Home Heating Fuel Type (CY 2000-CY 2021)



In CY 2021, a furnace continued to be the primary equipment type for heating participating homes, although about 1% of participating homes also used heat pumps for heating (Figure 52).

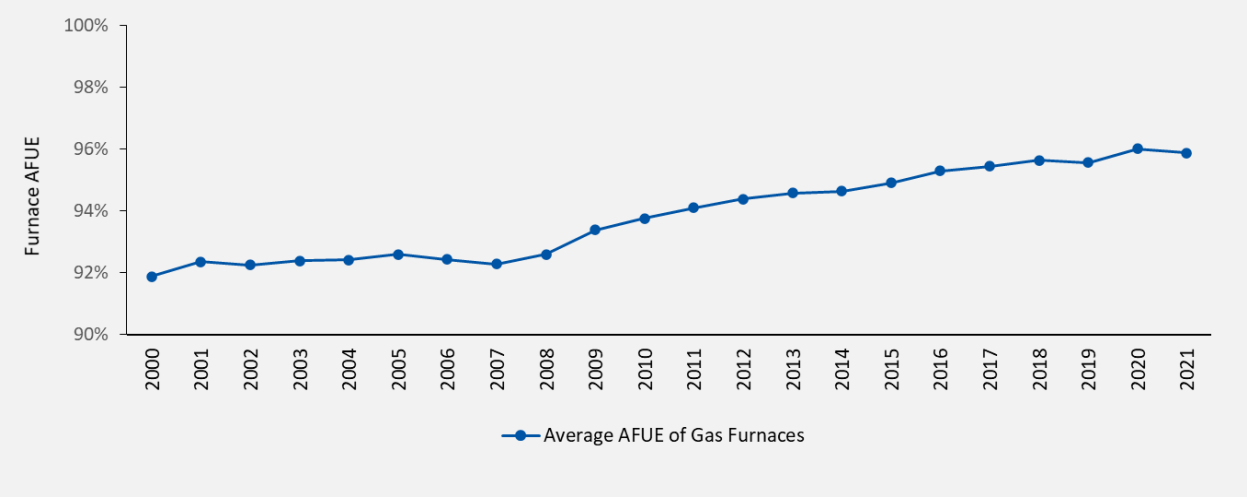
Figure 52. Residential New Construction Offering
Space Heating System in Participating Homes (CY 2000-CY 2021)



Participating homes are heated primarily by natural gas-powered furnaces. In CY 2021, the efficiency of participating home furnaces decreased slightly compared to the previous year, despite the introduction

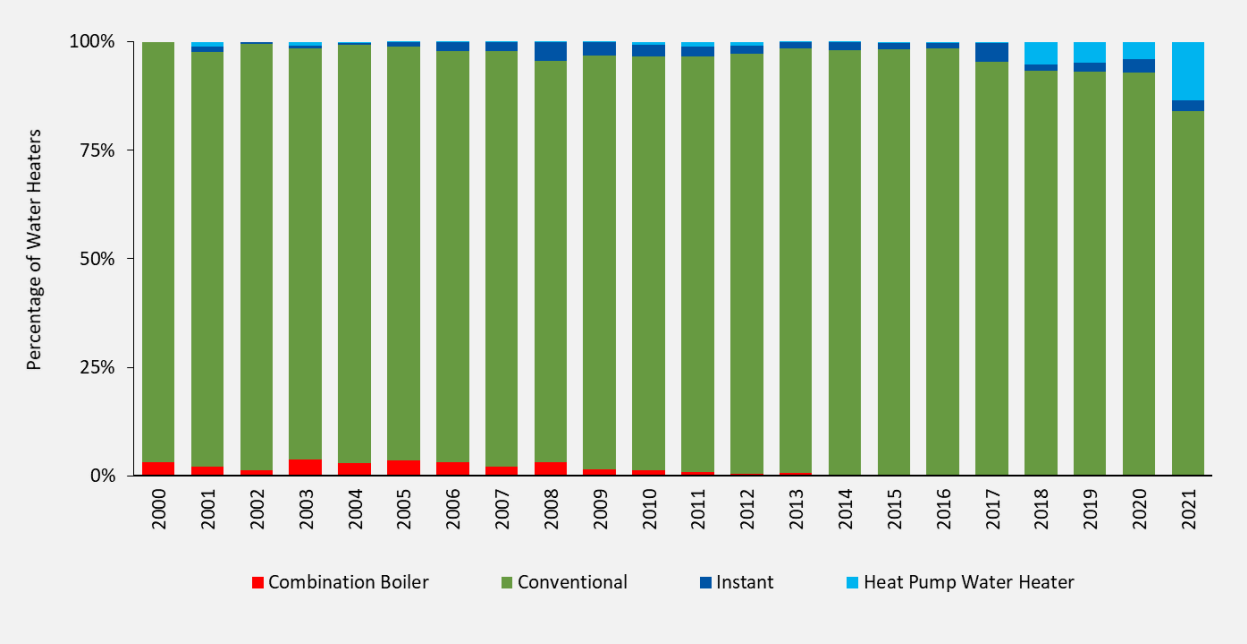
of a bonus incentive for highly efficient furnaces. However, the overall trend since CY 2007 has been one of continuous increases in furnace efficiency (Figure 53).

Figure 53. Residential New Construction Offering
Average Homes Furnace AFUE (CY 2000-CY 2021)



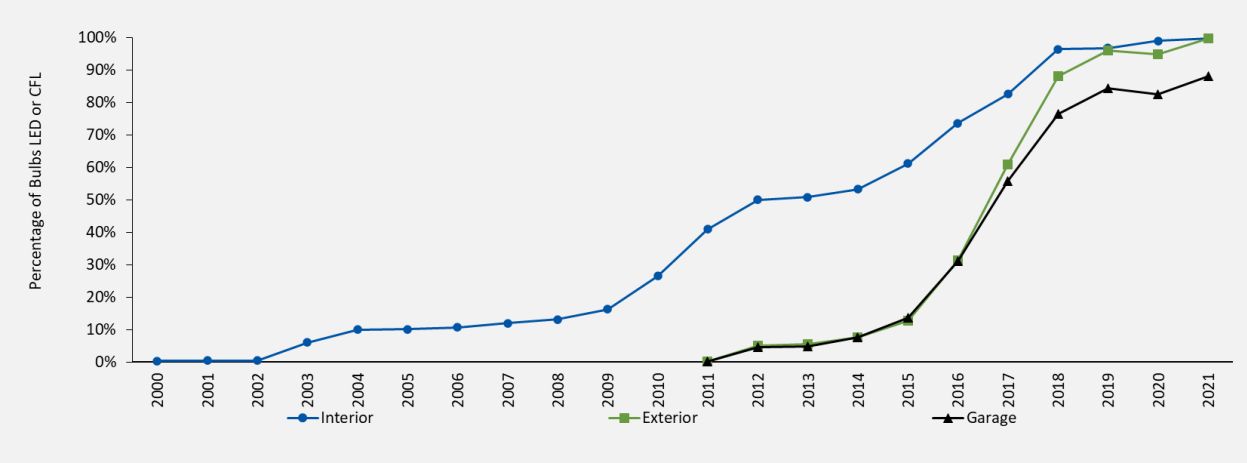
In CY 2021, the prevalence of heat pump water heaters in participating homes increased more than threefold, from 4% in CY 2020 to 13% in CY 2021 (Figure 54). As in CY 2017 through CY 2021, most participating homes used conventional tank water heating systems and a small proportion of homes also used tankless water heaters.

Figure 54. Residential New Construction Offering
Homes' Water Heating System (CY 2000-CY 2021)



In CY 2021, almost 100% of interior and exterior lighting fixtures in participating homes had efficient (LED or CFL, though almost exclusively LEDs) bulbs, and 88% of light fixtures in garages had efficient bulbs. As shown in Figure 55, participating homes have seen steady increases in efficient lighting technology since CY 2002.

Figure 55. Residential New Construction Offering Homes' Lighting Type (CY 2000-CY 2021)



For the CY 2021 evaluation, the team also extracted details about participating homes' mechanical ventilation systems. According to REM/Rate data, all homes still use mechanical ventilation systems, despite removing the requirement for participation. Twelve percent of homes used balanced mechanical ventilation systems that intake and exhaust air, and 88% of homes used exhaust only systems. The average run time was eight hours per day for balanced systems and nine hours per day for exhaust-only systems. The average wattage was 56 watts for balanced systems and 18 watts for exhaust-only systems. The REM/Rate data do not include details on where a system is installed (such as part of bathroom ventilation system) or if the systems are heat recovery systems, which can improve the efficiency of a home.

Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a demand-side management (DSM) offering. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix I. Cost Effectiveness and Emissions Methodology and Analysis in Volume III includes a description of the TRC test.

Table 69 lists the CY 2021 incentive costs for the Trade Ally Solution.

Table 69. CY 2021 Trade Ally Solution Incentive Costs

Offering	Incentive Costs
Total	**$9,554,299**

The evaluation team found that the CY 2021 Residential New Construction Solution was not cost-effective when including the T&D benefits (0.50), nor when excluding them (0.50). Table 70 lists the evaluated costs and benefits.

Table 70. Trade Ally Solution Costs and Benefits

Cost and Benefit Category	Total
Costs	
Administrative Costs	$104,802
Delivery Costs	$783,822
Incremental Measure Costs	$-
Total Non-Incentive Costs	**$888,625**
Electric Benefits (kWh)	$-
Electric Benefits (kW)	$-
T&D Benefits (kW)	$-
Gas Benefits	$378,759
Emissions Benefits	$64,013
Total TRC Benefits with T&D benefits	**$442,771**
Net TRC Benefits with T&D benefits	**($445,853)**
TRC Benefit/Cost Ratio with T&D benefits	**0.50**

Outcomes and Recommendations

The evaluation team identified the following outcomes and recommendations for the Residential New Construction Solution.

Outcome 1. The Residential New Construction Solution increased adoption of heat pump water heaters in participating homes, while other building metrics have stayed relatively consistent with previous years. In CY 2021, the adoption of heat pump water heaters increased approximately threefold since CY 2020, coinciding with the introduction of Focus on Energy's bonus incentive for heat pump water heaters. According to builders, Focus on Energy had a significant impact on their decision to adopt the measure. Several builders also said they have made the practice of using heat pump water heaters standard practice, increasing the likelihood that the adoption will persist over time.

The adoption of other building practices, such as the percentage of efficient lighting and central air conditioner efficiency have also improved over the past few years. However, participating homes have remained consistent in terms of air tightness, insulation levels, and furnace efficiency. Although contractors took advantage of the continuous exterior wall insulation bonus, the incentive does not appear to have led to increased overall insulation levels or more air-tight buildings. However, REM/Rate does not track the ability of continuous exterior insulation to reduce thermal bridging, whereby the homes' framing conducts heat and cold between the exterior and interior of the home.

The success of the bonus incentive for heat pump water heaters to show a visible increase of that technology's uptake in participating homes demonstrates the potential for targeted incentives, in light

of other home performance features remaining steady over the years. However, builders said they consider changes to building practices carefully, consulting contractors and BPCs and carefully weighing the pros and cons of adjusting their standard building practices.

Recommendation 1. Consider additional bonus incentives to further influence building practices. Consider if other technology-specific incentives could influence the building practices of home builders and improve the energy efficiency of homes. These bonus incentives should be selected based on likely builder uptake, widespread feasibility, and energy-savings potential. Good candidates include heat recovery ventilation or smart thermostats. Note that the REM/Rate software currently does not track heat recovery ventilation or smart thermostats, so uptake of this bonus would not be trackable in the same way that uptake of heat pump water heaters was trackable.

Outcome 2. Participation in the solution has been stable over the last 18 years and is disproportionately concentrated in southern Wisconsin and urban areas. Since CY 2004, the number of homes certified by Focus on Energy has remained consistent, despite great fluctuations in overall market activity. The solution has a stable group of core participating builders that construct a large share of the Focus on Energy-certified homes. However, participation has largely been concentrated in southern Wisconsin and urban areas. To expand the number of participating builders, Focus on Energy conducts targeted outreach and has gained membership in homebuilder associations across the state.

Recommendation 2. Focus recruitment of builders and building performance consultants in the Central and Northern Wisconsin regions as well as rural areas. Focus on Energy is focused on expanding its builder network and recruiting building performance consultants. As part of these efforts, Focus on Energy should consider focusing on areas of Wisconsin that have seen less participation compared to the new construction market, such as northern parts of the state and rural areas.

Outcome 3. Contractors continue to be identified as an influence on builder practices, further supporting the market effects theory of change that was developed in CY 2019. The CY 2019 Residential New Construction evaluation included a market effects logic model. This logic model identified contractors, who learn approaches while working on Focus on Energy-certified homes and engaging with BPCs, and bring those approaches to other uncertified homes, as a primary avenue by which the solution improves the efficiency of the Wisconsin new home stock. Interviews with builders in CY 2021 provided further support for this framework by highlighting the influence that contractors have on builders' decisions regarding building practices.

The CY 2019 logic model and CY 2021 interviews also described how the solution influences the energy efficiency of uncertified homes by raising homebuyer demand for energy-efficient homes. However, builders said that market demand for new homes surpasses supply and homebuyers show relatively little interest in energy efficiency. Under these conditions, the primary pathway for market effects is likely to be contractor skills carryover.

Outcome 4. BPCs serve a critical advisory role to builders and are the cornerstone to program delivery. The CY 2019 evaluation found that the interaction between BPCs and contractors was one of the key ways in which the solution's market effects occur. In CY 2021 interviews, participating builders again

praised the work of BPCs and said that BPCs serve as a trusted advisor and are influential in making changes to building practices. However, some builders reported scheduling difficulties with BPCs and the program administrator pointed out that many of the existing BPCs are nearing retirement age, thus highlighting the need for recruitment and training of new BPCs. To meet this need, Focus on Energy has made recruitment a priority in previous years and launched a pilot program to recruit and train BPCs in CY 2021.

Midstream Solution

This section presents the evaluation results for CY 2021 for the Midstream Solution. It provides incentives through the following channels.

Channels in the Midstream Solution

- Commercial Kitchen Equipment
- HVAC Equipment
- Heat Pump Water Heaters
- Circulator Pumps

Midstream Solution

The Midstream Solution is administered by APTIM and implemented by ICF. The solution provides incentives to residential and commercial distributors who sell efficiency upgrades through the four statewide channels described here:[36]

- **Commercial Kitchen Equipment** provides incentives to support the sales of commercial food service equipment, including, but not limited to, fryers, hot food holding cabinets, steamers, dishwashers, and ice makers and refrigerators.
- **HVAC Equipment** provides incentives to support the sales specifically of ductless mini-split heat pumps. The offering is primarily intended for residential use, though some units are installed in small business settings.
- **Heat Pump Water Heaters** provides incentives to support the sales of high-efficiency heat pump-based hot water heaters. This offering was launched in 2020, though sales have been slow through 2021.
- **Circulator Pumps** provides incentives to support the sales of high-efficiency hot water variable speed circulator pumps, often used to move water in large buildings for heating or hot water end uses.

Table 71 summarizes impacts of the Midstream Solution's core measures for CY 2021.

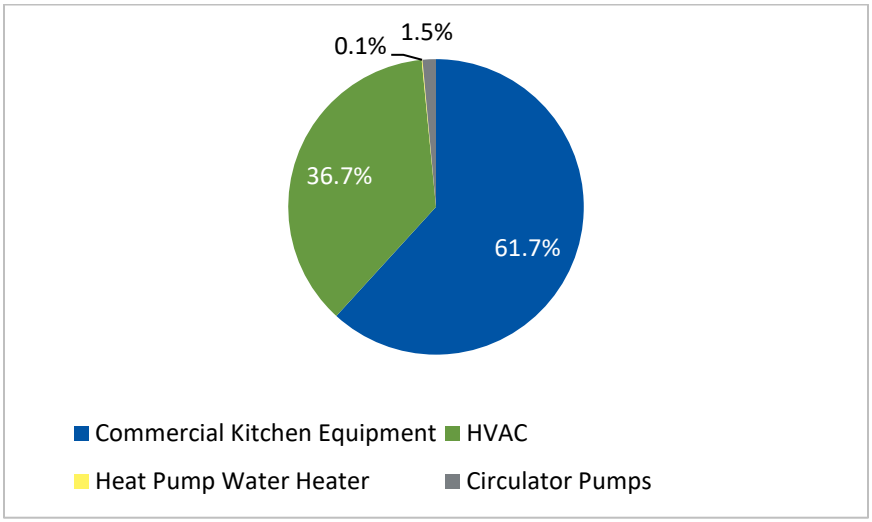
Table 71. Midstream Solutions Summary

Item	Units	CY 2021
Incentive Spending	$	$718,575
Participation	Number of Participants	1,555
Verified Gross Lifecycle Savings	kWh	43,336,920
	kW	N/A
	therms	6,051,445
Verified Gross Lifecycle Realization Rate	% (MMBtu)	101%
Annual NTG Ratio	% (MMBtu)	100%
Net Annual Savings	kWh/year	2,859,897
	kW	263.27
	therms/year	384,868
Net Lifecycle Savings	MMBtu	489,354.38
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	1.52

Figure 56 shows the proportion of Midstream Solution savings by measure. HVAC equipment contributed the most net lifecycle MMBtu savings to the solution. Circulator pumps contributed only 1.5% of savings and heat pump water heaters only 0.1% of savings.

[36] Sixty percent of incentives must be passed through to end-use participants.

Figure 56. Proportion of Net Lifecycle Savings by Measure



Achievement Against Goals

Table 72 shows the percentage of gross lifecycle savings goals achieved by the Midstream Solution in CY 2021. The solution exceeded its *ex post* net kWh goals substantially but did not achieve either its demand (kW) or therm goals.

Table 72. Net Lifecycle Achievement Against Goal for Midstream Solution

Category	Net Goals	*Ex Post* Net Savings
kWh	19,842,487	43,336,920
kW	1,031	263
therms	6,411,640	6,051,445

Impact Evaluation

This section contains the findings for the CY 2021 impact evaluation for the Midstream Solution. Findings are reported by individual offering. A discussion of each offering follows.

Impact Evaluation Methodology

The evaluation team designed its evaluation, measurement, and verification approach to integrate multiple perspectives in assessing the performance of each offering and of the Midstream Solution as a whole. Table 73 lists specific data collection activities and sample sizes used in the evaluation. Additional details about these activities are in discussions about the specific offerings below and in Appendix G. Net Savings Analysis in Volume III.

The CY 2021 Midstream Solution was negatively affected by the continued COVID-19 pandemic, though the degree of impact was lower than in CY 2020. Nevertheless, despite the pandemic, the offering was still able to offer incentives for many measures, including a large number of commercial kitchen measures to non-restaurant businesses, local governments, and school districts.

Table 73. CY 2021 Data Collection Activities and Sample Sizes – Impact Evaluation

Activity	Commercial Kitchen Equipment	HVAC Equipment	Heat Pump Water Heaters	Circulator Pumps
Tracking Database Review	Census	Census	Census	Census
Distributor Surveys	14	15	0	0

Verified Gross Savings Results for Midstream Solution

Table 74 lists the first-year and lifecycle realization rates for CY 2021 by offering. Table 75 lists the verified first-year and lifecycle savings by offering. Overall, the Midstream Solution achieved a first-year evaluated realization rate of 101.2%, weighted by total (MMBtu) energy savings. Detailed findings for each offering, including factors affecting the realization rates, are discussed in the next section.

Table 74. CY 2021 Midstream First-Year and Lifecycle Realization Rates

Offering	First-Year Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Commercial Kitchen Equipment	101.7%	112.8%	99.8%	100.2%	100.0%	99.8%	99.9%
HVAC Equipment	104.3%	101.8%	101.3%	101.8%	104.3%	101.3%	101.8%
Heat Pump Water Heaters	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Circulator Pumps	100.0%	100.0%	N/A	100.0%	100.0%	N/A	100.0%
Overall Realization Rate	103.1%	108.0%	100.7%	101.2%	103.0%	100.8%	100.0%

Table 75. CY 2021 Midstream First-Year and Lifecycle Verified Energy Savings Summary

Offering	Verified First-Year Savings				Verified Lifecycle Savings		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Core Offerings							
Commercial Kitchen Equipment	970,788	156	145,403	17,841	10,005,582	1,742,740	208,293
HVAC Equipment	1,668,213	100	239,132	29,585	30,027,834	4,304,376	532,532
Heat Pump Water Heaters	4,968	0	333	50	64,584	4,329	652
Circulator Pumps	215,928	6	N/A	734	3,238,920	N/A	11,012
Total Solution	**2,859,897**	**263**	**384,868**	**48,210**	**43,336,920**	**6,051,445**	**752,490**

Commercial Kitchen Equipment: Verified Gross Savings Results

For the Commercial Kitchen Equipment Offering, the evaluation team conducted a database review and a TRM review. The team found very close alignment between *ex ante* and *ex post* gross savings for each measure. The offering had a gross lifecycle realization rate of 100.2% MMBtu. There were no substantial deviations between *ex ante* and *ex post* gross savings for the offering.

Table 76 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for the Commercial Kitchen Equipment measure.

Table 76. CY 2021 Commercial Kitchen Equipment *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
First Year Gross Savings	954,986	138.48	145,623	970,788	156.25	145,403
Lifecycle Gross Savings	10,005,582	N/A	1,742,740	10,005,582	N/A	1,742,740

HVAC Equipment: Verified Gross Savings Results

For the HVAC Equipment Offering, the evaluation team conducted a database review and a TRM review. The team found high fidelity between *ex ante* and *ex post* gross savings for the one measure (ductless mini-split heat pump). The offering had a gross lifecycle realization rate of 101.8% MMBtu. There were no deviations between *ex ante* and *ex post* gross savings for the offering.

Table 77 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for the HVAC Equipment Offering.

Table 77. CY 2021 HVAC Equipment *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
First Year Gross Savings	1,598,929	98.72	236,157	1,668,213	100.48	239,132
Lifecycle Gross Savings	30,027,834	N/A	4,304,376	30,027,834	N/A	4,304,376

Heat Pump Water Heaters: Verified Gross Savings Results

For the Heat Pump Water Heater Offering, the evaluation team conducted a database review and a TRM review. The team found high fidelity between *ex ante* and *ex post* gross savings for the measure. The offering had a gross lifecycle realization rate of 100.0% MMBtu. There were no deviations between *ex ante* and *ex post* gross savings for the offering.

Table 78 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for the Heat Pump Water Heater Offering.

Table 78. CY 2021 Heat Pump Water Heater *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
First Year Gross Savings	4,968	0.24	333	4,968	0.24	333
Lifecycle Gross Savings	64,584	N/A	4,329	64,584	N/A	4,329

Circulator Pumps: Verified Gross Savings Results

For the Circulator Pumps Offering, the evaluation team conducted a database review and a TRM review. The team found high fidelity between *ex ante* and *ex post* gross savings for this offering. The offering had a gross lifecycle realization rate of 100.0% MMBtu. There were no substantial deviations between *ex ante* and *ex post* gross savings.

Table 79 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for the Circulator Pumps Offering.

Table 79. CY 2021 Circulator Pumps *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
Core Retail Offering						
First Year Gross Savings	215,928	6.31	N/A	215,928	6.31	N/A
Lifecycle Gross Savings	3,238,920	N/A	N/A	3,238,920	N/A	N/A

Verified Net Savings Results for Midstream Solution

In the Midstream Solution, the implementer works with distributors and, for some measures, with contractors to provide instant discounts for customers purchasing qualifying energy-saving equipment. This market intervention design seeks to overcome barriers to sales of high-efficiency equipment and to accelerate the adoption of energy-efficient products to achieve long-term and sustainable market transformation.

Quantification of attributable net savings considers the impact of the solution on the broader market over an extended period, usually multiple years. The evaluation team, in coordination with the PSC, the implementer, and other stakeholders, determined the approach to identify freeridership and spillover attributable to the solution. Data collection for that effort will be completed at the start of CY 2023.

Process Evaluation

The evaluation team conducted a process evaluation to assess the success of the CY 2021 Midstream Solution in meeting its objectives. The process evaluation is designed to incorporate perspectives from the administrator, the implementer, and participating distributors, contractors, and customers.

Process Evaluation Methodology

Table 80 lists the process evaluation activities for the offerings in the CY 2021 Midstream Solution. The sample population represents the total number of participating distributors, contractors, and customers with valid contact information but does not include any who did not provide contact information.

Table 80. CY 2021 Midstream Solution Process Evaluation Activities

Activity	CY 2021 Sample Population	CY 2021 Completes
Tracking Database Review	Census	N/A
Commercial Kitchen Equipment Distributor In-Depth Interviews	14	12
HVAC Equipment Distributor In-Depth Interviews	15	9
Commercial Kitchen Equipment Customer Survey	41	5
HVAC Equipment Customer Survey	418	56
HVAC Equipment Contractor Survey	23	17

Tracking Database Reviews

The evaluation team reviewed and summarized the Midstream Solution 2021 sales data in SPECTRUM, by equipment category and by distributor, to characterize the level of distributor participation and in preparation for distributor interviews.

Distributor Interviews

The evaluation team interviewed 12 of 14 participating distributors in the Commercial Kitchen Equipment Offering and nine of 15 participating distributors in the HVAC Equipment Offering. The interviews covered the following topics about the Midstream Solution:

- Motivations for and barriers to participation
- Successes and challenges
- Satisfaction
- Market share of qualifying equipment and participating distributors
- Retrospective and prospective counterfactual sales
- Influence on distributors' stocking, promotional, and pricing practices

The evaluation team developed an interview guide to ensure all topics were covered but conducted the interviews informally, that is, not as a structured survey, so the conversation could flow naturally and respondents could be comfortable giving a candid perspective.

Customer Surveys

The evaluation team emailed a survey to all participating customers in the Commercial Kitchen Equipment and HVAC Equipment Offerings who had email addresses available in the Midstream Solution tracking data. The survey covered the following topics about the Midstream Solution:

- Confirmation of participation
- Equipment characteristics and usage
- Solution influence on purchase decision-making
- Customer intention to purchase equipment
- Spillover
- Satisfaction
- Firmographics or demographics

The evaluation team conducted the survey between August 9 and September 28, 2021. Customers were contacted by email multiple times before the survey was closed. Five customers responded to the Commercial Kitchen Equipment survey and 56 customers responded to the HVAC Equipment survey. For taking the survey, Commercial Kitchen Equipment customers were awarded a $40 Visa gift card and HVAC customers were awarded a $10 Visa gift card.

Contractor Surveys

The evaluation team also emailed a survey to participating HVAC contractors who installed qualified ductless mini-split heat pumps. The surveys covered the following topics about the Midstream Solution:

- Contractor awareness of the Midstream Solution
- Retrospective and prospective counterfactual sales
- Contractor promotion and pricing practices
- Suggestions for improvement
- Satisfaction

The evaluation team completed the survey between August 31 and September 28, 2021. Contractors were contacted by email multiple times before the survey was closed. Seventeen of 23 contractors responded to the survey. For taking the survey, the HVAC contractors were awarded a $50 Visa gift card.

Solution Design and Delivery

The Midstream Solution launched in 2020, combining with the Commercial Kitchen Equipment Pilot from 2019 and expanding in 2020 to include incentives for HVAC equipment, heat pump water heaters, and circulator pumps. The implementer helped distributors who had participated in the pilot transition their processes to the new system and recruited new distributors across all channels now offered through the Midstream Solution.

The Midstream Solution focuses on outreach and training to encourage distributors to increase their stock and promotion of qualifying equipment. Distributors then recruit contractors to participate. Both distributors and contractors use an online portal provided and maintained by the implementer to check the eligibility of equipment and incentive levels and to submit sales and customer data.

Incentives are paid directly to distributors, and they have some discretion regarding how much of the incentive is passed to the purchaser. Distributors can keep up to 40% of the incentive to cover administrative costs related to participation or offer spiffs to encourage sales staff to promote qualifying equipment. In CY 2021, as in CY 2020, most distributors reported passing the full value of incentives on to the equipment's final purchaser. The implementer allocated an incentive budget for each distributor, based on the distributor's forecasted sales of qualifying equipment.

In CY 2021, participation in the HVAC and Commercial Kitchen Equipment Offerings was relatively successful, considering the effects of the COVID 19 pandemic. The HVAC, Commercial Kitchen Equipment, and Circulator Pumps Offerings represented over 99% of sales by measure quantity.

However, sales through the Heat Pump Water Heaters Offering remained comparatively minimal. This offering was impeded by significant supply chain issues and was unable to distribute any units in CY 2020 and only nine units in CY 2021. In addition, the price point compared to less efficient options and other factors will continue to be barriers to adoption for heat pump water heaters and to reaching the same market penetration as ductless mini-split heat pumps.

Process Evaluation Findings by Offering

Commercial Kitchen Equipment: Process Evaluation Findings

Offering Design, Delivery, and Changes

In CY 2021, 14 distributors participated in the Commercial Kitchen Equipment Offering and 12 were interviewed. Nine of the interviewed distributors said it took a moderate effort to incorporate the offering into existing processes while three distributors said it took a small amount of effort to do so. When asked what could have made set-up easier, several mentioned implementation issues on their end that were unrelated to the implementer. These issues included challenges with getting salespeople to incorporate the offering into their efforts, integrating the offering into their own tracking systems, and learning how to process rebates in multiple ways, as the Midstream Solution has different procedures and requirements compared to other rebate programs.

One distributor noted that, though other offerings were ready, the implementer appeared not to be prepared to fully launch the Commercial Kitchen Equipment Offering at the time of the kickoff informational meeting, though that could be a reference to the launch before CY 2021.

A few distributors noted challenges with the portal used to apply for incentive applications. One mentioned not pushing the offering on the sales floor because using the portal was perceived as time-consuming, another said there was redundancy in the information required on the portal, and a third said the portal does not allow the distributor to look up a customer's address to determine what the customer qualifies for.

Distributor Satisfaction and Motivations for Participating

In CY 2021, distributors were largely satisfied with the Commercial Kitchen Equipment Offering. One distributor rated satisfaction as a 6 out of 10; however, when this distributor was asked if they wanted to tell the implementer about any issues with the offering, they said no and that their program representative has been good. Six distributors rated satisfaction as a 7 out of 10, one as an 8, one as a 9, and three as a 10 out of 10, for an average score of 8 out of 10.

General feedback about the benefits of the Commercial Kitchen Equipment Offering included staying competitive and/or increasing sales (eight distributors), helping their customers through the incentive (four distributors), and having environmental, energy saving, and higher efficiency and/or higher quality equipment benefits (four distributors).

Impact on Distributor Sales, Stocking, and Promotional Practices

The evaluation team asked interviewed distributors about their sales, stocking, and promotional practices during CY 2021. Many said they would have sold all or most of the qualifying equipment in the absence of the Commercial Kitchen Equipment Offering, but some said sales for specific types of equipment would have been significantly affected. One distributor would have sold 50% fewer ice machines without the offering. Another said the incentive for fryers was a big driver and sales would have been far fewer without the offering.

Distributors who said the offering was less than *very important* to their CY 2021 sales were asked to explain why. One distributor sold 2,000 ice machines in CY 2021 and said that though approximately 1,000 qualified for the offering no one wanted to take the time to process an incentive of only $50. Another explained that ice machines sell because of their quality and efficiency not because of the incentive. One distributor sold approximately 20 qualified ovens but said, compared to the overall price, the incentive was not enough to justify the submittal process.

When asked to estimate the market share of qualifying equipment models in Wisconsin, most distributors were unable to confidently give estimates; many said they were making a best guess and others said they were unable to make an estimation. Estimates of market share ranged widely for most equipment types. Ovens had the narrowest range, with 60% (one distributor), 50% (three distributors), and 25% (one distributor).

Forecasted sales of qualifying equipment in 2022 varied significantly by distributor and appeared to be largely due to uncertainty in the supply chain. One distributor was told if orders were not placed by January of 2022, the equipment would not be received this year. Another commented that the offering cannot be used if qualifying equipment is not available to sell. Another thought 2022 would be a difficult year for the offering due to limited product availability.

When asked about stocking practices, distributors' responses varied by equipment type. Many distributors said their company kept equipment in stock and decisions about inventory were based on market demand and prior sales; however, some equipment is more seasonal or stocked only when ordered. Several distributors said stocking practices have been impacted by the COVID-19 pandemic. One said current stocks were based on what they could get. Another said equipment price changes over the past two years also impacted choices in stock. Another said many items have been backordered. One distributor normally stocked a specific brand but was not always able to get it and ended up ordering other equipment, which affected the availability of ENERGY STAR units.

All 12 distributors said they make recommendations about equipment to contractors or buyers at least some of the time. However, distributors' propensity to make recommendations varied substantially by equipment type and did not appear to be consistently related to efficiency level or size of incentive.

All 12 distributors reported engaging in marketing efforts. Though all said they relied on one or more means of traditional marketing, eight said they rely on social media as part of their marketing approach. Two distributors said they also rely on Google ads.

Suggestions for Improvement

When asked to suggest ways Focus on Energy could improve the Commercial Kitchen Equipment offering, distributors offered the following suggestions:

- Give the buyer the incentive credit after the submittal
- Improve system of listing program qualifying equipment
- Incorporate an incentive that goes directly to salespeople
- Bring back refrigeration

- Increase ice machine rebate and/or tier the incentive based on machine size
- Eliminate redundancy involved in incentive submittals
- Redesign the incentive submittal process with a single form that takes no more than two minutes to complete
- Add an online address lookup tool to verify customer eligibility
- Provide implementer training directly targeted to salespeople
- Add an explanation in the portal to indicate what is wrong with an incentive application
- Provide more promotion of the offering by the implementer

Eight of 12 distributors thought the current incentives were sufficient. The distributor who suggested an additional incentive that went directly to the salesperson said programs in neighboring states offer such an incentive and this could help drive sales of higher-efficiency equipment. One distributor suggested that the incentive for ice machines should be tiered based upon machine size. Several distributors said incentives were not necessarily incremental and that more expensive qualifying units receive the same rebate as less expensive qualifying units. As an example, one distributor said that a $500 incentive on a high capacity dishwasher sold through the program reduced the final price by just 1.25%.

Customer Satisfaction

Only five end-use customers completed the email survey about the Commercial Kitchen Equipment Offering, so the evaluation team could not generalize the results.[37] Among the five respondents, satisfaction was decidedly mixed. One respondent did not answer any satisfaction questions. Another gave a 10 out of 10 rating to the offering, the equipment, the contractor they worked with, and the likelihood of recommending the offering to others, indicating very high satisfaction. However, two others rated the offering as only a 5 or a 6 out of 10. One respondent rated their contractor as a 0 out of 10. Two respondents would recommend the offering to other customers, while two others would not.

HVAC: Process Evaluation Findings

Offering Design, Delivery, and Changes

The HVAC Equipment Offering was new in 2020, and the implementer worked with distributors to train their sales staff on the offering's requirements and processes. The evaluation team interviewed nine of 15 HVAC distributors. Eight distributors sell largely to other contractors, four also sell to business owners or managers, and three also sell directly to residential customers.

In general, the distributors were enthusiastic about the Midstream Solution, with several lauding the support they received from the implementer. All nine distributors said they had not experienced any issues participating in the offering.

[37] This included a representative for Kwik Trip, which purchased a large number of fryers and dishwashers for locations throughout the state, representing a substantial portion of the offerings achieved savings.

When asked about the level of effort to get set up to participate in the HVAC Equipment Offering, five distributors said only a small effort, three said a moderate effort, and one said a very large effort. Six distributors could not think of anything that could have made the setup process easier. One distributor said there was initial difficulty setting the portal up on the contractor side but added Focus on Energy had helped with the necessary training. This distributor said setting up required a very large effort, and explained this was mostly on the part of the distributor asking multiple rounds of questions about what could and could not be done through the offering. This distributor recognized the importance of being set up properly but could not think of a way to make it easier. Another distributor requested more contractor oriented information from the implementer, as it took a while to get contractors up to speed on the offerings features, which was a problem as contractors are this distributor's main customer.

When asked about making participation in the offering more seamless, only one distributor had suggestions. This distributor suggested that Focus on Energy advertise the offering more. This distributor also suggested establishing a variable set of rates for incentives, noting that though distributors are allowed to take 40% of the incentive, they think they must give 100% of it to remain competitive, and also that in a neighboring state's program the incentive rate to the customer is fixed.

Distributor Satisfaction and Motivations for Participating

Overall, distributors were very satisfied with the new HVAC Equipment Offering. Of a top score of 10, the lowest satisfaction rating was a 7 (three distributors). Four distributors rated their satisfaction as an 8, one as a 9, and one as a 10.

Six distributors said that participating has had, or it is anticipated will have, a positive impact on equipment sales. Three distributors said their contractor customers benefit from their participation in the offering, such as increasing the number of jobs for contractors, creating greater contractor awareness of other Focus on Energy offerings, and more contractors promoting high-efficiency equipment.

Impact on Distributor Sales, Stocking and Promotional Practices

The evaluation team asked interviewed distributors about their 2021 sales, stocking, and promotional practices and how their participation had impacted those practices. Responses from distributors in the HVAC Equipment Offering differed somewhat from distributors in the Commercial Kitchen Equipment Offering. Three HVAC distributors said they would have sold the same number of units in absence of the offering, and three were not certain how sales might have changed had the offering not been in place. One distributor said 85% of the high-efficiency units sold through the offering would have sold without it, and one distributor said 50% of units would have sold without it.

Asked about the impact of the HVAC Equipment Offering on their 2021 sales of qualifying equipment, one distributor said it was *very important*, which was in line with the distributor's statement that sales of qualifying equipment would have been cut in half in 2021 without the offering. Two distributors said the offering was *somewhat important*, one was neutral, one said *not too important*, and one said *not at all important*. The distributor who rated the impact on sales as *not too important* did not know how sales would have been impacted in the absence of the offering. The distributor who rated the impact on

sales as *not at all important* also stated that their sales would not have changed in the absence of the offering.

When asked to estimate the market share of qualifying ductless mini-split heat pump models in Wisconsin, four of the nine distributors were willing to speculate. Estimations varied, with two distributors estimating market share at 75%. However, two estimated the market share was considerably lower, at 15% and between 10% and 15%. One distributor was unable to speculate but did acknowledge that the market share is increasing quickly.

Like distributors in the Commercial Kitchen Equipment Offering, seven distributors said stocking is based on market demand. Four said stocking decisions are affected by energy costs, three said utility rebates, two said market competition, one mentioned new product lines, and another said the brand of high-efficient equipment they carry. Just one distributor said the HVAC Equipment Offering incentive is very influential to stocking decisions.

Eight distributors said they made recommendations about equipment to contractors or buyers, and one distributor was not certain. When selling ductless mini-split heat pumps, six distributors said the incentive influences their recommendations of efficiency level. Interestingly, of the two distributors who said the incentive did not influence their recommendation of efficiency level, when asked how often they recommend high-efficiency equipment, one distributor said 85% to 90% of the time, noting that most of the units they sell are high-efficiency. The other distributor recommended high-efficiency equipment 100% of the time and said recommendations are based on the best solution for the customer while also noting that most of the ductless mini-split heat pumps they sell are high-efficiency.

Suggestions for Improvement

When asked about one thing Focus on Energy could change to improve the HVAC Equipment Offering, distributors suggested the following:

- Increase the tankless water heater incentive as it is not adequate
- Raise incentive amounts
- Provide incentive payments more quickly
- Include more inverter units
- Increase level of Focus on Energy marketing and advertising
- Uncap funds available for the offering
- Incorporate an incentive reference number
- Make process for submitting incentives easier
- Add outreach to contractors

Eight of nine distributors thought incentive levels were sufficient, but one did not. When asked how much incentives would need to increase, this distributor was not certain and did not provide a firm target.

Customer Motivations for Purchasing Ductless Mini-Split Heat Pumps

Surveyed end-use customers were asked to list the reasons they had chosen to purchase ductless mini-split heat pumps. Among the most common responses were to improve comfort (41 of 56 respondents) and to save energy and be more energy-efficient (40 of 56 respondents). Other reasons mentioned more than 10 times included to replace old but still functioning equipment, reduce utility bills, and receive the discount from Focus on Energy.

Customer Heat Pump Usage Patterns

Most respondents said the spaces where ductless mini-split heat pumps were installed were either not cooled at all or cooled with a portable or window air conditioner only. Of 24 respondents who said they used the ductless mini-split heat pump to heat an area, 50% said the previous area was heated primarily from a central boiler. Twenty-four respondents said the new units served a living or dining room, and 18 respondents installed the units in bedrooms. Ninety-one percent of units were installed in single-family detached homes. Eighty-one percent of respondents said natural gas was their primary heating fuel.

Contractor Impressions

Most contractors said they learned about the HVAC Offering program by word-of-mouth from their distributors. When asked why customers might choose qualifying ductless mini-split heat pumps, contractors said the most common reasons were for increased comfort and energy savings, which largely aligned with customer survey results. All surveyed contractors rated the HVAC Equipment Offering a 7 or higher on a 10-point scale, with 10 of 16 reporting it as a 9 or 10. Most contractors said that all of the appropriate eligible products were covered by Midstream Solution incentives, and 87% said the rebate levels were sufficient to induce customers to opt for more efficient equipment. Only two suggested other models that could be included in future years, including parts and repair equipment currently ineligible for solution discounts. Some contractors suggested improvements to the Midstream Solution, such as increasing rebate amounts, designing easier or shorter submission forms, including smart thermostats or other HVAC equipment, and reimbursing incentives more quickly.

Causal Pathway NTG Methodology for Commercial Kitchen Equipment and HVAC Offerings

Cadmus intends to use distributor, contractor (HVAC only), and end-user causal pathway NTG methodology to estimate attribution scores (NTG ratios) for the Commercial Kitchen Equipment and HVAC offerings, which will inform Solution NTG at the end of the quadrennium at the end of CY 2022. This approach is based on methods used in California and other states for similar upstream and midstream offerings, most recently described in detail in the 2018 California Public Utilities Commission HVAC Impact Evaluation Report.[38]

Table 81 presents the question themes associated with the three causal pathways—stocking, upselling, and pricing—for distributors, contractors, and end-use buyers.

[38] California Public Utilities Commission. 2018. *HVAC Impact Evaluation Report*. http://www.calmac.org/publications/Year2_CPUC_Group_A_HVAC_Report_Final_CALMAC_20200420.pdf

Table 81. Question Themes Associated with the Three Causal Pathways

Causal Pathways	Distributor/Contractor Question Theme	End User Question Theme
Stocking	1. What was the program influence on distributor stock?	1. How did the mix of equipment in stock influence the end user?
Upselling	2. What was the program influence on encouraging the distributor/contractor to promote or upsell the units?	2. What was the influence that distributor/contractor upselling had on the end user's decision?
Pricing	3. Did the distributor/contractor pass on some or all of the incentive to buyers?	3. What was the influence the price had on the end user's decision?

Each of the causal pathways is dependent on the distributor changing their behavior in response to the program, and that change in behavior influencing the decision-making of their contractors and end-use buyers. Each causal pathway is independently based on the assumption that if the program failed to show attribution through the distributors, contractors, or end-use buyers, then the program did not affect the equipment sale on that particular causal path. This does not mean that the program had no influence on the sale, only that any influence it had was not through this path. If another causal path did show program influence, then the sale was determined to be at least partially attributable to the program.

The evaluation team calculated the overall causal pathway attribution score (NTG ratio) for each offering by averaging the lifecycle energy savings weighted end user, distributor, and, where applicable, contractor survey attribution scores along each causal path, as shown in Table 82. The table also presents the NTG ratios as a percent sales lift (NTG ratio divided by 1 minus the NTG ratio), which indicates a 64% sales lift for Commercial Kitchen Equipment and a 79% sales lift for HVAC equipment. These ratios will be combined with CY 2022 survey results, and reviewed and revised by a Delphi Panel of experts, when Cadmus calculates offering NTG in 2023.

Table 82. Causal Pathway Attribution Scores/NTG Ratios

Offering	Stocking Attribution	Upselling Attribution	Pricing Attribution	Overall Attribution Score/NTG Ratio	Percent Sales Lift [NTG Ratio ÷ (1 - NTG Ratio)]
Commercial Kitchen Equipment	15%	27%	74%	**39%**	**64%**
HVAC	10%	40%	83%	**44%**	**79%**

Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a DSM offering. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix I. Cost-Effectiveness and Emissions Methodology and Analysis in Volume III includes a description of the TRC test.

Table 83 lists the CY 2021 incentive costs for the Midstream Solution.

Table 83. CY 2021 Midstream Incentive Costs

Offering	Incentive Costs
Commercial Kitchen Equipment	$203,175
HVAC	$472,500
Heat Pump Water Heaters	$4,500
Circulator Pumps	$38,400
Total	**$718,575**

The evaluation team found that the CY 2021 Midstream Solution was cost-effective with T&D benefits (1.52) and without T&D benefits (1.46). Table 84 lists the evaluated costs and benefits.

Table 84. Midstream Costs and Benefits

Cost and Benefit Category	Total
Costs	
Administration Costs	$45,810
Delivery Costs	$585,951
Incremental Measure Costs	$3,828,757
Total Non-Incentive Costs	**$4,460,517**
Benefits	
Electric Benefits (kWh)	$1,592,420
Electric Benefits (kW)	$528,477
T&D Benefits (kW)	$234,106
Gas Benefits	$3,283,398
Emissions Benefits	$1,124,349
Total TRC Benefits with T&D benefits	**$6,762,750**
Net TRC Benefits with T&D benefits	**$2,302,232**
TRC Benefit/Cost Ratio with T&D benefits	**1.52**

Outcomes and Recommendations

Outcome 1: As was noted in 2020 and 2021, participating distributors continue to be highly satisfied with the program and would like to see it expanded to include more equipment types and models.

Outcome 2: HVAC customers and contractors report high satisfaction with the offering, though Commercial Kitchen Equipment customers were less satisfied.

Outcome 3: Distributors and contractors noted that the process for entering data to receive qualifying rebates was onerous, and that the portal was not user-friendly.

Outcome 4: There is limited evidence that the Midstream Solution is changing distributors' behavior with regard to stocking for HVAC and commercial kitchen equipment. However, 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 full year of the Midstream Solution's implementation and changes to stocking practices tend to take multiple years to come into full effect, so

this result is not unexpected. The data will serve as a baseline for any changes observed in future years as the solution matures.

Recommendation 1: Work with distributors to identify equipment categories and efficiency tiers that would most benefit from program incentives, in order to maximize the program's impact and minimize freeridership. For example, if most of the ductless mini-splits carried by distributors are at least 18 SEER, consider limiting incentives to only higher SEER models. Consider eliminating incentives for equipment with significant market share and shifting these resources to increase incentive levels for equipment with higher incremental costs. This would also apply to Commercial Kitchen Equipment, particularly ice machines and fryers.

Recommendation 2. The implementation team should review data entry requirements and seek to minimize the time and detail required by participating distributors and contractors entering information into rebate forms and the portal and to eliminate any fields that are not essential to recordkeeping or evaluation efforts.

Nonresidential Solutions

This section presents the evaluation results for CY 2021 for these nonresidential solutions and their offerings.

Business and Industry

- Commercial and Industrial
- Large Industrial
- Agribusiness

Schools and Government

- Schools
- Government

Nonresidential New Construction

- Energy Design Assistance/Energy Design Review
- Prescriptive
- Multifamily Product and Equipment Performance

Renewable Energy Competitive Incentive Program (RECIP)

Business and Industry Solution

Through the Business and Industry Solution, Focus on Energy offers technical assistance and prescriptive and custom incentives for nonresidential customers who install energy-efficient measures.

APTIM is the solution administrator. The solution implementer, Franklin Energy, oversees management and delivery, and its subcontractors Leidos Engineering, CESA 10, and CleanTech Partners, provide subject matter expertise. The implementer's energy advisors, with support from trade allies and the administrator, promote and deliver the Business and Industry Solution to customers.

The Business and Industry Solution is divided into three offerings: Commercial and Industrial, Large Industrial, and Agribusiness, detailed below. Each offering is discussed in further detail later in this chapter.

- **Commercial and Industrial** supports commercial and small- and medium-sized industrial customers.
- **Large Industrial** supports industrial customers whose average monthly demand exceeds 1,000 kW of electricity or 100,000 therms of natural gas per month and whose combined utility bills were at least $60,000 in any month of the preceding year.
- **Agribusiness** supports agricultural producers engaged in growing and producing grain, livestock, milk, poultry, fruits, vegetables, greenhouses, bees and honey, fish, shellfish, or other common agricultural products that are living organisms in Wisconsin.

The rural initiative, another component in the Business and Industry Solution, seeks to increase geographic equity for Focus on Energy participation. Industrial and healthcare customers in rural areas can access additional assistance through the Staffing Incentive and the Rural Industrial Striving for Efficiency [RISE] initiative.

Through its Staffing Incentive, Focus on Energy offers rural customers 20% more than its standard prescriptive and custom incentives, and up to 100% of the project cost or $25,000, to offset the administrative costs of implementing an energy-efficient project.

Through RISE, rural industrial customers receive a series of guided, interactive workshops to help them better understand their energy use and to develop a project list. Customers can receive up to $15,000 in incentives, including a $1,500 incentive for successfully completing the guided workshops and $1,000 for each no- or low-cost measure implemented from the project list.

Agribusiness is also a part of the rural initiative. Participants can receive incentives for agricultural equipment such as grain dryers and milking equipment, and trade allies can receive bonus incentives when their customers implement agribusiness projects.

All customers eligible for Business and Industry Solution incentives also have access to prescriptive solar electric incentives and the Renewable Energy Competitive Incentive.

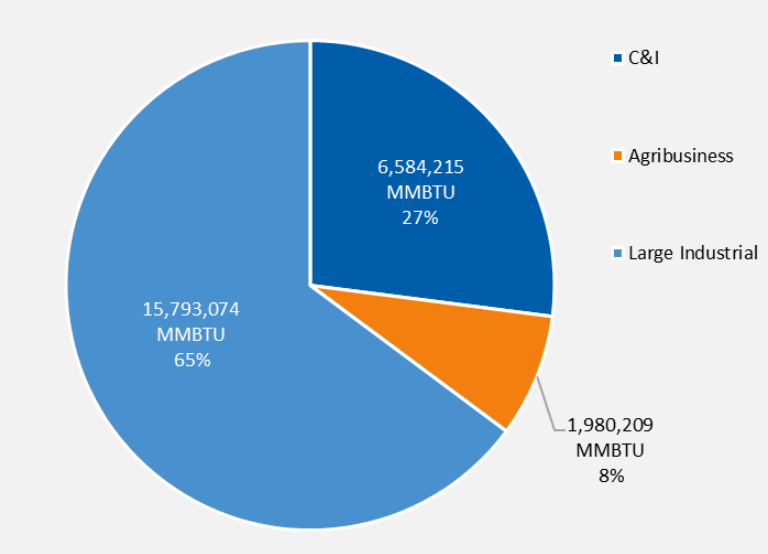
Table 85 summarizes the impacts of the Business and Industry Solution for CY 2021.

Table 85. CY 2021 Business and Industry Solution Summary

Item	Units	CY 2021
Incentive Spending	$	$17,445,999
Participation	Number of Participants	3,370
Verified Gross Lifecycle Savings	kWh	4,464,602,773
	kW	38,155
	therms	169,631,589
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%
Annual NTG Ratio	% (MMBtu)	76%
Net Annual Savings	kWh/year	234,981,380
	kW	29,262
	therms/year	7,574,790
Net Lifecycle Savings	MMBtu	24,357,498
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio with T&D Benefits	3.52

Figure 57 shows the proportion of savings by offering. The Large Industrial Offering contributed 65%, the Commercial and Industrial Offering contributed 27%, and the Agribusiness Offering contributed 8%.

Figure 57. CY 2021 Proportion of Business and Industry Solution Net Lifecycle Savings by Offering



Achievement Against Goals

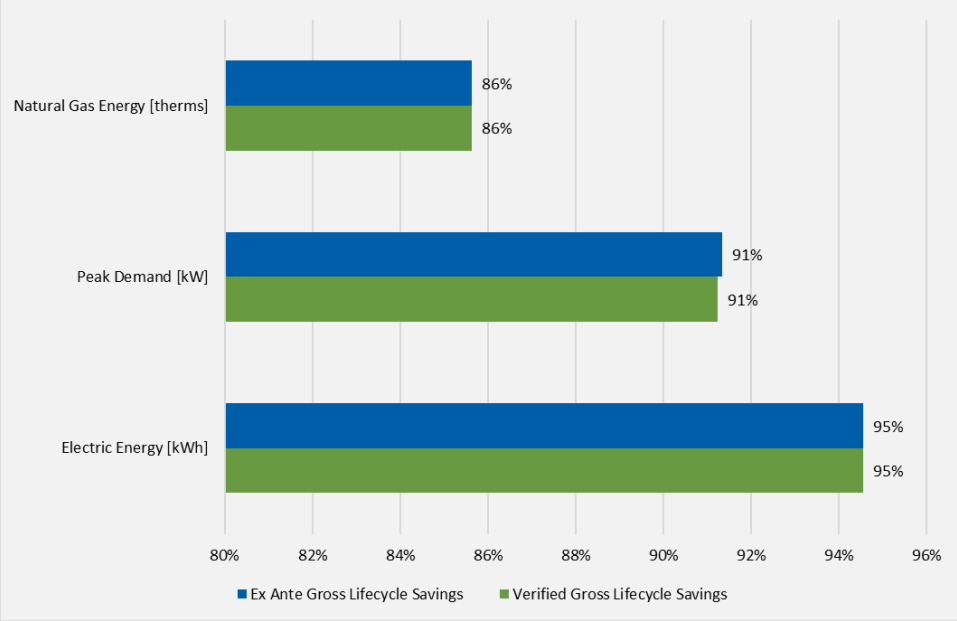
As shown in Table 86, the Business and Industry Solution achieved 95% of its electric energy savings goal, 86% of its therm savings goal, and 91% of its peak demand savings goal in CY 2021 based on *ex ante* lifecycle savings at the solution level. Figure 58 shows the percentage of gross lifecycle savings goals achieved for the Business and Industry Solution in CY 2021.

Table 86. CY 2021 Business and Industry Solution Achievement of Gross Lifecycle Savings Goals

Savings	*Ex Ante* Gross Lifecycle Savings		Verified Gross Lifecycle Savings		*Ex Ante* Percent Achieved	Verified Gross Percent Achieved
	Goal	Actual	Goal	Actual [a]		
Electric Energy [kWh]	4,720,076,201	4,464,602,773	4,720,076,201	4,464,602,773	95%	95%
Peak Demand [kW]	41,807	38,198	41,807	38,155	91%	91%
Natural Gas Energy [therms]	198,101,000	169,631,589	198,101,000	169,631,589	86%	86%
Total Energy [MMBtu][a]	**35,915,000**	**32,195,489**	**35,915,000**	**32,195,489**	**90%**	**90%**

a Verified kWh and therm savings may not sum to verified MMBtu values due to conversion/rounding associated with measure level application of realization rates.

Figure 58. CY 2021 Business and Industry Solution Achievement of Gross Lifecycle Savings Goals



The 100% *ex ante* gross lifecycle savings reflects the implementer's contract goals for CY 2021. Verified gross lifecycle savings contribute to the administrator's portfolio-level goals.

Impact Evaluation

This section contains the findings for the CY 2021 impact evaluation at the solution level, followed by a discussion of each offering.

Impact Evaluation Methodology

The evaluation team conducted an impact evaluation of the CY 2021 Business and Industry Solution. The team designed its evaluation, measurement, and verification approach to integrate multiple perspectives in assessing the performance of each offering and of the solution as a whole.

The team used the following approaches to measure the impact of the Business and Industry Solution:

- Tracking database review

- Engineering desk reviews
- Virtual verification site visits and interviews

Table 87 lists the specific data collection activities and sample sizes used in the evaluation. Additional details about these activities and their findings can be found in the offering-specific discussions below.

Table 87. CY 2021 Business and Industry Solution Impact Activities

Offering	Suboffering	Total Measures	Impact Evaluation Sample		
			Desk Reviewed Measures	Virtually Verified Measures	Proportion Sampled (by *Ex Ante* MMBtu savings)
Commercial and Industrial	Small and Medium Industrial	1,687	30	16	9%
	Small and Medium Commercial	528	34	16	15%
	Large Commercial	5,981	32	11	1%
Large Industrial		1,823	63	58	22%
Agribusiness		2,349	27	15	7%
Total		**12,368**	**186**	**116**	**16%**

Engineering Desk Reviews

The evaluation team reviewed all available project documentation in SPECTRUM for a sample of 186 measures in the CY 2021 Business and Industry Solution. This review included an assessment of the savings calculations and methodology applied by the implementer. The team relied on the applicable TRMs and other relevant secondary sources as needed. Secondary sources included energy codes and standards, case studies, and energy efficiency program evaluations of comparable measures (based on geography, sector, measure application, and date of issue).

For prescriptive measures, the team used the Focus on Energy 2020 and 2021 TRMs and associated workpapers as primary sources to determine methodology and data in nearly all cases. For hybrid and custom measures, the team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation.

To conduct the impact analysis of the offering, the evaluation team selected a representative sample of measures to evaluate then extrapolated findings to the larger population. In 2021, this process used both purposive and proportional sampling.

The **census sampling** selected the measures with the largest savings by offering. These measures are referred to as census measures. The threshold of savings varied by offering and were determined by percentage distribution analysis. Most measures larger than 5% of the offering's MMBtu lifecycle savings were sampled as census. Because these measures were sampled with certainty (100% of eligible highest saving measures were sampled), the results were not extrapolated to the offering population.

The **random sampling** measures were randomly selected from the population of offering measures. These measures are referred to as randomly sampled measures. The cumulative realization rate of randomly sampled measures by offering was extrapolated to the remainder of the offering population.

On-Site and Virtual Verification Site Visits

The evaluation team conducted 89 virtual verification site visits, including interviews with the site contact, using several remote technology interfaces to abide by travel restrictions due to the COVID-19 pandemic. The team verified the type and quantity of equipment installed, determined how the installed equipment is controlled, and documented the operating hours of the installed equipment. The team verified savings calculation input parameters based on operational and occupancy schedules, claimed and observed setpoints, trend data, utility data, and any other relevant details identified prior to contact with the site.

Verified Gross Savings Results for Business and Industry Solution

Table 88 lists the first-year and lifecycle realization rates for the CY 2021 Business and Industry Solution. Table 89 lists verified first-year and lifecycle savings by offering. The sampled projects represent 16% of Business and Industry Solution lifecycle MMBtu savings. Overall, the solution achieved a first-year evaluated realization rate of 99%, weighted by total (MMBtu) energy savings. Realization rates are determined by strata, such as census and sample strata, and claimed and verified savings are summed to the offering level to arrive at offering savings and realization rates. Detailed findings for each offering, including factors affecting the realization rates, are discussed in detail in the next section of this chapter.

Table 88. CY 2021 Business and Industry Solution First-Year and Lifecycle Realization Rates

Offering	First-Year Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Commercial and Industrial (C&I)	100%	100%	100%	100%	100%	100%	100%
Large Industrial	100%	100%	97%	98%	100%	100%	100%
Agribusiness	99%	99%	100%	99%	100%	100%	100%
B&I Solution	**100%**	**100%**	**98%**	**99%**	**100%**	**100%**	**100%**

Table 89. CY 2021 Business and Industry Solution
First-Year and Lifecycle Verified Energy Savings Summary

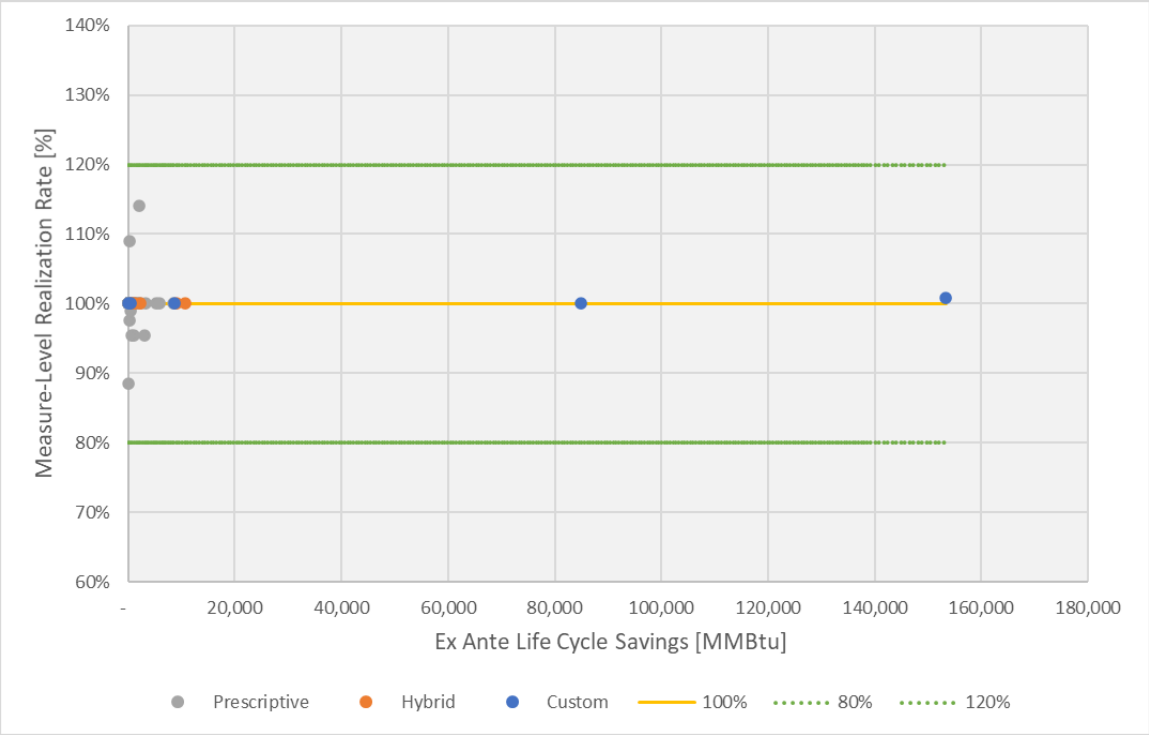
Offering	Verified First-Year Savings				Verified Lifecycle Savings		
	kWh	kW	therms	MMBtu [a]	kWh	therms	MMBtu[a]
C&I	122,630,766	17,449	1,979,485	616,365	1,684,606,216	28,039,465	8,550,929
Large Industrial	152,336,683	16,511	7,896,666	1,307,185	2,240,414,803	136,976,966	21,341,992
Agribusiness	32,356,447	4,195	240,760	134,235	539,581,754	4,615,158	2,302,569
B&I Solution	**307,323,896**	**38,155**	**10,116,911**	**2,057,785**	**4,464,602,773**	**169,631,589**	**32,195,489**

[a] Verified kWh and therm savings may not sum to verified MMBtu values due to conversion/rounding associated with measure level application of realization rates.

Commercial and Industrial: Verified Gross Savings Results

For the Commercial and Industrial Offering, the evaluation team conducted a database review, desk reviews, interviews, and virtual site visits to inform verified gross savings. The sampled projects represent 4% of Commercial and Industrial Offering lifecycle MMBtu savings. The offering had a gross lifecycle realization rate of 100%. Figure 59 presents the magnitude of and associated realization rates for reported MMBtu savings of the sampled projects.

Figure 59. CY 2021 Commercial and Industrial Offering Sampling Results



As Figure 59 shows, very few of the *ex post* savings calculations deviated from *ex ante* savings in the Commercial and Industrial Offering sample and were primarily in the prescriptive measures. For two prescriptive measures sampled, the source of the *ex ante* savings calculation for MMID 3400 was not clear. However, the source of the issue was determined that the MMID was not correctly updated in the TRM or SPECTRUM. *Ex Ante* savings for these measures had been calculated using the most recent workpaper for this measure. Evaluated savings also used the workpaper for *ex post* savings calculation, resulting in a realization rate of 100% for both projects.

The following describe the main factors affecting the realization rate:

- For five prescriptive measures sampled, *ex ante* savings were taken from the 2021 TRM before its publication on April 15, 2021. The evaluation team revised reported savings to match the *ex post* calculation, which used the 2020 TRM that was current as of the project application created date in SPECTRUM. *Ex post* verified kWh savings decreased slightly for four of the prescriptive measures and increased slightly for one.

- The evaluation team adjusted a refrigerated evaporator fan control cooler measure to reflect the specific reported project operation hours, as determined through a virtual site visit with the customer. The unit runs 8,760 annual hours with no scheduled down time. *Ex post* verified kWh savings increased slightly as a result.
- The team adjusted a condensing boiler measure to reflect operating conditions found during an on-site visit. The measure claimed two condensing boilers, and both were found in operation. However, one is redundant and programmed to run in lead/lag configuration but never with the other. These boilers, which replaced two noncondensing boilers in the same sequence, have been programmed with supply and return setpoint ranges that will not achieve the condensing state. The team adjusted the *ex post* verified savings to reflect a single boiler, using near condensing measure savings, which reduced the realized first-year and lifecycle therm savings to 39% of *ex ante* projections.
- In two instances, inputs to the prescriptive saving calculation were apparently rounded off in the *ex ante* calculation, leading to overestimating kWh savings. An adjustment to *ex post* verified savings resulted in kWh realization rates of 98% and 99%.

Table 90 lists the CY 2021 *ex ante* and verified gross savings by segment for the Commercial and Industrial Offering.

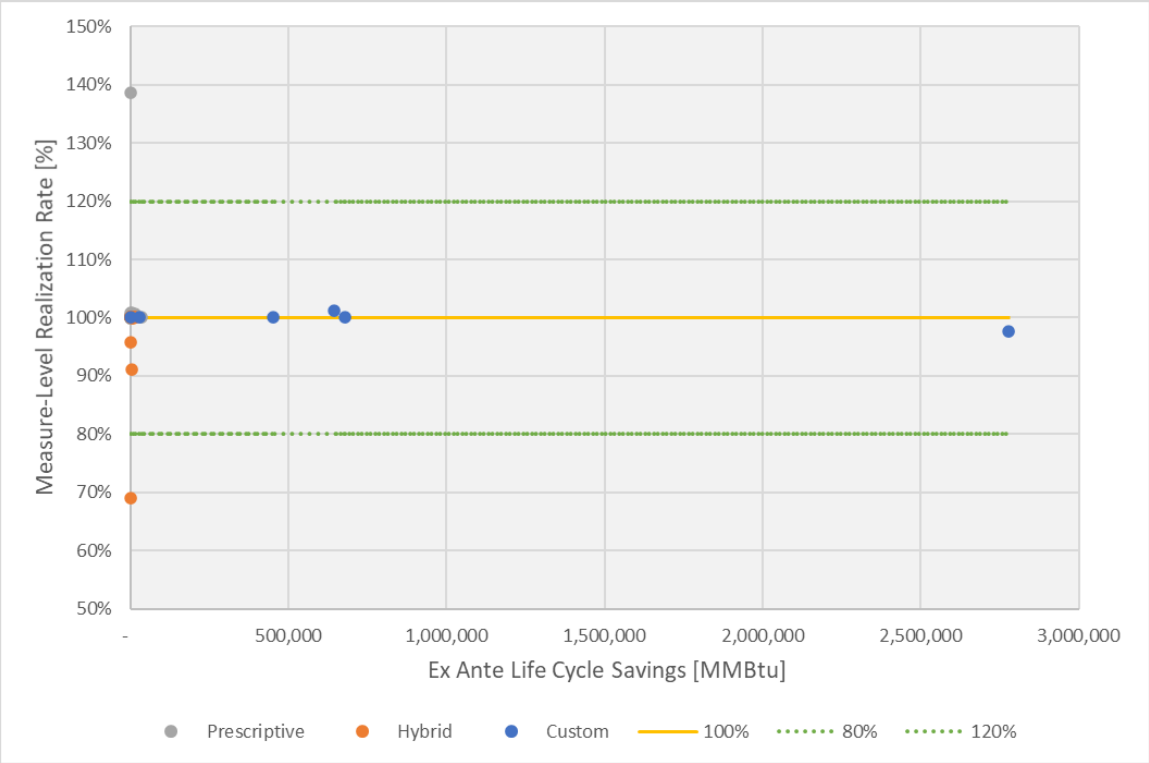
Table 90. CY 2021 Commercial and Industrial *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
Overall Commercial and Industrial						
First-Year Gross Savings	122,630,766	17,449	1,979,485	122,630,766	17,449	1,979,485
Lifecycle Gross Savings	1,684,606,216	17,449	28,039,465	1,684,606,216	17,449	28,039,465
Small and Medium Industrial						
First-Year Gross Savings	44,121,040	6,456	651,258	44,121,040	6,456	651,258
Lifecycle Gross Savings	663,495,828	6,456	9,370,202	663,495,828	6,456	9,370,202
Small and Medium Commercial						
First-Year Gross Savings	3,678,053	384	26,758	3,678,053	384	26,758
Lifecycle Gross Savings	48,090,181	384	467,070	48,090,181	384	467,070
Large Commercial						
First-Year Gross Savings	74,831,673	10,609	1,301,469	74,831,673	10,609	1,301,469
Lifecycle Gross Savings	973,020,207	10,609	18,202,193	973,020,207	10,609	18,202,193

Large Industrial: Verified Gross Savings Results

For the Large Industrial Offering, the evaluation team conducted a database review, desk reviews, interviews, and virtual site visits to inform verified gross savings. The sampled projects represent 22% of Large Industrial Offering lifecycle MMBtu savings. The offering had a gross lifecycle realization rate of 100% MMBtu. Figure 60 presents the magnitude of and associated realization rates for reported MMBtu savings of the sampled projects.

Figure 60. CY 2021 Business and Industry Solution Large Industrial Offering Sample Results



As Figure 60 shows, the prescriptive and custom projects generally maintained a 100% realization rate, with minor fluctuations. The sampled hybrid measures had more variability. Most of the projects with the highest variability were associated with relatively low savings.

The following describes the main factors that affected the measure realization rates:

- For one low-impact measure, *ex ante* savings used the new 2021 TRM before its publication on April 15, 2021. The evaluation team revised reported savings to match the *ex post* calculation, which used the 2020 TRM that was current as of the project application created date in SPECTRUM. This led to a kWh realization rate of 139% for this prescriptive project.
- For one measure, a reported calculation was finalized from a hardcoded value rather than from correctly calculating the values in the provided documentation. The actual calculated value reduced savings and resulted in a kWh lifecycle realization rate of 91%.
- For one custom boiler measure, the team adjusted savings to reflect customer feedback on the project ramp-up schedule. The project was expected to be at 40% ramp-up, but was at 24% and consequentially flared off most of its production. This adjustment significantly reduced first-year therm savings to 59% of *ex ante* realization. The remaining 19 years of EUL were unmodified and resulted in a lifecycle therm realization of 98%.
- For one hybrid variable frequency drive (VFD) process fan measure, the team adjusted measure savings downward based on equipment specification and operation data obtained during an on-site visit. The actual motor name plate differed slightly from specifications used in the *ex ante*

calculations. In addition, the boiler system is one of two, redundant to each other, and only one runs at a time with cumulative run hours of 8,100 hours. The boiler system for this application claimed approximately 4,050 hours. The reduction of run hours and efficiency rating reduced the *ex ante* therm savings realization rate to 69%.

- For one hybrid VFD process pump measure, customer data showed that the production line is not scheduled to ramp up to full production until next year (2022). The evaluation team adjusted *ex post* therm savings for the first year of the 15-year measure EUL to reflect the current production level reported. Therm savings reported for the remaining 14 years of the lifecycle have not been adjusted. The net effect on therm lifecycle realization rate is 96%.
- In two instances, inputs to the prescriptive saving calculation for MMID 2257 for *ex ante* savings reflect a units error found in the TRM. The claimed savings input reflects output energy, not input energy. The evaluation team followed the published TRM calculation without correction. *Ex post* verified savings resulted in both a first-year and lifecycle therm realization rate of 101%.
- In one large custom process measure, the team adjusted *ex ante* therm savings to reflect a weighted average of the product currently produced, according to data provided by the customer. *Ex post* verified therm savings increased very slightly for both first-year and lifecycle savings.

Table 91 lists the CY 2021 *ex ante* and verified gross savings by segment for the Large Industrial Offering.

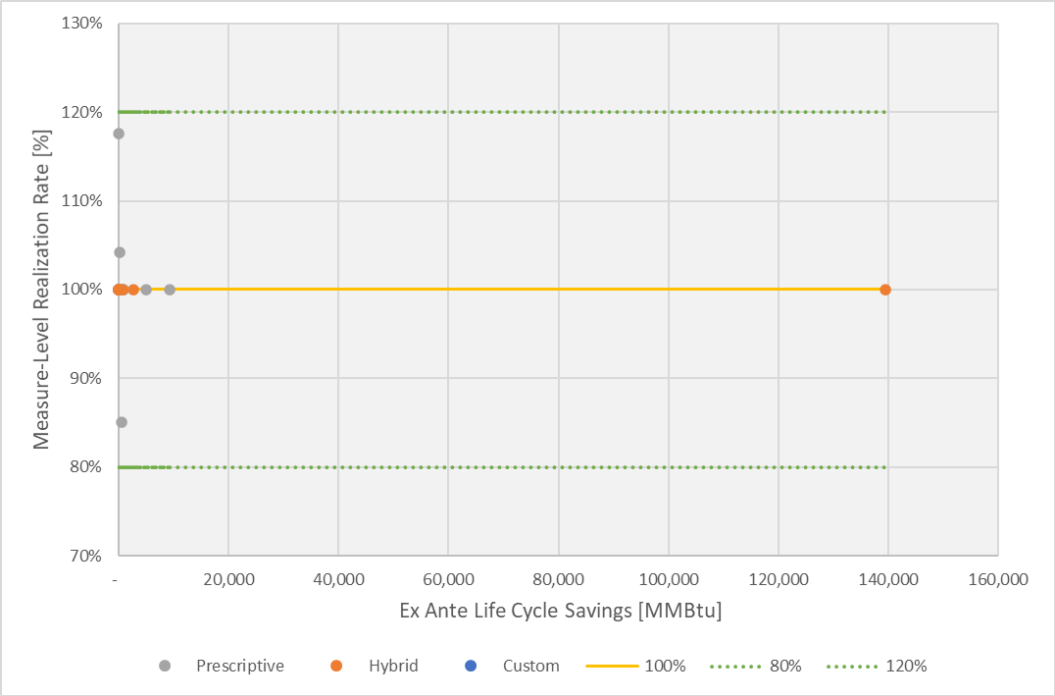
Table 91. CY 2021 Large Industrial Offering *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
First-Year Gross Savings	152,336,683	16,511	8,140,893	152,336,683	16,511	7,896,666
Lifecycle Gross Savings	2,240,414,803	16,511	136,976,966	2,240,414,803	16,511	136,976,966

Agribusiness: Verified Gross Savings Results

For the Agribusiness Offering, the evaluation team conducted a database review, desk reviews, interviews, and virtual site visits to inform verified gross savings. The sampled projects represent 7% of Agribusiness Offering lifecycle MMBtu savings. The offering had a gross lifecycle realization rate of 100% MMBtu. Figure 61 presents the magnitude of and associated realization rates for reported MMBtu savings of the sampled projects.

Figure 61. CY 2021 Business and Industry Solution Agribusiness Offering Sample Results



As Figure 61 shows, most sampled measures received high realization rates. In CY 2021, there were three instances of *ex post* savings calculations deviating from *ex ante* savings. The following are the main factors that affected the realization rate:

- In two prescriptive measures, the MMIDs for the projects (4696 and 4697) are not in the 2020 TRM, which was current as of the project's application created date in SPECTRUM. The MMIDs used to calculate *ex ante* savings were 3092 and 3093 in the 2020 TRM, which are defined as equivalent measures to MMID 4696 and MMID 4697 respectively. However, it appears the wrong MMID match was selected for each project. For the MMID 4697 project, MMID 3092 was used when MMID 3093 is the equivalent. Similarly, for the MMID 4696 project, MMID 3093 was used when MMID 3092 is the equivalent. *Ex post* savings calculations matched the correct MMID together to derived savings from the 2020 TRM. The realization rates for these projects were 117% and 85% respectively.
- In one prescriptive measure, *ex ante* savings were taken from the 2021 TRM before its publication on April 15, 2021. The evaluation team revised reported savings to match the *ex post* calculation, which used the 2020 TRM that was current as of the project application created date in SPECTRUM. This modification led to a kWh realization rate of 104% for this prescriptive project.

Table 92 lists the CY 2021 *ex ante* and verified gross savings by segment for the Agribusiness Offering.

Table 92. CY 2021 Agribusiness Offering *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
First-Year Gross Savings	32,683,280	4,238	240,760	32,356,447	4,195	240,760
Lifecycle Gross Savings	539,581,754	4,238	4,615,158	539,581,754	4,195	4,615,158

Verified Net Savings Results for the Business and Industry Solution

The evaluation team did not conduct a participant survey in CY 2021. Instead, it used CY 2020 NTG data to assess net savings for the Business and Industry Solution by offering. The team weighted the 2020 offering-level NTG estimates by 2021 total population lifecycle MMBtu savings to calculate an overall NTG ratio of 76% for the CY 2021 solution.

Verified Net Savings Results

The evaluation team calculated freeridership and participant spillover by offering for the CY 2021 Business and Industry Solution using findings from the participant survey conducted in CY 2020. To calculate the NTG for each offering in CY 2020, the team combined the self-reported freeridership and participant spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

Table 93 shows the offering-level NTG results for the Business and Industry Solution in CY 2020. The 2020 Evaluation Report contains the full detailed analysis of NTG completed in CY 2020.

Table 93. Business and Industry Solution NTG Ratios by Offering

Offering	Freeridership	Spillover	NTG Ratio
Commercial and Industrial	24% [a]	1%	77%
Large Industrial	28% [a]	2%	74%
Agriculture	15% [a]	1%	86%

[a] Weighted by lifecycle gross verified MMBtu savings

Table 94 shows the weighted average NTG ratio by offering as well as the total lifecycle gross verified savings and lifecycle net savings in CY 2021. The evaluation team calculated an overall NTG estimate of 76% for the solution in CY 2021.

Table 94. CY 2021 Business and Industry Lifecycle Net Savings and NTG

Offering	Total Lifecycle Gross Verified Savings (MMBtu)	Total Lifecycle Net Savings (MMBtu)	NTG Ratio
Commercial and Industrial	8,550,929	6,584,215	77%
Large Industrial	21,341,992	15,793,074	74%
Agriculture	2,302,569	1,980,209	86%
Total Business and Industry Solution	**32,195,489**	**24,357,498**	**76%**

Process Evaluation

The CY 2021 process evaluation of the Business and Industry Solution focused on these key topics:

- Solution design, delivery, and goals
- Participant satisfaction and experience
- State of the commercial real estate market
- Opportunities to support the commercial real estate market

Process Evaluation Methodology

In CY 2021, the evaluation team conducted a process evaluation of the Business and Industry Solution, designing its evaluation approach to assess solution performance as well as to understand any changes from CY 2020. Table 95 lists specific data collection activities and sample sizes used in the evaluation.

Table 95. CY 2021 Business and Industry Solution Process Evaluation Activities and Sample Sizes

Activity	Measure Group or Offering	CY 2021 Sample Size (n)
Administrator and Implementer Interviews	N/A	2
Ongoing Participant Satisfaction Surveys	All	360
Commercial Real Estate Property Manager and Owner Interviews	C&I	20

Administrator and Implementer Interviews

In July 2021, the evaluation team interviewed the administrator and the implementer to learn how the new Business and Industry Solution structure was working and to assess its objectives, performance, and implementation challenges and resolutions. The team also asked the administrator and the implementer about their marketing, outreach, and training efforts for engaging trade allies and customers.

Ongoing Participant Satisfaction Surveys

Throughout CY 2021, the solution administrator emailed participants in Business and Industry Solution links to the web-based satisfaction surveys. The evaluation team supplemented these results by fielding a paper survey by mail during the first quarter of the year only.

There were two objectives for these satisfaction surveys:

- Understand customer satisfaction on an ongoing basis and respond to any changes in satisfaction before the end of the annual reporting schedule
- Help to facilitate timely follow-up with customers to clarify and address service concerns

Using contact information stored in SPECTRUM, the solution administrator administered web-based satisfaction surveys throughout the year to CY 2021 participants. In the first quarter of CY 2021, the team also mailed a paper survey to participants with no email address on file. Responses from both survey modes were combined to conduct the analysis. A total of 360 Business and Industry Solution participants responded to the CY 2021 survey (162 online respondents and 198 paper respondents).

The survey covered several topics including overall satisfaction, satisfaction with offering staff and trade allies, likelihood of recommending Focus on Energy, and other feedback.

Commercial Real Estate Property Manager and Owner Interviews

During fall 2021, the evaluation team contacted commercial real estate property managers and owners to ask about their familiarity with Focus on Energy, decision-making practices when evaluating properties for improvements, and changes or challenges specific to this market segment due to the COVID-19 pandemic. To create the sample, the team used a subset of the nonresidential general population survey sample (see Appendix M. Survey and Interview Instruments by Offering in Volume III) and a list the team had developed for its 2015 focus groups with the commercial real estate market. As shown in Table 96, of the 717 property managers and owners contacted, the evaluation team completed 20 interviews for a 3% response rate.

Table 96. Commercial Real Estate Sample

Sample Group	Population	Included in Sample	Attempts	Total Completes
Focus group	133	104	401	8
Utility-supported sample	751	613	975	12
Total	**884**	**717**	**1,376**	**20**

Solution Design and Delivery

With the Business and Industry Solution, Focus on Energy offers incentives for prescriptive measures and custom projects that address a broad range of building and customer energy efficiency applications. Customers apply for incentives directly to Focus on Energy or through their trade ally, with support from energy advisors, the implementer, and occasionally from Wisconsin utility account representatives. In CY 2021, Focus on Energy made the following changes to offerings in its Business and Industry Solution:

- Restructured retrocommissioning incentive to $0.10 per square foot for projects with a 5% or greater reduction in energy use intensity
- Expanded the online energy assessment platform, previously targeting small businesses, to cover all commercial and industrial customers
- Discontinued distribution of free energy-saving packs targeting retail, offices, and restaurants small businesses due to low participation. In CY 2020, over 10,000 email addresses were contacted to participate in a campaign to complete the online assessment and receive a free pack. Only 103 customers completed an assessment, and 76 ordered an energy-saving pack.

In addition to the offerings described above, Focus on Energy also offers strategic energy management (SEM) to nonresidential customers.

Focus on Energy implemented the following changes to incentives in CY 2021:

- Reduced incentives for smart thermostats and for high bay LEDs replacing T8/T5HO.

- Revised the incentive structure for agribusiness ventilation or circulation fans from tiered incentives based on fan efficiency to incentives based on fan use or application.
- Discontinued incentives for 15 SEER split systems, parking garage ventilation controls, and case lighting occupancy sensors.
- Added incentives for exterior networked lighting controls, exterior 8-foot TLEDs, parking garage controls, and VFDs for agribusiness ventilation or circulation fans.

Impacts of COVID-19 on Design and Delivery

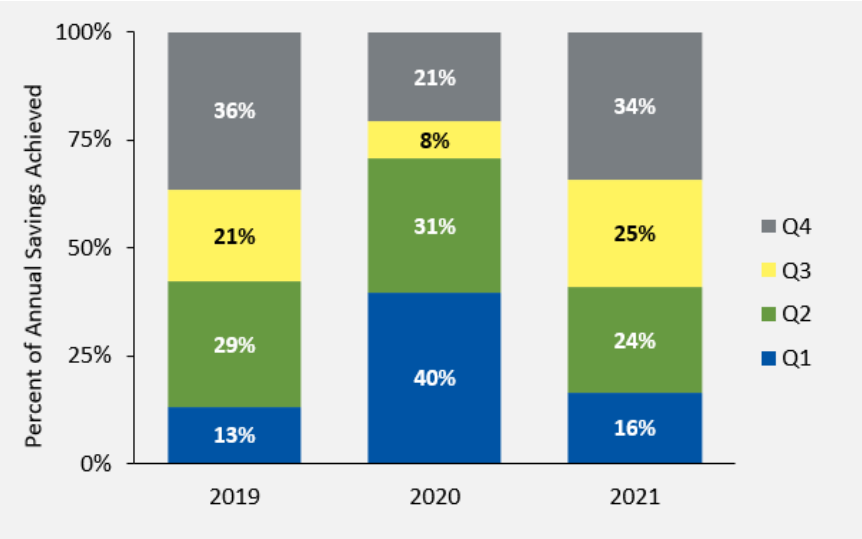
As a result of the COVID-19 pandemic, Focus on Energy continued to limit in-person field outreach to trade allies in CY 2021. Energy advisors supplemented reduced in-person engagement with more telephone and virtual meetings and email correspondence. The administrator shared feedback it obtained from its trade ally survey that trade allies are comfortable with the implementer's remote outreach methods.

The administrator reported a decline in the number of projects initiated in CY 2020 and completed in CY 2021 compared to previous years and said this was probably due less to field presence and more to customer reports of the risks of making capital expenditures during uncertain times. In response, the implementer said it made the following changes to increase solution activity:

- Reduced the custom payback eligibility criteria from 1.5 years to one year
- Conducted comprehensive energy advisor outreach to every large industrial customer
- Conducted strategic outreach to grocery and warehouse markets and to small- to midsize-industrial customers that had participated in the past
- Offered a 20% bonus on custom incentives and doubled the maximum incentive for project assessment incentives

Figure 62 shows the CY 2019, CY 2020, and CY 2021 lifecycle *ex ante* MMBtu savings achievement percentages by quarter. The market is showing some level of rebound, with more Business and Industry Solution savings captured in the second half of CY 2019 and CY 2021, whereas most CY 2020 savings occurred in the first half of the year. In the first quarter of CY 2020, incentive payment activity was higher for most market sectors because projects completed in late CY 2019 were paid in CY 2020, but incentive payment activity declined in the second half of CY 2020.

Figure 62. Percentage of 2019, 2020, and 2021 *Ex Ante* Gross MMBtu Lifecycle Savings Achieved by Quarter for the Business and Industry Solution



Marketing and Outreach

Similar to previous years, the implementer led most of the customer and trade ally marketing and outreach activities and material development, while the administrator managed the Focus on Energy website and oversaw outreach strategy. Focus on Energy continued to coordinate marketing efforts with utilities through regular meetings, a shared marketing calendar, and cobranded bill inserts, postcards, and mailings available through an online collateral portal.

The administrator and implementer employed a variety of marketing strategies in CY 2021. In their market engagement plan for the Business and Industry Solution, they identified three market segments—rural healthcare, manufacturing, and nondairy agriculture—as primary customer targets for CY 2021. The administrator supported creation of a nonprofit landing page for its website. The implementer, trying strategies to target specific market segments and to refresh several market areas, created several new marketing materials, including an industrial case study video, a rural healthcare guide, an agricultural sell sheet, direct mail, emails to nurture a marketing campaign promoting dairy tune-ups, and materials highlighting the top five energy-saving tips for food banks and places of worship.

The website and all marketing materials direct nonresidential customers to one Focus on Energy phone number and one email address. The implementer routes inquiries from these sources to energy advisors who work with customers on project opportunities.

Trade allies are also critical to ensuring customers are aware of and benefiting from Focus on Energy's offerings. The implementer maintained internal goals to retain trade allies who participated in the previous year, which encouraged outreach staff to keep trade allies engaged throughout CY 2021.

A total of 1,088 trade allies participated in the Business and Industry Solution in CY 2021, compared to 1,220 in CY 2020.

Ongoing Participant Satisfaction Surveys

Throughout CY 2021, the solution administrator invited Business and Industry Solution participants to take web-based satisfaction surveys. During the first quarter of CY 2021, the evaluation team also fielded paper surveys by mail to gather additional responses.

Awareness

The participant satisfaction survey asked respondents how they learned about the Business and Industry Solution. For CY 2021 respondents, the most common sources were trade allies (45%, n=345), Focus on Energy advisors and staff (18%), and manufacturers and distributors (11%), which was the same as the most common responses from CY 2020 respondents.

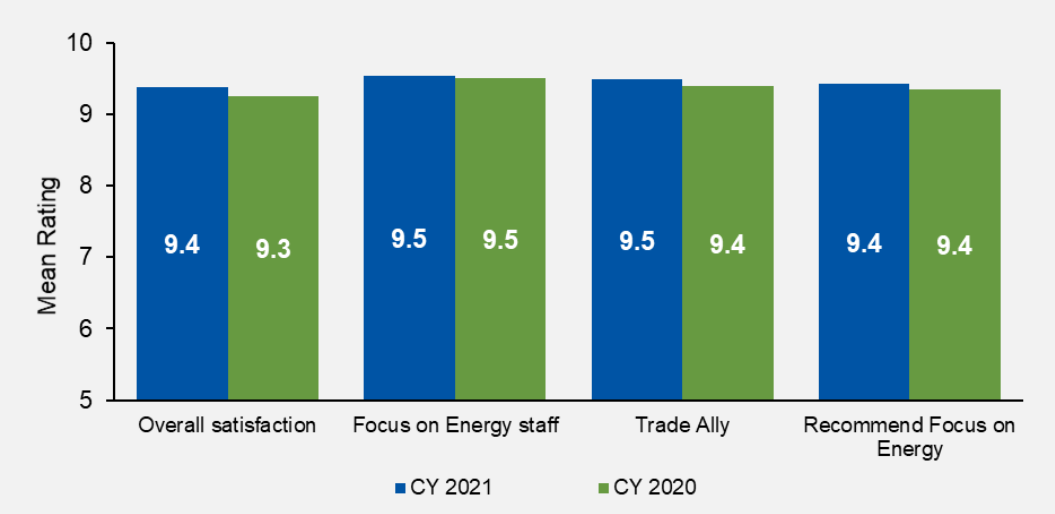
Participant Experience

Respondents answered questions related to satisfaction and likelihood on a scale of 0 to 10, where 10 indicated the highest degree of satisfaction or likelihood and 0 the lowest.[39] Figure 63 shows that Business and Industry Solution respondents gave the offerings they participated in an average overall satisfaction rating of 9.4 in CY 2021, statistically equivalent to CY 2020 ratings for this solution (9.3) and significantly higher than the portfolio target (8.9).[40] Respondents gave high average satisfaction ratings of 9.5 for Focus on Energy staff and trade allies, consistent with ratings from CY 2020.

[39] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped or did not know answers to questions.

[40] The administrator's contract established a portfolio target of 8.9 to maintain or increase customer satisfaction.

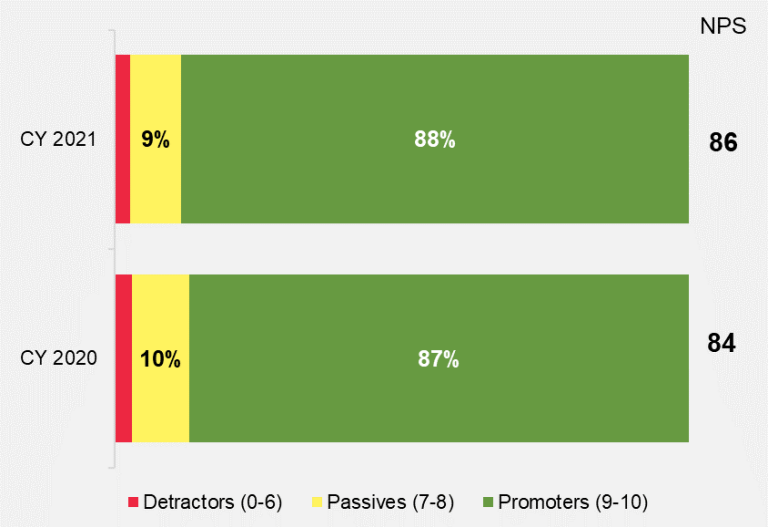
Figure 63. Satisfaction and Likelihood Ratings for the Business and Industry Solution



Source: Business and Industry Solution Participant Satisfaction Survey Questions. "Overall, how satisfied are you with your most recent experience with Focus on Energy?" (CY 2021 n=359; CY 2020 n=848). "How satisfied are you with the Energy Advisor or Focus on Energy staff member who assisted you with your project?" (CY 2021 n=248; CY 2020 n=585). "How satisfied are you with the contractor that provided your business upgrades?" (CY 2021 n=269; CY 2020 n=656). "How likely are you to recommend Focus on Energy to others?" (CY 2021 n=360; CY 2020 n=845).
There are no statistically significant differences between CY 2021 and CY 2020 ratings.

Using these survey data, the evaluation team calculated a NPS based on customers' likelihood to recommend Focus on Energy. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). High NPS scores (+70 or higher) are theoretically predictive of customer behaviors such as participating in another offering, implementing additional energy improvements, and referring Focus on Energy offerings to others. The Business and Industry Solution's NPS was +86 for CY 2021, consistent with +84 for CY 2020 (Figure 64).

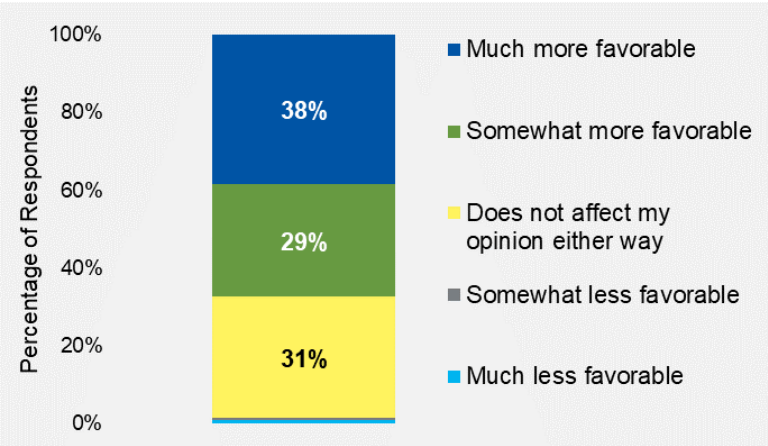
Figure 64. Net Promoter Scores for Business and Industry Solution



Source: Trade Ally Solutions Participant Satisfaction Survey Question. "How likely are you to recommend Focus on Energy to others?" (CY 2021 n=360; CY 2020 n=845). Note: Unlabeled segments represent 3% or less of respondents.

Respondents were asked if they were aware that the Business and Industry Solution was offered in partnership with their local utility before receiving the satisfaction survey, and 80% (n=352) were aware in CY 2021, similar to 75% in CY 2020. Respondents were also asked if Focus on Energy offerings affected their opinion of their utilities. As Figure 65 shows, 67% reported that their opinion had become *much more favorable* or *somewhat more favorable* while, only 1% of participants reported that their opinion had become *much less favorable* or *somewhat less favorable*. These results were very similar to CY 2020 (70% more favorable, 1% less favorable).

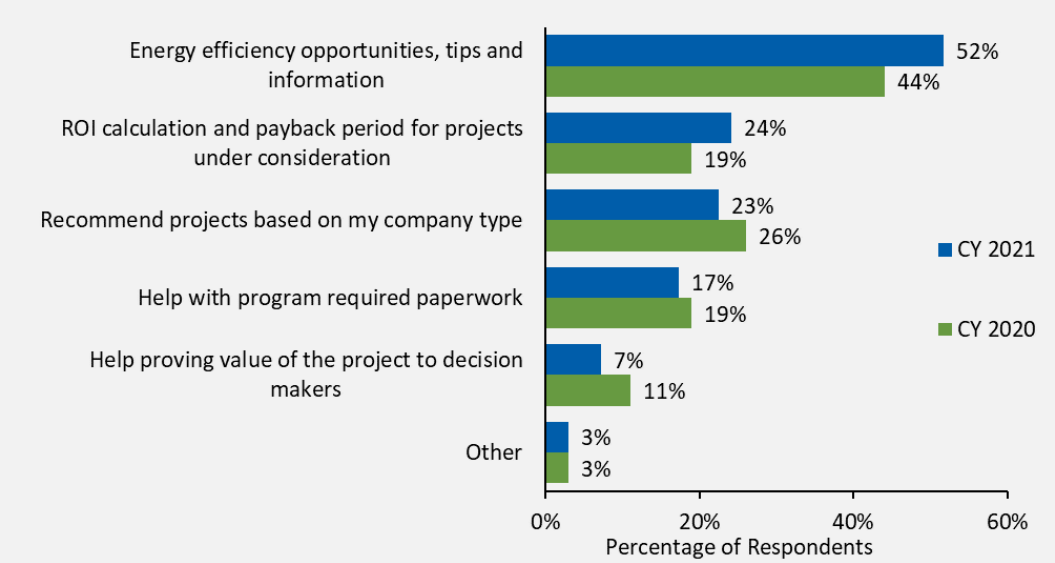
Figure 65. Focus on Energy Offerings Impact on Business and Industry Solution Participants' Opinion of Utilities



Source: Trade Ally Solutions Participant Satisfaction Survey Question. "How have these offerings affected your opinion of your energy utility, if at all?" (n=341). Note: Unlabeled segments represent 3% or less of respondents.

Survey respondents identified how Focus on Energy could best support their organization with future projects (Figure 66). The most frequent response from CY 2021 Business and Industry Solution participants was energy efficiency opportunities, tips, and information (52%), as it was in CY 2020 (44%).

Figure 66. CY 2021 Participants' Most Valued Support



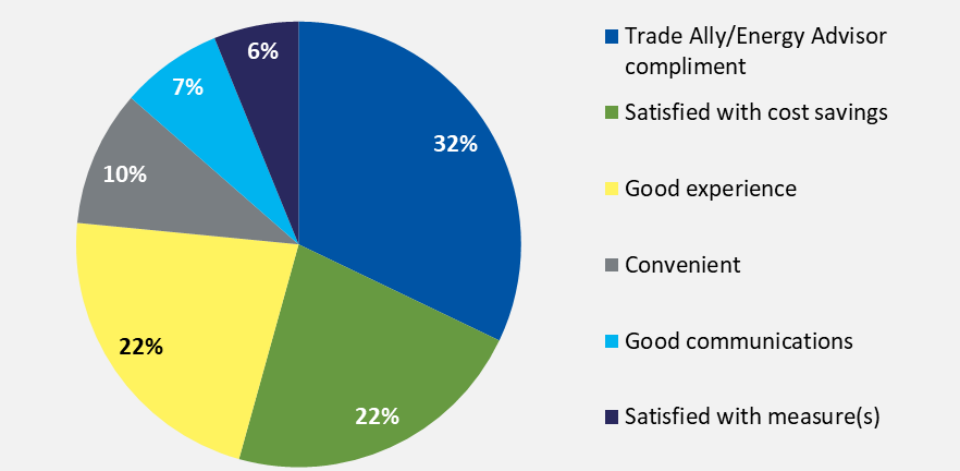
Source: Business and Industry Participant Satisfaction Survey Question. "Aside from providing project incentive dollars, how can Focus on Energy best support your organization going forward?" (CY 2021 n=306, CY 2020 n=836).Responses total to more than 100% because multiple responses were allowed.

Participant Feedback and Suggestions for Improvement

During the customer satisfaction surveys, the evaluation team asked participants if they had any comments or suggestions for improving the solution. Of the 360 participants who responded to the survey, 24% provided open-ended feedback, which the evaluation team coded into a total of 103 mentions. Of these mentions, 81 were positive or complimentary comments (79%), and 22 were suggestions for improvement (21%).

The positive responses are shown in Figure 67, with most comments reflecting compliments for trade allies and Focus on Energy staff (32%), satisfaction with cost savings from incentives and lower utility bills (22%), or a generally positive experience (22%). The largest differences from CY 2020 positive comments were more mentions of cost savings (22%, up from 11%) and fewer mentions of convenience (10%, down from 16%).

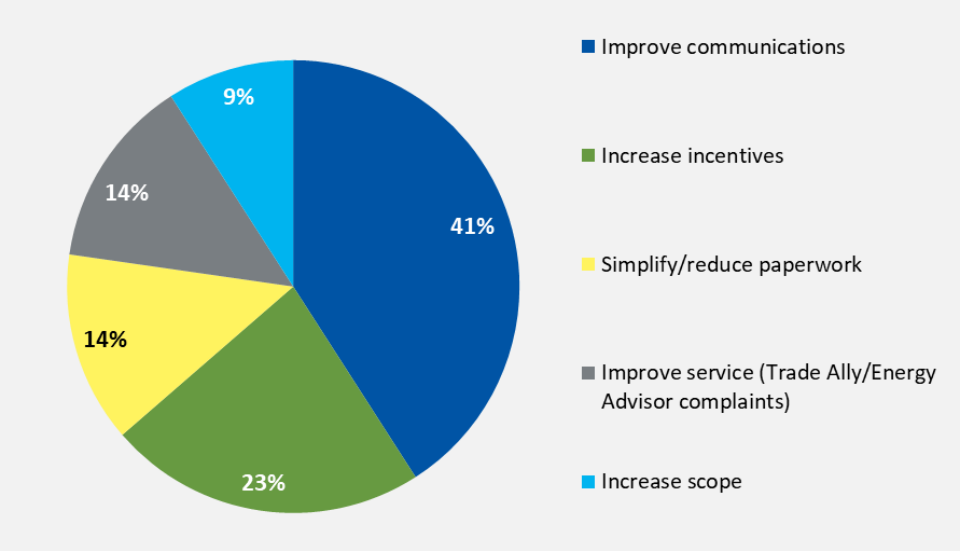
Figure 67. Positive Comments about the Business and Industry Solution



Source: Trade Ally Solutions Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement." (Total positive mentions n=81)

Suggestions for improvement are shown in Figure 68; the most common suggestions in CY 2021 were to improve communications (41%) and increase incentives (23%), which were also the most common suggestions in CY 2020 (44% and 18%, respectively). Suggestions about improving communications typically focused on follow-up to incentive applications, requests for more information about saving energy, and more promotion for Focus on Energy offerings.

Figure 68. Suggestions for Improving the Business and Industry Solution



Source: Trade Ally Solutions Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement."
(Total suggestions for improvement mentions n=22)

Commercial Real Estate Property Insights

The evaluation team conducted interviews with 20 commercial real estate property managers and owners to accomplish the following:

- Assess awareness of and interest in energy efficiency improvement
- Understand how commercial property managers and owners evaluate their properties for improvements
- Identify any changes or challenges that property managers and owners and tenant businesses have undergone due to COVID-19
- Determine what opportunities exist for Focus on Energy to support these businesses in making improvements

Firmographics

Interviewed property managers and owners representing 31 properties throughout Wisconsin, with 13 properties located in Milwaukee and Madison and 18 properties located in other cities across the state. Many respondents managed more than one property with a variety of Class A, B, and C buildings, as shown in Table 97.[41] The respondents also represented a wide range of managed square footage, with the majority either below 20,000 or above 100,000 square feet.

Table 97. Building Class Type and Square Footage

Class	Number
Mixed Class	11
Class A Only	1
Class B Only	7
Class C Only	0
Don't Know	1
Square Footage	**Number**
0 – 20,000 sq ft	5
40,000 - 60,000 sq ft	3
60,000 - 80,000 sq ft	2
80,000 - 100,000 sq ft	1
Above 100,000 sq ft	7
Don't Know	2

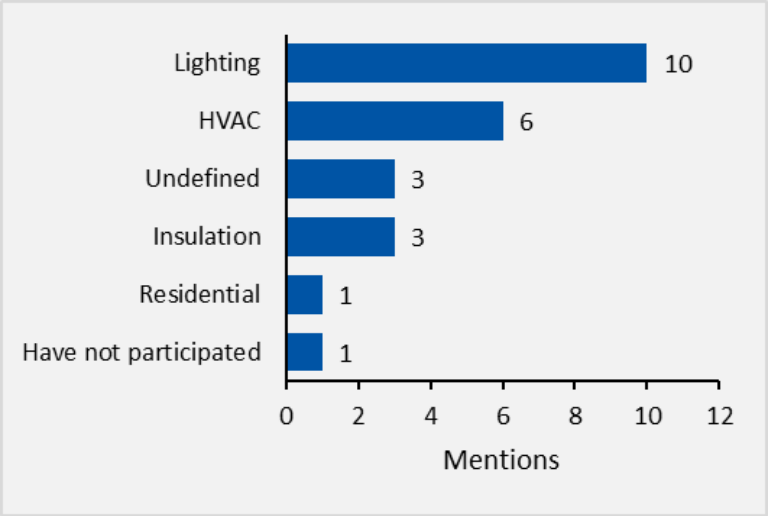
Source: CY 2021 Real Estate Owner/Manager Interview Question Q4 "About what percentage are Class A, B, and C, respectively, would you say? How much is mixed-use?" (n=20) and Question Q2 " In square feet, about how much commercial space does your company manage In Wisconsin?" (n=20)

[41] Class A properties are the newest and highest quality buildings. Class B buildings are generally older and well maintained. And Class C are older buildings that need upgrades.

Familiarity with Focus on Energy Offerings

All 20 respondents were familiar with Focus on Energy, and five considered themselves *very familiar*. Of the 19 who responded about whether they had participated in any Focus on Energy offerings, 18 had participated, and five mentioned having participated in more than one type of program. As shown in Figure 69, property managers and owners most commonly received incentives for lighting (10 respondents), HVAC (six respondents), and insulation (three respondents). Three respondents who had participated in the past did not specify the offering.

Figure 69. Participation in Focus on Energy Offerings



Source: CY 2021 Real Estate Owner/Manager Interview Question Q9b "Have you participated in any Focus on Energy offerings?" (n=19)
Note: Multiple responses were allowed.

The evaluation team asked whether the property managers and owners were aware and interested in two specific Focus on Energy offerings and in an energy management system (EMS). As shown in Table 98, most respondents were not aware of the retrocommissioning incentives or the scholarships for Building Operator Certification (BOC) courses, and most were interested in learning more about both. Fifteen property managers and owners said they did not currently have an EMS in place, and seven of them were interested in learning more. Three respondents expressed concerns with the applicability of the incentives and an EMS in their historical buildings, and one doubted the company would qualify as a small property.

Table 98. Awareness and Interest in Focus on Energy Offerings

Retrocommissioning Incentives		Energy Management Systems		BOC Courses Scholarships	
Awareness (n=20)		**Have EMS** (n=20)		**Awareness** (n=20)	
Yes	4	Yes	5	Yes	0
No	16	No	15	No	20
Interest (n=20)		**Interest** (n=15)		**Interest** (n=19)	
Interested in learning more	14	Interested in learning more	7	Interested in learning more	11
Unsure of benefits	3	Unsure of benefits	3	Unsure of benefits	4
Not interested	2	Not interested	3	Not interested	3
Don't know	1	Don’t know	2	Don’t know	1

Source: CY 2021 Real Estate Owner/Manager Interview Question Q15 “Are you aware that Focus on Energy offers retrocommissioning incentives?” (n=20), Question Q15.2 “What is your immediate reaction to this type of offer?” (n=20); Question Q16 “Do you have any energy management systems in place for your properties? Why or why not?” (n=20); Question Q16.a “What is your immediate reaction to this type of software?” (n=15); Question Q17 “Are you aware of [the BOC] offer? (if yes) Have you or staff at your company completed this training?” (n=20); Question Q17.a “What is your immediate reaction to this offer?” (n=19)

When asked what would encourage them to look into these offerings, the most commonly cited answer was more information about the details, incentives, and savings (nine of 17 for retrocommissioning, four of 10 for EMS, and four of 13 for BOC course scholarships). Other responses included the following:

- Phone/in-person contact from Focus on Energy (two respondents, retrocommissioning)
- If company experiences growth (two respondents, BOC courses)
- If Focus covered unexpected costs from retrocommissioning (1 respondent, retrocommissioning)
- More flexible eligibility requirements (one respondent, retrocommissioning)
- If utility prices increased (one respondent, EMS)
- Compensation for time to participate (one respondent, BOC courses)
- If property owner is also interested (one respondent, BOC courses)

Perceived Importance of Energy Efficiency

The evaluation team also asked the property managers and owners about the importance they place on energy efficiency and the reasons behind their responses. As shown in Table 99, most think energy efficiency is *very important* or *somewhat important* to their company. Keeping operating costs low was the most cited reason for viewing energy efficiency as *very* or *somewhat important*. Those who said energy efficiency is *very important* to their company were motivated by the desire to keep costs low, limit their impact on the environment, and stay competitive in the market. The only respondent who considered energy efficiency to be *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 property managers and owners place on energy efficiency.

Table 99. 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.

Most interviewed property managers and owners, regardless of lease type, thought their tenants viewed energy efficiency as *not important* or only *somewhat important* (Table 100). Only one property manager, who manages a mixed lease agreement property, thought energy efficiency was *very important* to the tenants. No property managers and owners with full service gross lease agreements (when the rent covers utility bills) thought their tenants placed large importance on energy efficiency. More than half who have triple net leases (when the tenant pays for all costs, including utilities) thought energy efficiency is *not important* to their tenants, primarily because they believe their tenants are not paying attention to energy costs.

Table 100. Building Managers' Perception of Tenant Energy Efficiency Importance by Lease Type

Perceptions of Energy Efficiency Importance to Tenants	Type of Lease Agreement				Total
	Full Service Gross	Modified Gross	Triple Net	Mixed	
Very important				1	1
Somewhat important	2	1	1	1	5
Important for some, not important for others		2	2	1	5
Not important	3		4	1	8
Don't know			1		1

Source: CY 2021 Real Estate Owner/Manager Interview Question Q11 "How important would you say energy efficiency is to your tenants (Very important, somewhat important, not too important, not at all important)? Why would you say that?" (n=20); Question Q12 "What type of lease agreements do you generally have with your tenants (full-service gross, modified gross, triple net)?" (n=20)

Evaluating Commercial Properties for Improvements

The evaluation team asked the 20 property managers and owners how they evaluate their property for potential improvements. Eight property managers and owners plan for improvements through an annual plan (five respondents) or a longer-term plan (three respondents). The others evaluate as the need for repairs and replacement arises (six respondents), as funds are available (four respondents), or to lower energy or maintenance costs (two respondents).

Of the 18 respondents who manage more than one building, 12 evaluate all buildings for improvements simultaneously. Table 101 shows how improvements are prioritized and whether improvements are done by building or simultaneously. All the property managers and owners who reported having a long-term plan manage over 100,000 square feet of commercial space.

Table 101. Improvement Prioritization When Managing More Than One Building

Improvement Prioritization	Facilities Evaluated		Total
	Independently	Simultaneously	
As needed (replacement/repair)	2	3	5[a]
Annual plan		4	4[b]
Availability of funds	2	2	4
Long-term plan (>1 year)	2	1	3
Based on energy savings		2	2

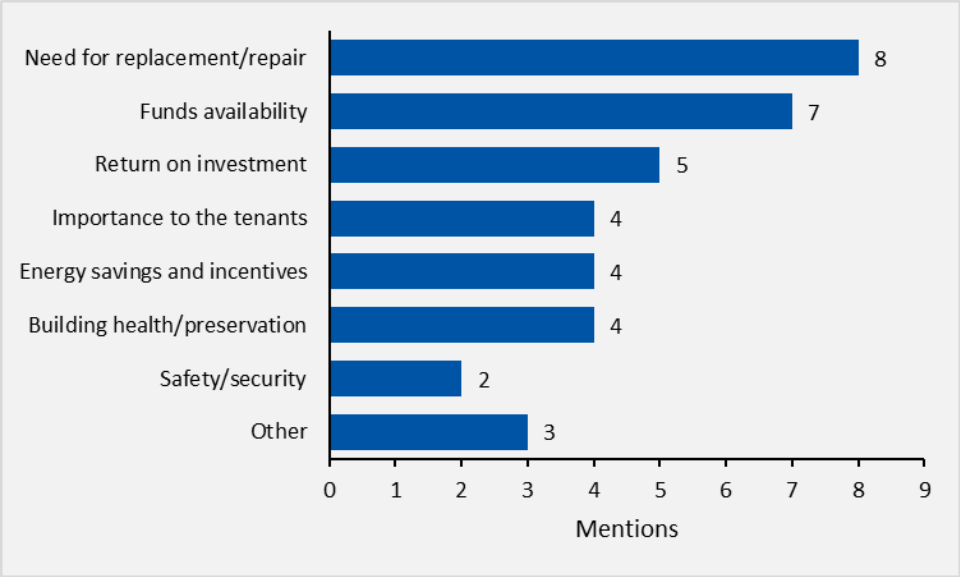
Source: CY 2021 Real Estate Owner/Manager Interview Question Q7 "If the need for a building improvement is identified in one facility, are similar facilities simultaneously looked at for *similar* needs?" (n=18); Q6 " How are your properties evaluated for potential improvement needs?" (n=20)

[a] Six respondents responded *as needed*, however only five of those also responded Q6

[b] Five respondents responded *annual plan*, however only four of those also responded Q6

Figure 70 shows the factors property managers and owners consider when deciding whether to make major building improvements. The most cited factor was need for replacement/repair, followed by availability of funds and return on investment. Responses in the other category include tenants' health, regulations, and incorporating renewable energy.

Figure 70. Factors Commonly Considered when Making Major Improvements



Source: CY 2021 Real Estate Owner/Manager Interview Question Q8 "What factors are considered when deciding whether or not to make major building improvements?" (n=20). Multiple responses were allowed.

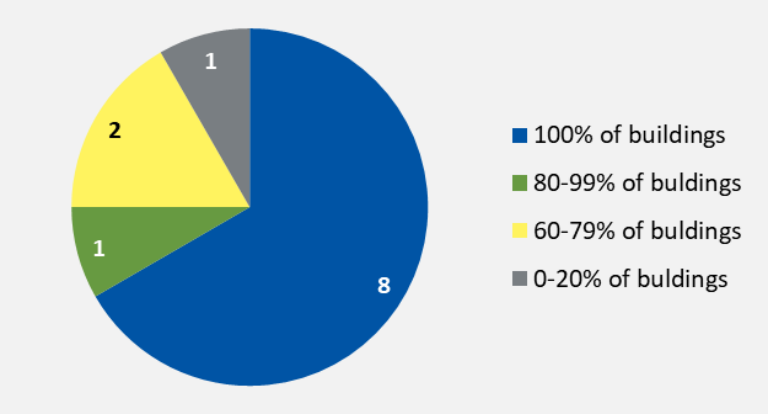
COVID-19 Impacts on Commercial Business

Of the 20 property managers and owners interviewed, 15 reported one or more types of COVID-19 pandemic impacts:

- Increased delinquency or rent assistance requests (nine respondents)
- Increase in tenants backing out of new leases or requesting updated leases (five respondents)
- Lost tenants or increased vacancies (four respondents)

Of those who reported impacts, most said 100% of their buildings were affected by the COVID-19 pandemic (Figure 71).

Figure 71. Share of Customer Buildings Affected by the COVID-19 Pandemic



Source: CY 2021 Real Estate Owner/Manager Interview Question Q18d "What share of your buildings would you say have been affected?" (n=12)

Of 19 property managers and owners, 12 did not change their rents in response to the COVID-19 pandemic (one respondent answered *don't know*). The other seven made the following modifications:

- Decreased the rent to tenants on an as-needed basis (three respondents)
- Permanently decreased the rent to all tenants (one respondent)
- Provided a temporary discount to all tenants (one respondent)
- Postponed a planned rent increase (one respondent)
- Increased the rent (one respondent)

Of 19 property managers and owners, 10 reported that their tenants' occupancy or staffing levels were affected by the pandemic in one of the following ways, and four said these changes persisted in 2021:

- Reduced staffing levels (four respondents; two reported the trend persisted in 2021)
- Office space tenants switched to working from home (all nine respondents said some or all their tenants still worked from home in 2021, three said 25% of their tenants still worked from home, 5 said at least 50% of tenants still worked from home, and one said 100% of tenants still worked from home)
- Increase in tenant occupancy (one respondent)
- Decrease in existing tenant occupancy hours (one respondent)
- Decline in energy use (one respondent)

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 the question).

Six of 15 property managers and owners reconfigured commercial space or completed upgrades in response to the pandemic. Of the six respondents who performed building upgrades in 2020, 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 due to the ease of doing upgrades with the building empty. Of all upgrades, only one was reported to be energy-efficient (lighting upgrade).

Of 16 property managers and owners, eight said the pandemic changed how their company plans for or considers upgrades. Five delayed upgrades due to low budget, two reported a higher budget for cleaning and HVAC maintenance, and one reported diversifying the type of business they consider leasing their space to.

The evaluation team also asked how the pandemic affected the size of respondents' current portfolio, and 13 of 19 respondents reported no change. Three reported a decrease in occupancy rates, two reported a delayed expansion, and just one said portfolio size had increased during the pandemic.

Other changes that property managers and owners experienced to their businesses or relationships with tenants during the pandemic included the following:

- Difficulty obtaining or retaining maintenance staff, particularly for smaller, owner-operated companies (three respondents)
- Changed company culture and working hours (two respondents)
- Internal support staff lay-offs (one respondent)
- External demands on property manager and owner time (one respondent)

Opportunities to Support Commercial Property Managers and Owners

The evaluation team asked property managers and owners how Focus on Energy could support them. As shown in Table 102, the most common suggestions related to increasing awareness of Focus on Energy solutions and offerings among property managers and owners, contractors, and tenants.

Table 102. How Focus on Energy Can Support Property Managers and Owners

Mentions	Number of Mentions
More outreach and exposure to the different solutions and offerings	5
Increase contractor awareness of Focus on Energy	2
Increase awareness of the solutions and offerings for the tenants	2
Incorporate renewable energy in the offers	2
Help with the development of electric vehicle infrastructure in the buildings	1
More information on alternative energy solutions	1
More offers on lighting	1
Simplify the participation in Focus on Energy's offerings	1
Increase access/revise eligibility for small companies	1

Source: CY 2021 Real Estate Owner/Manager Interview Question 27 "Is there anything you'd say that Focus on Energy could do to better serve you or your tenants?" (n=18, two responses were compliments)

The team also asked what was the most important thing Focus on Energy can do to encourage greater participation in its offerings for commercial real estate (Table 103). Three property managers and owners mentioned simplifying the application process. For example, one property manager said it's very hard to apply for different programs in different cities because of how decentralized it is, and another said it takes too much time to apply to the programs. The property managers and owners also recommended outreach measures such as informational webinars about Focus on Energy solutions and offerings and newsletters focused on the commercial real estate industry.

Table 103. Property Managers' Suggestions to Increase Commercial Real Estate Participation in Focus on Energy Offerings

Mentions	Number
Simplify application process	3
Expand outreach	3
Increase incentives and expand offerings (lighting, energy auditing, cost-sharing)	3
Educate more contractors to utilize incentives in sales tactics	2
Become more involved with the commercial real estate community	1
Provide consistency in offers over time	1
Provide greater focus on smaller businesses	1
Increase staff technical expertise	1
Increase personal contact with customers	1

Source: CY 2021 Real Estate Owner/Manager Interview Question 28 "Thinking about everything we have discussed, what do you think is the most important thing Focus on Energy can do to encourage greater participation in its offerings for commercial real estate?" (n=19, one response was a compliment)

Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a DSM offering. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix I. Cost-Effectiveness and Emissions Methodology and Analysis includes a description of the TRC test.

Table 104 lists the CY 2021 incentive costs for the Business and Industry Solution.

Table 104. CY 2021 Business and Industry Incentive Costs

Offering	Incentive Costs
C&I	$7,088,085
Large Industrial	$8,293,665
Agriculture	$2,064,249
Total	**$17,445,999**

The evaluation team found that the CY 2021 Midstream Solution was cost-effective with T&D benefits (3.52) and without T&D benefits (3.23). Table 105 lists the evaluated costs and benefits.

Table 105. Midstream Costs and Benefits

Cost and Benefit Category	Total
Costs	
Administration Costs	$763,053
Delivery Costs	$11,214,457
Incremental Measure Costs	$84,365,092
Total Non-Incentive Costs	**$96,342,602**
Benefits	
Electric Benefits (kWh)	$125,328,382
Electric Benefits (kW)	$63,658,207
T&D Benefits (kW)	$27,947,193
Gas Benefits	$64,590,861
Emissions Benefits	$58,065,536
Total TRC Benefits with T&D benefits	**$339,590,179**
Net TRC Benefits with T&D benefits	**$243,247,577**
TRC Benefit/Cost Ratio with T&D benefits	**3.52**

Outcomes and Recommendations

The evaluation team identified the following outcomes and recommendations for improving the Business and Industry Solution.

Outcome 1. The Business and Industry Solution showed some signs of recovery during the second year of the COVID-19 pandemic. The Business and Industry Solution achieved 95% of its verified gross electric energy lifecycle savings goal, 86% of its therm savings goal, and 91% of its peak demand savings goal. Total energy (MMBtu) achievements increased 1% over CY 2020. The administrator, implementer, and interviewed commercial real estate property managers and owners reported project delays due to risks of making capital expenditures during uncertain times. To overcome the limited pipeline of projects heading into CY 2021 compared to pre-pandemic years, the implementer reduced the custom payback eligibility criteria from 1.5 years to one year and conducted strategic outreach to target markets less affected by the pandemic, including grocery and warehouse businesses. According to CY 2021 application activity, the market shows some level of rebound with most of the savings for the Business and Industry Solution captured in second half of the year; this proportion was similar to CY 2019, whereas the majority of CY 2020 savings occurring in the first half of the year.

Outcome 2. Despite high familiarity with Focus on Energy in general, the commercial real estate property managers and owners have low awareness of specific nonresidential Focus on Energy initiatives. Most are open to learning more about retrocommissioning, energy management systems, and BOC courses. All 20 respondents were familiar with Focus on Energy, and 18 had participated in some Focus on Energy offering.[42] However, most were not aware that Focus on Energy has

[42] The evaluation team acknowledges it is very likely that the study experienced nonresponse bias when recruiting for commercial real estate property manager and owner interviews, given the 3% response rate.

retrocommissioning and BOC courses, but once informed, over half expressed some level of interest. Fifteen respondents did not currently have an EMS in place, but seven of those were interested in learning more. Building age and size affected the level of interest in retrocommissioning, as respondents considered it a difficult application for historic buildings or unnecessary for small buildings.

In addition, when asked about how Focus on Energy could better serve them or their tenants, half the suggestions focused on outreach. Though respondents were already interested in Focus on Energy offerings, they said there was still more to learn and that their industry would benefit from more information about Focus on Energy offerings.

Recommendation 1. In past years, the implementer conducted outreach with members of both the Institute of Real Estate Management and the Building Owners and Management Association. To increase the commercial real estate industry's awareness of specific offerings such as retrocommissioning, EMS, and BOC, consider expanding marketing and outreach efforts through informational webinars, newsletters, and direct outreach targeting the commercial real estate industry to deepen these relationships.

Outcome 3. Though commercial property managers and owners often address property improvements as replacements and repairs are needed, many also plan these improvements in advance. The presence of annual and long-terms plans for equipment upgrades could explain why some property managers and owners' plans were unaffected by the pandemic. Of 20 property managers and owners, eight said the need for repair or replacement was the most common factor when deciding to make a major building improvement. Need was also the most important factor across company size, including the larger companies. Eight respondents had improvements and upgrades planned, either as part of an annual (five respondents) or long-term plan (three respondents). Carrying out annual plans could explain why eight respondents said their plans were unaffected by the COVID-19 pandemic, and it is likely that property managers and owners may wait to implement their long-term plans until the equipment fails.

Recommendation 2. Because property managers and owners are responding to upgrades as they are needed, engage with commercial real estate managers and owners well ahead of the need so that they are aware of the Focus on Energy offerings.

Recommendation 3. Consider offering an early retirement bonus to address older but still functioning equipment.

Outcome 4. The evaluation team's desk reviews uncovered several minor discrepancies that led to a realization rate differing from 100%. These issues included incorrect savings assigned to some measures in SPECTRUM, incorrect calculations of lifecycle savings, and measure savings in SPECTRUM attributed to a version of the TRM that was not current.

Recommendation 4. To improve the accuracy of *ex ante* savings, have the implementor ensure all MMID savings are updated in SPECTRUM consistently to reflect the current version of the TRM. Base *ex ante* savings on the appropriate TRM using the SPECTRUM creation date of the project. Ensure all

MMIDs are updated on the effective date of the TRM to reduce SPECTRUM lag issues that result from variable updates.

Outcome 5. Some larger and more complex projects lacked consistency in documentation, detailed savings calculations, documentation, and data. This lack of information caused some discrepancies in calculations in the reported and verified savings. Some of the largest discrepancies were found during the virtual site visits when the evaluation team was using actual customer trend or meter data to inform savings analysis and the results showed that verified savings deviated from reported savings.

Recommendation 5. 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. Consider amending standard protocol for developing savings estimates for these types of projects, which might include the following elements:

- Establish a threshold of savings or incentive value, above which final project savings verification will require following the established protocol.
- Continue having advanced discussion with the evaluation team and other stakeholders regarding project details to deliberate and agree upon the best available savings calculation specific to the project and any known data limitations.
- Consider requiring a standardized technical analysis summary (TAS) report, in which the implementer provides details about the methodologies used and assumptions made to calculate savings.
- Consider designing a standardized verification report, in addition to the verification sheet, in which assumptions in the TAS are verified, pictures and invoices collected, and any changes to the project accounted for.
- Obtain trend data collected and provided by the customer or vendor to establish an accurate picture of the baseline and post-installation sequencing, operation, loading, production and run time, as applicable to the metrics involved in the project. Encourage less reliance on specification data and engineering assumptions when actual data are available to support savings estimates and verification.
- Conduct power metering of baseline and installed equipment, as applicable to the metrics involved in the project. The duration of metering should be determined by the pattern of use of the equipment involved. Weather-dependent equipment (most HVAC) will likely require seasonal timing to accurately capture annual performance, whereas weather-independent equipment (most process) will likely require only a couple weeks of normal operation to extrapolate annual performance.
- Develop metering guidelines to be used internally and potentially by vendors externally that specify standard metering practices to be followed and the installation documentation to be generated as part of a metering installation. Consider using IPMVP Option C as a foundation for this guideline.

- To ensure receipt of the above data, fully discuss the requirements with the customer prior to issuance of offer and consider linking incentive delivery to the receipt of data.

Outcome 6. Water savings claimed for CY 2021 projects in the Business and Industry Solution were documented under unique application measure IDs rather than associated with the measure that resulted in water savings. When water saving projects were sampled in the CY 2021 evaluation, it was difficult to determine the source of the water savings when they resulted from another project. This was primarily because flow rates were hard-coded in a water-related savings template.

Recommendation 6. If water savings are associated with a measure, include them with savings from other fuel sources under the same application measure ID. Water-related kWh savings should include data to support flow calculations rather than being hard-coded and separate from other measures.

Outcome 7. Ramp up projects have inherently more savings realization uncertainty. Two ramp-up projects were sampled in the CY 2021 evaluation, and the evaluation team found that both were behind schedule and below the production level originally forecasted. Finding deviations within the first year of a multiyear ramp-up erode confidence in savings projections for successive years.

Recommendation 7. Continue to evaluate ramp-up projects on a case-by-case basis and ensure the project ramp-up schedule reflects a realistic and data-driven estimate of the project progression to realize *ex ante* savings. Consider additional program protocols to revisit the ramp-up projects annually during the ramp-up period to evaluate the on-target realization of the original savings projections for research purposes. Consider advanced discussion with the evaluation team and other stakeholders regarding project details to deliberate and agree upon the best available savings calculation specific to the project and any known data limitations. The evaluation team recommends that all ramp-up projects are census sampled in the evaluation.

Schools and Government Solution

The Schools and Government Solution provides technical assistance and prescriptive and custom incentives to K-12 schools, colleges, universities and local, county, and state government facilities. Participation in the Schools and Government Solution is tracked within the two offerings: Schools and Government.

The solution is administered by APTIM and implemented by CESA 10, supported by Leidos as a subcontractor.

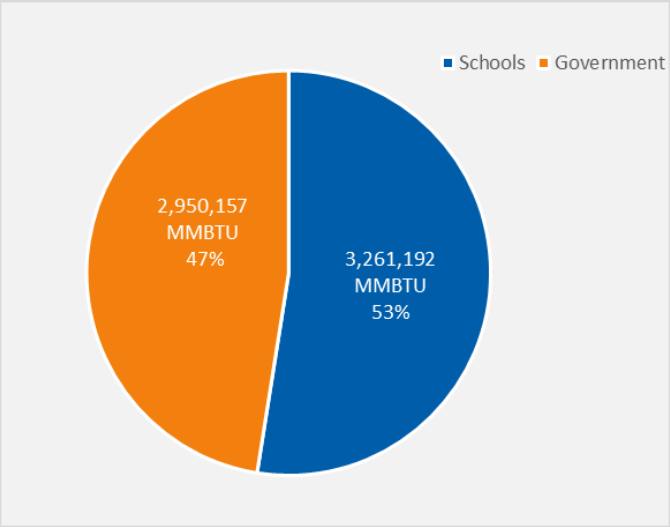
Table 106 lists actual spending, savings, participation, and cost-effectiveness of the Schools and Government Solution for CY 2021.

Table 106. CY 2021 Schools and Government Solution Summary

Item	Units	CY 2021
Incentive Spending	$	$5,036,844
Participation	Number of Participants	473
Verified Gross Lifecycle Savings	kWh	799,789,033
	kW	7,917
	therms	57,798,166
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%
Annual NTG Ratio	% (MMBtu)	73%
Net Annual Savings	kWh/year	41,768,480
	kW	5,779
	therms/year	2,752,538
Net Lifecycle Savings	MMBtu	6,211,349
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	1.64

Figure 72 shows that the offerings have nearly equal total net lifecycle savings, with the Schools Offering contributing 53% of the net lifecycle MMBtu savings to the Schools and Government Solution.

Figure 72. Proportion of Schools and Government Solution Net Lifecycle Savings by Offering



Achievement Against Goals

As shown in Table 107, the Schools and Government Solution achieved 89% of its electric energy savings goal, 77% of its peak demand savings goal, and 130% of its therm savings goal in CY 2021 based on verified gross lifecycle savings at the solution level.

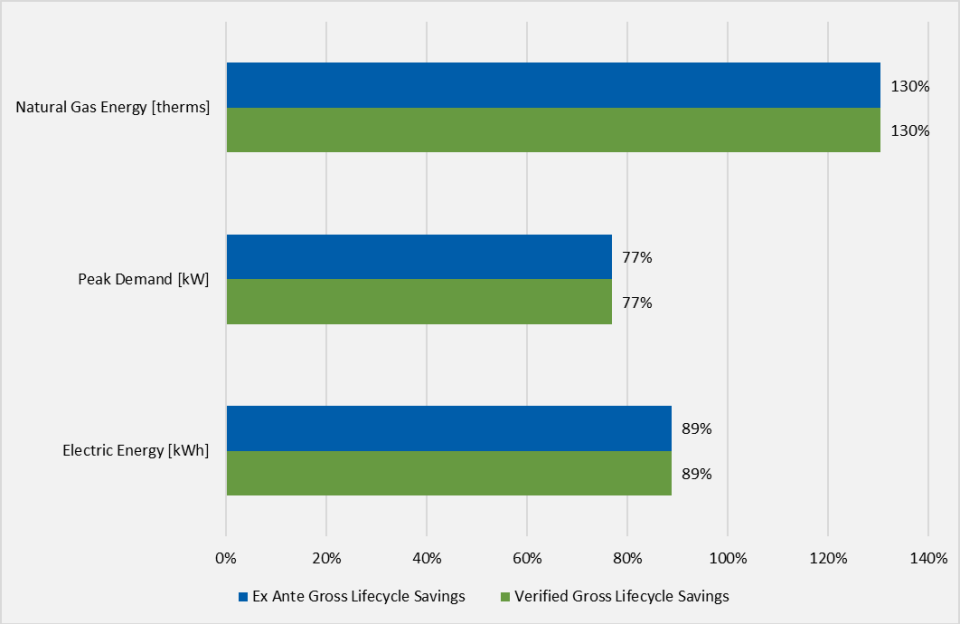
Figure 73 shows the percentage of gross lifecycle savings goals achieved for the Schools and Government Solution in CY 2021.

Table 107. CY 2021 Schools and Government Solution Achievement of Gross Lifecycle Savings Goals

Savings	*Ex Ante* Gross Lifecycle Savings		Verified Gross Lifecycle Savings		Percent Achieved	
	Goal	Actual	Goal	Actual	*Ex Ante*	Verified Gross
Electric Energy (kWh)	900,000,000	799,789,033	900,000,000	799,789,033	89%	89%
Peak Demand (kW)	10,285	7,917	10,285	7,917	77%	77%
Natural Gas Energy (therms)	44,292,000	57,798,166	44,292,000	57,798,166	130%	130%
Total Energy (MMBtu) [a]	7,500,000	8,508,697	7,500,000	8,508,697	113%	113%

[a] Verified kWh and therm savings may not sum to verified MMBtu values due to conversion/rounding associated with measure level application of realization rates.

Figure 73. CY 2021 Schools and Government Solution Achievement of Gross Lifecycle Savings Goals



The 100% *ex ante* gross lifecycle savings reflects the implementer's contract goals for CY 2020. Verified gross lifecycle savings contribute to the administrator's portfolio-level goals.

Impact Evaluation

This section contains the findings for the CY 2021 impact evaluation of the Schools and Government Solution at the solution level, followed by a discussion of each offering.

Impact Evaluation Methodology

The evaluation team conducted an impact evaluation of the CY 2021 Schools and Government Solution. The team designed its evaluation, measurement, and verification approach to integrate multiple perspectives in assessing the performance of each offering and of the solution as a whole. Table 108 lists the specific data collection activities and sample sizes used in the evaluation. Additional details about these activities and their findings can be found in the offering-specific discussions below.

Table 108. CY 2021 Schools and Government Solution Impact Activities

Offering	Total Measures	Impact Evaluation Sample		
		Desk Reviewed Measures	Virtually Verified Measures	Proportion Sampled (by *Ex Ante* MMBTU Savings)
Schools	2,184	18	8	18%
Government	1,030	22	8	63%
Total	**3,214**	**40**	**16**	**54%**

Tracking Database Review

The evaluation team reviewed the census of records in Focus on Energy's database, SPECTRUM. This involved thoroughly reviewing the data to ensure SPECTRUM totals matched the administrator's

reported totals and to check that complete and consistent information was applied across data fields (e.g., measure names, first-year savings applications, EUL).

Engineering Desk Review

The evaluation team reviewed all available project documentation in SPECTRUM and assessed the savings calculations and methodology applied by the implementer. The team relied on the applicable TRMs and other relevant primary and secondary sources as needed.

The Wisconsin Focus on Energy TRM and associated work papers were the primary sources to determine methodology and data in nearly all cases. For hybrid and custom measures, the team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation.

To conduct the impact analysis of the offering, the evaluation team selected a representative sample of measures to evaluate then extrapolated findings to the larger offering population. In 2021, this process used both purposive and proportional sampling. The purposive sampling selected the largest saving measures by offering. Because these measures were sampled with certainty (100% of eligible highest saving measures were sampled), the results were not extrapolated to the offering population. These measures are referred to as census measures. The proportional sampling measures were randomly selected from the population of offering measures. These measures are referred to as randomly sampled measures. The cumulative realization rate of randomly sampled measures by offering was extrapolated to the remainder of the offering population.

Engineering Desk Review and Interview

The evaluation team conducted engineering desk reviews on all sampled projects. Several of these reviews also involved an interview or email exchange with the site contact to verify key parameters, collect additional site photos, discuss operating schedules, and obtain additional trend data.

Virtual Verification Site Visits

The evaluation team also conducted virtual verification site visits that involved an engineering desk review then the use of software to connect to the site contact's mobile device camera and microphone. This allowed the team to visually verify the type and quantity of equipment installed, ask the site contact how the installed equipment was controlled, and document the operating hours of the installed equipment. The team verified savings calculation input parameters based on operational and occupancy schedules, claimed and observed setpoints, trend data, utility data, and any other relevant details identified.

Verified Gross Savings Results for Schools and Government Solution

Table 109 lists the first-year and lifecycle realization rates for CY 2021. Table 110 is a summary of verified first-year and lifecycle savings by offering. Overall, the Schools and Government Solution achieved a first-year evaluated realization rate of 100%, weighted by total (MMBtu) energy savings. Realization rates are determined by strata, such as census and sample strata, and claimed and verified savings are summed to the offering level to arrive at savings and realization rates. Detailed findings for

each offering, including factors affecting the realization rates, are discussed in the next sections of this report.

Table 109. CY 2021 Schools and Government Solution First-Year and Lifecycle Realization Rates

Offering	First-Year Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Schools	100%	100%	100%	100%	100%	100%	100%
Government	100%	100%	100%	100%	100%	100%	100%
Total Schools and Government Solution	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 110. CY 2021 Schools and Government Solution First-Year and Lifecycle Verified Energy Savings Summary

Offering	Verified First-Year Savings				Verified Lifecycle Savings		
	kWh	kW	therms	MMBtu[1]	kWh	therms	MMBtu[a]
Schools	32,099,882	5,387	2,176,609	327,186	440,217,325	29,653,643	4,467,386
Government	25,117,214	2,530	1,593,990	245,099	359,571,707	28,144,523	4,041,311
Total Schools and Government Solution	**57,217,096**	**7,917**	**3,770,600**	**572,285**	**799,789,033**	**57,798,166**	**8,508,697**

[a] Verified kWh and therm savings may not sum to verified MMBtu values due to conversion/rounding associated with measure-level application of realization rates.

Schools: Verified Gross Savings Results

For the Schools Offering, the evaluation team conducted a database review, desk reviews, interviews, and virtual site visits to inform verified gross savings. The offering had a gross lifecycle realization rate of 100% MMBtu. Figure 74 presents the magnitude of and associated realization rates for reported MMBtu savings of the sampled projects.

As seen in the figure, all prescriptive, hybrid, and custom projects maintained a 100% realization rate.

Figure 74. CY 2021 Schools and Government Solution - School Offering Sampling Results

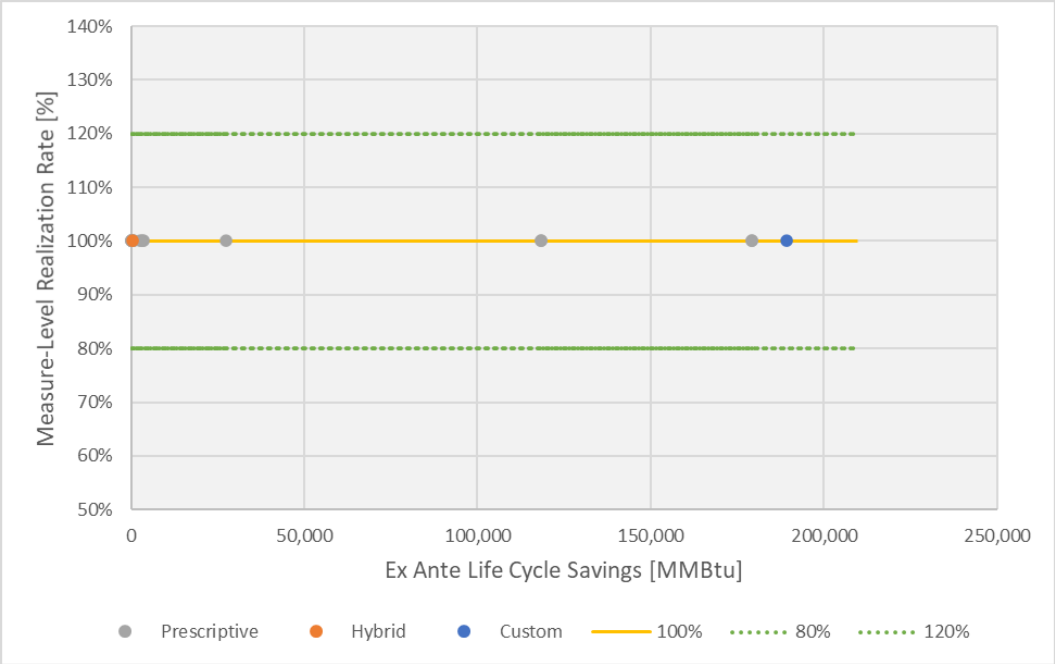


Table 111 lists the CY 2021 *ex ante* and verified gross savings for the Schools Offering.

Table 111. CY 2021 Schools Offering *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
Schools Offering						
First-Year Gross Savings	32,099,882	5,387	2,176,609	32,099,882	5,387	2,176,609
Lifecycle Gross Savings	440,217,325	5,387	29,653,643	440,217,325	5,387	29,653,643

Government: Verified Gross Savings Results

For the Government Offering, the evaluation team conducted a database review, desk reviews, interviews, and virtual site visits to inform verified gross savings. The offering had a gross lifecycle realization rate of 100% MMBtu. Figure 75 presents the magnitude of and associated realization rates for reported MMBtu savings of the sampled projects.

As seen in the figure, none of the *ex post* savings calculations deviated from the *ex ante* savings in the Government Offering sample for CY 2021.

Figure 75. Schools and Government Solution - Government Offering Sampling Results

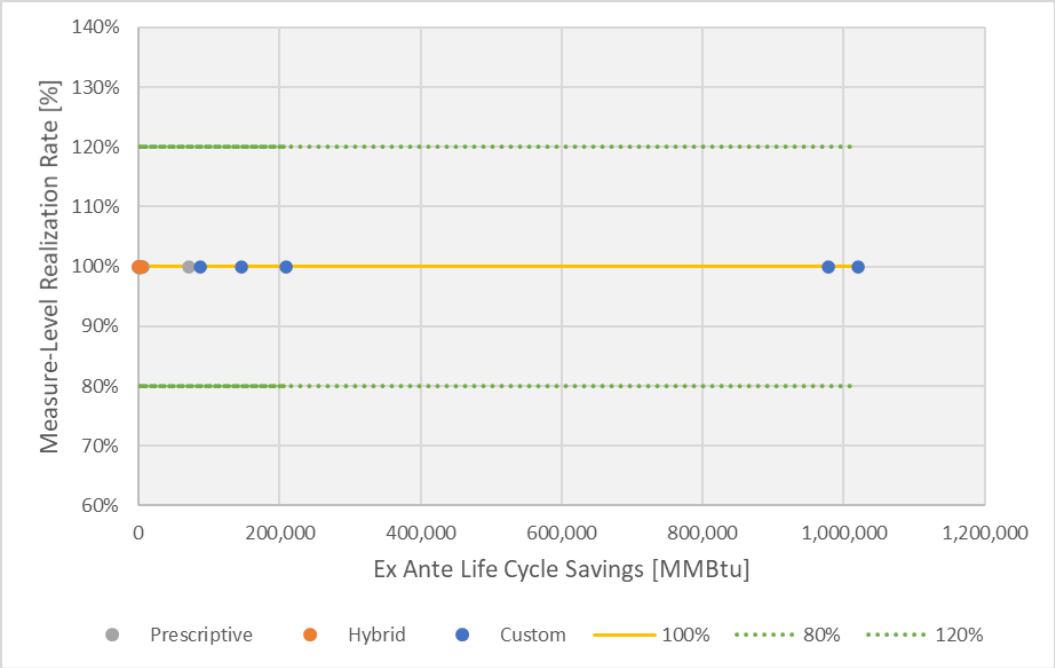


Table 112 lists the CY 2021 *ex ante* and verified gross savings for the Government Offering.

Table 112. CY 2021 Government Offering *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
Government Offering						
First-Year Gross Savings	25,117,214	2,530	1,593,990	25,117,214	2,530	1,593,990
Lifecycle Gross Savings	359,571,707	2,530	28,144,523	359,571,707	2,530	28,144,523

Verified Net Savings Results for the Schools and Government Solution

The evaluation team used the CY 2020 participant surveys to assess net savings for the Schools and Government Solution at the offering level. The team weighted the offering-level NTG estimates by total population lifecycle MMBtu savings to calculate a NTG ratio of 73% for the CY 2020 solution. The NTG of 73% is used in the CY 2021 solution analysis. For a detailed description of NTG analysis methodology and findings, refer to Appendix G. Net Savings Analysis in Volume III.

Verified Net Savings Results

The evaluation team calculated freeridership and participant spillover for the Schools and Government Solution using findings from a survey conducted with 75 participants.[43] To calculate the solution NTG,

[43] Thirty-nine Government Offering participants and 36 Schools Offering participants.

the team combined self-reported freeridership and participant spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

Table 113 shows the NTG results for the Schools and Government Solution.

Table 113. CY 2021 Schools and Government Solution NTG Ratio

Freeridership	Spillover	NTG Ratio
27% [a]	0%	73%

[a] Weighted by lifecycle gross verified MMBtu savings

Two projects with the greatest savings represent 27% of the NTG analysis sample lifecycle gross verified savings.[44] Their combined savings weighted average freeridership is 37.5%, accounting for 10 percentage points of the Schools and Government Solution freeridership ratio of 27%.

Table 114 shows the weighted average NTG ratio by offering as well as the total lifecycle gross verified savings and lifecycle net savings.

Table 114. CY 2021 Schools and Government Solution Lifecycle Net Savings and NTG

Offering	Total Lifecycle Gross Verified Savings (MMBtu)	Total Lifecycle Net Savings (MMBtu)	NTG Ratio
Schools	4,467,386	3,261,192	73%
Government	4,041,311	2,950,157	73%
Total	**8,508,697**	**6,211,349**	**73%**

Process Evaluation

The CY 2021 process evaluation focused on these key topics:

- Solution design, delivery, and goals
- Participant satisfaction and experience

Process Evaluation Methodology

In CY 2021, the evaluation team designed the process evaluation of the Schools and Government Solution to assess performance and to understand any changes from CY 2020. The process evaluation involved in-depth interviews with the administrator and implementer as well as an analysis of the results of the ongoing participant satisfaction survey.

Table 115 lists the data collection activities and sample sizes for all primary data collection.

[44] Two energy-efficient boiler projects by Schools participants.

Table 115. Schools and Government Solution Process Evaluation Sample Sizes

Group	Data Collection Method	Sample
Administrator and Implementer	Interviews	2
Ongoing Participant Satisfaction	Online and mail survey	92

Administrator and Implementer Interviews

In December 2021, the evaluation team interviewed the administrator and the implementer to learn their objectives, performance, and challenges and resolutions. The team also asked about their marketing, outreach, and training efforts for engaging trade allies and customers.

Ongoing Participant Satisfaction Survey

Throughout CY 2021, the administrator emailed participants a link to the web-based satisfaction survey. The evaluation team supplemented these results by fielding paper surveys by mail during the first quarter of the year only. Responses from both survey modes were combined to conduct the analysis. The survey covered topics including overall satisfaction, satisfaction with Focus on Energy staff and trade allies, likelihood of recommending Focus on Energy, likelihood to initiate another energy-efficient project, and other feedback.

The satisfaction survey had two objectives:

- Understand customer satisfaction on an ongoing basis and respond to any changes in satisfaction before the end of the annual reporting schedule
- Help facilitate timely follow-up with customers to clarify and address service concerns

As in previous years, the evaluation team analyzed the survey results. According to SPECTRUM data, 92 School and Government Solution participants responded to the CY 2021 survey (59 online respondents and 33 paper respondents).

Solution Design and Delivery

The Schools and Government Solution offers technical assistance to identify energy-saving opportunities and equipment and various prescriptive and custom incentives to reduce the upfront cost of projects to improve energy efficiency. Any local, county, or state government agency and public or private school or university that is also in the service territory of a Focus on Energy participating utility is eligible.

The solution is delivered through energy advisors who reach out to school and government customers and help them identify projects and submit applications. They also conduct energy calculations to determine savings and available incentive dollars for custom projects. Some energy advisors are assigned to key accounts, the majority are assigned to a particular region, and one is assigned to wastewater agencies. Participants can also apply directly to Focus on Energy for prescriptive incentives for eligible products.

Eligible customers are from one of three segments: higher education (including all two-year and four-year institutions), K-12 schools, and government (including all state and local government, tribal-owned organizations, and wastewater).

Special Offerings and Initiatives

In CY 2021, some solution offerings and initiatives were offered broadly, while others targeted specific customer segments.

Practical Energy Management (PEM). Training in PEM, which the implementer started offering in the third quarter of CY 2020, has been successful. The goal of PEM training is for Focus on Energy to nurture relationships with customers to increase participation and engage participants. Participants learn to implement long-range energy plans, benchmark and analyze facility usage, evaluate and select new energy-efficient equipment, and create a business case for energy-efficient upgrades. PEM training includes a toolkit to guide participants in starting an energy team. Training originated as day-long sessions but was shortened to a few hours per day to lessen the time required for participation.

Higher Education SEM. Higher education customers can enroll in SEM to advance their energy-management capabilities for achieving low- and no-cost operational energy improvements and establish a process for continuing to do so. Participants receive an enrollment incentive of $1,500, energy performance and tracking tools, and support for energy management system development.

Wastewater Plant Energy Assessments. As in CY 2020, wastewater plants can work with Focus on Energy's Wastewater Service Providers to receive an assessment of their plant's energy use and opportunities to reduce energy costs through capital projects and low- to no-cost improvements. Participants can receive up to $5,000 (up to 90% of an assessment's cost).

Wastewater Plant Pump Assessment. New in Q4 of CY 2021, Focus on Energy offers a $500-per-pump incentive for a comprehensive pump assessment, up to 100% of the assessment cost. Participants can receive a 50% bonus (up to $2,000) for installing a variable speed drive on their pump system following the pump assessment.

Retrocommissioning Audit. All Schools and Government customers are eligible for Focus on Energy's retrocommissioning initiative. Customers who completed a retrocommissioning audit to identify low-cost measures involving adjustments, calibrations, and process changes are eligible for an incentive if they also reduced their energy-use intensity. The solution links retrocommissioning to available federal COVID-19 pandemic assistance funding by associating qualifying energy-use improvements with improved indoor air quality.[45]

In addition to these specific initiatives, the implementer created a free energy team toolkit that provides tips on building an energy team, resources to get started, and sample energy policy language and topics for team meetings.

[45] Elementary and Secondary Schools Emergency Relief (ESSER) funds and CARES Act Fund.

Changes Due to COVID-19 Factors

Many COVID-19 impacts that originated in 2020 continued in CY 2021, particularly funding constraints, workforce shortages, and supply chain issues, but these impacts varied by segment. From CY 2020 to CY 2021, applications from K-12 schools, municipalities, and tribal-owned organizations declined; applications from wastewater plants held steady; and applications from higher education institutions increased (possibly due to increased engagement in CY 2021). The implementer said some tribal-owned organizations were the most negatively impacted segment due to their reliance on gaming revenue, which declined significantly due to the pandemic.

Lower tax revenue due to the pandemic, timing of the state budget cycle, and timing of local referendums for school budgets reduced the application pipeline for K-12 schools and municipal governments. Schools and governments were delayed until July 2021 in finalizing their budget due to the 21-23 State Budget finalization on July 8, 2021. Many schools and governments waited to plan their projects until their budgets were finalized. Nevertheless, the implementer expected that some project plans may come to fruition by the end of 2021 and early 2022.

Budgets for K-12 were further strained by having fewer scheduled opportunities for local budget referendums in 2021 along with having to spend more on staffing and health and safety measures. Over the long term, the implementer anticipated that a lower pass rate of referendums would have a lasting effect on budgets and participation in the Schools and Government Solution.

The implementer mitigated the effects of lower tax revenue by promoting federal funding through the Coronavirus Aid, Relief, and Economic Security (CARES) Act and Emergency and Secondary Emergency Relief (for K-12) as ways to fund participation in Focus on Energy. This funding shifted the mix of CY 2021 projects away from lighting upgrades and toward HVAC and ventilation upgrades that improved indoor air quality.

Across all segments, workforce shortages and supply chain issues for needed equipment caused delays in project completion. The implementer said trade allies are busy implementing projects that address indoor air quality and ways to reduce virus transmission at the same time they are experiencing equipment and labor shortages.

Marketing and Outreach

The Schools and Government Solution tailored its marketing strategy to different customer segments and adapted messaging to changing priorities during the COVID-19 pandemic. Larger customers, such as water utilities and universities, continued to receive direct individual outreach primarily through energy advisors, as was previously the standard for all customer types. The implementer said it successfully increased energy advisor outreach to higher education customers in CY 2021, which resulted in five new enrollments in SEM.

Though previously the solution relied on presentations and distribution of print materials at conferences and events, the implementer shifted toward additional promotional email campaigns and virtual meetings, particularly for K-12 institutions, the most likely to have to limit in-person visits.

Messaging for the Schools and Government Solution also shifted in CY 2021, from traditionally focusing on lowering energy bills, to prioritizing health and safety through improved air quality, particularly for schools. Promotions also highlighted the PEM initiative and energy team toolkits.

Awareness

The participant satisfaction survey asked respondents how they learned about the Schools and Government Solution. For CY 2021 respondents, the most common sources were Focus on Energy advisors and staff (38%, n=88), trade allies (20%), and manufacturers and distributors (10%), which were also the most common responses from CY 2020 respondents.

Ongoing Participant Satisfaction Surveys

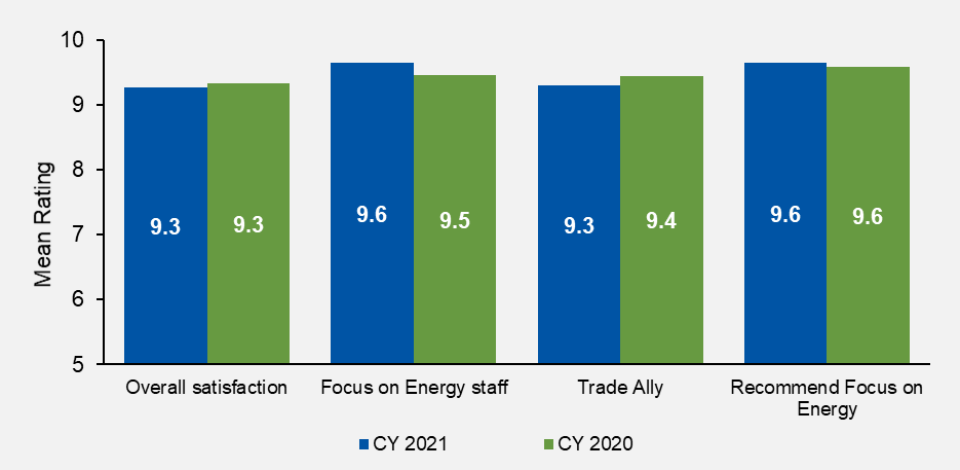
Throughout CY 2021, the administrator invited Schools and Government Solution participants to take web-based satisfaction surveys. During the first quarter of CY 2021, the evaluation team also fielded paper surveys by mail to gather additional responses. Respondents answered questions related to satisfaction and likelihood on a scale of 0 to 10, where 10 indicated the highest degree of satisfaction or likelihood and 0 the lowest.[46]

Figure 76 shows that Schools and Government Solution participants gave the offering they participated in an average overall satisfaction rating of 9.3 in CY 2021, which was the same as the average rating in CY 2020 and statistically higher than the portfolio target for CY 2021.[47] Respondent ratings for satisfaction with Focus on Energy advisors and staff (9.6) and trade allies (9.3) remained high in CY 2021 and were statistically equivalent to the corresponding CY 2020 ratings.

[46] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped or did not know answers to questions.

[47] The administrator's contract established a portfolio target of 8.9 to maintain or increase customer satisfaction..

Figure 76. Satisfaction and Likelihood Ratings for the School and Government Solution

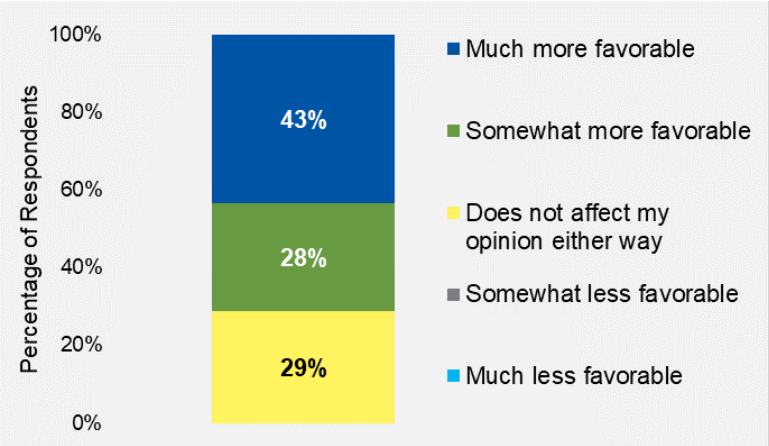


Source: Schools and Government Solution Participant Satisfaction Survey Questions. "Overall, how satisfied are you with your most recent experience with Focus on Energy?" (CY 2021 n=92, CY 2020 n=208). "How satisfied are you with the Energy Advisor or Focus on Energy staff member who assisted you with your project?" (CY 2021 n=76; CY 2020 n=159). "How satisfied are you with the contractor that provided your school or government building update?" (CY 2021 n=78; CY 2020 n=178). "How likely are you to recommend Focus on Energy to others?" (CY 2021 n=91; CY 2020 n=207).
There are no statistically significant differences between CY 2021 and CY 2020 ratings.

Using these survey data, the evaluation team calculated a NPS based on customers' likelihood to recommend Focus on Energy. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). 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 Schools and Government Solution's NPS was +91 for CY 2021, consistent with the very high NPS for this solution in CY 2020 (+90).

CY 2021 participants were asked if they were aware before receiving the satisfaction survey that the Schools and Government Solution was offered in partnership with their local utility, and 84% (n=91) were aware, similar to the CY 2020 rate (78%, n=206). Respondents were also asked if Focus on Energy offerings affected their opinion of their utilities, and 71% reported that their opinion had become *much more favorable* or *somewhat more favorable* (Figure 77). None of the survey respondents said their opinion had become less favorable (0%), and 29% said their opinion of their utility was not affected. These ratings were almost identical to CY 2020 responses (71% more favorable, 2% less favorable).

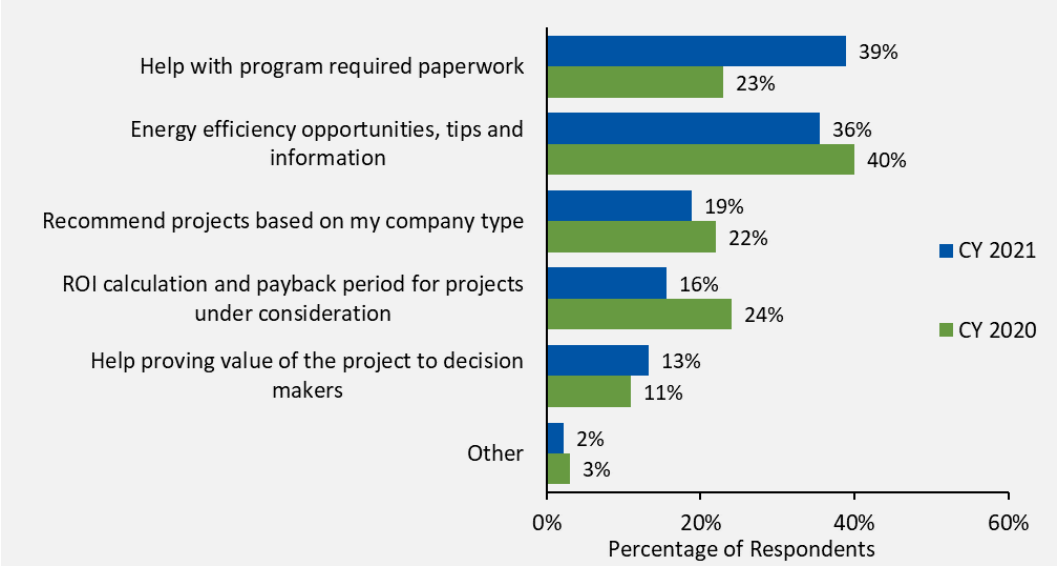
Figure 77. Effect of Focus on Energy Offerings on Schools and Government Participants' Opinion of Utilities



Source: Schools and Government Solution Participant Satisfaction Survey Question. "How have these offerings affected your opinion of your energy utility, if at all?" (CY 2021 n=90).

Survey respondents identified how Focus on Energy can best support their organization with future projects (Figure 78). The most frequent responses from Schools and Government Solution participants in CY 2021 were help with paperwork (39%) and energy efficiency opportunities, tips, and information (36%). Compared to CY 2020, more respondents mentioned help with paperwork (39% up from 23%) and fewer mentioned assistance with return on investment (ROI) calculations (16% down from 24%).

Figure 78. CY 2021 Participants' Most Valued Support



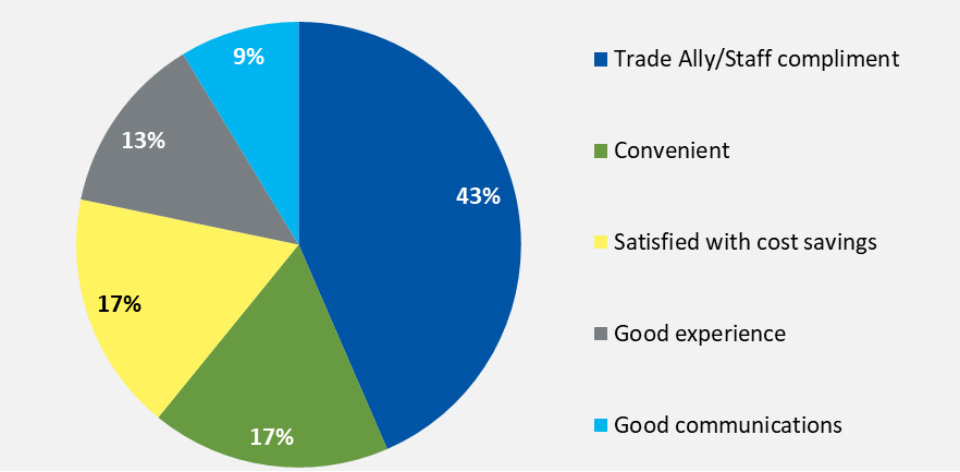
Source: Schools and Government Solution Participant Satisfaction Survey Question. "Aside from providing project incentive dollars, how can Focus on Energy best support your organization going forward?" (CY 2021 n=90, CY 2020 n=204). Responses total to more than 100% because multiple responses were allowed.

Participant Feedback and Suggestions for Improvement

During the customer satisfaction surveys, the evaluation team asked participants if they had any comments or suggestions for improving the offering. Of the 92 participants who responded to the survey, 29% provided open-ended feedback, which the evaluation team coded into a total of 36 mentions. Of these mentions, 23 were positive or complimentary comments (64%), and 13 were suggestions for improvement (36%).

The positive responses are shown in Figure 79, with most comments reflecting compliments for trade allies and Focus on Energy staff (43%), the convenience of the offering (17%), or satisfaction with cost savings on equipment and energy bills (17%). These results were very similar to positive comments from CY 2020 participants.

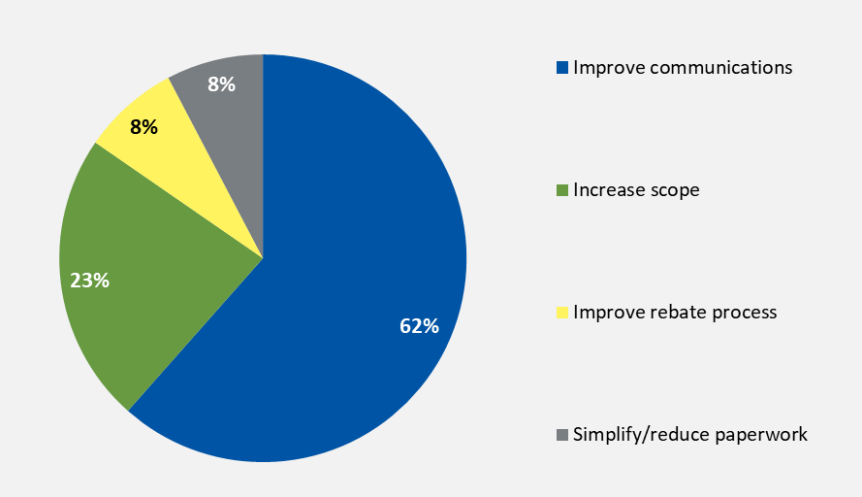
Figure 79. Positive Comments about the Schools and Government Solution



Source: Schools and Government Solution Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement."
(Total positive mentions n=23)

Suggestions for improvement are shown in Figure 80; the most common suggestions in CY 2021 were to improve communications (62%) and increase the scope of the offering (23%), which were also the most common suggestions in CY 2020. Suggestions about improving communications typically focused on making it easier to find the information required to submit applications and receiving faster responses from energy advisors. Suggestions about increasing the scope mentioned expanding the offering to include incentives for energy use management, automation systems, and solar arrays.

Figure 80. Suggestions for Improving the Schools and Government Solution



Source: Schools and Government Solution Participant Satisfaction Survey Question. "Please tell us more about your experience and any suggestions for improvement." (Total suggestions for improvement n=13)

Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a DSM offering. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix I. Cost-Effectiveness and Emissions Methodology and Analysis in Volume III includes a description of the TRC test.

Table 116 lists the CY 2021 incentive costs for the Schools and Government Solution.

Table 116. CY 2021 Schools and Government Incentive Costs

	Incentive Costs
Schools	$3,168,647
Government	$1,800,088
Virtual Commissioning Pilot	$68,109
Total	**$5,036,844**

The evaluation team found that the CY 2021 Schools and Government Solution was cost-effective (1.64). Table 117 lists the evaluated costs and benefits.

Table 117. Schools and Government Costs and Benefits

Cost and Benefit Category	Total
Costs	
Administration Costs	$305,307
Delivery Costs	$3,406,783
Incremental Measure Costs	$40,844,784
Total Non-Incentive Costs	**$44,556,874**
Benefits	
Electric Benefits (kWh)	$21,271,439
Electric Benefits (kW)	$12,047,485
T&D Benefits (kW)	$5,320,020
Gas Benefits	$22,735,199
Emissions Benefits	$11,701,923
Total TRC Benefits with T&D benefits	**$73,076,066**
Net TRC Benefits with T&D benefits	**$28,519,192**
TRC Benefit/Cost Ratio with T&D benefits	**1.64**

Outcomes and Recommendations

The evaluation team synthesized information from the CY 2021 evaluation activities to inform the following outcomes and recommendations for the Schools and Government Solution. Overall, the solution performed well in CY 2021, achieving 113% of its total energy savings goal. The team offers the following recommendations to improve the accuracy of quantifying the energy savings resulting from this solution.

Outcome 1. The desk reviews uncovered several minor discrepancies that led to a realization rate differing from 100%. These issues included incorrect savings assigned to some measures in SPECTRUM, incorrect calculations of lifecycle savings, and measure savings in SPECTRUM attributed to a version of the TRM that was not current.

Recommendation 1. To improve the accuracy of *ex ante* savings, have the implementer ensure that all MMID savings are updated in SPECTRUM consistently to reflect the current version of the TRM. Base *ex ante* savings on the appropriate TRM using the SPECTRUM creation date of the project. Ensure all MMIDs are updated on the effective date of the TRM to reduce SPECTRUM lag issues that result from variable updates.

Outcome 2: To mitigate the long-term effects of lower tax revenue on Focus on Energy participation levels, the implementer promoted federal funding through the CARES Act and Emergency and Secondary Emergency Relief (for K-12) as ways to fund improvements in air quality and energy efficiency. However, the implementer said most energy projects that receive funding from the CARES Act and Emergency and Secondary Emergency Relief will not be completed until 2023 and 2024.

Recommendation 2. As part of future customer survey evaluation efforts in 2023 and 2024, ask participants if they used funding from the CARES Act and Emergency and Secondary Emergency Relief (for K-12) for their energy efficiency projects.

Nonresidential New Construction

Through the New Construction Solution, Focus on Energy provides incentives to participating residential and nonresidential customers and their design teams to design and build new energy-efficient buildings or to complete substantial renovations of existing buildings. The Residential New Construction Offering is reported separately.

For nonresidential buildings, which include multifamily buildings, Focus on Energy targets new construction projects as well as major renovation projects of 5,000 square feet or more.

The New Construction Solution is administered by APTIM and implemented by Willdan, with CESA-10 as a subcontractor.

Focus on Energy offers three participation paths for nonresidential new construction:

- **Energy Design Assistance** provides a free customized, whole-building analysis of energy-saving options in the planning phase and early design phase.
- **Energy Design Review** offers plan review for buildings late in the design phase and uses whole-building energy simulation analysis to investigate and capture savings associated with energy efficiency improvements included in the final design.
- **Product and equipment incentives** offers prescriptive equipment incentives for buildings in the construction phase or move-in phase.
- **Multifamily product and equipment performance** offers incentives for multifamily buildings not participating in Energy Design Assistance or Energy Design Review and uses a hybrid approach.

These participation paths recognize that commercial building construction is complex and long term and offer solutions for building designers and builders at progressive phases of a new construction project.

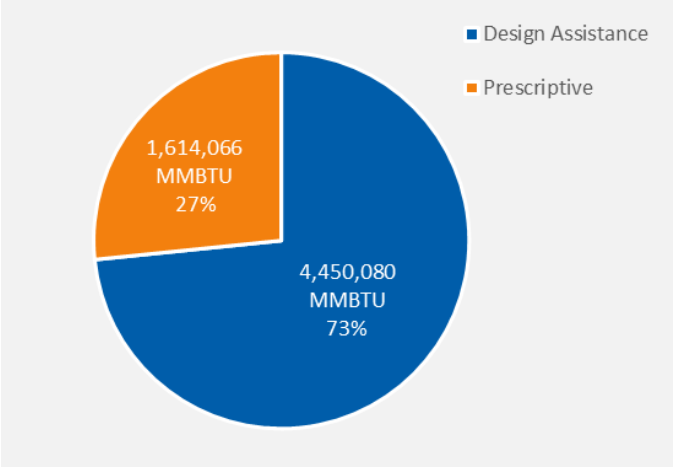
Table 118 lists actual spending, savings, participation, and cost-effectiveness of the Nonresidential New Construction Solution in CY 2021.

Table 118. CY 2021 Nonresidential New Construction Solution Summary

Item	Units	CY 2021
Actual Incentive Spending	$	$5,237,461
Participation	Number of Participants	267
Verified Gross Lifecycle Savings	kWh	825,638,852
	kW	8,097
	therms	46,155,074
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%
Annual NTG Ratio	% (MMBtu)	81%
Net Annual Savings	kWh/year	37,488,381
	kW	6,558
	therms/year	1,906,464
Net Lifecycle Savings	MMBtu	6,064,146
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	2.37

Figure 81 shows the proportion of savings by offering. For impact reporting purposes, the evaluation team combined the Energy Design Assistance and Energy Design Review Offerings. The combined offering contributed 73%, and the Prescriptive Offering contributed 27% of the total solution savings.

Figure 81. CY 2021 Proportion of Nonresidential New Construction Solution Net Lifecycle Savings by Offering



Achievement Against Goals

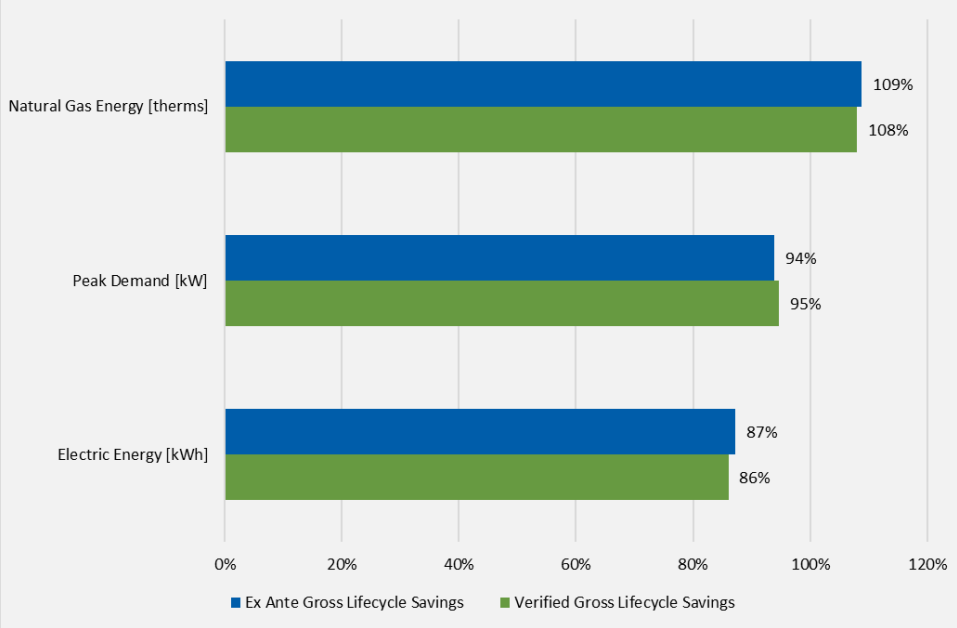
As shown in Table 119, the Nonresidential New Construction Solution did not achieve its peak demand and electric energy savings goals but exceeded its natural gas savings goal. Figure 82 shows the percentage of gross lifecycle savings goals achieved by the Nonresidential New Construction Solution in CY 2021.

Table 119. CY 2021 Nonresidential NC Solution Achievement of Gross Lifecycle Savings Goals

Savings	*Ex Ante* Gross Lifecycle Savings		Verified Gross Lifecycle Savings		*Ex Ante* Percent Achieved	Verified Gross Percent Achieved
	Goal	Actual	Goal	Actual		
Electric Energy [kWh]	959,847,597	837,054,107	959,847,597	825,638,852	87%	86%
Peak Demand [kW]	8,550	8,025	8,550	8,097	94%	95%
Natural Gas Energy [therms]	42,750,000	46,516,329	42,750,000	46,155,074	109%	108%
Total Energy (MMBtu) [z]	**7,550,000**	**7,506,729**	**7,550,000**	**7,486,601**	**99%**	**99%**

[a] Verified kWh and therm savings may not sum to verified MMBtu values due to conversion/rounding associated with measure-level application of realization rates.

Figure 82. Nonresidential New Construction Solution Achievement of CY 2021 Gross Lifecycle Savings Goals



The 100% *ex ante* gross lifecycle savings reflects the implementer's contract goals for CY 2021. Verified gross lifecycle savings contribute to the administrator's portfolio-level goals.

Impact Evaluation

This section contains the findings for the CY 2021 impact evaluation at the solution level, followed by a discussion of each offering.

Impact Evaluation Methodology

The evaluation team conducted an impact evaluation of the CY 2021 Nonresidential New Construction Solution. The team designed its evaluation, measurement, and verification approach to integrate multiple perspectives in assessing the performance of each offering and of the solution as a whole. Table 120 lists specific data collection activities and sample sizes used in the evaluation. Additional details about these activities and their findings can be found in the offering-specific discussions below.

Table 120. CY 2021 Nonresidential New Construction Solution Impact Activities

Solution	Offering	Total Measures	Impact Evaluation Sample		
			Desk Reviewed Measures	Verified Measures	Proportion Sampled (by *Ex Ante* MMBtu Savings)
Nonresidential New Construction	Energy Design Assistance, Energy Design Review	178	20	7	61%
	Prescriptive	734	26	9	18%
Total		**912**	**46**	**16**	**50%**

Engineering Desk Reviews

The evaluation team reviewed all available project documentation in SPECTRUM for a sample of 46 measures. This review included an assessment of the savings calculations and methodology applied by the implementer. The team relied on the applicable TRMs and other relevant secondary sources as needed. Secondary sources included energy codes and standards, case studies, energy efficiency program evaluations of comparable measures (based on location, sector, measure application, and date of issue), and the Focus on Energy Design Assistance Energy Modeling Protocol.

For prescriptive measures, the team used the Focus on Energy TRM and associated work papers as primary sources to determine methodology and data in nearly all cases. For hybrid and custom measures, the team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation.

To conduct the impact analysis, the evaluation team selected a representative sample of measures to evaluate then extrapolated findings to the larger program population. In CY 2021, this process used both purposive and proportional sampling.

The purposive sampling selected the largest-saving measures by offering. Because these measures were sampled with certainty (100% of eligible highest-saving measures were sampled), the results were not extrapolated to the offering population. These measures are referred to as census measures.

The proportional sampling measures were randomly selected from the population of offering measures. These measures are referred to as randomly sampled measures. The cumulative realization rate of randomly sampled measures in each offering was extrapolated to the remainder of the offering population.

Verification Site Visits

The evaluation team conducted 16 virtual and on-site verification visits for the CY 2021 Nonresidential New Construction Solution. Site visits and customer interviews involved verifying the type and quantity of equipment installed, determining how the installed equipment is controlled, and documenting the operating hours of the installed equipment. The team verified savings calculation input parameters based on plans, designs, specification data, and any other relevant details identified prior to contact with the site. Given travel restrictions due to the COVID-19 pandemic, the team conducted the majority of these visits and interviews remotely with the site contacts through several technology interfaces.

Verified Gross Savings Results for Nonresidential New Construction Solution

Table 121 lists the first-year and lifecycle realization rates for CY 2021. Table 122 contains a summary of verified first-year and lifecycle savings by offering. For reporting purposes, the evaluation team combined the Energy Design Assistance and Energy Design Review offerings. Overall, the solution achieved a first-year evaluated realization rate of 99%, weighted by total (MMBtu) energy savings. Detailed findings for each offering, including factors affecting the realization rates, are discussed in detail in the next section of this chapter.

Table 121. CY 2021 Nonresidential New Construction Solution
First-Year and Lifecycle Realization Rates

Offering	First-Year Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
Energy Design Assistance/ Energy Design Review	100%	102%	99%	100%	100%	99%	100%
Prescriptive	96%	99%	100%	99%	96%	100%	99%
Overall Realization Rate	**99%**	**101%**	**99%**	**99%**	**99%**	**99%**	**99%**

Table 122. CY 2021 Nonresidential New Construction Solution
First-Year and Lifecycle Verified Energy Savings Summary

Offering	Verified First-Year Savings				Verified Lifecycle Savings		
	kWh	kW	therms	MMBtu [a]	kWh	therms	MMBtu [a]
Energy Design Assistance/ Energy Design Review	27,583,637	5,153	1,788,213	274,743	551,672,740	35,764,265	5,493,926
Prescriptive	18,698,315	2,943	565,446	121,772	273,966,112	10,390,809	1,992,674
Overall Savings	**46,281,952**	**8,097**	**2,353,659**	**396,515**	**825,638,852**	**46,155,074**	**7,486,601**

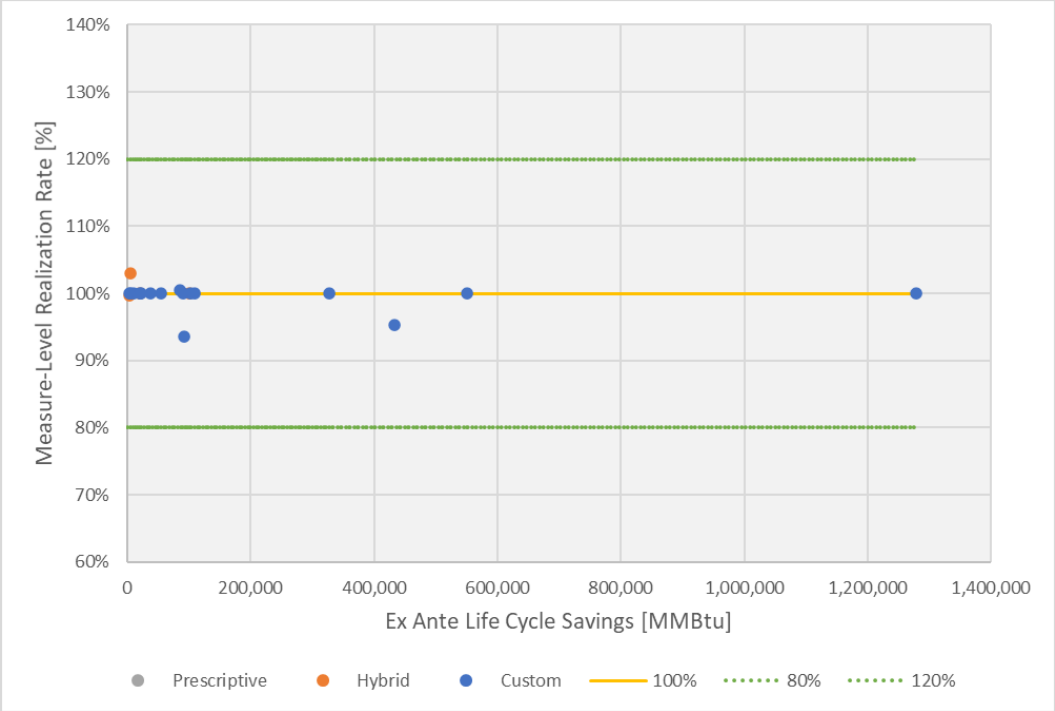
[a] Verified kWh and therm savings may not sum to verified MMBTU values due to conversion/rounding associated with measure-level application of realization rates.

Nonresidential New Construction Solution Energy Design Assistance/Energy Design Review: Verified Gross Savings Results

For the Energy Design Assistance and Energy Design Review Offerings, the evaluation team conducted a database review, engineering desk reviews, and site visits. The combined offerings had a gross lifecycle realization rate of 100% MMBtu. Figure 83 presents the magnitude of and associated realization rates for reported MMBtu savings of the sampled projects.

As the figure shows, there was little deviation from *ex ante* savings in the sample for CY 2021. The evaluation team found that the administration and implementation processes for providing energy design assistance and review and calculating energy savings using simulation modeling were thorough, well-documented, and technically correct. Most sampled projects achieved an individual realization rate of 100%.

Figure 83. Nonresidential New Construction Solution – Energy Design Assistance Offering Sampling Results



For three sampled projects, minor inconsistencies between reported values and energy model inputs or outputs led to small increases or decreases in realization rates. During a virtual site visit, the evaluation team found that a portion of one of the planned energy-saving measures that related to control of the boiler temperature had either not been implemented or was no longer being used. Removing the savings for this control measure decreased the realization rate for this project.

Table 123 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for the Energy Design Assistance and Energy Design Review Offerings.

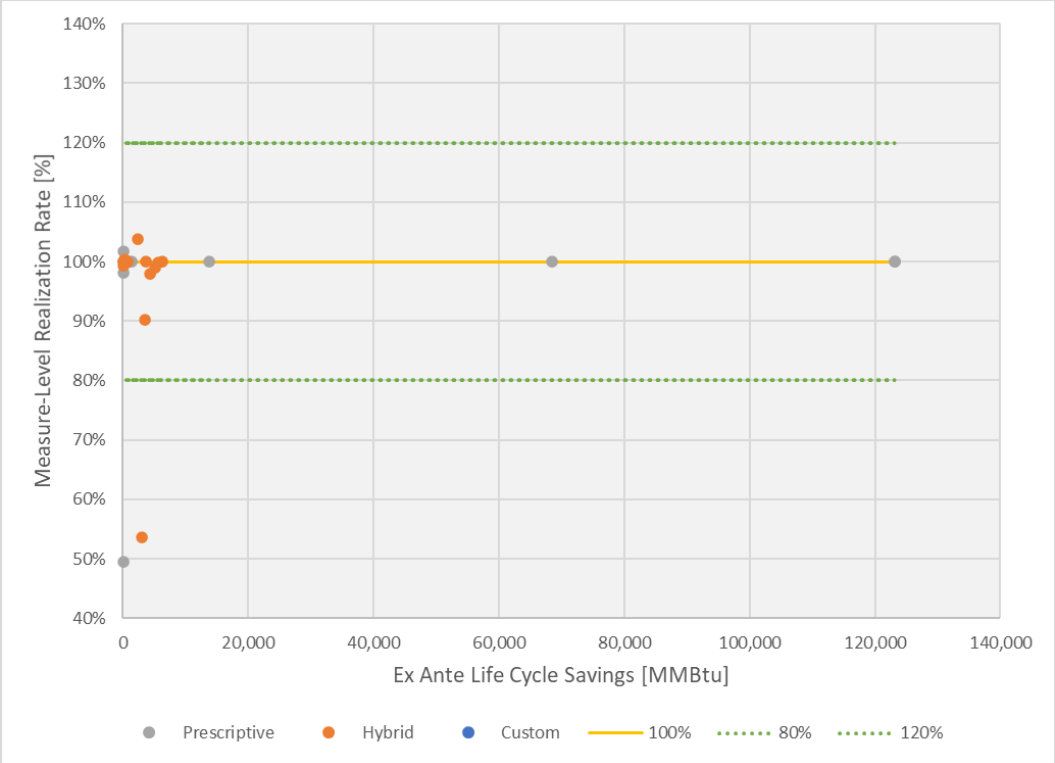
Table 123. CY 2021 Nonresidential New Construction Solution Energy Design Assistance and Energy Design Review Offerings *Ex Ante* and Verified Gross Savings

	***Ex Ante* Gross**			**Verified Gross**		
	kWh	**kW**	**therms**	**kWh**	**kW**	**therms**
First-Year Gross Savings	27,583,637	5,052	1,806,276	27,583,637	5,153	1,788,213
Lifecycle Gross Savings	551,672,740	5,052	36,125,520	551,672,740	5,153	35,764,265

Nonresidential New Construction Solution Prescriptive: Verified Gross Savings Results

For the Prescriptive Offering, the evaluation team conducted a database review, a TRM review, engineering desk reviews, and virtual site visits. The offering had a gross lifecycle realization rate of 99% MMBtu. Figure 84 represents the magnitude of and associated realization rates for reported MMBtu savings among sampled projects.

Figure 84. Nonresidential New Construction Solution – Prescriptive Offering Sampling Results



As shown in the figure, there was little deviation from *ex ante* savings for most sampled projects in CY 2021. There were some minor deviations in individual project realization rates due to slight differences between values used in the *ex ante* savings calculations and values listed in equipment cutsheets for light fixture wattage. A few sampled projects deviated more significantly from their *ex ante* savings. Two hybrid projects achieved lower realization rates due to shorter verified hours of use than used in the *ex ante* savings calculations. One sampled project achieved a 50% realization rate because a virtual site visit could not verify that the two reported heat pumps had been installed and were in operation. For one sampled project, the evaluation team determined that a different sector designation for the TRM deemed savings was more appropriate, based on its application in new construction nonresidential space.

The evaluation team believes it is important to distinguish between residential and nonresidential applications for a given piece of equipment in a multifamily facility. This sector has a higher deemed savings than the one used in the *ex ante* savings calculations, resulting in a higher realization rate for this project.

Table 124 lists the CY 2021 *ex ante* and verified gross first-year and lifecycle savings for the Prescriptive Offering.

Table 124. CY 2021 Nonresidential New Construction Solution Prescriptive Offering *Ex Ante* and Verified Gross Savings

	Ex Ante Gross			Verified Gross		
	kWh	kW	therms	kWh	kW	therms
First-Year Gross Savings	19,477,412	2,973	565,446	18,698,315	2,943	565,446
Lifecycle Gross Savings	285,381,367	2,973	10,390,809	273,966,112	2,943	10,390,809

Verified Net Savings Results for Nonresidential New Construction Solution

The evaluation team used CY 2020 participant surveys to assess net savings for the Nonresidential New Construction Solution at the offering level. The team weighted the offering-level NTG estimates by total population lifecycle MMBtu savings to calculate a NTG ratio of 81% for the CY 2020 solution. The NTG of 81% is used in the CY 2021 solution analysis.

Verified Net Savings Results

The evaluation team calculated freeridership and participant spillover at the offering level for the Nonresidential New Construction Solution using findings from a survey conducted with CY 2020 solution participants. Customer survey activity did not occur in CY 2021, therefore CY 2020 freeridership and participant spillover data from CY 2020 was used in the CY 2021 verified net savings analysis. To calculate the NTG for each offering in CY 2020, the team combined the self-reported freeridership and participant spillover results using the following equation:

$$NTG = 1 - Freeridership\ Ratio + Participant\ Spillover\ Ratio$$

Table 125 shows the offering-level NTG results for the Nonresidential New Construction Solution. The CY 2020 evaluation report contains the full detailed analysis of NTG completed in 2020.

Table 125. Nonresidential New Construction Solution NTG Ratios by Offering

Offering	Respondents (n)	Freeridership	Spillover	NTG Ratio
Energy Design Assistance/Energy Design Review	17	19% [a]	0%	81%
Prescriptive	9	19% [a]	0%	81%

[a] Weighted by lifecycle gross verified MMBtu savings.

Table 126 shows the weighted average NTG ratio by offering, as well as the total lifecycle gross verified savings and lifecycle net savings.

Table 126. CY 2021 Nonresidential New Construction Solution Lifecycle Net Savings and NTG

Offering	Total Lifecycle Gross Verified Savings (MMBtu)	Total Lifecycle Net Savings (MMBtu)	NTG Ratio
Energy Design Assistance/Energy Design Review	5,493,926	4,450,080	81%
Prescriptive	1,992,674	1,614,066	81%
Total	**7,486,601**	**6,064,146**	**81%**

Process Evaluation

The CY 2021 process evaluation focused on these key topics:

- Solution design, delivery, and goals
- Participant satisfaction and experience

Process Evaluation Methodology

In CY 2021, the evaluation team designed the process evaluation of the Nonresidential New Construction Solution to assess performance and to understand any changes from CY 2020. The process evaluation involved in-depth interviews with the administrator and implementer as well as an analysis of the results of participant satisfaction survey.

Table 127 lists specific data collection activities and sample sizes used in the evaluation.

Table 127. CY 2021 New Construction Solution Process Evaluation Activities and Sample Sizes

Activity	Measure Group or Offering	CY 2021 Sample Size (n)
Administrator and Implementer Interviews	N/A	3
Ongoing Participant Satisfaction Surveys	Prescriptive and Energy Design	18 (11 Prescriptive, 7 Energy Design)

Administrator and Implementer Interviews

Cadmus conducted interviews with three staff members from APTIM, the administrator, and Willdan, the implementer, to obtain the following:

- Gather perspectives on offering delivery, achievements, and changes
- Understand Nonresidential New Construction Solution goals and the impact of COVID-19 on those goals
- Document outreach strategies and assess impact of marketing activities to date
- Understand how the program implementer interacts with participants

Ongoing Participant Satisfaction Survey

Throughout CY 2021, the administrator emailed Prescriptive path participants a link to the web-based satisfaction survey. The evaluation team supplemented these results by fielding paper surveys by mail during the first quarter of the year only. APTIM also developed a survey for the Energy Design Review participants starting in Q2 2021. There were two objectives for these surveys:

- Understand customer satisfaction on an ongoing basis and respond to any changes in satisfaction before the end of the annual reporting schedule.
- Help facilitate timely follow-up with customers to clarify and address service concerns.

As in previous years, the evaluation team analyzed the survey results. According to SPECTRUM data, 18 Nonresidential New Construction Solution participants in the Prescriptive and Energy Design Review offerings responded to the CY 2021 survey (nine online and two mail in the Prescriptive Offering; and seven in the Energy Design Review Offering). The survey covered several topics including overall

satisfaction, satisfaction with Offering staff and trade allies, likelihood of recommending Focus on Energy, and other feedback.

Solution Design and Delivery

The Nonresidential New Construction Solution maintained a similar design, staffing, and delivery processes as in CY 2020. The implementer manages solution services, such as reviewing and approving applications, monitoring project-level savings, planning and implementing outreach activities, conducting training sessions, and maintaining communication and accountability with the administrator. The administrator oversees solution activities throughout the year, monitors progress on goals, and coordinates with the implementer.

Participants have opportunities for incorporating energy-efficient design measures at three stages. In the initial building design plans (Energy Design Assistance), the implementer and the project design team evaluate potential energy-saving design strategies and select a bundle of strategies to include in the project design. For projects that are beyond the initial design phase, the Energy Design Review path includes incentives to capture savings associated with energy efficiency improvements in the final design.

After construction is completed, the implementer verifies execution of the energy-saving strategies and that all project savings are associated with the verified project-savings measures. Note that design and modeling assistance do not have associated energy savings.

The implementer said participation in the prescriptive path was strong at the beginning of CY 2021. Participation in the Energy Design Review path was more challenging due to timing variability for measures such as building envelope, mechanical systems, and the final design phase. By the end of CY 2021, however, participation in Energy Design Assistance was sufficient to meet the savings goal.

In CY 2021, Focus on Energy implemented two key changes to the Nonresidential New Construction Solution:

- Focus on Energy returned to the original incentive metric, $/kWh or $/therm, that was more easily understood by participants. In CY 2020, Focus on Energy changed the incentive calculation method to $/MMBtu saved. However, this was confusing to participants who had been involved previously or were in a longer construction phase and were used to the original calculation method.
- In the second quarter, Focus on Energy introduced the product equipment performance incentives for multifamily building construction projects after the implementer evaluated the planned building envelope, lighting, and HVAC systems and recommended measures that fulfilled an energy performance approach of “good/better/best.” Participants received an incentive per square foot based on the measures they selected. Participants with multifamily projects also received incentives for conditioned garage spaces and bonus incentives for installing advanced HVAC systems (including ground source heat pumps and variable refrigerant flow).

COVID-19 Impact

Overall, the COVID-19 pandemic had a minimal effect on participation. The implementer said supply chain shortages and delays for equipment and labor resulted in project schedule extensions, making it difficult to forecast project completion and shifting some projects from CY 2021 to CY 2022. These challenges, however, were not consistent or universal across all projects. The implementer managed each participant's challenges individually.

Supply chain issues primarily affected participants in the prescriptive path in the construction phase. Some builders managed longer lead times by ordering materials well in advance, but others struggled with higher costs and unforeseen delays for equipment and labor. Nevertheless, the Nonresidential New Construction Solution was able to maintain its planned participation and savings levels, achieving 99% of its CY 2021 savings goals (discussed in the achievement against goals section).

As in CY 2020, the administrator and implementer maintained safety protocols when meeting with participants and mostly used email and video for communication and outreach. They said participants were increasingly uninterested in attending in-person lunch-and-learn workshops but that it was unclear if this was due to COVID concerns, other factors such as time, or combination of both.

Marketing and Outreach

The implementer, with support from the administrator, conducted direct outreach to design professionals, such as architects, engineers, and design contractors, through several channels:

- Sponsored the U.S. Green Building Council and the American Institute of Architects (AIA) conference, including the New Construction Trade Ally Awards presented during the AIA Wisconsin 2021 Design Awards Gala in September
- Enhanced the New Construction landing page website with new videos and resources. This tool provides an online application form and a resource for customer questions and requests and generates notifications for implementers to follow up with customers. This tool streamlines the application process, making it easy to update and integrate project data with SPECTRUM.
- Developed a new YouTube video with step-by-step guidance on how to use the lighting power density workbook, report and qualify a project, and submit an application for incentives
- Developed a dedicated PEP website page
- Provided quarterly trade ally newsletter, promotional emails, and online training webinars and continued to engage with architectural and engineering firms on an individual and by-request basis
- Continued coordination and collaboration with utilities

In CY 2021, the implementer made a more focused effort to interact with utility representatives and account managers with varied success. It said one utility is very engaged with the New Construction Solution, but the implementer does not have the same level of engagement with other utilities. The implementer also noted success with participation and sponsorship at the AIA conference. Most utilities

sent a representative or account manager, so the implementer was able to identify key contacts and establish relationships for deeper engagement in the future.

Ongoing Participant Satisfaction Surveys

Throughout CY 2021, the administrator invited Prescriptive and Energy Design Review participants to take web-based satisfaction surveys. During the first quarter of CY 2021, the evaluation team also fielded a paper survey by mail to Prescriptive participants to gather additional responses. Respondents answered questions related to satisfaction and likelihood to recommend Focus on Energy on a scale of 0 to 10, where 10 indicated the highest degree of satisfaction or likelihood and 0 the lowest.[48]The team received 11 survey responses from Prescriptive participants and seven from Energy Design Review participants. The response proportions and mean scores should be interpreted with caution due to the low number of survey responses.

Prescriptive participants gave the offering they participated in an average overall satisfaction rating of 9.5 in CY 2021, while Energy Design Review participants gave their offering an average rating of 8.7 in CY 2021. The rating for Prescriptive was statistically higher to the portfolio target for CY 2021, while the rating for Energy Design Review was statistically equivalent to the portfolio target.[49] Table 128 shows the average satisfaction and likelihood ratings for the offering in CY 2021, which were all above 9.0 for Prescriptive and at least 8.7 for Energy Design Review.

Table 128. CY 2021 Average Ratings for Nonresidential Prescriptive and Energy Design Review Offerings

Item	Prescriptive Participants CY 2021	Energy Design Review Participants CY 2021
Satisfaction with the offering overall	9.5 (n=11)	8.7 (n=7)
Satisfaction with Focus on Energy staff	9.3 (n=10)	9.4 (n=7)
Satisfaction with Trade Ally	9.3 (n=10)	*Not asked*
Satisfaction with ease of applying for incentives	*Not asked*	8.7 (n=7)
Satisfaction with information presented at results meeting	*Not asked*	8.7 (n=7)
Likelihood of recommending Focus on Energy	9.1 (n=11)	10.0 (n=7)

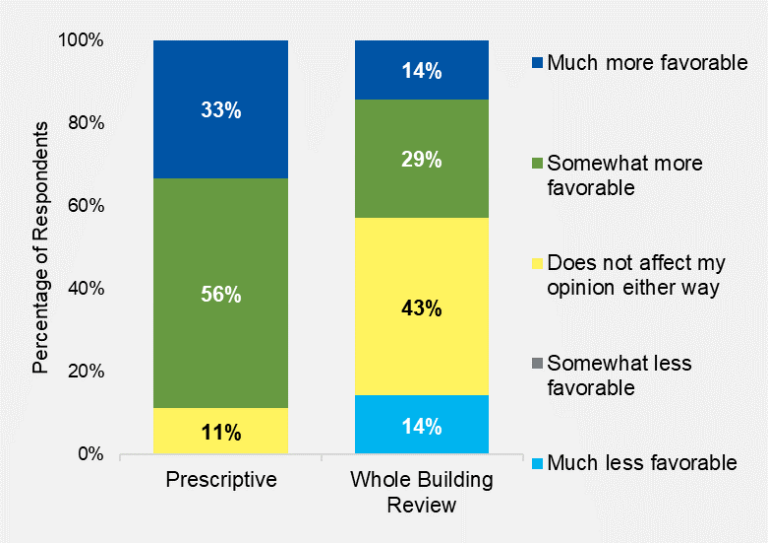
[48] The number of participants who completed a survey does not always match the number of responses for each question, as some participants skipped or did not know answers to questions.

[49] The program administrator's contract established a portfolio target of 8.9 to maintain or increase customer satisfaction.

Using these survey data, the evaluation team calculated NPS based on customers' likelihood to recommend Focus on Energy. The NPS is expressed as an absolute number between -100 and +100 that represents the difference between the percentage of promoters (respondents giving a rating of 9 or 10) and detractors (respondents giving a rating of 0 to 6). High NPS scores (+70 or higher) are theoretically predictive of customer behaviors such as participating in another offering, implementing additional energy improvements, and referring Focus on Energy offerings to others. The Nonresidential Prescriptive Offering's NPS was +64 for CY 2021, directionally lower than the NPS of +80 for this offering in 2020. The NPS for Energy Design Review was +100 for CY 2021 since all seven respondents gave ratings of "10" for their likelihood to recommend Focus on Energy.

CY 2021 participants were asked if they were aware before receiving the satisfaction survey that the offering they participated in was offered in partnership with their local utility, and 100% (n=11) of Prescriptive respondents and 86% (n=7) of Energy Design Review respondents were aware. Respondents were also asked if Focus on Energy offerings affected their opinion of their utilities (Figure 85), and 89% of Prescriptive respondents reported their opinion had become *much more favorable* or *somewhat more favorable*. None of the Prescriptive respondents reported their opinion had become less favorable, and 11% (one respondent) said their opinion of their utility was not affected. However, only 43% of Energy Design Review respondents reported their opinion had become *much more favorable* or *somewhat more favorable*, while 14% (one respondent) reported their opinion had become *much less favorable* and 43% said their opinion of their utility was not affected.

Figure 85. Focus on Energy Offerings Impact on New Construction Solution Participants' Opinion of Utilities



Source: Business and Industry Participant Satisfaction Survey Question. "How have these offerings affected your opinion of your energy utility, if at all?" (Prescriptive n=9, Energy Design Review n=7).

CY 2021 participants were asked how they learned about the Nonresidential New Construction Solution Prescriptive Offering, and most respondents (54%, n=11) mentioned Focus on Energy advisors, with contractors (36%) accounting for most of the rest, and one respondent (11%) mentioned an email from

Focus on Energy. Respondents were also asked how Focus on Energy could support their organization going forward, and their responses were energy efficiency opportunities, tips and information (45%, n=11 with multiple responses allowed), help with program required paperwork (36%), ROI calculation and payback period for projects under consideration (18%), and recommend projects based on my company type (18%).[50]

Participant Feedback and Suggestions for Improvement

During the customer satisfaction surveys, the evaluation team asked participants if they had any comments or suggestions for improving the offering. Of the 11 participants who responded to the Prescriptive survey, two (18%) provided open-ended feedback. Both comments expressed a positive experience with the offering and Focus on Energy advisors, though one also suggested trade allies could provide more support for invoicing.

Only one of the seven Energy Design Review respondents offered any comments (14%), suggesting: "Having a clear and consistent point person to engage [with on] all of the Focus on Energy programs would be ideal. Having a consistent point of contact for the design assistance program is a critical expectation."

Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a DSM offering. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix I. Cost-Effectiveness and Emissions Methodology and Analysis in Volume III includes a description of the TRC test.

Table 129 lists the CY 2021 incentive costs for the Nonresidential New Construction Solution.

Table 129. CY 2021 Nonresidential New Construction Solution Incentive Costs

	Incentive Costs
Whole-Building	$4,030,446
Prescriptive only	$1,207,016
Total	**$5,237,461**

The evaluation team found that the CY 2021 Nonresidential New Construction Solution was cost-effective (2.37). Table 130 lists the evaluated benefits and costs.

[50] Whole Building Review respondents were not asked for their source of awareness or how Focus on Energy could further support their organizations

Table 130. CY 2021 Nonresidential New Construction Solution Costs and Benefits

Cost and Benefit Category	Total
Costs	
Administration Costs	$246,192
Delivery Costs	$3,146,105
Incremental Measure Costs	$31,149,455
Total Non-Incentive Costs	**$34,541,752**
Benefits	
Electric Benefits (kWh)	$24,911,891
Electric Benefits (kW)	$17,063,649
T&D Benefits (kW)	$7,324,956
Gas Benefits	$20,110,751
Emissions Benefits	$12,453,869
Total TRC Benefits with T&D benefits	**$81,865,116**
Net TRC Benefits with T&D benefits	**$47,323,364**
TRC Benefit/Cost Ratio with T&D benefits	**2.37**

Outcomes and Recommendations

The evaluation team synthesized information from the CY 2021 evaluation activities to inform the following outcomes and recommendations for the Nonresidential New Construction Solution. Overall, the solution performed well in CY 2021, achieving 99% of its total energy savings goal while maintaining high satisfaction with participants. The team identified some suggestions for improving the accuracy of quantifying the energy savings resulting from this solution.

Outcome 1: The evaluation team identified multiple instances of project data discrepancies, leading to realization rates that varied from 100%. Verification report specifications often differed from model inputs parameters for several Design Assistance/Design Review projects. This created uncertainty for the evaluation team concerning whether the documentation or the model had not been properly updated and which should be considered the most current. In addition, a virtual site visit at a Design Assistance project found that a controls-related portion of a boiler efficiency strategy was not in use. For a different project, documentation for a Prescriptive Offering project did not list unique serial numbers for installed units, making the invoices provided an unreliable data source.

Recommendation 1: Consider enacting or formalizing a quality control process for aligning verification reports with the energy model inputs and outputs.

Recommendation 2: The estimated useful life of behavior driven measures may need to be reviewed and determined on a project by project basis. These types of measures often have highly variable realized savings in the first year, and the savings achieved in subsequent years are dependent on the continued participation of the building operating staff.

Recommendation 3: For projects where an on-site verification is not conducted, consider requiring the site contact to submit photos of the installed units that show make, model, and serial numbers.

Outcome 2: The evaluation team identified small rounding error differences between the *ex ante* and *ex post* savings for several prescriptive lighting projects. Coarse rounding of the watts per fixture or watts per square foot used in the *ex ante* savings calculations led to less accurate results in several cases.

Recommendation 4: Consider establishing standards for how to round values to achieve consistent accuracy and precision, particularly in calculating lighting power density.

Outcome 3. The evaluation team's desk reviews uncovered several minor discrepancies that led to a realization rate differing from 100%. These issues included incorrect savings assigned to some measures in SPECTRUM, incorrect calculations of lifecycle savings, and measure savings in SPECTRUM attributed to a version of the TRM that was not current.

Recommendation 5. To improve the accuracy of *ex ante* savings, have the implementer ensure that all MMID savings are updated in SPECTRUM consistently to reflect the current version of the TRM. Base *ex ante* savings on the appropriate TRM using the SPECTRUM creation date of the project. Ensure all MMIDs are updated on the effective date of the TRM to reduce SPECTRUM lag issues that result from variable updates.

Renewable Energy Competitive Incentive Program

Through the Renewable Energy Competitive Incentive Program (RECIP) Solution, Focus on Energy offers financial incentives to Wisconsin business customers that install eligible, cost-effective renewable energy systems. Eligible projects include the installation of solar thermal, biogas, biomass, or wind systems. Previous years included solar electric and geothermal as eligible project types (pre-2020). The RECIP Solution will be discontinued after this current year (CY 2021).

The administrator, APTIM, issues a request for proposals three times a year and selects winning proposals through a competitive bid process. The implementers, Franklin Energy and CESA 10, process the awarded projects through the specific Focus on Energy business solution for which the customer is eligible.

Table 131 summarizes RECIP Solution impacts for CY 2021.

Table 131. CY 2021 RECIP Solution Summary

Item	Units	CY 2021
Incentive Spending	$	$269,966
Participation	Number of Participants	5
Verified Gross Lifecycle Savings	kWh	27,268,380
	kW	238
	therms	0
Verified Gross Lifecycle Realization Rate	% (MMBtu)	100%
Annual NTG Ratio	% (MMBtu)	93%
Net Annual Savings	kWh/year	1,143,667
	kW	222
	therms/year	0
Net Lifecycle Savings	MMBtu	86,527
Cost-Effectiveness	Total Resource Cost Test: Benefit/Cost Ratio	2.87

Achievement Against Goals

The RECIP Solution has no energy-savings goals for CY 2021 and has not established goals in the past. Though there are no energy savings targets and goals contractually for this solution, the savings achieved by the RECIP Solution contribute to its core goals.

Impact Evaluation

This section contains the findings for the CY 2021 impact evaluation for the RECIP Solution.

Impact Evaluation Methodology

The evaluation team conducted an impact evaluation of the CY 2021 RECIP Solution. The team designed its evaluation, measurement, and verification approach to integrate multiple perspectives in assessing the performance of the solution. Table 132 lists specific data collection activities and sample sizes used

in the evaluation. Additional details about these activities and their findings can be found in the offering-specific discussions below and in Appendix G. Net Savings Analysis in Volume III.

Table 132. CY 2021 Data Collection Activities and Sample Sizes – Impact Evaluation
RECIP Solution

Activity	RECIP
Tracking Database Review	Census
Desk Review + Interview	1
On Site Visits	5

Tracking Database Review

The evaluation team reviewed the census of records in Focus on Energy's database, SPECTRUM. This involved thoroughly reviewing the data to ensure SPECTRUM totals matched the administrator's reported totals and to check for complete and consistent applications of information across data fields (e.g., measure names, first-year savings applications, UL applications)

Engineering Desk Review

The evaluation team reviewed all available project documentation in SPECTRUM and assessed the savings calculations and methodology applied by the implementer. The team relied on the applicable TRMs and other relevant secondary sources as needed. Secondary sources included energy codes and standards, case studies, and energy efficiency program evaluations of comparable measures (based on geography, sector, measure application, and date of issue).

The Focus on Energy TRM and associated work papers were the primary sources to determine methodology and data in nearly all cases. For hybrid projects, the evaluation team reviewed the SPECTRUM savings analysis workbooks and adjusted inputs and methodologies as necessary based on engineering judgment and project documentation.

To conduct the impact analysis of the offering, the evaluation team analyzed a census of the measures.

Engineering Desk Review and Interview

The evaluation team conducted engineering desk reviews and a phone interview or email exchange with the site contact to verify key parameters, collect additional site photos, discuss operating schedules, and obtain additional trend data.

On-Site Visits

The evaluation team conducted verification site visits, which involved an engineering desk review then an in-person visit to the site. The team visually verified the type and quantity of equipment installed, asked the site contact how the installed equipment was controlled, and documented the operation of the installed equipment. The team verified savings calculation input parameters based on operational schedules, claimed and observed setpoints, trend data, utility data, and any other relevant details identified.

Verified Gross Savings Results for RECIP

Table 133 lists the first-year and lifecycle realization rates for CY 2021. Table 134 lists verified first-year and lifecycle savings by offering. Overall, the RECIP Solution achieved a first-year evaluated realization rate of 100%, weighted by total (MMBtu) energy savings. Detailed findings, including factors affecting the realization rates, are discussed in detail in the next section of this chapter.

Table 133. CY 2021 RECIP Solution First-Year and Lifecycle Realization Rates

Offering	First-Year Realization Rate				Lifecycle Realization Rate		
	kWh	kW	therms	MMBtu	kWh	therms	MMBtu
RECIP	100%	100%	-	100%	100%	-	100%

Table 134. CY 2021 RECIP Solution First-Year and Lifecycle Verified Total Energy Savings Summary

Offering	Verified First-Year Savings				Verified Lifecycle Savings		
	kWh	kW	therms	MMBtu [a]	kWh	therms	MMBtu [a]
RECIP	1,229,749	238	-	4,196	27,268,380	-	93,040

[a] Verified kWh and therm savings may not sum to verified MMBTU values due to conversion/rounding associated with measure level application of realization rates.

For the RECIP Solution, the evaluation team reviewed the database, the TRM, and the application file reviews, interviewed the site contact, and conducted measure-level engineering analyses to inform verified gross savings. The solution had a gross lifecycle realization rate of 100% MMBtu.

The RECIP Solution population was made up of six projects—four solar PV measures, one biogas, and one wind turbine. Each project had 100% of its savings verified.

The team did not find any sampled projects for which the COVID-19 pandemic adversely impacted the savings from participating in RECIP.

Table 135 lists the *ex ante* and verified gross first year gross for the CY 2021 year by measure type.

Table 135. CY 2021 RECIP Solution First Year Verified Savings Summary by Measure

Measure	*Ex Ante Gross First Year*			Verified Gross First Year		
	kWh	kW	therms	kWh	kW	therms
Biogas	627,691	-	-	627,691	-	-
Photovoltaics	534,680	231	-	534,680	231	-
Wind Electric	67,378	8	-	67,378	8	-
Total First Year	**1,229,749**	**238**	**-**	**1,229,749**	**238**	**-**

Table 136 lists the *ex ante* and verified gross lifecycle savings for the CY 2021 year by measure type.

Table 136. CY 2021 RECIP Solution Lifecycle Verified Savings Summary by Measure

Measure	*Ex Ante Gross Lifecycle*			Verified Gross Lifecycle		
	kWh	kW	therms	kWh	kW	therms
Biogas	12,553,820	-	-	12,553,820	-	-
Photovoltaics	13,367,000	231	-	13,367,000	231	-
Wind Electric	1,347,560	8	-	1,347,560	8	-
Total Lifecycle	**27,268,380**	**238**	**-**	**27,268,380**	**238**	**-**

Verified Net Savings Results for RECIP

The evaluation team used the CY 2020 participant surveys to assess net savings for the RECIP Solution at the offering level. The team weighted the offering-level NTG estimates by total population lifecycle MMBtu savings to calculate a NTG ratio of 93% for the CY 2020 solution. The team used this percentage in the CY 2021 solution analysis. For a detailed description of NTG analysis methodology and findings, refer to Appendix G. Net Savings Analysis in Volume III.

Verified Net Savings Results

The evaluation team calculated freeridership and participant spillover at the offering level for the RECIP Solution using findings from a survey conducted with CY 2019 solution participants. No customer survey was conducted in CY 2021. The team used the CY 2019 freeridership and participant spillover data in the CY 2021 verified net savings analysis.

Table 137 lists total verified first year and lifecycle MMBtu savings for the CY 2021 along with NTG.

Table 137. RECIP Solution Lifecycle Net Savings and NTG

Solution	Total Lifecycle Gross Verified Savings (MMBtu)	Total Lifecycle Net Savings (MMBtu)	NTG Ratio
RECIP	93,040	86,527	93%

Cost-Effectiveness

Evaluators commonly use cost-effectiveness tests to compare the benefits and costs of a DSM offering. The benefit/cost test used in Wisconsin is a modified version of the TRC test. Appendix I. Cost-Effectiveness and Emissions Methodology and Analysis in Volume III includes a description of the TRC test.

Table 138 lists the CY 2021 incentive costs for the RECIP Solution.

Table 138. CY 2021 RECIP Solution Incentive Costs

	Incentive Costs
Total	**$269,966**

The evaluation team found that the CY 2021 RECIP Solution was cost-effective (2.87). Table 139 lists the evaluated benefits and costs.

Table 139. CY 2021 RECIP Solution Costs and Benefits

Cost and Benefit Category	Total
Costs	
Administration Costs	$8,592
Delivery Costs	$29,194
Incremental Measure Costs	$801,559
Total Non-Incentive Costs	**$839,345**
Benefits	
Electric Benefits (kWh)	$964,287
Electric Benefits (kW)	$779,223
T&D Benefits (kW)	$319,441
Gas Benefits	$0
Emissions Benefits	$346,787
Total TRC Benefits with T&D benefits	**$2,409,738**
Net TRC Benefits with T&D benefits	**$1,570,393**
TRC Benefit/Cost Ratio with T&D benefits	**2.87**

Outcomes and Recommendations

The evaluation team identified the following outcomes and recommendations for the RECIP Solution.

Outcome 1: *Ex ante* energy and demand savings for PV systems require site-specific information and have in the past deviated from deemed TRM values. All projects calculated *ex ante* savings with a hybrid method that uses site-specific data (e.g., panel orientation, site location, system size, and power) and PVWatts software to estimate PV system performance. The RECIP Solution will be discontinued after this current year (CY 2021).

Pilots

This section presents the evaluation results for CY 2021 for Focus on Energy pilots and initiatives.

- **Save to Give Rural Behavior Pilot**

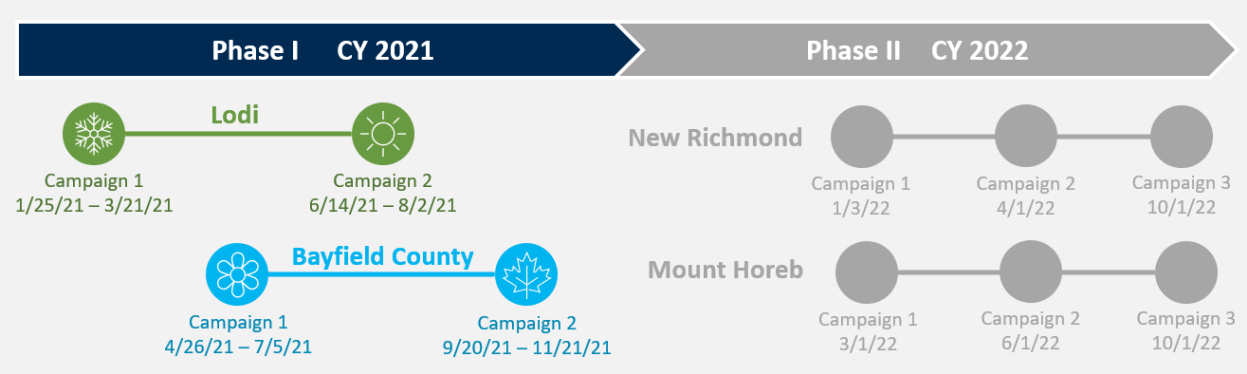
Save to Give Rural Behavior Pilot

In CY 2021, Focus on Energy launched the Save to Give Rural Behavior pilot to reach and serve rural residential utility customers in Wisconsin with a unique energy efficiency offering. This two-year pilot uses a community-based behavior program design where customers in select rural communities can sign up to take on energy efficiency challenges. In exchange for completing those challenges, participants earn points toward a monetary donation to a local nonprofit.

Focus on Energy selected the city of Lodi and Bayfield County to partake in the first year of the pilot. Lodi is a small town of roughly 3,060 people located in the Driftless Region of Wisconsin. Bayfield County, the second largest county in Wisconsin in area, is home to roughly 14,990 people and is located in the Northwoods of Wisconsin on the southern shore of Lake Superior.

APTIM, the program administrator for Focus on Energy, and Vermont Energy Investment Corporation, the program administrator's subcontractor, enlisted Minnesota's Center for Energy and Environment (CEE) to design and implement this pilot. The pilot is organized in two phases, as shown in Figure 86. This CY 2021 evaluation report covers Phase I.

Figure 86. Save to Give Pilot Plan and Timeline



In addition to providing rural customers access to an energy efficiency offering, the pilot has these three objectives:

- Achieve high customer satisfaction with participants
- Test the efficacy of the behavioral program design on rural Wisconsin customers for possible integration into Focus on Energy's broader portfolio
- Demonstrate measurable energy savings for participants

Phase I of the pilot focused on the first objective of achieving high customer satisfaction. Phase II will focus on the other two objectives, with outcomes reported later in CY 2022 and in CY 2023.

Process Evaluation

The evaluation team reviewed materials to understand the pilot design and conducted a participant survey to assess customer satisfaction and experience.

Design and Delivery

For Phase I of the pilot, Focus on Energy selected two communities, the city of Lodi and Bayfield County, and partnered with the communities' respective energy providers, Lodi Utilities and Xcel Energy. To initiate the pilot in each community, CEE hosted stakeholder workshops to achieve three goals:

- Establish a communitywide energy reduction goal
- Identify the number of and which specific local nonprofits to include in the pilot
- Gather local input on the campaign designs, including the number of and which energy-saving actions to target

As shown in Figure 86 above, CEE organized two eight-week campaigns for each community. Lodi participated in the winter 2021 and summer 2021 campaigns. Bayfield County participated in the spring 2021 and fall 2021 campaigns.

CEE worked with the nonprofits and community leaders to recruit, engage, and encourage customers to participate in the pilot. Recruitment strategies included emails, bill inserts, newsletters, flyers, local signage, social media, print media, digital ads, and community and classroom zoom meetings. Due to the ongoing COVID-19 pandemic, CEE largely used digital rather than the in-person community outreach originally intended. Nevertheless, when possible, safe, and compliant with local public health COVID-19 guidelines, CEE attended community events to recruit participants.

Once enrolled, participants received weekly challenge emails that encouraged them to adopt no- and low-cost energy-saving actions and to record their completed actions on the MyMeter online website. For completing and documenting their actions, participants earned points toward a monetary donation to one of the nonprofits selected by a community advisory committee. The more actions participants completed, the greater their energy savings and the greater the financial donation to the nonprofit.

Participants earned points on behalf of the nonprofits listed in Table 140.

Table 140. Community Nonprofits for CY 2021 Save to Give Pilot

Lodi	Bayfield County
• Lodi Parent Teacher Organization • Prairie Valley Resale Store • Reach Out Lodi	• Across the Pond Veteran Park, Inc. • Ashwabay Outdoor Education Foundation • Bayfield Heritage Association • Bayfield Recreation and Fitness Resources • Chequamegon Bay Renewables • Katie Flowers Endowment • Northern Lights Services

Each energy-saving action is assigned 1 to 8 points based on the level of effort and impact of the action. For example, participants receive 1 point per week during the eight-week campaign for recurring actions

such as unplugging unused electronics, for up to 8 points. Participants receive more points for one-time actions, such as 3 points for ordering and installing a smart thermostat from Focus on Energy.

A total of 226 rural utility customers enrolled in the pilot during CY 2021, consisting of 138 participants from Lodi and 88 participants from Bayfield County.

CEE reported data coordination challenges with some utilities, which reduced customer recruitment and onboarding opportunities.

Participant Survey Methodology

In February 2022, the evaluation team conducted an online survey with pilot participants from the communities of Lodi and Bayfield County. The team contacted participants with valid email addresses, and 33 completed the survey, for an overall response rate of 15%. Table 141 shows the number of participants contacted, survey completions, and response rates by community and overall.

Table 141. Save to Give Pilot Participant Survey Sample

Community	Participant Population	Survey Sample Frame (Customers with Valid Email Addresses)	Completions	Response Rate
Lodi	138	137	17	12%
Bayfield County	88	84	16	19%
Total	**226**	**221**	**33**	**15%**

To analyze the survey data, the evaluation team compiled frequency outputs and coded open-end survey responses according to the thematic similarities. When data were available, the evaluation team compared the Save to Give pilot's survey results to other Focus on Energy residential and rural offerings.

Appendix M. Survey and Interview Instruments by Offering in Volume III contains a copy of the participant survey instrument.

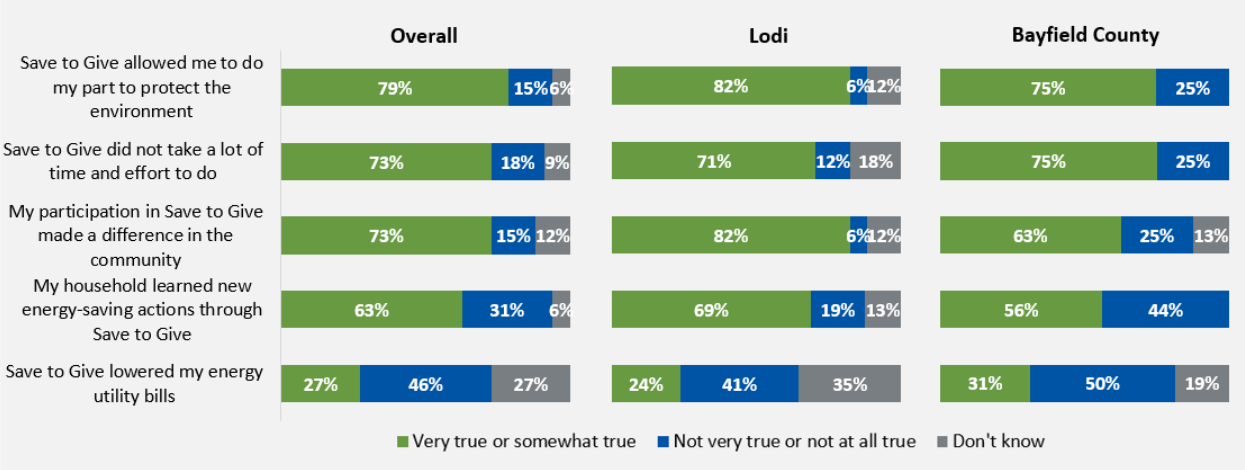
Overall Participant Experience

The Save to Give pilot delivered positive feelings and benefits to respondents. As shown in Figure 87, respondents were asked how well a series of statements applied. Most respondents selected *very true or somewhat true* for the following statements:

- Save to Give allowed me to do my part to protect the environment (79%)
- My participation in Save to Give made a difference in my community (73%)
- Save to Give did not take a lot of time and effort to do (73%)
- My household learned new energy-saving actions (63%)

Notably, more Lodi respondents than Bayfield County respondents reported that the Save to Give pilot was a positive experience.

Figure 87. Participant Experience with Save to Give Pilot



Source: Save to Give Participant Survey Question. "Below are statements about the Save to Give Challenge. Please indicate how well each statement applies to you." (Overall n=33, Lodi n=17, Bayfield County n=16).

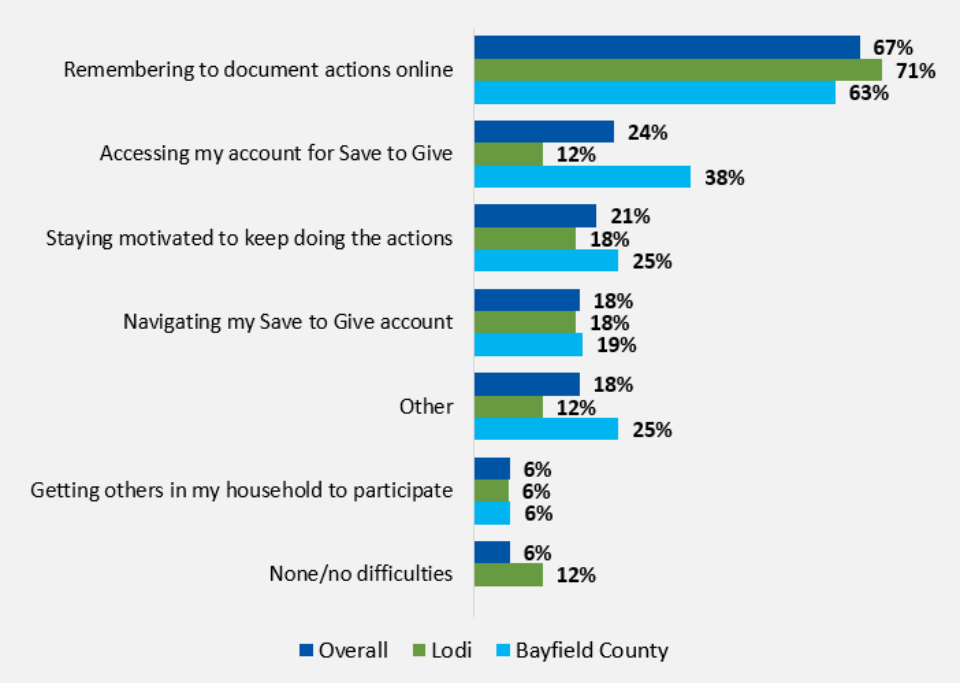
Although one the objectives of the pilot was to demonstrate measurable energy savings for participants, most respondents did not see the benefit of lower utility bills. Only 27% responded *very true or somewhat true* to "Save to Give lowered my energy utility bills."

By far, respondents' biggest obstacle with participating in the pilot was remembering to document their completed energy-saving actions online in the MyMeter website, according to 67% of respondents. Figure 88 shows the various difficulties of the pilot reported by respondents.

Most respondents (82%, n=33) found the points assigned to the energy-saving actions to be reasonable. A participant could have earned a maximum of 88 points over the course of two campaigns. About half (53%, n=32) participated in two campaigns and earned, on average, 34.2 points (n=33). Although more Lodi respondents reported positive benefits of the pilot, they earned slightly fewer points (32.2, n=17) than Bayfield County respondents (36.3, n=16).

A review of the actions actually completed by participants revealed that most completed more recurring behavioral actions (yielding low energy and money savings) and fewer one-time product installation actions (yielding high energy and money savings). As such, the majority of the points earned came from respondents completing recurring behavioral actions rather than one-time product installation actions.

Figure 88. Participant Difficulties with Save to Give Pilot



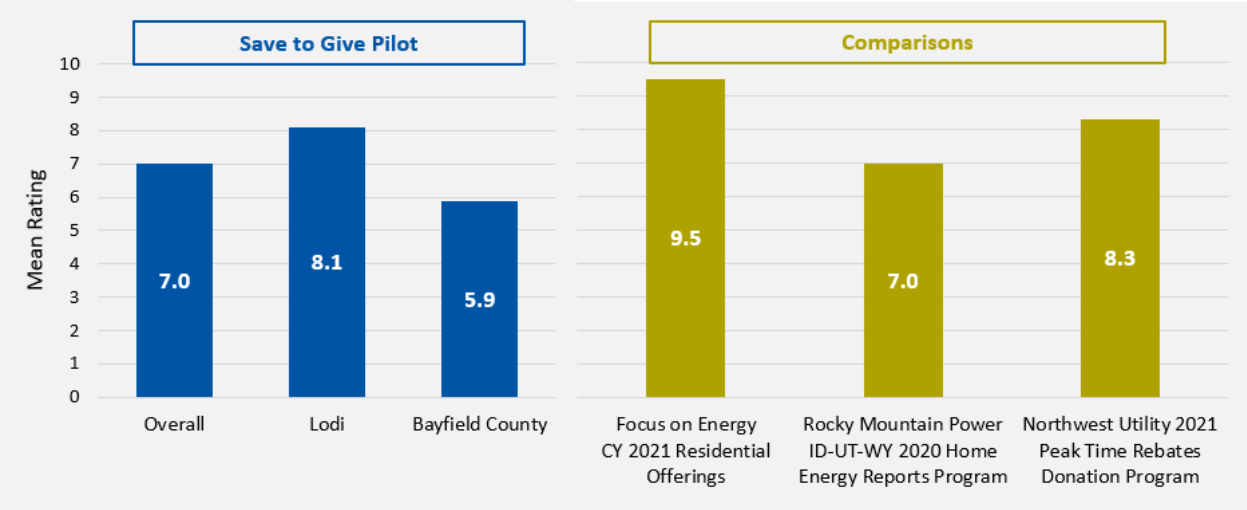
Source: Save to Give Participant Survey Question. "What other difficulties, if any, did you experience with the Save to Give Challenge? Select all that apply."
(Overall n=33, Lodi n=17, Bayfield County n=16).

Satisfaction with Overall Pilot

The survey asked respondents to rate their overall satisfaction with the pilot on a scale of 0 to 10, where 0 meant *not at all satisfied* and 10 meant *extremely satisfied*. Respondents gave a mean rating of 7.0 for their satisfaction with the Save to Give pilot, as shown in Figure 89.

When asked why they gave that rating, respondents who gave a high rating tended to say that they liked supporting nonprofits, they learned something new, and it was easy to do. Respondents who gave a low rating were more likely to say that the energy-saving actions were not new or useful and that they experienced difficulties logging into the MyMeter online website.

Figure 89. Satisfaction with Save to Give Pilot



Note: The mean for Focus on Energy CY 2021 Residential Offerings is weighted. Source: Save to Give Participant Survey Question. "Overall, how satisfied are you with your experience with the Save to Give Challenge?"(Overall n=32, Lodi n=16, Bayfield County n=16).Benchmarking Sources: Focus on Energy CY 2021 Satisfaction Surveys, n=5,062 (Cadmus 2022). Evaluation Report of 2018-2019 Home Energy Reports Program for Rocky Mountain Power Idaho-Utah-Wyoming, n=525 (Cadmus 2020). Northwest U.S. Utility Demand Response Program Evaluation, n=29 (Cadmus 2022).

Lodi respondents gave a higher mean satisfaction rating (8.1) compared to Bayfield County respondents (5.9). The difference may be due to when the campaigns were offered. Lodi's campaigns were during the heating and cooling seasons (winter and summer), while Bayfield County's campaigns were during the shoulder seasons (spring and fall). The types of energy-saving actions that participants are able and willing to do could differ depending on the season.

Another explanation for differences in satisfaction may be demographics. Lodi is a smaller, tight-knit community with younger residents and higher income compared to Bayfield County, which has several communities mainly in the tourism and lumber industries.

Each community also selected a different number of nonprofits to support, with Lodi selecting three nonprofits and Bayfield County selecting seven nonprofits. According to CEE, the pilot was designed to lean on the nonprofits for recruitment support because of their status as a trusted messenger. CEE reported that when the advisory committee chose a high number of nonprofits in Bayfield County, it reduced the incentive for the nonprofits to participate, that is, their potential split of $25,000.

Another difference between the communities was setting up the MyMeter website. Lodi Utilities had launched the website months before the Save to Give pilot, but the website needed to be built for Xcel Energy customers in Bayfield County. This meant that all Bayfield participants but only a portion of Lodi participants were new to the website.

Confusion over eligibility and utility territory may also have been factors. The city of Lodi and Lodi Utilities' service territory have the same boundary. Several utilities operate in Bayfield County, and their service territories are not well understood by residents. CEE noted that creating an informal group of

people to raise money for the same nonprofit was more difficult because only Xcel Energy customers were eligible to participate.

As shown above in Figure 89, the mean rating of 7.0 for the Save to Give pilot was far below Focus on Energy's CY 2021 residential portfolio mean rating of 9.5. One plausible explanation is program design. The Focus on Energy residential offerings surveyed in CY 2021 were traditional programs with an incentive or equipment-based product for participants. The Save to Give pilot operates as a behavior program that uses nudges and informational feedback to encourage behavior change. Other evaluations conducted by Cadmus have shown lower customer satisfaction in behavior programs compared to traditional rebate/incentive programs. For example, Cadmus' evaluation of Rocky Mountain Power's behavioral home energy reports programs found a mean program satisfaction rating of 7.0, the same as the Save to Give pilot.

Unlike the behavioral home energy reports program, a component of the Save to Give pilot is a nonprofit donation. In another example, Cadmus evaluated a Northwest U.S. utility's peak time rebates demand response program in which customers in select communities could donate their rebate earnings to a nonprofit of their choice. Customers gave a satisfaction rating of 8.3 to this Northwest U.S. utility's donation program, which may have been because the program offered participants a local business coupon book and drawings for local business gift cards as incentives for enrolling and participating in peak time events. These incentives not only provided personal rewards but further supported local businesses in the community.

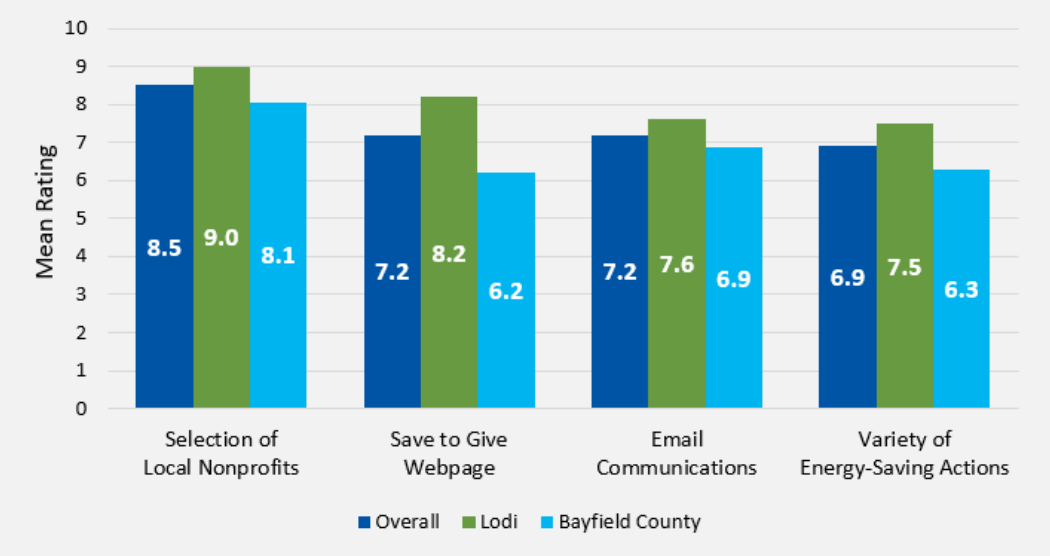
Lodi achieved nearly the same mean satisfaction rating (8.1) as the Northwest U.S. utility's program (8.3), which may be due to the seasons in which customers participated. Lodi participated in the heating and cooling seasons (winter and summer); the Northwest U.S. utility's demand response was offered during two winter seasons.

Satisfaction with Pilot Components

Respondents rated their satisfaction with the four pilot components shown in Figure 90. The selection of local nonprofits received the highest mean rating (8.5), while the variety of energy-saving actions received the lowest mean rating (6.9). Lodi and Bayfield County respondents differed on satisfaction with each of the four components. For all four components, Lodi respondents gave a higher mean rating than Bayfield County respondents, which aligns with Lodi respondents giving a higher mean rating for overall satisfaction compared to Bayfield County.

Twenty respondents answered the question about what improvements they would suggest for the Save to Give pilot. Respondents most frequently said to increase the variety of energy-saving actions (45%), followed by offer more nonprofit options (15%) and change the point values (15%).

Figure 90. Satisfaction with Save to Give Components



Source: Save to Give Participant Survey Question. "How satisfied are you with the following aspects of the Save to Give Challenge?"(Overall n=32, Lodi n=16, Bayfield County n=16).

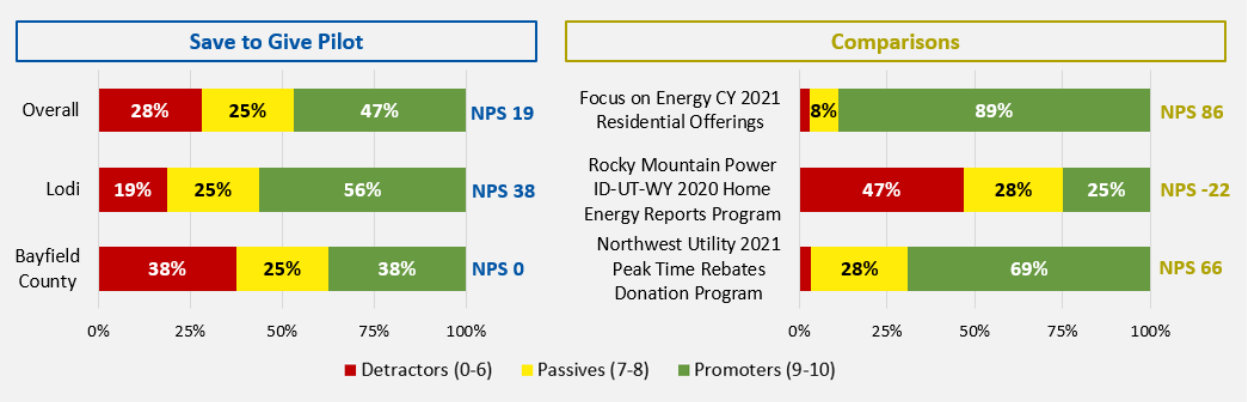
Net Promoter Score: Likelihood to Recommend the Pilot

The NPS is a metric of brand loyalty that measures how likely customers are to recommend the pilot to others. Respondents rate their likelihood to recommend the pilot on a 0 to 10 scale, where 0 means *not at all likely* and 10 means *extremely likely.* Respondents who give a rating of 9 or 10 are known as promoters, a rating of 7 or 8 are known as passives, and a rating of 0 to 6 are known as detractors. The NPS is expressed as a number between -100 and +100 that represents the difference between the percentage of promoters and detractors. The passives are excluded from the calculation. An excellent NPS is +50 and above.

As shown in Figure 91, the Save to Give pilot achieved an NPS of +19, indicating there are more promoters (47%) than detractors (28%) among the respondents. Lodi achieved an NPS of +38, higher than the NPS of 0 for Bayfield County. In comparison, the Focus on Energy CY 2021 residential offerings achieved an NPS of +86.

The Save to Give pilot achieved a higher NPS than Rocky Mountain Power's behavioral home energy reports programs, which achieved an NPS of -22, but much lower than another community-based donation program offered by the Northwest U.S. utility program, which had an NPS of +66. Behavioral home energy reports programs often exhibit a low NPS, possibly because they lack an incentive or equipment-based product for participants.

Figure 91. Net Promoter Score for Save to Give Pilot



Note: The NPS for Focus on Energy CY 2021 Residential Offerings is not weighted. Source: Save to Give Participant Survey Question. "How likely would you be to recommend the Save to Give Challenge to others?"(Overall n=32, Lodi n=16, Bayfield County n=16).Benchmarking Sources: Focus on Energy CY 2021 Satisfaction Surveys, n=5,046 (Cadmus 2022). Evaluation Report of 2018-2019 Home Energy Reports Program for Rocky Mountain Power Idaho-Utah-Wyoming, n=525 (Cadmus 2020). Northwest Utility Demand Response Program Evaluation, n=29 (Cadmus 2022).

Awareness of Focus on Energy

Respondents were asked if they had heard about Focus on Energy prior to enrolling in the Save to Give pilot. Most respondents (85%) had heard of Focus on Energy prior to enrollment (n=33). Notably, all Lodi respondents (100%, n=17) and two-thirds of Bayfield County respondents (69%, n=16). Bayfield County may have shown lower awareness because significant portions of the county are served by an electric co-op that does not participate in Focus on Energy.

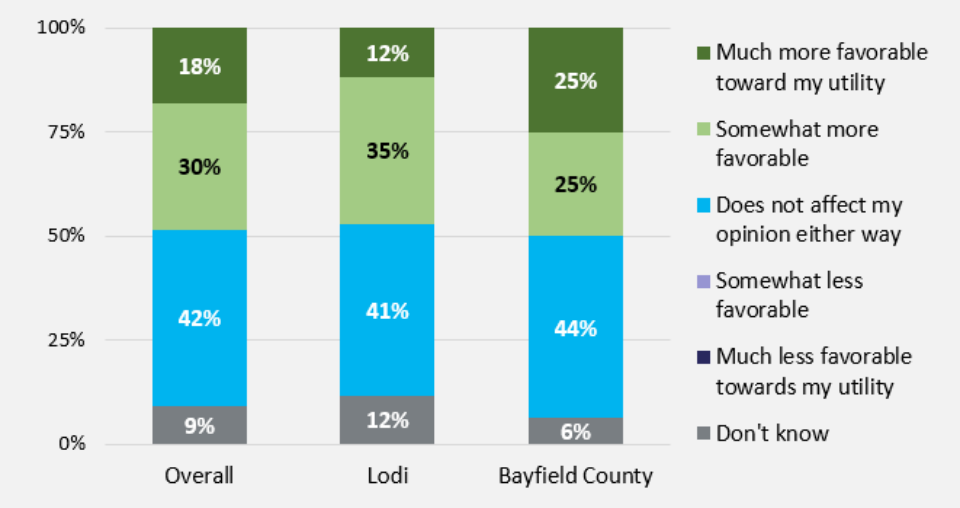
Moreover, 61% of respondents (n=33) said they had participated in a Focus on Energy offering, with similar participation rates between Lodi (59%, n=17) and Bayfield County (63%, n=16). All except one respondent had participated in a Focus on Energy offering *before* enrolling in the pilot. These findings and the customer suggestions for more variety of energy-saving actions suggest that those who enrolled in the pilot were more likely to be familiar and experienced with energy efficiency.

Awareness of Utility Partnership and Opinion of Utility

Respondents were asked if they were aware before receiving the survey that the pilot was offered in partnership with their local utility. Most respondents (82%) were aware of the utility partnership (n=33). Lodi (82%, n=17) and Bayfield County (81%, n=16) respondents showed a similar level of awareness.

The pilot did not have any negative impact on respondents' opinion of their utility. Figure 92 shows that 48% of respondents said their opinion of their utility became more favorable, and 42% said their opinion had not changed after participating in the pilot. None said their opinion of their utility had become less favorable. Notably, more Bayfield County respondents (25%) said their opinion of their utility had become much more favorable compared to Lodi respondents (12%). This difference is surprising given that Bayfield County respondents exhibited lower satisfaction with the pilot and program components.

Figure 92. Impact of Save to Give Pilot on Participant's Opinion of Utilities

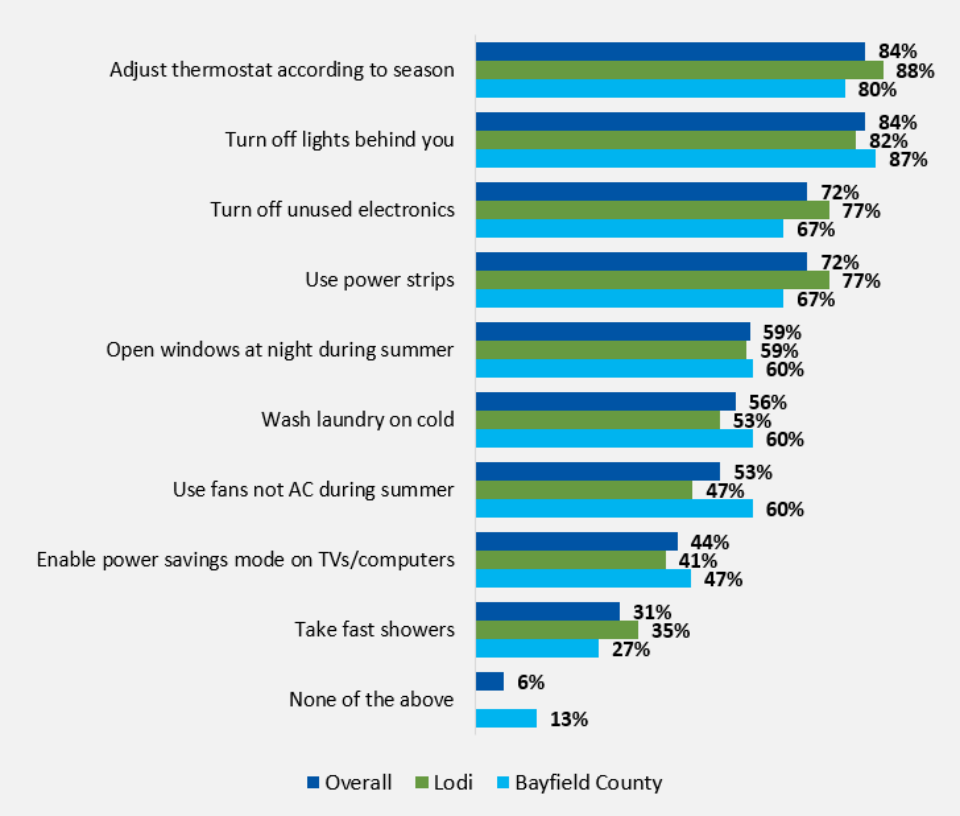


Source: Save to Give Participant Survey Question. "How has the Save to Give Challenge affected your opinion of [Xcel Energy or Lodi Utilities], if at all?"
(Overall n=33, Lodi n=17, Bayfield County n=16).

Behavioral Persistence

The survey explored the persistence of the behavioral energy-saving actions encouraged by the pilot after the campaigns ended. Many behaviors did persist, as shown in Figure 93. Overall, 94% of respondents (n=32) reported continuing the behavioral energy-saving actions on a regular basis, with higher persistence among Lodi respondents (100%) than Bayfield County respondents (87%). Specifically, most respondents continued to adjust the thermostat according to the season (84%), turn off lights (84%), turn off unused electronics (72%), and use power strips (72%). Moreover, one of the behavioral actions with the highest energy-savings potential—adjusting the thermostat according to the season—came out on top.

Figure 93. Behaviors that Participants Continue Regularly Post Pilot



Source: Save to Give Participant Survey Question. "Which of the Save to Give actions have become something you now do on a regular basis? Select all that apply."
(Overall n=32, Lodi n=17, Bayfield County n=15).

Uplift and Spillover

As detailed in Table 142, the survey did not find any evidence of uplift (the pilot's influence on participants' uptake of Focus on Energy offerings). Sixty-one percent of respondents said they had participated in a Focus on Energy offering. Of these respondents, 95% said they had participated in the Focus on Energy offering prior to enrolling in the Save to Give pilot. None of the respondents said they had participated after enrolling in the pilot. The small number of pilot participants and survey respondents may have made it difficult to detect uplift.

Table 142. Uplift: Save to Give Participants' Uptake of Other Focus on Energy Offerings Post Pilot

Have you ever participated in a Focus on Energy program offering where you received a rebate/incentive from Focus on Energy? (n=33)	You enrolled in the Save to Give Challenge on [Date]. Did you participate in the Focus on Energy program offering before or after enrolling in the Save to Give Challenge? (n=20)
Yes 61%	Before enrolling in Save to Give 95%
	After enrolling in Save to Give 0% (uplift)
	Don't know 5%
No 27%	Question not asked
Don't know 12%	Questions not asked

Source: Save to Give Participant Survey Questions.

As detailed in Table 143, the survey found some evidence of spillover (the pilot's influence on participants' uptake of non-rebated energy-efficient improvements). Eight respondents (24%) said they purchased or installed energy-efficient products or upgrades without a Focus on Energy rebate after participating in the pilot. Of these, three said the pilot was an important factor in their decision.

Table 143. Spillover: Save to Give Participants' Other Energy-Efficient Actions Post Pilot

After [Date], have you purchased or installed any energy-efficient products or upgrades at your home for which you did not receive a Focus on Energy rebate or incentive? (n=33)	Which of the following energy-efficient products or upgrades did you install for which you did not receive a Focus on Energy rebate or incentive? Select all that apply. (n=8)	How important was the Save to Give Challenge in your decision to purchase and install the energy-efficient products or upgrades for which you did not receive a Focus on Energy rebate/incentive? (n=8)
Yes 24%	**LEDs** (7 respondents) **Smart or Wi-Fi thermostat** (4 respondents) **Insulation** (3 respondents) **Ductless heat pump** (2 respondents) **Air sealing** (2 respondents) **Recycled fridge or freezer** (1 respondent) **Furnace** (1 respondent) **Boiler** (1 respondent) **Showerhead** (1 respondent)	**5 – Very important** (2 respondents)
		4 (1 respondent)
		3 (1 respondent)
		2 (1 respondent)
		1 – Not at all important (2 respondents)
		Don't know (1 respondent)
No 73%	Question not asked	Question not asked
Don't know 3%	Questions not asked	Question not asked

Source: Save to Give Participant Survey Questions.

Outcomes and Recommendations

The evaluation team offers these outcomes and recommendations based on the participant survey.

Outcome 1. The Save to Give pilot's community-based, behavior-driven design delivered a positive experience to participants, but it produced only a moderate level of customer satisfaction. Survey respondents reported several positive feelings and benefits of the pilot, including protecting the environment, making a difference in their community, and learning new energy-saving actions. However, respondents gave the pilot a moderate overall satisfaction rating of 7.0, far below the average rating of 9.5 for Focus on Energy's CY 2021 residential offerings. In general, behavior programs exhibit

lower customer satisfaction than traditional rebate programs because they do not provide an incentive or equipment-based product to participants. Another community-based behavioral donation program from a Northwest U.S. utility achieved a satisfaction rating of 8.3. But it also offered participants a local business coupon book and local business gift card drawings as incentives, which gave participants direct personal rewards and ways to support local businesses outside of their program participation.

Recommendation 1. Offer an incentive that will reward participants personally and also allow them to support their community in ways beyond the donation of points to nonprofits. Amplifying participants' positive feelings toward the community and providing a personal incentive may boost satisfaction.

Outcome 2. Communities appear to differ in their experience with the Save to Give pilot, with several plausible factors contributing to the differences. Though based on a small sample of surveyed participants, Lodi respondents consistently exhibited a more favorable experience than Bayfield County respondents. This included higher satisfaction with the overall pilot, higher satisfaction with pilot components, a higher NPS, and higher persistence of behavioral energy-saving actions. Demographic differences, the size of the community (relating to strength of community bond), selection of nonprofits, familiarity with the MyMeter website, and differences in campaign seasons could have affected how engaged and satisfied participants were with the pilot. Lodi is a small, tight-knit community with more young and affluent residents. Participation was during the winter and summer, there were fewer nonprofits to choose from, and customers were already familiar with the MyMeter website prior to joining the pilot. On the other hand, Bayfield County is large, spanning several communities, with fewer younger and affluent residents. Participation was in the spring and fall, there was a wide selection of nonprofits to choose from, and customers had not used the MyMeter website before.

Outcome 3. The Save to Give pilot demonstrated persistence of energy-saving behaviors. Ninety-four percent of respondents said they continued to do the behavioral actions learned through the pilot on a regular basis. Most notably, one of the behavioral actions with the highest energy-savings potential—adjust the thermostat according to the season—came out on top. Other persistent behavioral actions were turning off lights, turning off unused electronics, and using power strips. Even with this persistence, only 27% of respondents reported a reduction in their energy utility bills. One explanation may be that respondents completed more recurring behavioral actions (yielding low energy savings) and fewer one-time product installation actions (yielding high energy savings). The energy-saving action challenges recommended to participants and the points earned by the participants were largely from recurring behavioral actions rather than one-time product installations. Respondents also cited the pilot's lack of variety in energy-saving actions, further suggesting that respondents wanted to complete more actions.

Recommendation 2. If the forthcoming impact evaluation does not show measurable energy savings, consider adding more one-time product installation recommendations and behavioral actions into the mix of energy-saving challenges. Behavioral actions alone cannot generate high, consistent energy savings. Providing a greater variety of energy-saving actions may help participants earn more points, reduce their energy utility bills, and improve satisfaction.